The Neurology Milestone Project

A Joint Initiative of

The Accreditation Council for Graduate Medical Education

and

The American Board of Psychiatry and Neurology

July 2015

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The milestones are designed only for use in evaluation of resident physicians in the context of their participation in ACGME-accredited residency or fellowship programs. The milestones provide a framework for assessment of the development of the resident physician in key dimensions of the elements of physician competency in a specialty or subspecialty. They neither represent the entirety of the dimensions of the six domains of physician competency, nor are they designed to be relevant in any other context.

Neurology Milestones

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Milestone Reporting

This document presents milestones designed for programs to use in semi-annual review of resident performance and reporting to the ACGME. Milestones are knowledge, skills, attitudes, and other attributes for each of the ACGME competencies organized in a developmental framework from less to more advanced. They are descriptors and targets for resident performance as a resident moves from entry into residency through graduation. In the initial years of implementation, the Review Committee will examine milestone performance data for each program's residents as one element in the Next Accreditation System (NAS) to determine whether residents overall are progressing.

For each period, review and reporting will involve selecting milestone levels that best describe a resident's current performance and attributes. Milestones are arranged into numbered levels. Tracking from Level 1 to Level 5 is synonymous with moving from novice to expert. These levels do not correspond with post-graduate year of education.

Selection of a level implies that the resident substantially demonstrates the milestones in that level, as well as those in lower levels (see the diagram on page v).

Level 1: The resident demonstrates milestones expected of a resident who has completed his or her first post-graduate year of education.

Level 2: The resident is advancing and demonstrates additional milestones, but is not yet performing at a mid-residency level.

Level 3: The resident continues to advance and demonstrate additional milestones, consistently including the majority of milestones targeted for residency.

Level 4: The resident has advanced so that he or she now substantially demonstrates the milestones targeted for residency. This level is designed as the graduation target.

Level 5: The resident has advanced beyond performance targets set for residency and is demonstrating "aspirational" goals which might describe the performance of someone who has been in practice for several years. It is expected that only a few exceptional residents will reach this level.

Additional Notes

Level 4 is designed as the graduation *target* and does not represent a graduation *requirement*. Making decisions about readiness for graduation is the purview of the residency program director. Study of milestone performance data will be required before the ACGME and its partners will be able to determine whether milestones in the first four levels appropriately represent the developmental framework, and whether milestone data are of sufficient quality to be used for high-stakes decisions.

Some milestone descriptions include statements about performing independently. These activities must conform to ACGME supervision guidelines, as well as institutional and program policies. For example, a resident who performs a procedure independently must, at a minimum, be supervised through oversight.

Examples are provided with some milestones. Please note that the examples are not the required element or outcome; they are provided as a way to share the intent of the element.

Answers to Frequently Asked Questions about Milestones are available on the Milestones web page: http://www.acgme.org/acgmeweb/Portals/0/MilestonesFAQ.pdf.

The diagram below presents an example set of milestones for one sub-competency in the same format as the milestone report worksheet. For each reporting period, a resident's performance on the milestones for each sub-competency will be indicated by:

