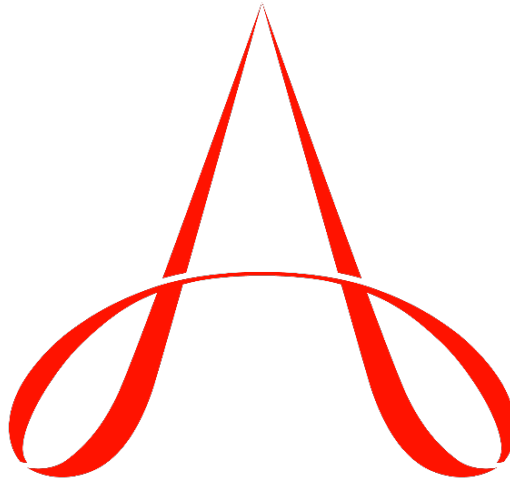




# Supplemental Guide: Neurodevelopmental Disabilities



A C G M E

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## **Milestones Supplemental Guide**

This document provides additional guidance and examples for the Neurodevelopmental Disabilities Milestones. This is not designed to indicate any specific requirements for each level, but to provide insight into the thinking of the Milestone Work Group.

Included in this document is the intent of each Milestone and examples of what a Clinical Competency Committee (CCC) might expect to be observed/assessed at each level. Also included are suggested assessment models and tools for each subcompetency, references, and other useful information.

Review this guide with the CCC and faculty members. As the program develops a shared mental model of the Milestones, consider creating an individualized guide (Supplemental Guide Template available) with institution/program-specific examples, assessment tools used by the program, and curricular components.

Additional tools and references, including the Milestones Guidebook, Clinical Competency Committee Guidebook, and Milestones Guidebook for Residents and Fellows, are available on the [Resources](#) page of the Milestones section of the ACGME website.

| Patient Care 1: Neurologic and Developmental History                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Overall Intent:</b> To efficiently obtain, communicate, and document a history that addresses the neurologic and/or developmental question                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Milestones                                                                                                                                                                                                                                         | Examples                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Level 1</b> <i>Obtains, communicates, and documents an appropriate history and begins to document perinatal, developmental, and family components</i>                                                                                           | <ul style="list-style-type: none"> <li>• In a child being evaluated for global developmental delay, not taking a three-generation pedigree</li> <li>• In obtaining developmental history, including functional abilities that are not typically achieved at the child's age or not able to be quantified</li> <li>• Failure to elicit history of chronic illness in the mother that precedes pregnancy</li> </ul> |
| <b>Level 2</b> <i>Obtains, communicates, and documents a relevant history, including perinatal, developmental, and family components, eliciting patient's and patient's family's contributions based on cognitive level and cultural norms</i>     | <ul style="list-style-type: none"> <li>• Maternal uncle is in special education and maternal grandfather has a new onset movement disorder</li> <li>• Collects external therapy notes and school data to incorporate into the report</li> <li>• The clinic note is generally organized, but the attending still needs to add some clarification</li> </ul>                                                        |
| <b>Level 3</b> <i>Obtains, communicates, and documents a well-organized history that incorporates supplemental data from external sources</i>                                                                                                      | <ul style="list-style-type: none"> <li>• Obtains a history that a faculty member can follow during the presentation; does not skip around in the history</li> <li>• Writes complete, organized, and clear clinic notes; does not need the attending to edit them</li> </ul>                                                                                                                                       |
| <b>Level 4</b> <i>Reconciles information from conflicting sources or sources that are difficult to access into the history, and uses the history to develop a differential diagnosis that serves as a foundation for an etiological evaluation</i> | <ul style="list-style-type: none"> <li>• Interprets, weighs, and synthesizes historical information to develop differential diagnoses</li> <li>• Uses alternative techniques to elicit history from family and health team members who cannot be present for the evaluation</li> <li>• Recognizes and applies historical clues to comorbid conditions</li> </ul>                                                  |
| <b>Level 5</b> <i>Teaches the fine points of history-taking to other learners</i>                                                                                                                                                                  | <ul style="list-style-type: none"> <li>• Demonstrates taking a history to medical students</li> <li>• Provides documentation that can educate referring providers or family</li> </ul>                                                                                                                                                                                                                            |
| Assessment Models or Tools                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>• American Board of Psychiatry and Neurology (ABPN) clinical skills exam (NEX)</li> <li>• Direct observation</li> <li>• Medical record (chart) audit</li> <li>• Objective structured clinical exams (OSCE)s</li> </ul>                                                                                                                                                     |
| Curriculum Mapping                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>•</li> </ul>                                                                                                                                                                                                                                                                                                                                                               |
| Notes or Resources                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>• Accardo PJ. <i>Capute &amp; Accardo's Neurodevelopmental Disabilities in Infancy and Childhood</i>. 3rd ed. Baltimore, MD: Brookes; 2008. ISBN: 978-1557667564.</li> <li>• Swaiman KF, Ashwal S, Ferriero DM, Schor N. <i>Swaiman's Pediatric Neurology</i>. 6th ed. Philadelphia, PA: Elsevier; 2017. ISBN:978-0323371018.</li> </ul>                                   |

| <b>Patient Care 2: Neurodevelopmental Examination</b>                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Overall Intent:</b> To efficiently obtain, communicate, and document a developmentally appropriate physical examination that addresses the neurologic question                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Milestones</b>                                                                                                                                                                                                                 | <b>Examples</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Level 1</b> <i>Identifies components of and performs a complete neurodevelopmental examination (neurological and developmental components)</i>                                                                                 | <ul style="list-style-type: none"> <li>• For an infant with global developmental delays, measures the head size, assesses visual attention and interactions, and checks muscle tone and reflexes, making some errors in assessment of strength</li> <li>• In a child with concerns for congenital infection, unable to visualize the fundus</li> <li>• In a child with a posterior fossa tumor, performs maneuvers to assess for ataxia and cranial nerve dysfunction, but is unable to visualize the optic discs</li> <li>• In a child who is being evaluated for possible neurofibromatosis, neglects to evaluate for axillary and inguinal freckling</li> </ul> |
| <b>Level 2</b> <i>Performs, communicates, and documents an accurate neurodevelopmental examination on patients across the lifespan</i>                                                                                            | <ul style="list-style-type: none"> <li>• Performs a systematic neurologic history including mental status, cranial nerves including fundoscopic, motor, sensory, coordination, and gait examinations, all of which are reproducible by faculty members</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Level 3</b> <i>Performs, communicates, and documents a comprehensive and relevant neurodevelopmental examination, incorporating some additional pertinent maneuvers on patients ranging across the lifespan</i>                | <ul style="list-style-type: none"> <li>• In evaluating children with hemiplegic cerebral palsy, evaluates for homonymous hemianopia and cortical sensory dysfunction</li> <li>• Detects and differentiates dysmorphisms that define syndromes associated with intellectual disability</li> </ul>                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Level 4</b> <i>Consistently demonstrates mastery in performing, communicating, and documenting a neurodevelopmental examination on patients ranging across the lifespan to inform diagnostic and treatment recommendations</i> | <ul style="list-style-type: none"> <li>• For a 19-year-old patient with Down syndrome who acutely stops walking, quickly performs and communicates an accurate focused examination of critical areas to include power examination, reflexes, and sensory level</li> <li>• For a girl with acute spinal cord symptoms, quickly performs and communicates an accurate focused examination of critical areas to include power examination, sensory level, and reflexes</li> </ul>                                                                                                                                                                                     |
| <b>Level 5</b> <i>Teaches other learners of varying experience and disciplines about techniques of the neurodevelopmental examination and implications of findings across a broad range of disorders</i>                          | <ul style="list-style-type: none"> <li>• After evaluating an adolescent male with autism spectrum disorder for altered mental status in the emergency department, identifies features of catatonia</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Assessment Models or Tools                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>• ABPN NEX</li> <li>• Direct observation</li> <li>• Medical record (chart) audit</li> <li>• OSCEs</li> <li>• Simulation</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Curriculum Mapping                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>•</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Notes or Resources | <ul style="list-style-type: none"><li>• DeMyer WE. <i>Technique of the Neurological Examination</i>. 5th ed. New York; NY: McGraw Hill; 2004. ISBN:978-0071405683.</li><li>• Larsen PD, Stensaas SS. PediNeurologic Exam: A Neurodevelopmental Approach. <a href="https://neurologicexam.med.utah.edu/pediatric/html/home_exam.html">https://neurologicexam.med.utah.edu/pediatric/html/home_exam.html</a>. 2021.</li><li>• O'Brien M. <i>Aids to the Examination of the Peripheral Nervous System</i>. 5th ed. Philadelphia, PA: Elsevier; 2010. ISBN:978-0702034473</li><li>• Volpe JJ. <i>Neurology of the Newborn</i>. 6th ed. Philadelphia, PA: Elsevier; 2017. ISBN:978-0323428767.<ul style="list-style-type: none"><li>○ Du Plessis AJ, Volpe JJ. Congenital hydrocephalus. In: Volpe JJ. <i>Neurology of the Newborn</i>. 6th ed. Philadelphia, PA: Elsevier; 2017:58.</li><li>○ Du Plessis AJ, Limperopoulos C, Volpe JJ. Cerebellar development. In: Volpe JJ. <i>Neurology of the Newborn</i>. 6th ed. Philadelphia, PA: Elsevier; 2017:73.</li><li>○ Volpe JJ. Neurological examination: Normal and abnormal features. In: Volpe JJ. <i>Neurology of the Newborn</i>. 6th ed. Philadelphia, PA: Elsevier; 2017:191.</li></ul></li></ul> |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| <b>Patient Care 3: Neurodevelopmental Disabilities</b>                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Overall Intent:</b> To demonstrate a comprehensive understanding of neurodevelopmental disability diagnoses                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Milestones</b>                                                                                                                                                                              | <b>Examples</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Level 1</b> <i>Recognizes when a patient may have a neurodevelopmental disability</i>                                                                                                       | <ul style="list-style-type: none"> <li>Identifies signs of motor asymmetry</li> <li>Recognizes atypical patterns of eye contact and social reciprocity</li> <li>Identifies significant delays in milestone acquisition (such as a nonverbal three-year-old)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Level 2</b> <i>Identifies neurodevelopmental disabilities' phenomenology and diagnoses</i>                                                                                                  | <ul style="list-style-type: none"> <li>Identifies hemiparesis in a child with history of prematurity and intraventricular hemorrhage</li> <li>Elicits specific findings during history gathering to assess a possible diagnosis of an autism spectrum disorder</li> <li>Recognizes typical phenotypic features of common genetic causes of intellectual disability (e.g., Down syndrome, Fragile X syndrome, Williams syndrome, etc.)</li> </ul>                                                                                                                                                                                                                                                                                          |
| <b>Level 3</b> <i>Diagnoses common neurodevelopmental disabilities and coexisting disorders</i>                                                                                                | <ul style="list-style-type: none"> <li>Elicits history of clinical features of attention deficit hyperactivity disorder (ADHD) in a patient with a diagnosis of a tic disorder</li> <li>Screens for comorbid attention or learning difficulties in a child with benign rolandic epilepsy or neurofibromatosis</li> <li>Makes a diagnosis of autism in a patient with tuberous sclerosis</li> </ul>                                                                                                                                                                                                                                                                                                                                        |
| <b>Level 4</b> <i>Distinguishes uncommon neurodevelopmental disabilities from alternative conditions that may have a similar presentation</i>                                                  | <ul style="list-style-type: none"> <li>Differentiates a diagnosis of hereditary spastic paraplegia from tethered cord</li> <li>Orders overnight electroencephalogram (EEG), which reveals electrical status epilepticus in sleep as the cause of a child's language regression</li> <li>Pursues metabolic and genetic testing in a child with cerebral palsy but normal brain magnetic resonance imaging (MRI)</li> </ul>                                                                                                                                                                                                                                                                                                                 |
| <b>Level 5</b> <i>Identifies previously undescribed neurodevelopmental disability disorders or engages in scholarly activity (e.g., teaching, research) in neurodevelopmental disabilities</i> | <ul style="list-style-type: none"> <li>Adapts common tools for telemedicine usage</li> <li>Develops evaluation protocols for children with sensory or communication needs that are not addressed with standard instruments</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Assessment Models or Tools</b>                                                                                                                                                              | <ul style="list-style-type: none"> <li>Direct observation</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Curriculum Mapping</b>                                                                                                                                                                      | <ul style="list-style-type: none"> <li></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Notes or Resources</b>                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Ashwal S, Russman BS, Blasco PA, et al. Practice parameter: Diagnostic assessment of the child with cerebral palsy: report of the Quality Standards Subcommittee of the American Academy of Neurology and the Practice Committee of the Child Neurology Society. <i>Neurology</i>. 2004;62(6):851-863. <a href="https://n.neurology.org/content/62/6/851.long">https://n.neurology.org/content/62/6/851.long</a>. 2021.</li> <li>Filipek PA, Accardo PJ, Ashwal S, et al. Practice parameter: Screening and diagnosis of autism. <i>Neurology</i>. 2000;55(4):468-479. <a href="https://n.neurology.org/content/55/4/468.long">https://n.neurology.org/content/55/4/468.long</a>. 2021.</li> </ul> |

| <b>Patient Care 4: Behavioral and Psychiatric Disorders</b><br><b>Overall Intent:</b> To recognize, evaluate, diagnose, and manage patients with cognitive, behavioral, or psychiatric disorders                                                                      |                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Milestones</b>                                                                                                                                                                                                                                                     | <b>Examples</b>                                                                                                                                                                                                                                                                                                                                                |
| <b>Level 1</b> <i>Recognizes when a patient with a neurodevelopmental disorder has a behavioral or psychiatric disorder</i><br><br><i>Lists various treatment approaches to behavioral or psychiatric disorders in patients with neurodevelopmental disorders</i>     | <ul style="list-style-type: none"> <li>• Detects changes in school performance, appetite, sleep, recreation, socialization</li> <li>• Parent-child interaction therapy, cognitive behavioral therapy, applied behavior analysis, pharmacological interventions including SSRIs</li> </ul>                                                                      |
| <b>Level 2</b> <i>Identifies common behavioral or psychiatric disorders in patients with neurodevelopmental disorders</i><br><br><i>Identifies major side effects of psychiatric and neurotropic medications in patients with neurodevelopmental disorders</i>        | <ul style="list-style-type: none"> <li>• Generalized anxiety disorder, obsessive-compulsive disorder, major depressive disorder, post-traumatic stress disorder</li> <li>• Serotonin syndrome, tardive dyskinesia, metabolic syndrome, selective serotonin reuptake inhibitors (SSRIs), and “black box” warning</li> </ul>                                     |
| <b>Level 3</b> <i>Diagnoses common behavioral or psychiatric disorders in patients with neurodevelopmental disorders</i><br><br><i>Manages patients with common psychiatric disorders in patients with neurodevelopmental disorders</i>                               | <ul style="list-style-type: none"> <li>• Screens for comorbid anxiety and mood disorders in ADHD</li> <li>• Manages patients with obsessive-compulsive disorder and Tourette syndrome</li> </ul>                                                                                                                                                               |
| <b>Level 4</b> <i>Diagnoses uncommon cognitive and behavioral disorders in patients with neurodevelopmental disorders</i><br><br><i>Manages complex combinations of medications with central nervous system effects in patients with neurodevelopmental disorders</i> | <ul style="list-style-type: none"> <li>• Recognizes when a patient’s neurological symptoms are of psychiatric origin</li> <li>• Recognizes when a patient’s psychiatric symptoms are of neurologic origin</li> <li>• Manages patients with comorbid anxiety and mood disorders in ADHD</li> <li>• Manages patients with catatonia and Down syndrome</li> </ul> |
| <b>Level 5</b> <i>Engages in scholarly activity (e.g., teaching, research) in cognitive, behavioral, or psychiatric disorders</i>                                                                                                                                     | <ul style="list-style-type: none"> <li>• Reviews the literature and prepares a seminar on the mechanisms of self-injury in intellectual disability</li> </ul>                                                                                                                                                                                                  |

# Neurodevelopmental Disabilities Supplemental Guide

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| <i>Demonstrates sophisticated knowledge of advanced diagnostic testing related to behavioral or psychiatric disorders in patients with neurodevelopmental disorders</i> | <ul style="list-style-type: none"> <li>• Teaches other residents how to interpret neuropsychology testing and implications for school management</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                       |
| Assessment Models or Tools                                                                                                                                              | <ul style="list-style-type: none"> <li>• Direct observation</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Curriculum Mapping                                                                                                                                                      | <ul style="list-style-type: none"> <li>•</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Notes or Resources                                                                                                                                                      | <ul style="list-style-type: none"> <li>• American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 5th ed. Washington, DC: American Psychiatric Association; 2013. <a href="https://dsm.psychiatryonline.org/doi/book/10.1176/appi.books.9780890425596">https://dsm.psychiatryonline.org/doi/book/10.1176/appi.books.9780890425596</a>. 2021.</li> <li>• Hauptman AJ, Salpekar JA. <i>Pediatric Neuropsychiatry: A Case-Based Approach</i>. 1st ed. Cham: Springer International Publishing; 2018. ISBN:978-3319949970.</li> </ul> |

**Patient Care 5: Critical Care****Overall Intent:** To diagnose and manage critical illnesses and emergencies that affect the nervous system

| Milestones                                                                                                                                                                                        | Examples                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Level 1</b> <i>Recognizes critical illnesses and emergencies that affect the nervous system</i>                                                                                                | <ul style="list-style-type: none"> <li>• Recognizes that sudden onset weakness of the right arm may be a stroke</li> <li>• Recognizes the need for immediate treatment of status epilepticus</li> </ul>                                                                                                                                                                                                                                                                                                             |
| <b>Level 2</b> <i>Diagnoses critical illnesses and emergencies that affect the nervous system</i>                                                                                                 | <ul style="list-style-type: none"> <li>• Diagnoses hypoxic ischemic encephalopathy in a newborn and initiates therapeutic cooling protocol</li> <li>• Diagnoses shunt failure in a child with hydrocephalus and arranges for imaging and neurosurgical consultations. Diagnoses Guillain Barre syndrome in an adolescent female who presents with progressive gait abnormality which was thought to be functional in nature</li> </ul>                                                                              |
| <b>Level 3</b> <i>With direct supervision, manages critical illnesses and emergencies that affect the nervous system</i>                                                                          | <ul style="list-style-type: none"> <li>• Uses an appropriate protocol of drugs and EEG monitoring for the treatment of a patient diagnosed with refractory status epilepticus under the direct supervision of a faculty member</li> </ul>                                                                                                                                                                                                                                                                           |
| <b>Level 4</b> <i>With indirect supervision, diagnoses and manages critical illnesses and emergencies that affect the nervous system</i>                                                          | <ul style="list-style-type: none"> <li>• Independently identifies signs and symptoms of increased intracranial pressure, orders emergent head neuroimaging, and initiates treatment</li> <li>• Independently diagnoses acute stroke and initiates pediatric brain attack protocol</li> <li>• Independently recognizes shifting level of consciousness in an 18-year-old patient with intellectual disability and arranges for transfer to a facility with a higher level of acuity</li> </ul>                       |
| <b>Level 5</b> <i>Teaches and supervises others in the management of critical illnesses and emergencies that affect the nervous system, and is an integral part of the interdisciplinary team</i> | <ul style="list-style-type: none"> <li>• Is sought out by intensive care unit (ICU) faculty members for insight into clinical situations and management</li> </ul>                                                                                                                                                                                                                                                                                                                                                  |
| Assessment Models or Tools                                                                                                                                                                        | <ul style="list-style-type: none"> <li>• ABPN NEX</li> <li>• Direct observation</li> <li>• Medical record (chart) audit</li> <li>• OSCEs</li> <li>• Simulation</li> </ul>                                                                                                                                                                                                                                                                                                                                           |
| Curriculum Mapping                                                                                                                                                                                | <ul style="list-style-type: none"> <li>•</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Notes or Resources                                                                                                                                                                                | <ul style="list-style-type: none"> <li>• Suarez JI. Neurocritical care. <i>Continuum</i>. 2018;24(6). <a href="https://journals.lww.com/continuum/pages/toc.aspx?year=2018&amp;issue=12000&amp;currenttab=IssueOverview">https://journals.lww.com/continuum/pages/toc.aspx?year=2018&amp;issue=12000&amp;currenttab=IssueOverview</a>. 2021.</li> <li>• Swaiman KF, Ashwal S, Ferriero DM, Schor N. <i>Swaiman's Pediatric Neurology</i>. 6th ed. Philadelphia, PA: Elsevier; 2017. ISBN:978-0323371018.</li> </ul> |

| <b>Patient Care 6: Diagnosis and Management of the Inpatient Setting</b><br><b>Overall Intent:</b> To gain competence in diagnosing and managing patients with neurological symptoms and disorders in the inpatient setting                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Milestones</b>                                                                                                                                                                                                                                                                                 | <b>Examples</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Level 1</b> <i>Identifies typical presentations of common neurodevelopmental conditions (neurological and developmental components)</i><br><br><i>Develops an initial plan to diagnose common neurodevelopmental disorders (neurological and developmental components)</i>                     | <ul style="list-style-type: none"> <li>• Identifies an eight-year-old boy with right-sided shaking as a possible seizure</li> <li>• Orders EEG for patient with possible focal seizure and considers neuroimaging</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Level 2</b> <i>Diagnoses common neurodevelopmental conditions</i><br><br><i>Manages common neurodevelopmental disorders, considering risks and benefits of treatment</i>                                                                                                                       | <ul style="list-style-type: none"> <li>• Evaluates a toddler with altered mental status and considers encephalitis</li> <li>• Evaluates a patient for feeding disorders</li> <li>• Considers neuroimaging before lumbar puncture</li> <li>• Recommends a patient undergo a lumbar puncture to evaluate cerebrospinal fluid autoimmune and infectious studies</li> </ul>                                                                                                                                                                                                                                                                                           |
| <b>Level 3</b> <i>Identifies atypical presentations of common neurodevelopmental conditions and typical presentations of uncommon neurodevelopmental conditions</i><br><br><i>Individualizes management, ensuring the appropriate level of care throughout hospitalization and upon discharge</i> | <ul style="list-style-type: none"> <li>• Evaluates a child coming from another country for pre-transplant evaluation who has seizures and identifies an underlying neurocutaneous disorder through use of a Wood's lamp</li> <li>• Cares for a nine-year-old boy with autism and significant behavioral challenges who is admitted for a new onset of epilepsy; and given the patient's risk for future seizures, appropriately recommends a daily anti-convulsant avoiding levetiracetam due to concern for worsening behavior</li> </ul>                                                                                                                        |
| <b>Level 4</b> <i>Diagnoses uncommon neurodevelopmental conditions</i>                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>• Evaluates a three-year-old patient with developmental regression, worsening vision, myoclonic, and atonic seizures admitted for myoclonic status epilepticus; orders confirmatory testing to confirm the diagnosis after an EEG shows a time-locked photoparoxysmal response at low-frequency flash stimulation on EEG and suspects neuronal ceroid lipofuscinosis</li> <li>• Evaluates an 11-year-old patient with a history of cerebral palsy, presenting with apparent neuroleptic malignant syndrome, and on review of old video tape finds a slowly progressive disorder that is of mitochondrial origin</li> </ul> |

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| <i>Reviews and evaluates the literature to manage treatment responses, disease progression, and complications of therapy</i>                                                                                                | <ul style="list-style-type: none"> <li>• Diagnoses a patient with electrographic status epilepticus of sleep with clinical developmental and language regression after obtaining an overnight EEG and starts the child on therapy with high dose bedtime diazepam; makes an appropriate recommendation on when to order another EEG to confirm response and knows how to change management if electrographic status epilepticus of sleep is still present on EEG</li> </ul> |
| <p><b>Level 5 Teaches inpatient management of neurodevelopmental conditions to other learners</b></p> <p><i>Conducts scholarly reviews, original research or participates in the development of clinical guidelines</i></p> | <ul style="list-style-type: none"> <li>• Lectures more junior residents on the comorbidities and management and prognosis of acquired and traumatic brain injury</li> <li>• Leads the inpatient interdisciplinary team in making complex management decisions, appropriately using ancillary services, and appropriately ordering neurodiagnostic testing and treatments for a variety of neurodevelopmental conditions in the hospital</li> </ul>                          |
| Assessment Models or Tools                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>• ABPN NEX</li> <li>• Direct observation</li> <li>• Mock oral examination of clinical reasoning</li> <li>• OSCEs</li> </ul>                                                                                                                                                                                                                                                                                                          |
| Curriculum Mapping                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>•</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Notes or Resources                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>• American Academy of Neurology. Clinical guidelines. <a href="https://www.aan.com/policy-and-guidelines/guidelines/">https://www.aan.com/policy-and-guidelines/guidelines/</a>. 2021.</li> <li>• Institutional protocols</li> </ul>                                                                                                                                                                                                 |

| <b>Patient Care 7: Diagnosis and Management in the Outpatient Setting</b><br><b>Overall Intent:</b> To diagnose and manage patients with neurological symptoms and disorders in the outpatient setting                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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| Milestones                                                                                                                                                                                                                                                                        | Examples                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Level 1</b> <i>Identifies typical presentations of common neurodevelopmental conditions</i><br><br><i>Develops an initial plan to diagnose common neurodevelopmental disorders</i><br><br><i>Recognizes the value and need for monitoring in the provision of ongoing care</i> | <ul style="list-style-type: none"> <li>• Lists the typical features of migraine headaches</li> <li>• Lists reasons why a spell may or may not be a seizure</li> <li>• Identifies signs of motor or tone asymmetry</li> <li>• Recognizes when developmental delay is present</li> <li>• Recognizes classic features of autism (e.g., poor eye contact, stereotypies, echolalia)</li> <li>• Recommends initial diagnostic testing to assess for causes of developmental delays</li> <li>• Recommends good headache hygiene and appropriate doses of over-the-counter pain medications for a patient with migraines</li> <li>• Suggests an appropriate plan for a child seen after first unprovoked seizure(s)</li> <li>• Considers referral for appropriate therapy services and family supports for patients with neurodevelopmental disorders</li> <li>• Recommends short-interval follow-up for diagnosis of migraine headaches</li> <li>• Recommends appropriate intervals of developmental monitoring to assess for progress and response to interventions</li> </ul>                              |
| <b>Level 2</b> <i>Diagnoses common neurodevelopmental conditions</i><br><br><i>Manages common neurodevelopmental disorders, considering risks and benefits of treatment</i><br><br><i>Enumerates the areas that are to be monitored for children with complex care needs</i>      | <ul style="list-style-type: none"> <li>• Diagnoses ADHD</li> <li>• Diagnoses migraine headaches in a patient with the typical features after obtaining the important historical components</li> <li>• Diagnoses childhood absence syndrome instead of generic “epilepsy”</li> <li>• Diagnoses cerebral palsy in a patient with non-progressive hemiparesis</li> <li>• Diagnoses a patient with an autism spectrum disorder</li> <li>• Manages ADHD by following American Academy of Pediatrics (AAP) guidelines</li> <li>• Recommends triptans for a migraine headache that does not respond to over-the-counter medication, and counsels family</li> <li>• Recommends an appropriate second anti-seizure medication if a patient has side effects after the first</li> <li>• Discusses the potential behavioral consequences of starting levetiracetam for seizures in a child with aggressive behavior</li> <li>• Refers patients with cerebral palsy for orthopedic and ophthalmologic monitoring</li> <li>• Refers patients with cerebral palsy for feeding and swallowing evaluations</li> </ul> |

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| <p><b>Level 3</b> <i>Recognizes atypical variants of common neurodevelopmental conditions and typical presentations of uncommon neurodevelopmental conditions</i></p> <p><i>Assesses the effectiveness of management programs, and individualizes management and adapts plan based on patient response and family factors</i></p> <p><i>Uses longitudinal follow-up and re-evaluations to assess effectiveness of care</i></p> | <ul style="list-style-type: none"> <li>• Diagnoses infantile spasms outside of a classic presentation</li> <li>• Recognizes intellectual disability in a child who presents with motor delay</li> <li>• Uses specific features of genetic testing or EEG features in children with epilepsy to guide consideration of preventive seizure medication; avoids prescribing valproate when families would like to avoid blood testing</li> <li>• Avoids beta blockers for the treatment of essential tremor for patients with asthma</li> <li>• Monitors progression of muscle tone and spasticity in a patient with cerebral palsy</li> <li>• Identifies patients at risk of academic difficulties without appropriate school-based supports</li> </ul> |
| <p><b>Level 4</b> <i>Diagnoses uncommon neurodevelopmental conditions</i></p> <p><i>Manages disease progression and complications of therapy; identifies when to change acuity of care considering lifespan issues</i></p> <p><i>Uses new information from the literature to provide anticipatory guidance appropriate to the patient's developmental age</i></p>                                                              | <ul style="list-style-type: none"> <li>• Appropriately diagnoses Joubert syndrome</li> <li>• Recognizes brittle or coarse hair as a potential sign of Menkes disease</li> <li>• Correctly refers a patient to the emergency room when a patient with history of migraines presents to clinic with acute, worsening encephalopathy and focal neurological deficits</li> <li>• Correctly obtains urgent prolonged EEG in an infant with tuberous sclerosis with new events concerning for infantile spasms</li> <li>• Discusses the relative advantages of limited powers of attorney over guardianship</li> </ul>                                                                                                                                     |
| <p><b>Level 5</b> <i>Teaches other learners about the presentation, evaluation, diagnosis, and management of neurodevelopmental conditions</i></p> <p><i>Coordinates, supervises, and evaluates quality of care</i></p> <p><i>Teaches other learners about longitudinal and complex needs</i></p>                                                                                                                              | <ul style="list-style-type: none"> <li>• Lectures residents on Supplemental Security Income (SSI) determination criteria</li> <li>• Longitudinally follows a patient with epilepsy; determines how often a patient with complex epilepsy needs to be seen in clinic, knows when to change medications and when to make a diagnosis of intractable epilepsy, and orders an appropriate pre-surgical evaluation for intractable epilepsy</li> <li>• Lectures multidisciplinary professionals on transition issues related to pediatric to adult care in patients with neurodevelopmental disabilities</li> </ul>                                                                                                                                       |
| <p><b>Assessment Models or Tools</b></p>                                                                                                                                                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>• ABPN NEX</li> <li>• Direct observation</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

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|                    | <ul style="list-style-type: none"> <li>• Mock oral examination</li> <li>• OSCEs</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Curriculum Mapping | <ul style="list-style-type: none"> <li>•</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Notes or Resources | <ul style="list-style-type: none"> <li>• American Academy of Neurology. Clinical guidelines. <a href="https://www.aan.com/policy-and-guidelines/guidelines/">https://www.aan.com/policy-and-guidelines/guidelines/</a>. 2021.</li> <li>• Institutional protocols and pathways</li> <li>• Wolraich ML, Hagan JF Jr, Allan C, et al. Clinical practice guideline for the diagnosis, evaluation, and treatment of attention – deficit/hyperactivity disorder in children and adolescents. <i>Pediatrics</i>. 2019;144(4):e20192528. <a href="https://pediatrics.aappublications.org/content/144/4/e20192528.long">https://pediatrics.aappublications.org/content/144/4/e20192528.long</a>. 2021.</li> </ul> |

| Patient Care 8: Electroencephalogram (EEG)                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| <b>Overall Intent:</b> To interpret and create reports for common EEG abnormalities                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Milestones                                                                                                                                                                                     | Examples                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Level 1</b> <i>Describes general indications and test selection for electroencephalographic studies</i>                                                                                     | <ul style="list-style-type: none"> <li>• Discusses that a suspected seizure and change in level of consciousness are indications for an EEG</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Level 2</b> <i>Describes normal EEG features and identifies status epilepticus using correct terminology, including common artifacts, across the lifespan</i>                               | <ul style="list-style-type: none"> <li>• Describes the posterior dominant rhythm and sleep/wake states</li> <li>• Describes eye blink artifact</li> <li>• Uses terminology including montage, amplitude, frequency, spikes, etc.</li> <li>• Identifies abnormal, rhythmic electrographic patterns indicative of status epilepticus</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Level 3</b> <i>With direct supervision, recognizes and describes patterns of status epilepticus, normal EEG variants, and common abnormalities across the lifespan, and writes a report</i> | <ul style="list-style-type: none"> <li>• Discusses that continuous right central spikes may be focal status epilepticus</li> <li>• Correctly identifies Rolandic spikes may be associated with self-limited epilepsy with centrotemporal spikes</li> <li>• Describes spikes over the right temporal area</li> <li>• Describes positive occipital sharp transients of sleep</li> <li>• Correctly identifies generalized 3-Hz spike-wave activity provoked by hyperventilation as an absence seizure</li> <li>• Identifies and describes hypsarrhythmia</li> <li>• Utilizes video review to differentiate rhythmic EEG artifact (such as patting or respiratory therapy) from electrographic seizure activity</li> </ul>                                                                                                  |
| <b>Level 4</b> <i>With indirect supervision, reads a standard EEG and writes a report</i>                                                                                                      | <ul style="list-style-type: none"> <li>• Produces a systematic description of the EEG record with reasonable interpretation of the significance of common findings</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Level 5</b> <i>Interprets uncommon EEG abnormalities or conducts research using EEG</i>                                                                                                     | <ul style="list-style-type: none"> <li>• Correctly identifies eye closure sensitivity</li> <li>• Assesses interburst interval in context of gestational age</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Assessment Models or Tools                                                                                                                                                                     | <ul style="list-style-type: none"> <li>• Assessment during case conferences</li> <li>• Direct observation</li> <li>• Mock oral examination</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Curriculum Mapping                                                                                                                                                                             | <ul style="list-style-type: none"> <li>•</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Notes or Resources                                                                                                                                                                             | <ul style="list-style-type: none"> <li>• There are several venues in which the reliability of the resident interpretation of EEG can be assessed. These would include escalation protocol rotations, neonatal intensive care unit rotations, epilepsy monitoring unit rotations and, although not usually applicable to outpatient records, the ability to interpret the EEG report in the clinical setting is frequently done in that setting</li> <li>• Britton JW, Frey LC, Hopp JL. <i>Electroencephalography (EEG): An Introductory Text and Atlas of Normal and Abnormal Findings in Adults, Children, and Infants [Internet]</i>. Chicago, IL: American Epilepsy Society; 2016.<br/> <a href="https://www.ncbi.nlm.nih.gov/books/NBK390356/">https://www.ncbi.nlm.nih.gov/books/NBK390356/</a>. 2021.</li> </ul> |