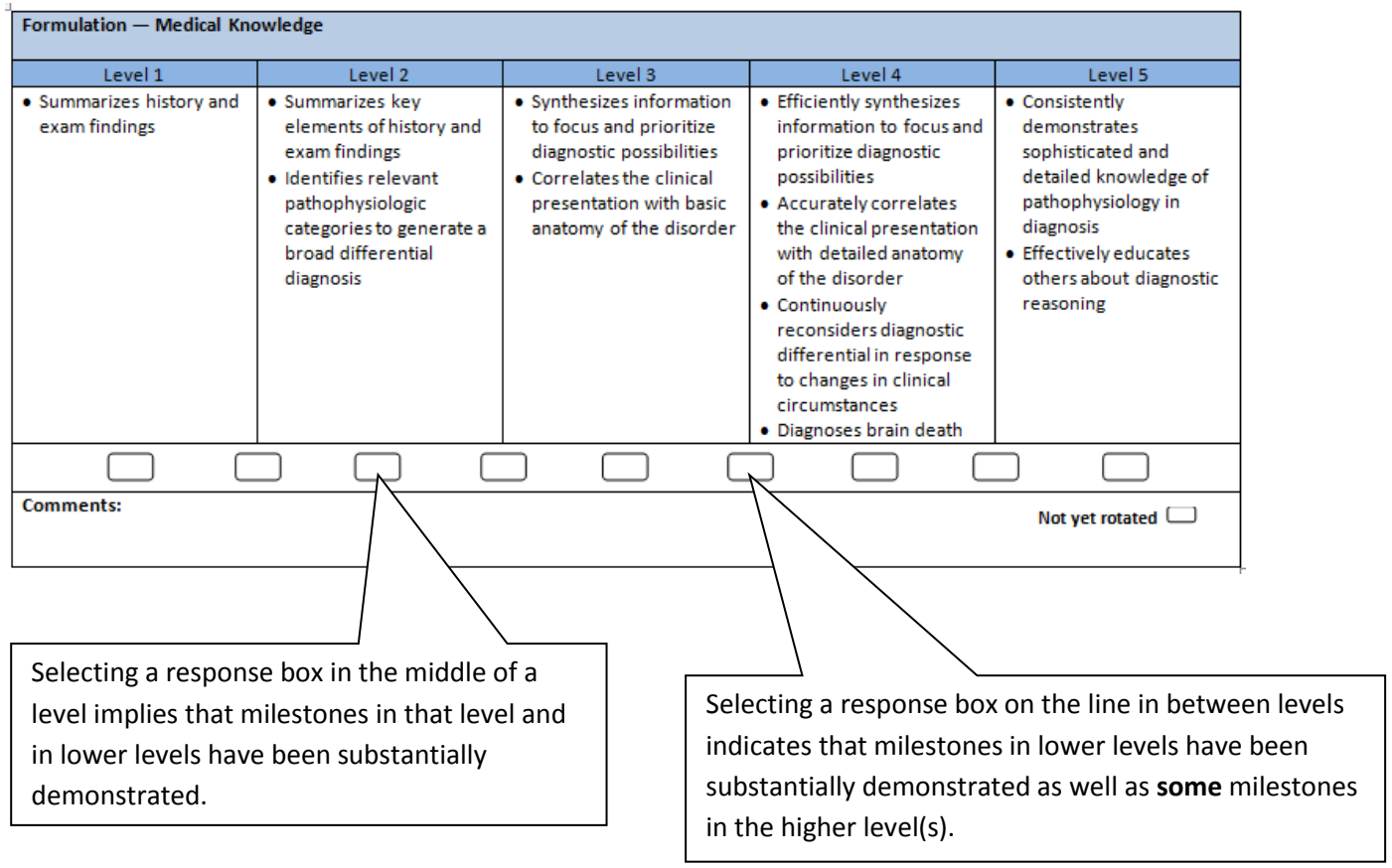
- selecting the level of milestones that best describes that resident's performance in relation to the milestones

or

- for Patient Care and Medical Knowledge milestones, selecting the option that says the resident has "Not yet rotated"

or

- for Interpersonal and Communication Skills, Practice-based Learning and Improvement, Professionalism, and Systems-based Practice milestones, selecting the option that says the resident has "Not yet achieved Level 1"



History — Patient Care				
Level 1	Level 2	Level 3	Level 4	Level 5
• Obtains a neurologic history	• Obtains a complete and relevant neurologic history	• Obtains a complete, relevant, and organized neurologic history	• Efficiently obtains a complete, relevant, and organized neurologic history	• Efficiently obtains a complete, relevant, and organized neurologic history incorporating subtle verbal and non-verbal cues
☐	☐	☐	☐	☐ ☐ ☐ ☐ ☐
Comments:				**Not yet rotated** ☐