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|  | <ul style="list-style-type: none"><li>• Fisch B. <i>Fisch and Spehlmann's EEG Primer: Basic Principles of Digital and Analog EEG</i>. 3rd ed. Philadelphia, PA: Elsevier; 1999. ISBN:978-0444821485.</li><li>• Libenson MK. <i>Practical Approach to Electroencephalography</i>. Philadelphia, PA: Elsevier Health Sciences; 2010. ISBN:978-0750674782.</li><li>• Schomer DL, Lopes da Silva F. <i>Niedermeyer's Electroencephalography: Basic Principles, Clinical Applications, and Related Fields</i>. 6th ed. Philadelphia. PA: Lippincott, Williams, &amp; Wolters; 2011. ISBN:978-0781789424.</li></ul> |
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| Patient Care 9: Lumbar Puncture                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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| Overall Intent: To independently perform lumbar puncture in the appropriate settings                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Milestones                                                                                                                                                                                  | Examples                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Level 1</b> <i>Lists the indications, contraindications, and complications of lumbar puncture</i>                                                                                        | <ul style="list-style-type: none"> <li>• Indications for a lumbar puncture include for a patient with fever and altered mental status</li> <li>• Contraindications include bleeding risk, suspicion of space-occupying lesion causing mass effect, etc.</li> <li>• Identifies complications of lumbar puncture include headache, infection, and epidural hematoma</li> </ul>                                                                                                                                                      |
| <b>Level 2</b> <i>With direct supervision, chooses cerebrospinal fluid studies based on clinical presentation, performs lumbar puncture, manages complications, and interprets findings</i> | <ul style="list-style-type: none"> <li>• Orders glucose, protein, cell count, culture, viral studies in a patient presenting with meningitis</li> <li>• Obtains opening pressure for patients with suspected idiopathic intracranial hypertension</li> <li>• Performs lumbar puncture using appropriate technique with faculty member at bedside</li> <li>• Manages post-lumbar puncture headache and back pain appropriately</li> <li>• Consults anesthesia for blood patch when appropriate</li> </ul>                          |
| <b>Level 3</b> <i>With indirect supervision, performs lumbar puncture and interprets findings</i>                                                                                           | <ul style="list-style-type: none"> <li>• Performs lumbar puncture using appropriate technique with faculty member(s) available as needed</li> <li>• Differentiates between bacterial, viral, aseptic, and fungal meningitis based on pattern of glucose, protein, and cell count</li> </ul>                                                                                                                                                                                                                                       |
| <b>Level 4</b> <i>Identifies and interprets specialized cerebrospinal fluid studies to aid diagnosis, and independently performs lumbar puncture on patients across the lifespan</i>        | <ul style="list-style-type: none"> <li>• Obtains cerebrospinal fluid lactate for suspected metabolic disorders</li> <li>• Obtains serum glucose and compares to cerebrospinal fluid studies in patients suspected of having glucose transporter deficiencies</li> <li>• Identifies albuminocytologic dissociation as an indicator of inflammatory processes</li> <li>• Performs lumbar puncture using appropriate technique on patients of all ages, including neonates, without direct supervision of faculty members</li> </ul> |
| <b>Level 5</b> <i>Instructs others in proper lumbar puncture technique and administers intrathecal therapies</i>                                                                            | <ul style="list-style-type: none"> <li>• Teaches more junior learners appropriate positioning and procedures for performing lumbar punctures</li> <li>• Assists other learners, providers, and staff members in obtaining cerebrospinal fluid in the setting of difficult or complex patient anatomy</li> <li>• Administers intrathecal medication such as baclofen</li> </ul>                                                                                                                                                    |
| Assessment Models or Tools                                                                                                                                                                  | <ul style="list-style-type: none"> <li>• Direct observation</li> <li>• Review of laboratory results</li> <li>• Simulation</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                              |
| Curriculum Mapping                                                                                                                                                                          | •                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Notes or Resources                                                                                                                                                                          | <ul style="list-style-type: none"> <li>• Ellengy MS, Tegtmeier K, Lai S, Braner DAV. Lumbar puncture. <i>N Engl J Med</i> 2006;355:e12. <a href="https://www.nejm.org/doi/full/10.1056/NEJMvcm054952">https://www.nejm.org/doi/full/10.1056/NEJMvcm054952</a>. 2021.</li> </ul>                                                                                                                                                                                                                                                   |

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|  | <ul style="list-style-type: none"><li>• Du Plessis AJ, Limperopoulos C, Volpe JJ. Cerebellar development. In: Volpe JJ. <i>Neurology of the Newborn</i>. 6th ed. Philadelphia, PA: Elsevier; 2017:73.</li></ul> |
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| <b>Patient Care 10: Determination of Death by Neurologic Criteria</b><br><b>Overall Intent:</b> To make an appropriate determination of death using neurologic criteria |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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| Milestones                                                                                                                                                              | Examples                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Level 1</b> <i>Discusses the concept of determination of death by neurologic criteria</i>                                                                            | <ul style="list-style-type: none"> <li>Explains why death may be declared while heart and lungs work or are being supported; may discuss criteria in general, but not identify all criteria</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Level 2</b> <i>Identifies components of determination of death by neurologic criteria</i>                                                                            | <ul style="list-style-type: none"> <li>Cites the different criteria for determination of death by neurologic criteria at different ages</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Level 3</b> <i>With assistance, performs determination of death by neurologic criteria</i>                                                                           | <ul style="list-style-type: none"> <li>Performs the exam with assistance, with the observer helping with technique or helping identify other components of the exam not addressed by the resident</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Level 4</b> <i>Performs determination of death by neurologic criteria in compliance with practice guidelines and state regulations</i>                               | <ul style="list-style-type: none"> <li>Performs the exam, including a complete and accurate assessment with faculty member present but not participating (simulation or live)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Level 5</b> <i>Teaches others the determination of death by neurologic criteria</i>                                                                                  | <ul style="list-style-type: none"> <li>Models the approach to determination of death by neurologic criteria, including identifying the patient appropriately, discussing with the patient's family, discussing with other medical teams and staff members, completing a full exam accurately, interpreting the exam appropriately, and discussing the results and interpretation with the family professionally and compassionately</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Assessment Models or Tools                                                                                                                                              | <ul style="list-style-type: none"> <li>Direct observation</li> <li>Simulation</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Curriculum Mapping                                                                                                                                                      | <ul style="list-style-type: none"> <li></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Notes or Resources                                                                                                                                                      | <ul style="list-style-type: none"> <li>Martin SD, Porter MB. Performing the brain death examination and the declaration of pediatric brain death. <i>J Pediatr Intensive Care</i>. 2017;6(4):229-233. <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6260313/pdf/10-1055-s-0037-1604013.pdf">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6260313/pdf/10-1055-s-0037-1604013.pdf</a>. 2021.</li> <li>Nakagawa TA, Ashwal S, Mathur M, et al. Guidelines for the determination of brain death in infants and children: An update of the 1987 task force recommendations. <i>Pediatrics</i>. 2011;128(3):e720-e740. <a href="https://pediatrics.aappublications.org/content/128/3/e720">https://pediatrics.aappublications.org/content/128/3/e720</a>. 2021.</li> <li>World Health Organization. International Guidelines for the Determination of Death – Phase I. <a href="https://www.who.int/patientsafety/montreal-forum-report.pdf">https://www.who.int/patientsafety/montreal-forum-report.pdf</a>. 2021.</li> </ul> |

| <b>Medical Knowledge 1: Development and Behavior</b>                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| <b>Overall Intent:</b> To demonstrate sufficient knowledge to counsel families regarding common disorders of motor, emotional, cognitive, and behavioral development                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Milestones</b>                                                                                                                                                                                                       | <b>Examples</b>                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Level 1</b> <i>Lists developmental norms across domains</i><br><br><i>Recognizes that all streams of development evolve across the lifespan</i>                                                                      | <ul style="list-style-type: none"> <li>• Cites different expectations for development and behavior at different points in the lifespan, including normal acquisition of milestones</li> <li>• Discusses that children typically roll by six months and walk by 15 months</li> <li>• Recognizes that children's behavior might change over time but cannot give concrete examples</li> </ul>                                             |
| <b>Level 2</b> <i>Identifies signs and patterns of abnormal development</i><br><br><i>Discusses normal neurodevelopment across the lifespan</i>                                                                         | <ul style="list-style-type: none"> <li>• Recognizes that children growing up in a bilingual household should not delay language acquisition</li> <li>• Discusses development of stranger anxiety</li> <li>• Discusses that teenagers placing less value on parent's values than on peers is typical</li> </ul>                                                                                                                          |
| <b>Level 3</b> <i>Interprets patterns of abnormalities across the streams of development</i><br><br><i>Discusses abnormal neurodevelopment across the lifespan</i>                                                      | <ul style="list-style-type: none"> <li>• Characterizes findings into context (e.g., isolated speech/language delay versus global developmental delay) and has appropriate knowledge to counsel families about abnormal findings</li> <li>• Discusses slower attainment of motor milestones in patients with hypotonia</li> <li>• Discusses how a child having trouble at school may indicate a learning disability</li> </ul>           |
| <b>Level 4</b> <i>Counsels families regarding common and uncommon disorders of neurodevelopment across the lifespan</i><br><br><i>Anticipates associated developmental disorders based on patterns of abnormalities</i> | <ul style="list-style-type: none"> <li>• Goes beyond putting abnormal findings into context and discusses specific trajectories of common disorders</li> <li>• Describes that children with cerebral palsy may have some functional improvement with therapies but may still have an increasing gap between their functioning and that of their classmates as the classmates learn to do more advanced skills (e.g., soccer)</li> </ul> |
| <b>Level 5</b> <i>Serves as a role model to counsel families regarding uncommon disorders of development across the lifespan</i>                                                                                        | <ul style="list-style-type: none"> <li>• Counsels families about a new diagnosis of intellectual disability, including etiologic evaluation, management strategies and prognosis</li> </ul>                                                                                                                                                                                                                                             |
| Assessment Models or Tools                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>• Direct observation</li> <li>• Mock oral examination</li> <li>• Simulations</li> </ul>                                                                                                                                                                                                                                                                                                          |
| Curriculum Mapping                                                                                                                                                                                                      | •                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Notes or Resources                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>• Menkes JH. <i>Textbook of Child Neurology</i>. 5th ed. Williams and Wilkins; 1995. ISBN:978-0683059205.</li> </ul>                                                                                                                                                                                                                                                                             |

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- Swaiman KF, Ashwal S, Ferriero DM, Schor N. *Swaiman's Pediatric Neurology*. 6th ed. Philadelphia, PA: Elsevier; 2017. ISBN:978-0323371018.
- Accardo P, Accardo J, Allen M, et al. *Capute & Accardo's Neurodevelopmental Disabilities in Infancy and Childhood: Neurodevelopmental Diagnosis and Treatment (Volume 1)*. 3rd ed. Paul H. Brookes Publishing Co, Baltimore, MD; 2008

| <b>Medical Knowledge 2: Localization</b>                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                           |
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| <b>Overall Intent:</b> To localize neurologic deficits to specific locations in the nervous system and apply their hypothesis to patient management                                |                                                                                                                                                                                                                                                                                                                                           |
| <b>Milestones</b>                                                                                                                                                                  | <b>Examples</b>                                                                                                                                                                                                                                                                                                                           |
| <b>Level 1</b> Localizes signs and symptoms to general regions of the nervous system                                                                                               | <ul style="list-style-type: none"> <li>• Hypothesizes that a patient with asymmetric hand usage, upgoing toe, ankle clonus, and asymmetric knee reflexes likely has spastic hemiplegia in association with a contralateral upper motor neuron lesion</li> </ul>                                                                           |
| <b>Level 2</b> <i>Localizes signs and symptoms to specific regions of the nervous system</i>                                                                                       | <ul style="list-style-type: none"> <li>• Discusses how a patient with spastic cerebral palsy and choreoathetosis localizes to the basal ganglia</li> </ul>                                                                                                                                                                                |
| <b>Level 3</b> <i>Localizes signs and symptoms to discrete structures of the nervous system, recognizing challenges in precise localization of lesions in infants and children</i> | <ul style="list-style-type: none"> <li>• Expectant management of spina bifida patients with bowel and bladder management</li> <li>• Differentiates central vs peripheral hypotonia in infants</li> <li>• Develops hypothesis for seizure localization in first encounter</li> </ul>                                                       |
| <b>Level 4</b> <i>Precisely localizes signs and symptoms and describes the impact on patient management</i>                                                                        | <ul style="list-style-type: none"> <li>• Differentiates brachial plexus injury vs hemiplegic cerebral palsy in asymmetric upper extremity use in infant and makes appropriate diagnostic and referral recommendations</li> </ul>                                                                                                          |
| <b>Level 5</b> <i>Role models the precise localization of complex signs and symptoms to discrete structures of the nervous system</i>                                              | <ul style="list-style-type: none"> <li>• Is sought out by other learners for an opinion when attempting to localize the source of neurologic deficits in a challenging case</li> </ul>                                                                                                                                                    |
| Assessment Models or Tools                                                                                                                                                         | <ul style="list-style-type: none"> <li>• Direct observation</li> <li>• In training examination; neuroanatomy section</li> <li>• Medical record (chart) audit</li> <li>• Mock oral examination</li> </ul>                                                                                                                                  |
| Curriculum Mapping                                                                                                                                                                 | <ul style="list-style-type: none"> <li>•</li> </ul>                                                                                                                                                                                                                                                                                       |
| Notes or Resources                                                                                                                                                                 | <ul style="list-style-type: none"> <li>• Blumenfeld H. <i>Neuroanatomy through Clinical Cases</i>. 2nd ed. Sunderland, MA: Sinauer Associates; 2010. ISBN:978-0878936137.</li> <li>• O'Brien M. <i>Aids to the Examination of the Peripheral Nervous System</i>. 5th ed. Philadelphia, PA: Elsevier; 2010. ISBN:978-0702034473</li> </ul> |

| <b>Medical Knowledge 3: Neuroimaging</b>                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Overall Intent:</b> To use and interpret developmental and acquired abnormalities on neuroimaging                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Milestones</b>                                                                                                                                                      | <b>Examples</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                                                                                                                        | A patient with a subtle malformation of the perisylvian gyri (Perisylvian polymicrogyria) (Vignette/Scenario for Levels 1-5)                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Level 1</b> <i>Identifies normal neuroanatomy on brain and spine magnetic resonance (MR) and computed tomography (CT)</i>                                           | <ul style="list-style-type: none"> <li>Identifies brain anatomy as it appears in all planes</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Level 2</b> <i>Describes major abnormalities of the brain, spine, and neurovasculature on MR and CT</i>                                                             | <ul style="list-style-type: none"> <li>Identifies abnormalities such as agenesis of corpus callosum, schizencephaly, and holoprosencephaly</li> <li>Describes size, location, and characteristics of a large posterior fossa lesion</li> </ul>                                                                                                                                                                                                                                                 |
| <b>Level 3</b> <i>Describes normal developmental changes on MR and CT and interprets subtle abnormalities of the brain, spine, and neurovasculature on imaging</i>     | <ul style="list-style-type: none"> <li>Suggests that an enlarged sylvian fissure is abnormal and identifies the cortical ribbon as normal or not</li> <li>Compares the normal and abnormal signal intensities in the areas in question</li> <li>Identifies changes in myelination patterns over the first two years of life</li> </ul>                                                                                                                                                         |
| <b>Level 4</b> <i>Interprets common clinical neuroimaging modalities with indirect supervision and identifies the indications for advanced neuroimaging techniques</i> | <ul style="list-style-type: none"> <li>Correctly diagnoses perisylvian polymicrogyria based on imaging findings</li> </ul>                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Level 5</b> <i>Interprets rare and complex findings on neuroimaging, and serves as a resource for colleagues or conducts research using neuroimaging</i>            | <ul style="list-style-type: none"> <li>Consistently diagnoses a variety of leukodystrophies based on imaging alone</li> </ul>                                                                                                                                                                                                                                                                                                                                                                  |
| Assessment Models or Tools                                                                                                                                             | <ul style="list-style-type: none"> <li>Assessment during case conferences</li> <li>Direct observation</li> <li>Mock oral examination</li> <li>OSCEs</li> </ul>                                                                                                                                                                                                                                                                                                                                 |
| Curriculum Mapping                                                                                                                                                     | <ul style="list-style-type: none"> <li></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Notes or Resources                                                                                                                                                     | <ul style="list-style-type: none"> <li>The neuroradiologist is often able to question the residents about findings in the setting of regular neuroradiology conferences</li> <li>Neurology. <a href="https://n.neurology.org/">https://n.neurology.org/</a>. 2021.</li> <li>Pediatric Neurology. <a href="https://www.pedneur.com/">https://www.pedneur.com/</a>. 2021.</li> <li>Radiopedia. <a href="https://radiopaedia.org/?lang=us">https://radiopaedia.org/?lang=us</a>. 2021.</li> </ul> |

| <b>Medical Knowledge 4: Electromyography</b><br><b>Overall Intent:</b> To interpret results of nerve conduction study/electromyogram testing |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| Milestones                                                                                                                                   | Examples                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Level 1</b> <i>Describes general indications for nerve conduction studies/electromyography tests</i>                                      | <ul style="list-style-type: none"> <li>• Discusses the use of nerve conduction study/electromyogram in diagnosis of disorders of the peripheral nervous system</li> <li>• Recognizes that an electromyogram can find abnormalities such as compression of the median nerve at the wrist</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Level 2</b> <i>Describes patterns seen on nerve conduction studies/electromyography related to localization</i>                           | <ul style="list-style-type: none"> <li>• Describes the pattern of fibrillation and positive sharp waves seen in infantile spinal muscular atrophy</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Level 3</b> <i>Plans nerve conduction studies/electromyography in the context of the clinical presentation</i>                            | <ul style="list-style-type: none"> <li>• Recognizes the importance of specialized electromyographic techniques in distinguishing myasthenia from other myopathic processes</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Level 4</b> <i>Interprets results of nerve conduction studies/electromyography testing in the context of the clinical presentation</i>    | <ul style="list-style-type: none"> <li>• Uses electromyography/nerve conduction velocity test data to plan multidisciplinary approach for child with brachial plexus injury</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Level 5</b> <i>Conducts research that uses nerve conduction studies/electromyography data</i>                                             | <ul style="list-style-type: none"> <li>• Studies peripheral neuropathy in leukodystrophy or myelopathy in adults with Down syndrome who have atlantoaxial instability</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Assessment Models or Tools                                                                                                                   | <ul style="list-style-type: none"> <li>• Assessment of case conferences</li> <li>• Clinical discussions on inpatient and outpatient rotation experiences</li> <li>• Direct observation</li> <li>• Simulation</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Curriculum Mapping                                                                                                                           | <ul style="list-style-type: none"> <li>•</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Notes or Resources                                                                                                                           | <ul style="list-style-type: none"> <li>• Darras BT, Royden Jones T, Ryan M, et al. <i>Neuromuscular Disorders of Infancy, Childhood, and Adolescence</i>. 2nd ed. Philadelphia, PA: Elsevier; 2015. ISBN:978-0-12-417044-5.</li> <li>• Kumbhare D, Robinson L, Buschbacher R. <i>Buschbacher's Manual of Nerve Conduction Studies</i>. 3rd ed. New York, NY: Demos Medical Publishing LLC; 2015. ISBN:978-1620700877.</li> <li>• Holmes, GL, Moshe SL, Royden Jones, H. <i>Clinical Neurophysiology of Infancy, Childhood and Adolescence</i>. Philadelphia, PA: Elsevier; 2006. ISBN:978-0-7506-7251-1.</li> <li>• Preston DC, Shapiro BE. Clinical-electrophysiologic correlations: Overview and common patterns. In: Preston DC, Shapiro BE. <i>Electromyography and Neuromuscular Disorders: Clinical-Electrophysiologic Correlations</i>. 3rd ed. Philadelphia, PA: Elsevier; 2013. ISBN:978-1455726721.</li> </ul> |

**Medical Knowledge 5: Diagnostic Investigation****Overall Intent:** To implement a targeted, cost-effective plan for high-yield diagnostic testing in patients with neurologic complaints

| Milestones                                                                                                             | Examples                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| <b>Level 1</b> <i>Discusses general diagnostic approach appropriate to clinical presentation</i>                       | <ul style="list-style-type: none"> <li>• Determines that a patient with hemiplegia and aphasia should have imaging of the brain</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Level 2</b> <i>Lists indications, contraindications, risks, and benefits of diagnostic testing</i>                  | <ul style="list-style-type: none"> <li>• Describes when a lumbar puncture may be indicated in a patient with fever and altered mental status</li> <li>• Discusses how iodinated contrast material may cause nephropathy in patients with impaired kidney function</li> <li>• Identifies that a benefit of a cerebral angiogram is identification of aneurysms or other vascular malformations that may require treatment to prevent catastrophic rupture</li> <li>• Informs families of possible results of genetic testing, including positive findings, negative findings, variants of uncertain significance, and potential unintended findings (other genetic abnormalities such as those predisposing to cancer risk, non-paternity, and consanguinity)</li> </ul>                                                                              |
| <b>Level 3</b> <i>Prioritizes and interprets diagnostic tests appropriate to clinical urgency and complexity</i>       | <ul style="list-style-type: none"> <li>• Discusses how a patient with papilledema and decreased vision who is suspected to have intracranial hypertension needs urgent imaging of the brain to rule out a space-occupying lesion and venous sinus thrombosis before a lumbar puncture is performed</li> <li>• After negative imaging, the lumbar puncture is performed, opening pressure is 35 and cerebrospinal fluid analysis is unremarkable. The resident understands that the high opening pressure and normal cerebrospinal fluid support the diagnosis of idiopathic intracranial hypertension</li> <li>• Uses a step-wise diagnostic approach in the evaluation of a child with global developmental delay or intellectual disability</li> <li>• Orders a serum creatine kinase (CK) level in a child with delayed walking skills</li> </ul> |
| <b>Level 4</b> <i>Uses complex diagnostic approaches that have the highest diagnostic yield and cost effectiveness</i> | <ul style="list-style-type: none"> <li>• Orders Duchenne muscular dystrophy deletion/duplication testing instead of ordering whole exome sequencing for a child with delayed walking and a creatine kinase level of 30,000</li> <li>• Counsels a migraine patient on why an MRI of the brain is not indicated in their condition</li> <li>• Orders a head ultrasound in a neonate with suspected hydrocephalus instead of an MRI of the brain</li> <li>• Orders epilepsy monitoring unit monitoring for a patient with suspected recurrent clinical seizure activity unresponsive to escalating therapies in the setting of normal routine and ambulatory EEG studies</li> </ul>                                                                                                                                                                     |
| <b>Level 5</b> <i>Demonstrates sophisticated knowledge of diagnostic testing and controversies</i>                     | <ul style="list-style-type: none"> <li>• Directs other team members in diagnostic testing of complex cases</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

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|                            | <ul style="list-style-type: none"> <li>• Interprets advanced diagnostic testing used for pre-surgical work-up of intractable epilepsy</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Assessment Models or Tools | <ul style="list-style-type: none"> <li>• Direct observation</li> <li>• Medical record (chart) audit</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Curriculum Mapping         | <ul style="list-style-type: none"> <li>•</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Notes or Resources         | <ul style="list-style-type: none"> <li>• Adam MP, Ardinger HH, Pagon RA, et al. <i>Gene Reviews</i>. Seattle, WA: University of Washington; 1993-2019. <a href="https://www.ncbi.nlm.nih.gov/books/NBK11116/">https://www.ncbi.nlm.nih.gov/books/NBK11116/</a>. 2021.</li> <li>• Gifford DR, Mittman BS, Vickrey BG. Diagnostic reasoning in neurology. <i>Neurologic Clinics</i>. 14(1):223-238. <a href="https://pubmed.ncbi.nlm.nih.gov/8676845/">https://pubmed.ncbi.nlm.nih.gov/8676845/</a>. 2021.</li> <li>• Preston DC, Shapiro BE. <i>Electromyography and Neuromuscular Disorders: Clinical-Electrophysiologic Correlations</i>. 3rd ed. Philadelphia, PA: Elsevier; 2013. ISBN:978-1455726721.</li> <li>• Du Plessis AJ, Limperopoulos C, Volpe JJ. Cerebellar development. In: Volpe JJ. <i>Neurology of the Newborn</i>. 6th ed. Philadelphia, PA: Elsevier; 2017:73.</li> </ul> |

| Systems-Based Practice 1: Patient Safety                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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| <b>Overall Intent:</b> Engages in the analysis and management of patient safety events, including relevant communication with patients, families, and health care professionals                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Milestones                                                                                                                                                                                                                                                                                                        | Examples                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p><b>Level 1</b> <i>Demonstrates knowledge of common patient safety events</i></p> <p><i>Demonstrates knowledge of how to report patient safety events</i></p> <p><i>Recognizes that most safety events are the result of system failure and not human error</i></p>                                             | <ul style="list-style-type: none"> <li>• Recognizes that multiple subtherapeutic doses of benzodiazepines put a patient at risk for continued seizure and also respiratory suppression, knows there is an online system for error reporting in the hospital but has not yet used it, and knows to speak to the emergency room physician about the patient safety event but may require guidance from the attending in how to approach this</li> <li>• Recognizes that incorrect medication dose administration may be related to systems-based errors, such as electronic health record (EHR) order entry, as opposed to the pharmacist incorrectly sending the wrong dose to the emergency department</li> </ul> |
| <p><b>Level 2</b> <i>Identifies system factors that lead to patient safety events</i></p> <p><i>Reports patient safety events through institutional reporting systems (simulated or actual)</i></p> <p><i>Demonstrates a non-accusatory, non-judgmental attitude in dealing with issues of patient safety</i></p> | <ul style="list-style-type: none"> <li>• Identifies that the lack of a protocol for status epilepticus in the emergency room may have contributed to this patient safety event</li> <li>• Records the event in the hospital's online anonymous event reporting database</li> <li>• When investigating a patient safety issue, the resident's tone is directed towards identifying system-based errors and prevention of recurrence</li> </ul>                                                                                                                                                                                                                                                                     |
| <p><b>Level 3</b> <i>Participates in analysis of patient safety events (simulated or actual)</i></p> <p><i>Participates in disclosure of patient safety events to patients and families (simulated or actual)</i></p> <p><i>Presents at a morbidity and mortality conference</i></p>                              | <ul style="list-style-type: none"> <li>• Organizes the data to evaluate a patient safety event so that others can provide interpretation</li> <li>• Participates in communication with patients/families about the event with available supervision</li> <li>• Prepares and participates in a morbidity and mortality conference</li> </ul>                                                                                                                                                                                                                                                                                                                                                                       |
| <p><b>Level 4</b> <i>Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual)</i></p> <p><i>Discloses patient safety events to patients and families (simulated or actual)</i></p>                                                                                 | <ul style="list-style-type: none"> <li>• Collaborates with a team to analyze a patient safety event to identify errors and formulate prevention strategies</li> <li>• Competently communicates with patients/families about those events</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

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| <i>Participates as a member of a team investigating a patient safety issue</i>                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>• Working with a team to gather data to investigate an event and formulate recommendations for future prevention</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Level 5</b> <i>Actively engages teams and processes to modify systems to prevent patient safety events</i><br><br><i>Models or mentors others in the disclosure of patient safety events</i><br><br><i>Evaluates the effectiveness of systems changes implemented as a result of patient safety activities</i> | <ul style="list-style-type: none"> <li>• Assumes a leadership role at the departmental or institutional level for patient safety and/or QI initiatives</li> <li>• Coaches a more junior resident on disclosure of medical errors in an actual or simulated setting</li> <li>• Conducts a retrospective review after systems changes are implemented</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Assessment Models or Tools                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>• Direct observation</li> <li>• E-module multiple choice tests</li> <li>• Multisource feedback</li> <li>• Portfolio review</li> <li>• Simulation</li> <li>• System documentation of safety reporting</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Curriculum Mapping                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>•</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Notes or Resources                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>• American Medical Association (AMA). AMA Graduate Medical Education (GME) Competency Education Program. <a href="https://edhub.ama-assn.org/gcep">https://edhub.ama-assn.org/gcep</a>. 2021. <ul style="list-style-type: none"> <li>◦ Modules on patient safety</li> <li>◦ Modules on quality improvement</li> </ul> </li> <li>• Agency for Healthcare Research and Quality (AHRQ). Programs. <a href="https://www.ahrq.gov/programs/index.html?search_api_views_fulltext=&amp;field_program_to_pics=14177">https://www.ahrq.gov/programs/index.html?search_api_views_fulltext=&amp;field_program_to_pics=14177</a>. 2021.</li> <li>• Institute of Healthcare Improvement. <a href="http://www.ihl.org/Pages/default.aspx">http://www.ihl.org/Pages/default.aspx</a>. 2021.</li> </ul> |

| Systems-Based Practice 2: Quality Improvement (QI)                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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| <b>Overall Intent:</b> To conduct a QI project                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Milestones                                                                                                                        | Examples                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Level 1</b> <i>Demonstrates knowledge of basic quality improvement methodologies and metrics</i>                               | <ul style="list-style-type: none"> <li>• Describes the Plan-Do-Study-Act (PDSA) methodology of QI</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Level 2</b> <i>Describes local quality improvement initiatives (e.g., public health measures)</i>                              | <ul style="list-style-type: none"> <li>• Describes a related QI project in the hospital</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Level 3</b> <i>Participates in local quality improvement initiatives</i>                                                       | <ul style="list-style-type: none"> <li>• Participates in a QI project, regarding the prescribing habits of physicians providing stimulant prescriptions and following safety measures</li> <li>• Evaluates bladder infection rates associated with catheterization in children with spina bifida</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Level 4</b> <i>Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project</i> | <ul style="list-style-type: none"> <li>• Recruits a team to conduct a review of accurate medication reconciliation in the EHR during outpatient visits</li> <li>• Develops a system to provide timely and comprehensive genetic testing results to patients and families</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Level 5</b> <i>Creates, implements, and assesses quality improvement initiatives at the institutional or community level</i>   | <ul style="list-style-type: none"> <li>• Develops a documentation template for telehealth visits for children with multi-system health needs</li> <li>• Collaborates with other team members to develop a patient and family satisfaction survey and take steps to develop interventions to address identified areas of weakness</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Assessment Models or Tools                                                                                                        | <ul style="list-style-type: none"> <li>• Direct observation</li> <li>• E-module multiple choice tests</li> <li>• Multisource feedback</li> <li>• Portfolio review</li> <li>• Simulation</li> <li>• System documentation of safety reporting</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Curriculum Mapping                                                                                                                | <ul style="list-style-type: none"> <li>•</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Notes or Resources                                                                                                                | <ul style="list-style-type: none"> <li>• American Medical Association (AMA). AMA Graduate Medical Education (GME) Competency Education Program. <a href="https://edhub.ama-assn.org/qcep">https://edhub.ama-assn.org/qcep</a>. 2021.             <ul style="list-style-type: none"> <li>◦ Modules on patient safety</li> <li>◦ Modules on quality improvement</li> </ul> </li> <li>• AHRQ. Programs. <a href="https://www.ahrq.gov/programs/index.html?search_api_views_fulltext=&amp;field_program_to_pics=14177">https://www.ahrq.gov/programs/index.html?search_api_views_fulltext=&amp;field_program_to_pics=14177</a>. 2021.</li> <li>• Institute of Healthcare Improvement. <a href="http://www.ihl.org/Pages/default.aspx">http://www.ihl.org/Pages/default.aspx</a>. 2021.</li> </ul> |

| <b>Systems-Based Practice 3: Systems of Care Delivery: Patient- and Family-Centered Care</b><br><b>Overall Intent:</b> To effectively navigate the health care system, including the interdisciplinary team and other care providers; to adapt care to a specific patient population to ensure high-quality patient outcomes                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| <b>Milestones</b>                                                                                                                                                                                                                                                                                                                                                              | <b>Examples</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Level 1</b> <i>Describes the role of interdisciplinary team members</i><br><br><i>Demonstrates knowledge of care coordination</i><br><br><i>Defines “family” for individual patients and lists the various roles that families play in care delivery and decision making</i>                                                                                                | <ul style="list-style-type: none"> <li>• Identifies social work and discharge planning needs during patient care rounds</li> <li>• Lists adverse outcomes that can result from lack of prioritized care</li> <li>• Identifies primary decision maker within the “family”</li> </ul>                                                                                                                                                                                                                      |
| <b>Level 2</b> <i>Demonstrates an attitude of mutual respect for other members of the interdisciplinary team</i><br><br><i>Coordinates care of patients in routine clinical situations effectively using the roles of the interprofessional teams</i><br><br><i>Listens carefully to patients’ families, with sensitivity to each family’s values and customs</i>              | <ul style="list-style-type: none"> <li>• Participates in an interdisciplinary team meeting to prioritize and coordinate care</li> <li>• Appropriately consults social work, and rehabilitation therapists to develop a comprehensive management plan for a child with cerebral palsy</li> <li>• Asks families how they prefer information to be transmitted (e.g., phone, electronic, in person) and to which family member</li> </ul>                                                                   |
| <b>Level 3</b> <i>Participates in interdisciplinary care activities</i><br><br><i>Coordinates care of patients in complex clinical situations effectively using the roles of their interprofessional teams</i><br><br><i>Provides timely, complete, and accurate information to patients’ families in a manner that would enable participation in care and decision making</i> | <ul style="list-style-type: none"> <li>• Works with nutrition, respiratory therapy, and physical therapy to optimize care for a patient with a new diagnosis of spinal muscular atrophy and severe malnutrition</li> <li>• Reviews patient care plans and progress during multidisciplinary care conference and contributes recommendations</li> <li>• Provides information about resources about obtaining an educational advocate to help with Individualized Education Plan (IEP) concerns</li> </ul> |
| <b>Level 4</b> <i>Leads interdisciplinary teams</i>                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>• Leads the discussion in an interprofessional discharge planning conference for a patient with complex psychosocial issues</li> </ul>                                                                                                                                                                                                                                                                                                                            |