Neurological Exam — Patient Care				
Level 1	Level 2	Level 3	Level 4	Level 5
• Performs complete neurological exam	• Performs complete neurological exam accurately	• Performs a relevant neurological exam incorporating some additional appropriate maneuvers • Visualizes papilledema • Accurately performs a neurological exam on the comatose patient	• Efficiently performs a relevant neurological exam accurately incorporating all additional appropriate maneuvers • Accurately performs a brain death examination	• Consistently demonstrates mastery in performing a complete, relevant, and organized neurological exam
☐	☐	☐	☐	☐ ☐ ☐ ☐ ☐
Comments:				**Not yet rotated** ☐

Management/Treatment — Patient Care				
Level 1	Level 2	Level 3	Level 4	Level 5
• Demonstrates basic knowledge of management of patients with neurologic disease	• Discusses general approach to initial treatment of common neurologic disorders, including risks and benefits of treatment • Identifies neurologic emergencies	• Individualizes treatment for specific patients • Initiates management for neurologic emergencies and triages patient to appropriate level of care • Appropriately requests consultations from non-neurologic care providers for additional evaluation and management	• Adapts treatment based on patient response • Identifies and manages complications of therapy • Independently directs management of patients with neurologic emergencies • Appropriately requests consultations from a neurologic subspecialist for additional evaluation or management	• Demonstrates sophisticated knowledge of treatment subtleties and controversies
☐	☐	☐	☐	☐ ☐ ☐ ☐ ☐
Comments:				**Not yet rotated** ☐

Movement Disorders — Patient Care				
Level 1	Level 2	Level 3	Level 4	Level 5
• Recognizes when a patient may have a movement disorder	• Identifies movement disorder phenomenology and categories (hypokinetic and hyperkinetic)	• Diagnoses and manages common movement disorders • Identifies movement disorder emergencies	• Diagnoses uncommon movement disorders • Appropriately refers a movement disorder patient for a surgical evaluation or other interventional therapies • Manages movement disorders emergencies	• Manages uncommon movement disorders • Engages in scholarly activity in movement disorders (e.g., teaching, research)
☐	☐	☐	☐	☐ ☐ ☐ ☐ ☐
Comments:				**Not yet rotated** ☐

Neuromuscular Disorders — Patient Care				
Level 1	Level 2	Level 3	Level 4	Level 5
• Recognizes when a patient may have a neuromuscular disorder	• Identifies patterns of neuromuscular disease (e.g., anterior horn cell disease, nerve root, plexus, peripheral nerve, neuromuscular junction, muscle) • Identifies neuromuscular disorder emergencies • Orders NCS (nerve conductive study)/EMG (electromyography) testing appropriately	• Diagnoses and manages common neuromuscular disorders • Manages neuromuscular disorder emergencies • Interprets results of NCS/EMG testing in context of clinical presentation	• Diagnoses uncommon neuromuscular disorders • Recognizes when tissue biopsy is warranted	• Manages uncommon neuromuscular disorders • Engages in scholarly activity in neuromuscular disorders (e.g., teaching, research)
☐	☐	☐	☐	☐ ☐ ☐ ☐ ☐
Comments:				**Not yet rotated** ☐

Cerebrovascular Disorders — Patient Care				
Level 1	Level 2	Level 3	Level 4	Level 5
• Recognizes when a patient may have a cerebrovascular disorder	• Describes stroke syndromes and etiologic subtypes • Identifies cerebrovascular emergencies • Lists indications and contraindications for intravenous thrombolytic therapy	• Identifies specific mechanism of patient's cerebrovascular disorder • Appropriately refers for interventional or surgical evaluation • Manages common cerebrovascular disorders including appropriate use of thrombolytics	• Diagnoses uncommon cerebrovascular disorders	• Manages uncommon cerebrovascular disorders • Engages in scholarly activity in cerebrovascular disorders (e.g., teaching, research)
☐	☐	☐	☐	☐ ☐ ☐ ☐ ☐
Comments:				**Not yet rotated** ☐