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| <i>Demonstrates effective coordination of patient-centered care among different disciplines and specialties</i>                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>• Calls the primary care doctor for a patient newly diagnosed with infantile spasms to discuss potential complications and dosing of steroid treatment</li> <li>• Coaches a more junior resident on how to communicate with the adult neurologist and family to transition a patient with intellectual disability and epilepsy to adult neurology</li> </ul>                                                                                                                                                                                                               |
| <i>Collaborates with families in the development and implementation of care management programs</i>                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>• Assists family to obtain overnight nursing care for a child with a tracheostomy needing respiratory care which enables the family to rest</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Level 5 Teaches and mentors interdisciplinary leaders</b><br><br><i>Analyzes the process of care coordination and leads in the design and implementation of care system improvements</i><br><br><i>Involves families in the development and implementation of teaching and research activities</i> | <ul style="list-style-type: none"> <li>• Works with genetic counsellors to develop interdisciplinary skills and enable them to recognize neurodevelopmental dysfunction seen in children with complex genetic disorders</li> <li>• Works with a QI mentor to identify better hand-off tools for transition to adult care</li> <li>• Conducts a needs assessment of an underserved population and designs an educational intervention to address medication non-adherence</li> </ul>                                                                                                                               |
| Assessment Models or Tools                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>• Direct observation</li> <li>• Medical record (chart) review</li> <li>• Multisource feedback</li> <li>• OSCEs</li> <li>• Quality metrics</li> <li>• Review of sign-out tools</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                   |
| Curriculum Mapping                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>•</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Notes or Resources                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>• CDC. Population Health Training in Place Program (PH-TIPP). <a href="https://www.cdc.gov/pophealthtraining/whatis.html">https://www.cdc.gov/pophealthtraining/whatis.html</a>. 2021.</li> <li>• Skochelak SE, Hawkins RE, Lawson LE, Starr SR, Borkan JM, Gonzalo JD. <i>AMA Education Consortium: Health Systems Science</i>. Philadelphia, PA: Elsevier; 2016. <a href="https://commerce.ama-assn.org/store/ui/catalog/productDetail?product_id=prod2780003">https://commerce.ama-assn.org/store/ui/catalog/productDetail?product_id=prod2780003</a>. 2021.</li> </ul> |

| <b>Systems-Based Practice 4: Physician Role in Health Care Systems</b>                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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| <b>Overall Intent:</b> To understand one's own role in the treatment team and in the complex health care system and how to optimize the system to improve patient care and the health system's performance                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Milestones</b>                                                                                                                                                                                                                                                                                                                                    | <b>Examples</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p><b>Level 1</b> <i>Identifies key components of the complex health care system (e.g., hospital, skilled nursing facility, finance, personnel, technology)</i></p> <p><i>Describes basic health payment systems (e.g., government, private, public, uninsured care) and practice models</i></p>                                                     | <ul style="list-style-type: none"> <li>• Lists hospital, skilled nursing facility, finance, personnel, and technology as components of the health care system</li> <li>• Recognizes there are different payment systems, such as managed care systems, Medicaid, and commercial third-party payors</li> <li>• Knows that there are different requirements for coding different levels of service</li> </ul>                                                                                                          |
| <p><b>Level 2</b> <i>Describes how components of a complex health care system are interrelated, and how this impacts patient care</i></p> <p><i>Discusses conceptual components of delivering the right care at the right time meeting patient's immediate and longer-term needs</i></p>                                                             | <ul style="list-style-type: none"> <li>• Understands that when a 10-year-old child needs an MRI of the brain and the hospital is not in the preferred network for this patient, the insurance company may not allow an MRI to be ordered without a peer-to-peer consultation</li> <li>• Arranges to have the MRI performed at an in-network facility so it can be covered by insurance</li> <li>• Lists medication and allergy reconciliation and updating the problem list as being required every visit</li> </ul> |
| <p><b>Level 3</b> <i>Discusses how individual practice affects the broader system (e.g., length of stay, readmission rates, clinical efficiency)</i></p> <p><i>Advocates for patient care needs (e.g., community resources, patient assistance resources) with consideration of strengths and challenges of patient, family, and environment</i></p> | <ul style="list-style-type: none"> <li>• Knows that a late discharge impacts new patient admissions</li> <li>• Discusses other options with the patient when their insurance does not cover rizatriptan</li> <li>• Codes an encounter at a Level 4 and elements of their notes supports this level of service</li> </ul>                                                                                                                                                                                             |
| <p><b>Level 4</b> <i>Manages various components of the complex health care system to provide efficient and effective patient care and transition of care</i></p> <p><i>Discuss means of effecting systemic change in health care costs and care delivery</i></p>                                                                                     | <ul style="list-style-type: none"> <li>• Works collaboratively with the institution to improve patient assistance resources or designs the institution's community health needs assessment</li> <li>• Provides documentation for need of lacosamide for a patient with intractable focal epilepsy</li> <li>• Finds a resource for free gene testing in a child</li> <li>• Asks social worker to suggest low-cost psychological therapy for patients</li> </ul>                                                       |

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|                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>• Reviews previous continuity clinic patients with seizures to determine the number with seizure action plans</li> <li>• Identifies a pattern of prolonged patient visits and level of billing</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Level 5</b> <i>Advocates for or leads systems change that enhances high-value, efficient, and effective patient care and transition of care</i><br><br><i>Participates in health policy advocacy activities</i> | <ul style="list-style-type: none"> <li>• Develops an institutional protocol regarding the neuroimaging of patients with particular types of headaches and addresses neuroimaging as it relates to delivering high-value care</li> <li>• Improves informed consent process for non-English-speaking patients requiring interpreter services</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Assessment Models or Tools                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>• Direct observation</li> <li>• Medical record (chart) audit</li> <li>• Portfolio review</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Curriculum Mapping                                                                                                                                                                                                 | •                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Notes or Resources                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>• AAN. Neurology career center. <a href="https://careers.aan.com/">https://careers.aan.com/</a>. 2021.</li> <li>• AHRQ. Measuring the Quality of Physician Care. <a href="https://www.ahrq.gov/professionals/quality-patient-safety/talkingquality/create/physician/challenges.html">https://www.ahrq.gov/professionals/quality-patient-safety/talkingquality/create/physician/challenges.html</a>. 2021.</li> <li>• AHRQ. Major Physician Performance Sets. <a href="https://www.ahrq.gov/professionals/quality-patient-safety/talkingquality/create/physician/measurementssets.html">https://www.ahrq.gov/professionals/quality-patient-safety/talkingquality/create/physician/measurementssets.html</a>. 2021.</li> <li>• The Commonwealth Fund. Health System Data Center. <a href="http://datacenter.commonwealthfund.org/?_ga=2.110888517.1505146611.1495417431-1811932185.1495417431#ind=1/sc=1">http://datacenter.commonwealthfund.org/?_ga=2.110888517.1505146611.1495417431-1811932185.1495417431#ind=1/sc=1</a>. 2021.</li> <li>• Dzau VJ, McClellan M, Burke S, et al. Vital directions for health and health care: priorities form a national academy of medicine initiative. <i>JAMA</i>. 2017;317(14):1461-1470. <a href="https://nam.edu/vital-directions-for-health-health-care-priorities-from-a-national-academy-of-medicine-initiative/">https://nam.edu/vital-directions-for-health-health-care-priorities-from-a-national-academy-of-medicine-initiative/</a>. 2021.</li> <li>• The Kaiser Family Foundation. Health Reform. <a href="https://www.kff.org/topic/health-reform/">https://www.kff.org/topic/health-reform/</a>. 2021.</li> </ul> |

| <b>Systems-Based Practice 5: Community Resources</b><br><b>Overall Intent:</b> To effectively navigate the health care system, including the interdisciplinary team and other care providers; to adapt care to a specific patient population to ensure high-quality patient outcomes                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| <b>Milestones</b>                                                                                                                                                                                                                                                                                                                                                    | <b>Examples</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Level 1</b> <i>Describes educational, mental health, rehabilitation, and community support resources for patients with neurodevelopmental disabilities ranging across the lifespan</i><br><br><i>Recognizes that most treatment for neurodevelopmental disabilities is provided in the community by community resources</i>                                       | <ul style="list-style-type: none"> <li>• Identifies access to primary care and insurance status as social determinants of health</li> <li>• Identifies available county- or state-based developmental services and resources</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Level 2</b> <i>Makes initial referrals to educational, mental health, rehabilitation, and community support resources for patients with neurodevelopmental disabilities ranging across the lifespan</i><br><br><i>Discusses relevant laws that guide the care of people with neurodevelopmental disabilities</i>                                                  | <ul style="list-style-type: none"> <li>• Refers families to appropriate county- or state-based services (e.g., Early Intervention, Birth to 3)</li> <li>• Identifies that the hospital serves a large, low-income, rural area without good public transportation and because of this, many patients have difficulty with making appointments, going to therapy, or accessing medications</li> <li>• Counsels patients and families on the right to free and appropriate public education</li> <li>• Counsels family of child with severe intellectual disability (ID) and autism spectrum disorder (ASD) on available Medicaid waiver programs and waitlists</li> </ul> |
| <b>Level 3</b> <i>Makes more complex referrals with requests for specific interventions to educational, mental health, rehabilitation, and community support resources for patients with neurodevelopmental disabilities ranging across the lifespan</i><br><br><i>Participates in a community meeting (e.g., individualized education plan, parent group, etc.)</i> | <ul style="list-style-type: none"> <li>• Provides information about resources for a local food bank and dental clinic near the patient's home when managing patients in continuity clinic</li> <li>• Refers a patient with communication disorder for augmentative and alternative communication providers</li> <li>• Attends an IEP meeting for a patient</li> </ul>                                                                                                                                                                                                                                                                                                   |
| <b>Level 4</b> <i>Consistently demonstrates competence in referring and coordinating services</i><br><br><i>Evaluates the strengths, challenges, and effectiveness of the community resources to which patients are referred</i>                                                                                                                                     | <ul style="list-style-type: none"> <li>• Collaborates with patients and families to identify and refer to service providers near the patient's home</li> <li>• In the continuity clinic, considers best way to present information to patients, families, and others based on literacy and cognition levels</li> <li>• Uses other professionals to help obtain additional resources for patients with limited local access to therapy</li> </ul>                                                                                                                                                                                                                        |

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| <p><b>Level 5</b> <i>Participates in leadership role in educational, mental health, rehabilitation, and community support resources for patients with neurodevelopmental disabilities</i></p> <p><i>Engages in scholarly projects regarding integration of medical, educational, mental health, rehabilitation, and community support resources for patients with neurodevelopmental and related disabilities</i></p> | <ul style="list-style-type: none"> <li>• Identifies needs of the refugee population in continuity clinic and designs a home visit program to improve medication adherence</li> <li>• Collaborates with their hospital's pediatric mobile clinic to provide neurodevelopmental services to the underserved and uninsured community</li> <li>• Develops educational materials on COVID-19 vaccination for patients with limited literacy</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <p>Assessment Models or Tools</p>                                                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>• Direct observation</li> <li>• Medical record (chart) review</li> <li>• Multisource feedback</li> <li>• OSCEs</li> <li>• Quality metrics</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <p>Curriculum Mapping</p>                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>•</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <p>Notes or Resources</p>                                                                                                                                                                                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>• ADA. A Guide to Disability Rights Laws. <a href="https://www.ada.gov/cguide.htm">https://www.ada.gov/cguide.htm</a>. 2021.</li> <li>• CDC. Population Health Training. <a href="https://www.cdc.gov/pophealthtraining/whatis.html">https://www.cdc.gov/pophealthtraining/whatis.html</a>. 2021.</li> <li>• Skochelak SE, Hawkins RE, Lawson LE, Starr SR, Borkan JM, Gonzalo JD. <i>AMA Education Consortium: Health Systems Science</i>. Philadelphia, PA: Elsevier; 2016. <a href="https://commerce.ama-assn.org/store/ui/catalog/productDetail?product_id=prod2780003">https://commerce.ama-assn.org/store/ui/catalog/productDetail?product_id=prod2780003</a>. 2021.</li> <li>• USA.Gov. Your Legal Disability Rights. <a href="https://www.usa.gov/disability-rights">https://www.usa.gov/disability-rights</a>. 2021.</li> </ul> |

| <b>Systems-Based Practice 6: Access and Outcomes in the Neurodevelopmental Population</b><br><b>Overall Intent:</b> To recognize and minimize the impact of adverse social determinants of health on management programs                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| <b>Milestones</b>                                                                                                                                                                                                                                     | <b>Examples</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Level 1</b> <i>Demonstrates knowledge of the neurodevelopmental population, community health needs, and variations in care</i><br><br><i>Recognizes differences in care and clinical outcomes for persons with neurodevelopmental disabilities</i> | <ul style="list-style-type: none"> <li>• Understands local patient population demographics</li> <li>• Identifies limited English proficiency as a barrier to accessing care</li> <li>• Uses an interpreter for any patient whose primary language is not English</li> </ul>                                                                                                                                                                                                                                                             |
| <b>Level 2</b> <i>Identifies specific health needs and care variations in the local neurodevelopmental population</i><br><br><i>Identifies local factors contributing to differences in care and outcomes</i>                                         | <ul style="list-style-type: none"> <li>• Finds that patients requiring medical transport to attend visits miss more clinic visits than patients with personal means of transportation</li> <li>• Discusses with families what they perceive to be the greatest barriers to accessing care</li> <li>• Recognizes that communication barriers exist even with use of interpreter</li> <li>• Refers Spanish-speaking family specifically to the neuropsychologist who can provide dual-language services and testing in Spanish</li> </ul> |
| <b>Level 3</b> <i>Identifies barriers and contributing factors affecting access and outcomes in neurodevelopmental care</i><br><br><i>Identifies available resources to reduce systems-level barriers to neurodevelopmental care</i>                  | <ul style="list-style-type: none"> <li>• Works with care coordinators to ensure adherence to follow-up plans</li> <li>• Ensures patients have access to appropriate communication supports during medical care</li> <li>• Locates and refers to primary care providers who are adept at managing care for children with complex medical needs</li> <li>• Refers patients to clinical social workers to assist in connecting families to resources</li> </ul>                                                                            |
| <b>Level 4</b> <i>Applies local resources to improve outcomes for neurodevelopmental populations</i><br><br><i>Adapts clinical practices to better meet the needs of specific patient populations</i>                                                 | <ul style="list-style-type: none"> <li>• Advocates for a condition-specific interdisciplinary clinic to facilitate care and reduce travel burden for patients with complex medical needs at systems level (e.g. hospital, community)</li> <li>• Provides consultative guidance and collaboration with patient case workers to facilitate follow-up care and coordinate complex referrals</li> </ul>                                                                                                                                     |
| <b>Level 5</b> <i>Leads innovations and advocates for improved access and outcomes in neurodevelopmental care at regional or national levels</i>                                                                                                      | <ul style="list-style-type: none"> <li>• Participates in research project assessing barriers to care in children with complex medical needs</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                  |

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| <i>Participates in regional and national advocacy and research to improve care delivery and clinical outcomes for neurodevelopmental populations</i> |                                                                                                                                                                                                                                                                               |
| Assessment Models or Tools                                                                                                                           | <ul style="list-style-type: none"> <li>• Direct observation</li> <li>• Medical record (chart) review</li> <li>• Multisource feedback</li> <li>• OSCEs</li> <li>• Quality metrics</li> </ul>                                                                                   |
| Curriculum Mapping                                                                                                                                   | <ul style="list-style-type: none"> <li>•</li> </ul>                                                                                                                                                                                                                           |
| Notes or Resources                                                                                                                                   | <ul style="list-style-type: none"> <li>• Tomoaia-Cotisel A, Farrell TW, Solberg LI, et al. Implementation of care management: an analysis of recent AHRQ research. <i>Med Care Res Rev</i>. 2018 Feb;75(1):46-65. doi: 10.1177/1077558716673459. Epub 2016 Oct 23.</li> </ul> |

| <b>Practice-Based Learning and Improvement 1: Evidence-Based and Informed Practice</b><br><b>Overall Intent:</b> To incorporate evidence into clinical practice |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| <b>Milestones</b>                                                                                                                                               | <b>Examples</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Level 1</b> <i>Uses available evidence to care for a routine patient</i>                                                                                     | <ul style="list-style-type: none"> <li>• Searches for review article on Duchenne muscular dystrophy</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Level 2</b> <i>Articulates clinical questions to guide evidence-based care</i>                                                                               | <ul style="list-style-type: none"> <li>• Search for evidence for use of steroids in Duchenne muscular dystrophy</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Level 3</b> <i>Locates and applies the best available evidence</i>                                                                                           | <ul style="list-style-type: none"> <li>• Uses clinical practice guideline from American Academy of Neurology (AAN) to treat patients with Duchenne muscular dystrophy</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Level 4</b> <i>Critically appraises and applies evidence to guide care, even in the face of uncertainty and conflicting evidence</i>                         | <ul style="list-style-type: none"> <li>• Reviews and analyzes a primary research article on the treatment of Duchenne muscular dystrophy that contradicts current practice</li> <li>• Reviews multiple articles on treatment of infantile spasms to determine appropriate treatment</li> </ul>                                                                                                                                                                                                                                                                                                                                                           |
| <b>Level 5</b> <i>Coaches others to critically appraise and apply evidence for complex patients, and/or participates in the development of guidelines</i>       | <ul style="list-style-type: none"> <li>• Coaches or is sought out by others in analyzing research</li> <li>• Reviews literature to update departmental protocols</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Assessment Models or Tools                                                                                                                                      | <ul style="list-style-type: none"> <li>• Direct observation</li> <li>• Journal club</li> <li>• Oral or written examination</li> <li>• Portfolio review</li> <li>• Presentation</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Curriculum Mapping                                                                                                                                              | <ul style="list-style-type: none"> <li>•</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Notes or Resources                                                                                                                                              | <ul style="list-style-type: none"> <li>• Institutional IRB guidelines</li> <li>• National Institutes of Health. Write Your Application. <a href="https://grants.nih.gov/grants/how-to-apply-application-guide/format-and-write/write-your-application.htm">https://grants.nih.gov/grants/how-to-apply-application-guide/format-and-write/write-your-application.htm</a>. 2021.</li> <li>• U.S. National Library of Medicine. PubMed Tutorial. <a href="https://www.nlm.nih.gov/bsd/disted/pubmedtutorial/cover.html">https://www.nlm.nih.gov/bsd/disted/pubmedtutorial/cover.html</a>. 2021.</li> <li>• Various journal submission guidelines</li> </ul> |

| Practice-Based Learning and Improvement 2: Reflective Practice and Commitment to Personal Growth                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| <b>Overall Intent:</b> To seek clinical performance information with the intent to improve care; to reflect on all domains of practice, personal interactions, and behaviors, and their impact on colleagues and patients (reflective mindfulness); to develop clear objectives and goals for improvement in some form of a learning plan |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Milestones                                                                                                                                                                                                                                                                                                                                | Examples                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Level 1</b> <i>Accepts responsibility for personal and professional development by establishing goals</i>                                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>• Creates a personal learning goal for the next year</li> <li>• Identifies that too much time is spent on notes</li> <li>• Asks attending for tips on efficient note writing</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Level 2</b> <i>Accepts performance data (feedback and other input) and uses it to develop a learning plan</i>                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>• Asks follow-up questions regarding how to improve after receiving feedback</li> <li>• Identifies that too much time spent on notes impacts other aspects of patient care</li> <li>• At the suggestion of the attending, uses a note template</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Level 3</b> <i>Seeks performance data and develops a learning plan with increasing independence</i>                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>• At the end of a particularly difficult rotation, asks for feedback; does not seek feedback for a rotation perceived to be easy</li> <li>• Tracks the time spent on notes to recognize improved efficiency</li> <li>• Independently creates a note template to improve efficiency of documentation</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Level 4</b> <i>Regularly measures oneself against the learning plan, modifying the plan when necessary</i>                                                                                                                                                                                                                             | <ul style="list-style-type: none"> <li>• At the end of all rotations, seeks out and uses feedback on performance</li> <li>• Works with information technology (IT) to improve note template after recognizing that documentation is still inefficient</li> <li>• Gets quality monitoring reports from IT to review the learning plan</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Level 5</b> <i>Models creation, implementation, analysis, and modification of learning plans, incorporating performance data</i>                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>• Asks more junior learners for feedback and asks for feedback from faculty members in front of more junior learners</li> <li>• Encourages other learners on the team to consider how their behavior affects the rest of the team</li> <li>• Implements “Feedback Fridays” with modification of learning plans following each session</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Assessment Models or Tools                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>• Direct observation</li> <li>• Multisource feedback</li> <li>• Portfolio review</li> <li>• Review of learning plan</li> <li>• Semiannual review</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Curriculum Mapping                                                                                                                                                                                                                                                                                                                        | •                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Notes or Resources                                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>• Burke AE, Benson B, Englander R, Carraccio C, Hicks PJ. Domain of competence: practice-based learning and improvement. <i>Academic Pediatrics</i>. 2014;14(2 Suppl):S38-S54. <a href="https://www.academicpediatrics.net/article/S1876-2859(13)00333-1/pdf">https://www.academicpediatrics.net/article/S1876-2859(13)00333-1/pdf</a>. 2021.</li> <li>• Hojat M, Veloski JJ, Gonnella JS. Measurement and correlates of physicians' lifelong learning. <i>Academic Medicine</i>. 2009;84(8):1066-1074. <a href="https://journals.lww.com/academicmedicine/fulltext/2009/08000/Measurement_and_Correlates_of_Physicians_Lifelong.21.aspx">https://journals.lww.com/academicmedicine/fulltext/2009/08000/Measurement_and_Correlates_of_Physicians_Lifelong.21.aspx</a>. 2021.</li> </ul> |

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|  | <ul style="list-style-type: none"><li>• Lockspeiser TM, Schmitter PA, Lane JL, Hanson JL, Rosenberg AA, Park YS. Assessing residents' written learning goals and goal writing skill: Validity evidence for the learning goal scoring rubric. <i>Academic Medicine</i>. 2013;88(10):1558-1563.<br/><a href="https://journals.lww.com/academicmedicine/fulltext/2013/10000/Assessing_Residents_Written_Learning_Goals_and.39.aspx">https://journals.lww.com/academicmedicine/fulltext/2013/10000/Assessing_Residents_Written_Learning_Goals_and.39.aspx</a>. 2021.</li></ul> |
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| <b>Professionalism 1: Professional Behavior</b>                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| <b>Overall Intent:</b> To recognize and address lapses in professional behavior, demonstrates professional behaviors, and use appropriate resources for managing professional dilemmas |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Milestones</b>                                                                                                                                                                      | <b>Examples</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Level 1</b> <i>Identifies and describes potential triggers for professionalism lapses and how to act upon professionalism lapses</i>                                                | <ul style="list-style-type: none"> <li>Identifies that professionalism impacts patient outcomes</li> <li>Identifies that stressors such as sleep deprivation and home stress can be potential triggers for professionalism lapses</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Level 2</b> <i>Demonstrates professional behavior in routine situations and takes responsibility for one's own professionalism lapses</i>                                           | <ul style="list-style-type: none"> <li>Is usually prepared and on time and when late, apologizes to the team</li> <li>Identifies procedures for dealing with unprofessional behavior, including ethics team, ombudsmen, and peer review</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Level 3</b> <i>Demonstrates professional behavior in complex or stressful situations</i>                                                                                            | <ul style="list-style-type: none"> <li>Remains an active listener to concerns when divorced parents of a patient disagree on next steps in care</li> <li>During night coverage, receives multiple pages and must prioritize responses</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Level 4</b> <i>Recognizes situations that may trigger professionalism lapses and/or intervenes to prevent lapses in oneself and others</i>                                          | <ul style="list-style-type: none"> <li>Offers to complete admissions for another resident who has had a busy call night so the colleague can return home to sleep</li> <li>Works to improve work distribution and call schedule to reduce resident fatigue</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Level 5</b> <i>Coaches others when their behavior fails to meet professional expectations</i>                                                                                       | <ul style="list-style-type: none"> <li>Coaches a colleague who is disrespectful to a consulting service how to help their behavior meet professional expectations</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Assessment Models or Tools                                                                                                                                                             | <ul style="list-style-type: none"> <li>Direct observation</li> <li>Multisource feedback</li> <li>Oral or written self-reflection (e.g., of a personal or observed lapse, ethical dilemma, or systems-level factors)</li> <li>Simulation</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Curriculum Mapping                                                                                                                                                                     | <ul style="list-style-type: none"> <li></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Notes or Resources                                                                                                                                                                     | <ul style="list-style-type: none"> <li>American Medical Association. Ethics. <a href="http://www.ama-assn.org/delivering-care/ethics">http://www.ama-assn.org/delivering-care/ethics</a>. 2021.</li> <li>Bynny RL, Paauw DS, Papadakis MA, Pfeil S, Alpha Omega Alpha. <i>Medical Professionalism Best Practices: Professionalism in the Modern Era</i>. Menlo Park, CA: Alpha Omega Alpha Honor Medical Society; 2017. <a href="http://alphaomegaalpha.org/pdfs/Monograph2018.pdf">http://alphaomegaalpha.org/pdfs/Monograph2018.pdf</a>. 2021.</li> <li>Levinson W, Ginsburg S, Hafferty FW, Lucey CR. <i>Understanding Medical Professionalism</i>. New York, NY: McGraw-Hill Education; 2014. <a href="https://accessmedicine.mhmedical.com/book.aspx?bookID=1058">https://accessmedicine.mhmedical.com/book.aspx?bookID=1058</a>. 2021.</li> </ul> |

| <b>Professionalism 2: Ethical Principles</b>                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| <b>Overall Intent:</b> To recognize and address lapses in ethical behavior, demonstrates ethical behaviors, and use appropriate resources for managing ethical dilemmas      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Milestones</b>                                                                                                                                                            | <b>Examples</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Level 1</b> <i>Demonstrates knowledge of fundamental ethical principles</i>                                                                                               | <ul style="list-style-type: none"> <li>• Discusses the basic principles underlying ethics (autonomy, beneficence, non-maleficence, justice) and professionalism (professional values and commitments)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Level 2</b> <i>Analyzes straightforward situations using ethical principles and recognizes the need to seek help in managing and resolving complex ethical situations</i> | <ul style="list-style-type: none"> <li>• Refuses to prescribe a stimulant to a student who does not have ADHD but wants to do better in math</li> <li>• Contacts the ethics committee when a patient in the ICU is on a ventilator and the parents disagree about the next steps</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Level 3</b> <i>Analyzes complex situations using ethical principles</i>                                                                                                   | <ul style="list-style-type: none"> <li>• Demonstrates understanding of autonomy and beneficence when explaining to a 17-year-old patient with intellectual disability why the patient needs surgery as part of obtaining informed consent</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Level 4</b> <i>Recognizes and uses appropriate resources for managing and resolving ethical dilemmas as needed</i>                                                        | <ul style="list-style-type: none"> <li>• Suggests to an attending that an ethics consultation may be warranted in the case of a 10-year old visiting from a resource-poor country who needs a feeding gastrostomy tube placed due to dysphagia</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Level 5</b> <i>Identifies and seeks to address system-level factors that induce or exacerbate ethical problems or impede their resolution</i>                             | <ul style="list-style-type: none"> <li>• Seeks to develop an institutional protocol for informed consent in patients with intellectual disability</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Assessment Models or Tools                                                                                                                                                   | <ul style="list-style-type: none"> <li>• Direct observation</li> <li>• Multisource feedback</li> <li>• Oral or written self-reflection (e.g., of a personal or observed lapse, ethical dilemma, or systems-level factors)</li> <li>• Simulation</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Curriculum Mapping                                                                                                                                                           | <ul style="list-style-type: none"> <li>•</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Notes or Resources                                                                                                                                                           | <ul style="list-style-type: none"> <li>• American Medical Association. Ethics. <a href="http://www.ama-assn.org/delivering-care/ethics">http://www.ama-assn.org/delivering-care/ethics</a>. 2021.</li> <li>• Bynny RL, Paauw DS, Papadakis MA, Pfeil S, Alpha Omega Alpha. <i>Medical Professionalism Best Practices: Professionalism in the Modern Era</i>. Menlo Park, CA: Alpha Omega Alpha Honor Medical Society; 2017. <a href="http://alphaomegalpha.org/pdfs/Monograph2018.pdf">http://alphaomegalpha.org/pdfs/Monograph2018.pdf</a>. 2021.</li> <li>• Levinson W, Ginsburg S, Hafferty FW, Lucey CR. <i>Understanding Medical Professionalism</i>. New York, NY: McGraw-Hill Education; 2014. <a href="https://accessmedicine.mhmedical.com/book.aspx?bookID=1058">https://accessmedicine.mhmedical.com/book.aspx?bookID=1058</a>. 2021.</li> </ul> |

| <b>Professionalism 3: Accountability/Conscientiousness</b><br><b>Overall Intent:</b> To take responsibility for one's own actions and the impact on patients and other members of the health care team                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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| Milestones                                                                                                                                                                                                                                                                                                           | Examples                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Level 1</b> <i>Takes responsibility for failure to complete tasks and responsibilities, identifies potential contributing factors, and describes strategies for ensuring timely task completion in the future</i><br><br><i>Responds promptly to requests or reminders to complete tasks and responsibilities</i> | <ul style="list-style-type: none"> <li>• Takes responsibility for consistently coming late to rounds and identifies sleep issues with newborn at home as contributing to tardiness and proposes using multiple alarm clocks to remedy the situation</li> <li>• Responds promptly to reminders from program administrator to complete work hour logs</li> </ul>                                                                                                                                                             |
| <b>Level 2</b> <i>Performs tasks and responsibilities in a timely manner with appropriate attention to detail in routine situations</i><br><br><i>Recognizes situations that may impact one's own ability to complete tasks and responsibilities in a timely manner</i>                                              | <ul style="list-style-type: none"> <li>• Communicates results to outpatients in a timely fashion</li> <li>• Addresses inbox before leaving for vacation</li> <li>• Asks colleague to cover their inbox the week before board exams</li> </ul>                                                                                                                                                                                                                                                                              |
| <b>Level 3</b> <i>Performs tasks and responsibilities in a timely manner with appropriate attention to detail in complex or stressful situations</i><br><br><i>Proactively implements strategies to ensure the needs of patients, teams, and systems are met</i>                                                     | <ul style="list-style-type: none"> <li>• Appropriately notifies resident on day service about overnight call events during transition of care or hand-off</li> <li>• Notifies attending of multiple competing demands on call, appropriately triages tasks, and asks for assistance from other residents or faculty members, if needed</li> <li>• When post call or on vacation, arranges for cross coverage, communicates with office staff, and creates an out of office message</li> </ul>                              |
| <b>Level 4</b> <i>Manages situations that may impact others' ability to complete tasks and responsibilities in a timely manner</i><br><br><i>Models the strategies to ensure the needs of patients, teams, and systems are met</i>                                                                                   | <ul style="list-style-type: none"> <li>• Senior residents advise junior residents how to manage their time in completing patient care tasks; escalates to communicating with program director if problem requires a system-based approach and needs addressing at a higher administrative level</li> <li>• Anticipates potential adverse outcomes and needs (physical, social, economic, etc.) and discusses with the multidisciplinary team for a patient with a new diagnosis of a neurodegenerative disorder</li> </ul> |
| <b>Level 5</b> <i>Identifies and seeks to address system-level factors that impact completion of tasks</i>                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>• Sets up a meeting with the nurse manager to streamline patient discharges</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                              |

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| <i>Coaches others to develop strategies to ensure the needs of patients, teams, and systems are met</i> | <ul style="list-style-type: none"> <li>• Coaches junior residents to do a QI project to improve clinic workflow and tracking diagnostic results</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Assessment Models or Tools                                                                              | <ul style="list-style-type: none"> <li>• Compliance with deadlines and timelines</li> <li>• Direct observation</li> <li>• Multisource feedback</li> <li>• Self-evaluations and reflective tools</li> <li>• Simulation</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Curriculum Mapping                                                                                      | <ul style="list-style-type: none"> <li>•</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Notes or Resources                                                                                      | <ul style="list-style-type: none"> <li>• AMA. AMA GME Competency Education Program. <a href="https://edhub.ama-assn.org/gcep">https://edhub.ama-assn.org/gcep</a>. 2021. <ul style="list-style-type: none"> <li>◦ Modules on professionalism</li> </ul> </li> <li>• Bynny RL, Paauw DS, Papadakis MA, Pfeil S, Alpha Omega Alpha. <i>Medical Professionalism Best Practices: Professionalism in the Modern Era</i>. Menlo Park, CA: Alpha Omega Alpha Honor Medical Society; 2017. <a href="http://alphaomegaalpha.org/pdfs/Monograph2018.pdf">http://alphaomegaalpha.org/pdfs/Monograph2018.pdf</a>. 2021.</li> <li>• Code of conduct from fellow/resident institutional manual</li> <li>• Expectations of residency program regarding accountability and professionalism</li> <li>• Levinson W, Ginsburg S, Hafferty FW, Lucey CR. <i>Understanding Medical Professionalism</i>. New York, NY: McGraw-Hill Education; 2014. <a href="https://accessmedicine.mhmedical.com/book.aspx?bookID=1058">https://accessmedicine.mhmedical.com/book.aspx?bookID=1058</a>. 2021.</li> </ul> |

| Professionalism 4: Well-Being                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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| <b>Overall Intent:</b> To identify, use, manage, improve, and seek help for personal and professional well-being for self and others |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Milestones                                                                                                                           | Examples                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Level 1</b> <i>With assistance, recognizes status of personal and professional well-being</i>                                     | <ul style="list-style-type: none"> <li>• Accepts feedback and exhibits positive responses to constructive criticism or suggestions for change</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Level 2</b> <i>Independently recognizes status of personal and professional well-being</i>                                        | <ul style="list-style-type: none"> <li>• Recognizes when other team members are sleep deprived</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Level 3</b> <i>With assistance, proposes a plan to promote personal and professional well-being</i>                               | <ul style="list-style-type: none"> <li>• With guidance from the program director, makes room in daily schedule for personal time and hobbies</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Level 4</b> <i>Independently develops a plan to promote personal and professional well-being</i>                                  | <ul style="list-style-type: none"> <li>• Arranges for team-building activities to help reduce stress</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Level 5</b> <i>Supports the departmental well-being program</i>                                                                   | <ul style="list-style-type: none"> <li>• Mentors colleagues in self-awareness and establishes plans to limit stress and burnout</li> <li>• Provides leadership to departmental wellness activities</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Assessment Models or Tools                                                                                                           | <ul style="list-style-type: none"> <li>• Direct observation</li> <li>• Group interview or discussions for team activities</li> <li>• Individual interview</li> <li>• Institutional online training modules</li> <li>• Participation in institutional well-being programs</li> <li>• Personal learning plan</li> <li>• Self-assessment</li> <li>• Self-reflection</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Curriculum Mapping                                                                                                                   | <ul style="list-style-type: none"> <li>•</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Notes or Resources                                                                                                                   | <ul style="list-style-type: none"> <li>• This subcompetency is not intended to evaluate a fellow's well-being. Rather, the intent is to ensure that each fellow has the fundamental knowledge of factors that affect well-being, the mechanisms by which those factors affect well-being, and available resources and tools to improve well-being.</li> <li>• American Academy of Neurology. Residency Program Wellness. <a href="https://www.aan.com/tools-and-resources/academic-neurologists-researchers/program-and-fellowship-director-resources/residency-program-wellness/">https://www.aan.com/tools-and-resources/academic-neurologists-researchers/program-and-fellowship-director-resources/residency-program-wellness/</a>. 2021.</li> <li>• ACGME. "Well-Being Tools and Resources." <a href="https://dl.acgme.org/pages/well-being-tools-resources">https://dl.acgme.org/pages/well-being-tools-resources</a>. 2021.</li> </ul> |