Cognitive/Behavioral Disorders — Patient Care				
Level 1	Level 2	Level 3	Level 4	Level 5
• Recognizes when a patient may have a cognitive/behavioral disorder	• Identifies common cognitive/behavioral disorders	• Diagnoses and manages common cognitive/behavioral disorders, including cognitive effects of traumatic brain injury • Manages behavioral complications of cognitive/behavioral disorders • Appropriately refers for neuropsychological testing in evaluating patients with cognitive/behavioral disorders	• Diagnoses and manages uncommon cognitive/behavioral disorders	• Engages in scholarly activity in cognitive/behavioral disorders (e.g., teaching, research) • Demonstrates sophisticated knowledge of advanced diagnostic testing and controversies
☐	☐	☐	☐	☐ ☐ ☐ ☐ ☐
Comments:				**Not yet rotated** ☐

Demyelinating Disorders — Patient Care				
Level 1	Level 2	Level 3	Level 4	Level 5
• Recognizes when a patient may have a demyelinating disorder	• Diagnoses and manages common demyelinating disorders	• Recognizes uncommon demyelinating disorders • Manages acute presentations of demyelinating disorders	• Diagnoses uncommon demyelinating disorders	• Manages uncommon demyelinating disorders • Engages in scholarly activity in demyelinating disorders (e.g., teaching, research)
☐	☐	☐	☐	☐ ☐ ☐ ☐ ☐
Comments:				**Not yet rotated** ☐

Epilepsy — Patient Care				
Level 1	Level 2	Level 3	Level 4	Level 5
• Recognizes when a patient may have had a seizure	• Identifies epilepsy phenomenology, and classification of seizures and epilepsies • Diagnoses convulsive status epilepticus	• Diagnoses and manages common seizure disorders and provides antiepileptic drug treatment • Diagnoses non-convulsive status epilepticus • Manages convulsive and non-convulsive status epilepticus	• Diagnoses uncommon seizure disorders • Appropriately refers an epilepsy patient for surgical evaluation or other interventional therapies	• Manages uncommon seizure disorders • Engages in scholarly activity in epilepsy (e.g., teaching, research)
☐	☐	☐	☐	☐ ☐ ☐ ☐ ☐
Comments:				**Not yet rotated** ☐

Headache Syndromes — Patient Care				
Level 1	Level 2	Level 3	Level 4	Level 5
• Recognizes common headache syndromes	• Diagnoses and manages common headache syndromes • Identifies headache emergencies	• Recognizes uncommon headache syndromes • Diagnoses and manages headache emergencies	• Diagnoses and manages uncommon headache syndromes	• Engages in scholarly activity in headache syndromes (e.g., teaching, research)
☐	☐	☐	☐	☐ ☐ ☐ ☐ ☐
Comments:				**Not yet rotated** ☐

Neurologic Manifestations of Systemic Disease — Patient Care				
Level 1	Level 2	Level 3	Level 4	Level 5
• Recognizes when a patient's neurologic symptoms may be due to systemic illness • Identifies neurologic emergencies due to systemic disease	• Diagnoses and manages common neurologic manifestations of systemic diseases • Diagnoses and manages neurologic emergencies due to systemic disease	• Recognizes uncommon neurologic manifestations of systemic disease	• Diagnoses and manages uncommon neurologic manifestations of systemic disease	• Engages in scholarly activity in neurologic manifestations of systemic disease (e.g., teaching, research)
☐	☐	☐	☐	☐ ☐ ☐ ☐
Comments:				**Not yet rotated** ☐

Child Neurology for the Adult Neurologist — Patient Care				
Level 1	Level 2	Level 3	Level 4	Level 5
• Obtains basic neurologic history of infants and children	• Lists the elements of a neurological examination of infants and children • Recognizes broad patterns of neurologic disease in infants and children • Lists normal developmental milestones	• Obtains a complete and age-appropriate neurologic history of infants and children • Performs a complete and age-appropriate neurological examination of infants and children • Diagnoses common child neurologic disorders	• Initiates management of common childhood neurologic disorders • Initiates management of common neurologic emergencies in infants and children	• Diagnoses uncommon childhood neurologic disorders
☐	☐	☐	☐	☐ ☐ ☐ ☐ ☐
Comments:				**Not yet rotated** ☐