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|  | <ul style="list-style-type: none"><li>• Hicks PJ, Schumacher D, Guralnick S, Carraccio C, Burke AE. Domain of competence: personal and professional development. <i>Acad Pediatr</i>. 2014;14(2 Suppl):S80-97. <a href="https://www.academicpedsjnl.net/article/S1876-2859(13)00332-X/fulltext">https://www.academicpedsjnl.net/article/S1876-2859(13)00332-X/fulltext</a>. 2021.</li><li>• Local resources, including Employee Assistance</li><li>• National Academy of Medicine. Action Collaborative on Clinical Well-Being and Resilience. <a href="https://nam.edu/initiatives/clinician-resilience-and-well-being/">https://nam.edu/initiatives/clinician-resilience-and-well-being/</a>. 2021.</li></ul> |
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| <b>Professionalism 5: Patient Care Etiquette with Patients of All Abilities</b><br><b>Overall Intent:</b> To attend to the comfort and dignity of all patients regardless of any impairment or disability      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| <b>Milestones</b>                                                                                                                                                                                              | <b>Examples</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Level 1</b> <i>Recognizes the need to respect the dignity of all patients regardless of impairments or disabilities</i>                                                                                     | <ul style="list-style-type: none"> <li>• Understands that all patients should be treated with respect, with due attention to their comfort and dignity, regardless of disability</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Level 2</b> <i>Demonstrates specific elements of verbal and physical communication that reflect respect for people with impairments or disabilities</i>                                                     | <ul style="list-style-type: none"> <li>• Sits at the level of a wheelchair for conversation with a patient who uses a wheelchair</li> <li>• Treats the wheelchair as part of the patient's personal space</li> <li>• Talks directly to the person with disability not through a caregiver or companion</li> <li>• Uses language that emphasizes the individual person and not just the disability when referring to the patient ("a person with paraplegia", not "a paraplegic")</li> <li>• Adjusts pillows and blanket if needed after examination, and replaces the call button or wheelchair so it is accessible to the patient if moved during patient examination in bed</li> <li>• Identifies self and makes the patient aware verbally before making physical contact with a patient who is blind</li> <li>• Helps adjust clothing to maximize modesty during the exam</li> </ul> |
| <b>Level 3</b> <i>Proactively maintains patients' comfort and dignity during history taking and physical examination for those with mild impairments or disabilities</i>                                       | <ul style="list-style-type: none"> <li>• Takes care to avoid causing discomfort to the patient while testing active range of motion of an inflamed knee joint</li> <li>• Approaches a patient with a right visual field defect from the patient's left (intact) side as not startle the patient</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Level 4</b> <i>Proactively maintains patients' comfort and dignity during history taking and physical examination for those with severe impairments or disabilities</i>                                     | <ul style="list-style-type: none"> <li>• Turns a patient with dense hemiplegia with ease during physical examination without pulling on the weak arm, keeps the weak arm supported at all times during the turn, and appropriately uses techniques such as bending the opposite knee or crossing the patient's ankles in the direction of the turn to facilitate the movement; controls any spasms provoked by the movement by exerting gentle pressure on the spastic limb</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Level 5</b> <i>Serves as a role model and as a resource for others by coaching them in behaviors and actions that optimize the comfort, dignity, and respect of people with impairments or disabilities</i> | <ul style="list-style-type: none"> <li>• Is recognized as a role model for demonstrating disability etiquette in clinical interactions and selected to teach a workshop on optimal techniques to examine patients with different disabling conditions</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Assessment Models or Tools</b>                                                                                                                                                                              | <ul style="list-style-type: none"> <li>• Direct observation</li> <li>• Global evaluation</li> <li>• Mentor and program director observations</li> <li>• Multisource feedback</li> <li>• Oral or written self-reflection</li> <li>• Simulation</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

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| Curriculum Mapping | •                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Notes or Resources | <ul style="list-style-type: none"> <li>• Sabharwal S. Assessment of competency in positioning and movement of physically disabled patients. <i>Acad Med</i>. 2000;75(5):525.<br/><a href="https://journals.lww.com/academicmedicine/Fulltext/2000/05000/Assessment_of_Competency_in_Positioning_and.47.aspx">https://journals.lww.com/academicmedicine/Fulltext/2000/05000/Assessment_of_Competency_in_Positioning_and.47.aspx</a>. 2021.</li> <li>• Sabharwal S. Objective assessment and structured teaching of disability etiquette. <i>Acad Med</i>. 2001;76(5):509.<br/><a href="https://journals.lww.com/academicmedicine/Fulltext/2001/05000/Objective_Assessment_and_Structured_Teaching_of.38.aspx#pdf-link">https://journals.lww.com/academicmedicine/Fulltext/2001/05000/Objective_Assessment_and_Structured_Teaching_of.38.aspx#pdf-link</a>. 2021.</li> <li>• United Spinal Association. <i>Disability Etiquette: Tips on Interacting with People with Disabilities</i>. New York, NY: United Spinal Association; 2019.<br/><a href="https://www.unitedspinal.org/pdf/DisabilityEtiquette.pdf">https://www.unitedspinal.org/pdf/DisabilityEtiquette.pdf</a>. 2021.</li> </ul> |

| <b>Interpersonal and Communication Skills 1: Patient- and Family-Centered Communication</b><br><b>Overall Intent:</b> To deliberately use language and behaviors to form constructive relationships with patients, to identify communication barriers including self-reflection on personal biases, and minimize them in the doctor-patient relationships; organize and lead communication around shared decision making |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| <b>Milestones</b>                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Examples</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Level 1</b> <i>Uses language and non-verbal behavior to demonstrate respect and establish rapport</i><br><br><i>Identifies common barriers to effective communication while accurately communicating own role within the health care system</i>                                                                                                                                                                       | <ul style="list-style-type: none"> <li>• Self-monitors and controls tone, non-verbal responses, and language and asks questions to invite patient/family participation</li> <li>• Accurately communicates their role in the health care system to patients/families</li> <li>• Readily uses a certified medical interpreter</li> <li>• Avoids medical jargon when talking to patients, meets families where they are and communicates with appropriate level of understanding</li> <li>• Recognizes the role of implicit bias during interactions with patients and families</li> </ul> |
| <b>Level 2</b> <i>Establishes a therapeutic relationship in straightforward encounters using active listening and clear language</i><br><br><i>Identifies complex barriers to effective communication</i>                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>• Uses active listening, attention to affect, and questions that optimally explore the active issues and context when speaking with patients and families</li> <li>• Identifies complex communication barriers such as a family that is unable to read the instructions for medication titration</li> </ul>                                                                                                                                                                                                                                      |
| <b>Level 3</b> <i>Establishes a therapeutic relationship in challenging patient encounters</i><br><br><i>When prompted, reflects on personal biases while attempting to minimize communication barriers</i>                                                                                                                                                                                                              | <ul style="list-style-type: none"> <li>• Establishes and maintains a therapeutic relationship by discussing medical management with a patient adamantly opposed to medication</li> <li>• With guidance, recognizes personal bias to natural remedies</li> </ul>                                                                                                                                                                                                                                                                                                                         |
| <b>Level 4</b> <i>Easily establishes therapeutic relationships, with attention to patient's/patient's family's concerns and context, regardless of complexity</i><br><br><i>Independently recognizes personal biases while attempting to proactively minimize communication barriers</i>                                                                                                                                 | <ul style="list-style-type: none"> <li>• Establishes a therapeutic relationship with divorced parents who have differing opinions on the patient's care</li> <li>• Repeats an implicit bias test after working to address previously identified biases</li> <li>• Attends workshops on implicit bias to gain insight into behaviors</li> </ul>                                                                                                                                                                                                                                          |
| <b>Level 5</b> <i>Mentors others in situational awareness and critical self-reflection to consistently develop positive therapeutic relationships</i>                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>• Leads discussions on self-reflection and how it can improve care</li> <li>• Is an example to others of leading shared decision making with clear recommendations to patients and families even in more complex clinical situations</li> </ul>                                                                                                                                                                                                                                                                                                  |

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|-------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Role models self-awareness practice while identifying teaching a contextual approach to minimize communication barriers |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Assessment Models or Tools                                                                                              | <ul style="list-style-type: none"> <li>• Direct observation</li> <li>• Multisource feedback</li> <li>• Self-assessment including self-reflection exercises</li> <li>• Standardized patients or structured case discussions</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Curriculum Mapping                                                                                                      | •                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Notes or Resources                                                                                                      | <ul style="list-style-type: none"> <li>• Laidlaw A, Hart J. Communication skills: an essential component of medical curricula. Part I: Assessment of clinical communication: AMEE Guide No. 51. <i>Med Teach</i>. 2011;33(1):6-8.<br/><a href="https://www.researchgate.net/publication/49706184_Communication_skills_An_essential_component_of_medical_curricula_Part_I_Assessment_of_clinical_communication_Amee_Guide_No_511">https://www.researchgate.net/publication/49706184_Communication_skills_An_essential_component_of_medical_curricula_Part_I_Assessment_of_clinical_communication_Amee_Guide_No_511</a>. 2021.</li> <li>• Makoul G. Essential elements of communication in medical encounters: The Kalamazoo consensus statement. <i>Acad Med</i>. 2001;76(4):390-393.<br/><a href="https://www.researchgate.net/publication/264544600_Essential_elements_of_communication_in_medical_encounters_The_Kalamazoo_Consensus_Statement">https://www.researchgate.net/publication/264544600_Essential_elements_of_communication_in_medical_encounters_The_Kalamazoo_Consensus_Statement</a>. 2021.</li> <li>• Makoul G. The SEGUE Framework for teaching and assessing communication skills. <i>Patient Educ Couns</i>. 2001;45(1):23-34.<br/><a href="https://www.researchgate.net/publication/11748796_The_SEGUE_Framework_for_teaching_and_assessing_communication_skills">https://www.researchgate.net/publication/11748796_The_SEGUE_Framework_for_teaching_and_assessing_communication_skills</a>. 2021.</li> <li>• Symons AB, Swanson A, McGuigan D, Orrange S, Akl EA. A tool for self-assessment of communication skills and professionalism in residents. <i>BMC Med Educ</i>. 2009;9:1.<br/><a href="https://bmcmmededuc.biomedcentral.com/articles/10.1186/1472-6920-9-1">https://bmcmmededuc.biomedcentral.com/articles/10.1186/1472-6920-9-1</a>. 2021.</li> </ul> |

| <b>Interpersonal and Communication Skills 2: Patient and Family Education</b><br><b>Overall Intent:</b> To effectively educate patients and use shared decision making to improve outcomes                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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| <b>Milestones</b>                                                                                                                                                                                                                                                                                                            | <b>Examples</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Level 1</b> <i>Recognizes link between patient outcomes and education</i><br><br><i>Identifies the need to adjust communication strategies based on each patient's/patient's family's expectations and understanding of their health status and treatment options</i>                                                     | <ul style="list-style-type: none"> <li>• Recognizes that the patient should understand their diagnosis of epilepsy and the importance of taking their medication to prevent seizures</li> <li>• Knows when to provide information to families in their native language about seizures to better inform them about their child's epilepsy</li> </ul>                                                                                                                                                                                           |
| <b>Level 2</b> <i>Describes methods for effective patient and patient family education</i><br><br><i>Organizes and initiates communication with patients and their families by introducing stakeholders, setting the agenda, clarifying expectations, and verifying understanding of the clinical situation</i>              | <ul style="list-style-type: none"> <li>• Tells a more junior resident how to access an appropriate seizure action plan</li> <li>• Coordinates additional teaching opportunities for families, such as a nursing teaching session about rescue medication for a patient with newly diagnosed epilepsy</li> </ul>                                                                                                                                                                                                                               |
| <b>Level 3</b> <i>Educates patients and their families effectively in straightforward situations, including eliciting understanding of information provided</i><br><br><i>Compassionately delivers medical information, elicits patient/family values, goals, and preferences, and acknowledges uncertainty and conflict</i> | <ul style="list-style-type: none"> <li>• Provides succinct and relevant family education which families find helpful and understandable</li> <li>• For a patient with cerebral palsy, educates the family about what is known and the limits of treatment saying, "I don't know" when that is the case and follows up appropriately</li> <li>• Compassionately conveys education in a conversational manner without lecturing, and continually checks in (verbally or non-verbally) to confirm patient and families' understanding</li> </ul> |
| <b>Level 4</b> <i>Educates patients and their families effectively in complex situations</i><br><br><i>Uses shared decision making to align patient/family values, goals, and preferences with treatment options to make a personalized care plan</i>                                                                        | <ul style="list-style-type: none"> <li>• For a patient with neuronal ceroid lipofuscinosis, educates the family about what is known and the limits of treatment saying, "I don't know" when that is the case and follows up appropriately</li> <li>• Elicits family preferences and formulates an appropriate treatment plan taking these preferences into consideration</li> </ul>                                                                                                                                                           |