Neuro-Oncology — Patient Care				
Level 1	Level 2	Level 3	Level 4	Level 5
• Recognizes common clinical presentations of a brain or spine mass	• Identifies neuro-oncological emergencies and initiates management	• Provides differential diagnosis of brain or spine mass • Identifies neurologic complications due to cancer or the treatment of cancer	• Appropriately refers for advanced testing, including biopsy • Manages neurologic complications due to cancer or the treatment of cancer	• Engages in scholarly activity in neuro-oncology (e.g., teaching, research)
☐	☐	☐	☐	☐ ☐ ☐ ☐ ☐
Comments: **Not yet rotated** ☐				

Psychiatry for the Adult Neurologist — Patient Care				
Level 1	Level 2	Level 3	Level 4	Level 5
• Recognizes when a patient may have a psychiatric disorder • Obtains an appropriate psychiatric history	• Identifies common psychiatric disorders • Identifies psychiatric co-morbidities in patients with a neurologic disease	• Recognizes when a patient's neurological symptoms are of psychiatric origin • Recognizes when a patient's psychiatric symptoms are of neurologic origin • Identifies major side effects of psychiatric medications	• Diagnoses common psychiatric disorders • Initiates management of psychiatric co-morbidities in patients with a neurologic disease	• Engages in scholarly activity in psychiatric disorders (e.g., teaching, research)
☐	☐	☐	☐	☐ ☐ ☐ ☐
Comments:				**Not yet rotated** ☐

Neuroimaging — Patient Care				
Level 1	Level 2	Level 3	Level 4	Level 5
• Identifies basic neuroanatomy on brain magnetic resonance (MR) and computerized tomography (CT)	• Recognizes emergent imaging findings on brain MR and CT • Identifies basic neuroanatomy on spine MR and CT • Identifies major vascular anatomy on angiography	• Describes abnormalities of the brain and spine on MR and CT • Identifies major abnormalities on angiography	• Interprets MR and CT neuroimaging of brain and spine	• Identifies subtle abnormalities on angiography • Interprets carotid and transcranial ultrasound
☐	☐	☐	☐	☐ ☐ ☐ ☐ ☐
Comments:				**Not yet rotated** ☐

Electroencephalogram (EEG) — Patient Care				
Level 1	Level 2	Level 3	Level 4	Level 5
• Explains an EEG procedure in non-technical terms	• Uses appropriate terminology related to EEG (e.g., montage, amplitude, frequency)	• Describes normal EEG features of wake and sleep states • Recognizes EEG patterns of status epilepticus • Recognizes common EEG artifacts	• Interprets common EEG abnormalities and creates a report • Recognizes normal EEG variants	• Interprets uncommon EEG abnormalities • Describes normal and some abnormal EEG features of wake and sleep states in children
☐	☐	☐	☐	☐ ☐ ☐ ☐ ☐
Comments:				**Not yet rotated** ☐

Nerve Conduction Studies (NCS)/Electromyography (EMG) — Patient Care				
Level 1	Level 2	Level 3	Level 4	Level 5
• Explains an NCS/EMG procedure in nontechnical terms	• Uses appropriate terminology related to NCS/EMG	• Describes NCS/EMG data • Lists NCS/EMG findings in common disorders	• Interprets NCS/EMG data in common disorders • Describes common pitfalls of NCS/EMG • Formulates basic NCS/EMG plan for specific, common clinical presentations	• Performs, interprets, and creates a report for NCS/EMG
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Comments:				**Not yet rotated** ☐