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| <p><b>Level 5</b> <i>Educates patients and their families in self-advocacy, community outreach, and activism</i></p> <p><i>Models shared decision making in patient/family communication, including those with a high degree of uncertainty/conflict</i></p> | <ul style="list-style-type: none"> <li>• Goes to local schools to educate students and staff members about epilepsy and seizure first aid</li> <li>• The resident is seen as a positive role model for effective communication during an interdisciplinary family meeting</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Assessment Models or Tools                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>• Direct observation</li> <li>• Multisource feedback</li> <li>• Self-assessment</li> <li>• Self-reflection</li> <li>• Standardized patients or structured case discussions</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Curriculum Mapping                                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>•</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Notes or Resources                                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>• Jotterand F, Amodio A, Elger BS. Patient education as empowerment and self-rebiasing. <i>Med Health Care Philos.</i> 2016;19(4):553-561. <a href="https://link.springer.com/article/10.1007%2Fs11019-016-9702-9">https://link.springer.com/article/10.1007%2Fs11019-016-9702-9</a>. 2021.</li> <li>• Lindeman, CA. Patient education. <i>Annu Rev Nur Res.</i> 1988;6:29-60. <a href="https://pubmed.ncbi.nlm.nih.gov/3291915/">https://pubmed.ncbi.nlm.nih.gov/3291915/</a>. 2021.</li> <li>• Parent K, Jones K, Phillips L, Stojan JN, House JB. Teaching patient and family-centered care: Integrating shared humanity into medical education curricula. <i>AMA J Ethics.</i> 2016;18(1):24-32. <a href="https://journalofethics.ama-assn.org/sites/journalofethics.ama-assn.org/files/2018-06/medu1-1601.pdf">https://journalofethics.ama-assn.org/sites/journalofethics.ama-assn.org/files/2018-06/medu1-1601.pdf</a>. 2021.</li> <li>• Vital Talks</li> </ul> |

| <b>Interpersonal and Communication Skills 3: Interprofessional and Team Communication</b><br><b>Overall Intent:</b> To effectively communicate with the health care team, including consultants, in both straightforward and complex situations                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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| <b>Milestones</b>                                                                                                                                                                                                                                                 | <b>Examples</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Level 1</b> <i>Respectfully requests and/or receives a consultation</i><br><br><i>Uses language that values all members of the health care team</i><br><br><i>Understands the importance of feedback</i>                                                       | <ul style="list-style-type: none"> <li>• Shows respect in health care team communications through words and actions</li> <li>• Uses respectful communication to all staff members</li> <li>• Listens to and considers others' points of view, is nonjudgmental and actively engaged, and demonstrates humility</li> </ul>                                                                                                                                                                                                                                                            |
| <b>Level 2</b> <i>Clearly and concisely requests or responds to a consultation</i><br><br><i>Communicates information effectively with all members of the health care team</i><br><br><i>Solicits feedback on performance as a member of the health care team</i> | <ul style="list-style-type: none"> <li>• Communicates back to referring provider the specific recommendations after performing a consult</li> <li>• When transferring a patient to a different service, communicates change to all members of the team</li> <li>• Asks nurses for feedback after a rotation</li> </ul>                                                                                                                                                                                                                                                               |
| <b>Level 3</b> <i>Checks own or others' understanding of consultation</i><br><br><i>Uses active listening to adapt communication style to fit team needs</i><br><br><i>Communicates concerns and provides feedback to peers and learners</i>                      | <ul style="list-style-type: none"> <li>• Verifies understanding of own communications by restating critical values and unexpected diagnoses using closed loop communication</li> <li>• Demonstrates active listening by fully focusing on all members of the team, actively showing verbal and non-verbal signs (eye contact, posture, reflection, questioning, summarization)</li> <li>• Respectfully and regularly provides feedback to junior members of the medical team for the purposes of improvement or reinforcement of correct knowledge, skills, and attitudes</li> </ul> |
| <b>Level 4</b> <i>Coordinates recommendations from different members of the health care team to optimize patient care</i><br><br><i>Communicates feedback and constructive criticism to superiors</i>                                                             | <ul style="list-style-type: none"> <li>• Incorporates recommendations from nurses to adjust medication schedule so as not to interfere with patient sleep schedule</li> <li>• Offers suggestions to negotiate or resolve conflicts among health care team members; raises concerns or provides opinions and feedback, when needed, to superiors on the team</li> </ul>                                                                                                                                                                                                               |

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| <p><b>Level 5 Models flexible communication strategies that value input from all health care team members, resolving conflict when needed</b></p> <p><i>Facilitates regular health care team-based feedback in complex situations</i></p> | <ul style="list-style-type: none"> <li>• The resident is seen as a positive role model by the junior residents for resolving conflict within the health care team</li> <li>• Organizes a team meeting to discuss and resolve potentially conflicting points of view on a plan of care (e.g., therapeutic apheresis for rare neurological condition, use of rare resources)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <p>Assessment Models or Tools</p>                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>• Direct observation</li> <li>• Medical record (chart) audit</li> <li>• Multisource feedback</li> <li>• Self-reflection</li> <li>• Simulation</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <p>Curriculum Mapping</p>                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>•</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <p>Notes or Resources</p>                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>• Braddock CH III, Edwards KA, Hasenberg NM, Laidley TL, Levinson W. Informed decision making in outpatient practice: time to get back to basics. <i>JAMA</i>. 1999;282(24):2313-2320. <a href="https://jamanetwork.com/journals/jama/fullarticle/192233">https://jamanetwork.com/journals/jama/fullarticle/192233</a>. 2021.</li> <li>• Dehon E, Simpson K, Fowler D, Jones A. Development of the faculty 360. <i>MedEdPORTAL</i>. 2015;11:10174. <a href="https://www.mededportal.org/publication/10174/">https://www.mededportal.org/publication/10174/</a>. 2019.</li> <li>• Fay D, Mazzone M, Douglas L, Ambuel B. A validated, behavior-based evaluation instrument for family medicine residents. <i>MedEdPORTAL</i>. 2007. <a href="https://www.mededportal.org/publication/622/">https://www.mededportal.org/publication/622/</a>. 2021.</li> <li>• Green M, Parrott T, Cook G. Improving your communication skills. <i>BMJ</i>. 2012;344:e357. <a href="https://www.bmj.com/content/344/bmj.e357">https://www.bmj.com/content/344/bmj.e357</a>. 2021.</li> <li>• Henry SG, Holmboe ES, Frankel RM. Evidence-based competencies for improving communication skills in graduate medical education: a review with suggestions for implementation. <i>Med Teach</i>. 2013;35(5):395-403. <a href="https://www.tandfonline.com/doi/full/10.3109/0142159X.2013.769677">https://www.tandfonline.com/doi/full/10.3109/0142159X.2013.769677</a>. 2021.</li> <li>• Lane JL, Gottlieb RP. Structured clinical observations: a method to teach clinical skills with limited time and financial resources. <i>Pediatrics</i>. 2000;105(4 Pt 2):973-977. <a href="https://www.ncbi.nlm.nih.gov/pubmed/10742358">https://www.ncbi.nlm.nih.gov/pubmed/10742358</a>. 2021.</li> <li>• Roth CG, Eldin KW, Padmanabhan V, Freidman EM. Twelve tips for the introduction of emotional intelligence in medical education. <i>Med Teach</i>. 2018:1-4. <a href="https://www.tandfonline.com/doi/full/10.1080/0142159X.2018.1481499">https://www.tandfonline.com/doi/full/10.1080/0142159X.2018.1481499</a>. 2021.</li> </ul> |

| <b>Interpersonal and Communication Skills 4: Communication within Health Care Systems</b><br><b>Overall Intent:</b> To communicate effectively using a variety of methods                                                                                             |                                                                                                                                                                                                                                                                                                            |
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| <b>Milestones</b>                                                                                                                                                                                                                                                     | <b>Examples</b>                                                                                                                                                                                                                                                                                            |
| <b>Level 1</b> <i>Accurately records information in the patient record as required by institutional policy</i><br><br><i>Describes appropriate use of documentation shortcuts as required by institutional policy</i>                                                 | <ul style="list-style-type: none"> <li>• Notes are accurate but may include extraneous information</li> <li>• Identifies smart phrases/prepared scripts in the EHR for clinic note writing</li> </ul>                                                                                                      |
| <b>Level 2</b> <i>Demonstrates organized diagnostic and therapeutic reasoning through notes in the patient record</i><br><br><i>Accurate, timely, and appropriate use of documentation shortcuts in formats specified by institutional policy</i>                     | <ul style="list-style-type: none"> <li>• Creates organized and accurate notes that may contain extraneous information</li> <li>• Uses smart phrases/prepared scripts and templates appropriately</li> </ul>                                                                                                |
| <b>Level 3</b> <i>Concisely reports diagnostic and therapeutic reasoning in the patient record</i><br><br><i>Appropriately selects direct (e.g., telephone, in-person) and indirect (e.g., progress notes, text messages) forms of communication based on context</i> | <ul style="list-style-type: none"> <li>• Documentation is accurate, organized, and concise, but may not consistently contain contingency planning for change in condition (anticipatory guidance)</li> <li>• Uses appropriate method of communication to share results needing urgent attention</li> </ul> |
| <b>Level 4</b> <i>Communicates clearly, concisely, timely, and in an organized written form, including anticipatory guidance</i><br><br><i>Achieves written or verbal communication (e.g., patient notes, email) that serves as an example for others to follow</i>   | <ul style="list-style-type: none"> <li>• Documentation is accurate, organized, and concise and includes anticipatory guidance</li> <li>• Others turn to this resident for examples of note template</li> <li>• Nurses evaluate this resident as having timely notes</li> </ul>                             |
| <b>Level 5</b> <i>Models feedback to improve others' written communication</i><br><br><i>Participates in developing departmental or institutional communication around policies and procedures</i>                                                                    | <ul style="list-style-type: none"> <li>• Teaches colleagues how to improve discharge summaries</li> <li>• Leads a QI initiative to improve house staff hand-offs</li> </ul>                                                                                                                                |
| <b>Assessment Models or Tools</b>                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>• Direct observation</li> </ul>                                                                                                                                                                                                                                     |

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|                    | <ul style="list-style-type: none"> <li>• Medical record (chart) audit</li> <li>• Multisource feedback</li> <li>• Portfolio review</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Curriculum Mapping | •                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Notes or Resources | <ul style="list-style-type: none"> <li>• Bierman JA, Hufmeyer KK, Liss DT, Weaver AC, Heiman HL. Promoting responsible electronic documentation: validity evidence for a checklist to assess progress notes in the electronic health record. <i>Teach Learn Med.</i> 2017;29(4):420-432. <a href="https://www.tandfonline.com/doi/full/10.1080/10401334.2017.1303385">https://www.tandfonline.com/doi/full/10.1080/10401334.2017.1303385</a>. 2021.</li> <li>• Haig KM, Sutton S, Whittington J. SBAR: a shared mental model for improving communication between clinicians. <i>Jt Comm J Qual Patient Saf.</i> 2006;32(3)167-175. <a href="https://www.ncbi.nlm.nih.gov/pubmed/16617948">https://www.ncbi.nlm.nih.gov/pubmed/16617948</a>. 2021.</li> <li>• Starmer AJ, Spector ND, Srivastava R, et al. I-PASS, a mnemonic to standardize verbal handoffs. <i>Pediatrics.</i> 2012;129(2):201-204. <a href="https://ipassinstitute.com/wp-content/uploads/2016/06/I-PASS-mnemonic.pdf">https://ipassinstitute.com/wp-content/uploads/2016/06/I-PASS-mnemonic.pdf</a>. 2021.</li> </ul> |

To help programs transition to the new version of the Milestones, the original Milestones 1.0 have been mapped to the new Milestones 2.0; it is indicated if subcompetencies are similar between versions. These are not exact matches but include some of the same elements. Not all subcompetencies map between versions. Inclusion or exclusion of any subcompetency does not change the educational value or impact on curriculum or assessment.

| <b>Milestones 1.0</b>                                  | <b>Milestones 2.0</b>                                                                                                                                                                 |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PC1: History                                           | PC1: Neurologic and Developmental History                                                                                                                                             |
| PC2: Neurological Exam                                 | PC2: Neurodevelopmental Examination<br>PC10: Determination of Death by Neurologic Criteria                                                                                            |
| PC3: Neurodevelopmental Exam                           | PC2: Neurodevelopmental Examination                                                                                                                                                   |
| PC4: Management/Treatment                              | PC5: Critical Care<br>PC6: Diagnosis and Management ion the Inpatient Setting<br>PC7: Diagnosis and Management in the Outpatient Setting                                              |
| PC5: Neurodevelopmental Disabilities                   | PC3: Neurodevelopmental Disabilities<br>PC5: Critical Care<br>PC6: Diagnosis and Management ion the Inpatient Setting<br>PC7: Diagnosis and Management in the Outpatient Setting      |
| PC6: Neurometabolic and Neurogenic Disorders           | PC5: Critical Care<br>PC6: Diagnosis and Management ion the Inpatient Setting<br>PC7: Diagnosis and Management in the Outpatient Setting                                              |
| PC7: Movement Disorders                                | PC5: Critical Care<br>PC6: Diagnosis and Management ion the Inpatient Setting<br>PC7: Diagnosis and Management in the Outpatient Setting                                              |
| PC8: Neuromuscular Disorders                           | PC5: Critical Care<br>PC6: Diagnosis and Management ion the Inpatient Setting<br>PC7: Diagnosis and Management in the Outpatient Setting<br>MK4: Electromyography                     |
| PC9: Cerebrovascular Disorders                         | PC5: Critical Care<br>PC6: Diagnosis and Management ion the Inpatient Setting<br>PC7: Diagnosis and Management in the Outpatient Setting                                              |
| PC10: Cognitive, Behavioral, and Psychiatric Disorders | PC4: Behavioral and Psychiatric Disorders<br>PC5: Critical Care<br>PC6: Diagnosis and Management ion the Inpatient Setting<br>PC7: Diagnosis and Management in the Outpatient Setting |
| PC11: Neuroimmunologic and White Matter Disorders      | PC5: Critical Care<br>PC6: Diagnosis and Management ion the Inpatient Setting                                                                                                         |

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|                                                                                                                   | PC7: Diagnosis and Management in the Outpatient Setting=                                                                                 |
| PC12: Epilepsy                                                                                                    | PC5: Critical Care<br>PC6: Diagnosis and Management ion the Inpatient Setting<br>PC7: Diagnosis and Management in the Outpatient Setting |
| PC13: Headache Syndromes                                                                                          | PC5: Critical Care<br>PC6: Diagnosis and Management ion the Inpatient Setting<br>PC7: Diagnosis and Management in the Outpatient Setting |
| PC14: Neuro-Oncology                                                                                              | PC5: Critical Care<br>PC6: Diagnosis and Management ion the Inpatient Setting<br>PC7: Diagnosis and Management in the Outpatient Setting |
| PC15: Neuroimaging                                                                                                | MK3: Neuroimaging                                                                                                                        |
| PC16: Electroencephalogram (EEG)                                                                                  | PC8: Electroencephalogram (EEG)                                                                                                          |
| PC17: Lumbar Puncture                                                                                             | PC9: Lumbar Puncture                                                                                                                     |
| MK1: Formulation                                                                                                  | PC5: Critical Care<br>PC6: Diagnosis and Management ion the Inpatient Setting<br>PC7: Diagnosis and Management in the Outpatient Setting |
| MK2: Development                                                                                                  | MK1: Development and Behavior                                                                                                            |
| MK3: Localization                                                                                                 | MK2: Localization                                                                                                                        |
| MK4: Diagnostic Investigation                                                                                     | MK5: Diagnostic Investigation                                                                                                            |
| SBP1: Community Resources                                                                                         | SBP5: Community Resources                                                                                                                |
| SBP2: Systems thinking, including cost- and risk-effective practice                                               | SBP4: Physician Role in Health Care Systems<br>SBP2: Quality Improvement                                                                 |
| SBP3: Work in inter-professional teams to enhance patient safety                                                  | SBP1: Patient Safety<br>SBP2: Quality Improvement                                                                                        |
|                                                                                                                   | SBP3: System of Care Delivery: Patient- and Family-Centered Care                                                                         |
|                                                                                                                   | SBP6: Access and Outcomes in the Neurodevelopmental Population                                                                           |
| PBLI1: Self-directed learning                                                                                     | PBLI2: Reflective Practice and Commitment to Personal Growth                                                                             |
| PBLI2: Locate, appraise, and assimilate evidence from scientific studies related to the patient's health problems | PBLI1: Evidence-Based in Informed Practice                                                                                               |

Neurodevelopmental Disabilities Supplemental Guide

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| PROF1: Compassion, integrity, accountability, and respect for self and others                                     | PROF1: Professional Behavior<br>PROF3: Accountability/Conscientiousness                                                                  |
| PROF2: Knowledge about, respect for, and adherence to the ethical principles relevant to the practice of medicine | PROF2: Ethical Principles                                                                                                                |
|                                                                                                                   | PROF4: Well-Being                                                                                                                        |
|                                                                                                                   | PROF5: Patient Care Etiquette with Patients of all Abilities                                                                             |
| ICS1: Relationship development, teamwork, and managing conflict                                                   | ICS1: Patient- and Family-Centered Communication<br>ICS2: Patient and Family Education<br>ICS3: Interprofessional and Team Communication |
| ICS2: Information sharing, gathering, and technology                                                              | ICS4: Communication within Health Care Systems                                                                                           |

### Available Milestones Resources

*Milestones 2.0: Assessment, Implementation, and Clinical Competency Committees Supplement, 2021* - <https://meridian.allenpress.com/jgme/issue/13/2s>

*Milestones Guidebooks:* <https://www.acgme.org/milestones/resources/>

- *Assessment Guidebook*
- *Clinical Competency Committee Guidebook*
- *Clinical Competency Committee Guidebook Executive Summaries*
- *Implementation Guidebook*
- *Milestones Guidebook*

*Milestones Guidebook for Residents and Fellows:* <https://www.acgme.org/residents-and-fellows/the-acgme-for-residents-and-fellows/>

- *Milestones Guidebook for Residents and Fellows*
- *Milestones Guidebook for Residents and Fellows Presentation*
- *Milestones 2.0 Guide Sheet for Residents and Fellows*

*Milestones Research and Reports:* <https://www.acgme.org/milestones/research/>

- *Milestones National Report*, updated each fall
- *Milestones Predictive Probability Report*, updated each fall
- *Milestones Bibliography*, updated twice each year

*Developing Faculty Competencies in Assessment courses* - <https://www.acgme.org/meetings-and-educational-activities/courses-and-workshops/developing-faculty-competencies-in-assessment/>

*Assessment Tool: Direct Observation of Clinical Care (DOCC)* - <https://dl.acgme.org/pages/assessment>

*Assessment Tool: Teamwork Effectiveness Assessment Module (TEAM)* - <https://team.acgme.org/>

*Improving Assessment Using Direct Observation Toolkit* - <https://dl.acgme.org/pages/acgme-faculty-development-toolkit-improving-assessment-using-direct-observation>

*Remediation Toolkit* - <https://dl.acgme.org/courses/acgme-remediation-toolkit>

*Learn at ACGME has several courses on Assessment and Milestones* - <https://dl.acgme.org/>