Lumbar Puncture — Patient Care				
Level 1	Level 2	Level 3	Level 4	Level 5
• Lists the indications and contraindications for lumbar puncture	• Lists the complications of lumbar puncture and their management	• Performs lumbar puncture under direct supervision	• Performs lumbar puncture without direct supervision	• Performs lumbar puncture on patients with challenging anatomy
☐	☐	☐	☐	☐ ☐ ☐ ☐ ☐
Comments:				**Not yet rotated** ☐

Localization — Medical Knowledge				
Level 1	Level 2	Level 3	Level 4	Level 5
• Attempts to localize lesions within the nervous system • Describes basic neuroanatomy	• Localizes lesions to general regions of the nervous system	• Accurately localizes lesions to specific regions of the nervous system	• Efficiently and accurately localizes lesions to specific regions of the nervous system • Describes advanced neuroanatomy	• Consistently demonstrates sophisticated and detailed knowledge of neuroanatomy in localizing lesions
☐	☐	☐	☐	☐ ☐ ☐ ☐ ☐
Comments:				**Not yet rotated** ☐

Formulation — Medical Knowledge				
Level 1	Level 2	Level 3	Level 4	Level 5
• Summarizes history and exam findings	• Summarizes key elements of history and exam findings • Identifies relevant pathophysiologic categories to generate a broad differential diagnosis	• Synthesizes information to focus and prioritize diagnostic possibilities • Correlates the clinical presentation with basic anatomy of the disorder	• Efficiently synthesizes information to focus and prioritize diagnostic possibilities • Accurately correlates the clinical presentation with detailed anatomy of the disorder • Continuously reconsiders diagnostic differential in response to changes in clinical circumstances • Diagnoses brain death	• Consistently demonstrates sophisticated and detailed knowledge of pathophysiology in diagnosis • Effectively educates others about diagnostic reasoning
☐	☐	☐	☐	☐ ☐ ☐ ☐
Comments:				**Not yet rotated** ☐

Diagnostic Investigation — Medical Knowledge				
Level 1	Level 2	Level 3	Level 4	Level 5
• Demonstrates general knowledge of diagnostic tests in neurology	• Discusses general diagnostic approach appropriate to clinical presentation • Lists risks and benefits of tests to patient	• Individualizes diagnostic approach to the specific patient • Accurately interprets results of common diagnostic tests	• Explains diagnostic yield and cost-effectiveness of testing • Accurately interprets results of less common diagnostic testing • Recognizes indications and implications of genetic testing • Recognizes indications of advanced imaging and other diagnostic studies	• Demonstrates sophisticated knowledge of diagnostic testing and controversies
☐	☐	☐	☐	☐ ☐ ☐ ☐ ☐
Comments:				**Not yet rotated** ☐

Systems thinking, including cost and risk effective practice — Systems-based Practice				
Level 1	Level 2	Level 3	Level 4	Level 5
• Describes basic cost and risk implications of care	• Describes cost and risk benefit ratios in patient care	• Makes clinical decisions that balance cost and risk benefit ratios	• Incorporates available quality measures in patient care	• Engages in scholarly activity regarding cost- and risk-effective practice
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐				
Comments: **Not yet achieved Level 1** ☐				

Work in inter-professional teams to enhance patient safety — Systems-based Practice				
Level 1	Level 2	Level 3	Level 4	Level 5
• Describes team members' roles in maintaining patient safety	• Identifies and reports errors and near-misses	• Describes potential sources of system failure in clinical care such as minor, major, and sentinel events	• Participates in a team-based approach to medical error analysis	• Engages in scholarly activity regarding error analysis and patient safety
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐				
Comments: **Not yet achieved Level 1** ☐				

Self-directed learning — Practice-based Learning and Improvement

- Identify strengths, deficiencies, and limits in one's knowledge and expertise
- Set learning and improvement goals
- Identify and perform appropriate learning activities
- Use information technology to optimize learning

Level 1	Level 2	Level 3	Level 4	Level 5
• Acknowledges gaps in knowledge and expertise	• Incorporates feedback	• Develops an appropriate learning plan based upon clinical experience	• Completes an appropriate learning plan based upon clinical experience	• Engages in scholarly activity regarding practice-based learning and improvement

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Comments:

Not yet achieved Level 1 ☐

Locate, appraise, and assimilate evidence from scientific studies related to the patient's health problems – Practice-based Learning and Improvement

Level 1	Level 2	Level 3	Level 4	Level 5
• Uses information technology to search and access relevant medical information	• Uses scholarly articles and guidelines to answer patient care issues	• Critically evaluates scientific literature	• Incorporates appropriate evidence-based information into patient care • Understands the limits of evidence-based medicine in patient care	• Engages in scholarly activity regarding evidence-based medicine

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Comments:

Not yet achieved Level 1 ☐

Compassion, integrity, accountability, and respect for self and others — Professionalism				
Level 1	Level 2	Level 3	Level 4	Level 5
• Demonstrates compassion, sensitivity, and responsiveness to patients and families • Demonstrates non-discriminatory behavior in all interactions, including diverse and vulnerable populations • Describes effects of sleep deprivation and substance abuse on performance	• Demonstrates appropriate steps to address impairment in self • Consistently demonstrates professional behavior, including dress and timeliness	• Demonstrates compassionate practice of medicine, even in context of disagreement with patient beliefs • Incorporates patients' socio-cultural needs and beliefs into patient care • Demonstrates appropriate steps to address impairment in colleagues	• Mentors others in the compassionate practice of medicine, even in context of disagreement with patient beliefs • Mentors others in sensitivity and responsiveness to diverse and vulnerable populations • Advocates for quality patient care	• Engages in scholarly activity regarding professionalism
☐	☐	☐	☐	☐
Comments:				**Not yet achieved Level 1** ☐

Knowledge about, respect for, and adherence to the ethical principles relevant to the practice of medicine, remembering in particular that responsiveness to patients that supersedes self-interest is an essential aspect of medical practice — Professionalism				
Level 1	Level 2	Level 3	Level 4	Level 5
• Describes basic ethical principles	• Determines presence of ethical issues in practice	• Analyzes and manages ethical issues in straightforward clinical situations	• Analyzes and manages ethical issues in complex clinical situations	• Demonstrates leadership and mentorship on applying ethical principles
☐	☐	☐	☐	☐ ☐ ☐ ☐ ☐
Comments:				**Not yet achieved Level 1** ☐

Relationship development, teamwork, and managing conflict — Interpersonal and Communication Skills				
Level 1	Level 2	Level 3	Level 4	Level 5
• Develops a positive relationship with patients in uncomplicated situations • Actively participates in team-based care	• Manages simple patient/family-related conflicts • Engages patients in shared decision-making	• Manages conflict in complex situations • Uses easy-to-understand language in all phases of communication	• Manages conflict across specialties and systems of care • Leads team-based patient care activities	• Engages in scholarly activity regarding teamwork and conflict management
☐	☐	☐	☐	☐ ☐ ☐ ☐ ☐
Comments:				**Not yet achieved Level 1** ☐

Information sharing, gathering, and technology — Interpersonal and Communication Skills				
Level 1	Level 2	Level 3	Level 4	Level 5
• Effectively communicates during patient hand-overs using a structured communication tool • Completes documentation in a timely fashion • Accurately documents transitions of care	• Effectively communicates during team meetings, discharge planning, and other transitions of care • Educates patients about their disease and management, including risks and benefits of treatment options • Completes all documentation accurately, including use of EHR, to promote patient safety	• Effectively communicates the results of a neurologic consultation in a timely manner • Effectively gathers information from collateral sources when necessary • Demonstrates synthesis, formulation, and thought process in documentation	• Effectively leads family meetings • Effectively and ethically uses all forms of communication • Mentors colleagues in timely, accurate, and efficient documentation	• Develops patient education materials • Engages in scholarly activity regarding interpersonal communication
☐	☐	☐	☐	☐ ☐ ☐ ☐
Comments:				**Not yet achieved Level 1** ☐