

# The Neuropathology Milestone Project

*A Joint Initiative of*

The Accreditation Council for Graduate Medical Education

and

The American Board of Pathology



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The Milestones are designed only for use in evaluation of fellows in the context of their participation in ACGME-accredited residency or fellowship programs. The Milestones provide a framework for the assessment of the development of the fellow 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.

## Neuropathology Milestones

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## Milestone Reporting

This document presents Milestones designed for programs to use in semi-annual review of fellow 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 fellow performance as a fellow moves from entry into fellowship through graduation. In the initial years of implementation, the Review Committee will examine Milestone performance data for each program's fellows as one element in the Next Accreditation System (NAS) to determine whether fellows overall are progressing.

For each period, review and reporting will involve selecting milestone levels that best describe each fellow'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 in the subspecialty. These levels do not correspond with post-graduate year of education.

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

**Level 1:** The fellow demonstrates milestones expected of an incoming fellow.

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

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

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

**Level 5:** The fellow has advanced beyond performance targets set for fellowship 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 fellows 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 fellowship 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.

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.

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

*Answers to Frequently Asked Questions about Milestones are available on the Milestones web page:*

<http://www.acgme.org/acqmeweb/Portals/0/MilestonesFAQ.pdf>.

The diagram below presents an example set of milestones for one sub-competency in the same format as the ACGME Report Worksheet. For each reporting period, a fellow’s performance on the milestones for each sub-competency will be indicated by selecting the level of milestones that best describes that fellow’s performance in relation to those milestones.

PC1 – Consultation				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Understands the role of the consultant in chemical pathology</p> <p>Observes and assists in the consultation</p> <p>Able to use the EMR and other electronic resources to obtain clinical and disease information</p>	<p>Performs, clinically useful consultation in a timely manner for requests. for blood products, apheresis, transfusion reactions, and other immunoematology work-ups and evaluations</p> <p>Prepares full and complete consultative reports with faculty guidance</p>	<p>Effectively communicates consultative recommendations and action plans</p> <p>Develops a portfolio of consultations</p> <p>Independently prepares full and complete consultative reports</p>	<p>Effectively teaches consultation skills</p> <p>Competently and independently performs consultation during regular working hours and while on call</p>	<p>Proficient in chemical pathology consultations (including those involved in complex clinical scenarios)</p> <p>Proficient in consultation regarding complicated patient evaluations</p> <p>Demonstrates expertise at the level expected of a subspecialist in chemical pathology</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>				

Selecting a response box in the middle of a level implies that milestones in that level and in lower levels have been substantially demonstrated.

Selecting a response box on the line in between levels indicates that milestones in lower levels have been substantially demonstrated as well as **some** milestones in the higher level(s).

PC1 — Procedure: Autopsy (General)				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Understands the value of autopsy examination of the central and peripheral nervous system</p> <p>Understands the principles of confidentiality, universal precautions, chemical hazards, and personal protective equipment</p> <p>Properly identifies the decedent, and verifies consent and limitations to extent of the autopsy</p>	<p>Reviews clinical records/history; contacts the clinical team in advance of the case and summarizes questions posed by the clinical team</p> <p>Is aware of reporting regulations, such as legal jurisdiction, statutes regarding authorization to perform autopsy (medical examiner), device reporting, communicable diseases</p>	<p>Performs uncomplicated gross dissections</p>	<p>Performs complex and special dissections</p>	<p>Plans and designs complex and special dissection</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>				Not yet achieved Level 1 <input type="checkbox"/>

**Suggested Evaluation Methods:** Direct observation; Feedback from clinical colleagues (360 evaluations), Narrative, Portfolio review, Quality management; Peer evaluation

PC2 — Procedure: Autopsy (Gross)				
Level 1	Level 2	Level 3	Level 4	Level 5
Possesses baseline knowledge of neuroanatomy	Performs routine coronal sectioning of brains by standard landmarks  Samples brain regions for microscopy according to standard protocol	Recognizes, describes, and locates, in anatomic terms, lesions  Determines appropriate sampling based on gross findings (beyond standard protocol)  Performs section of brain in other plane, as appropriate to clinical information	Integrates gross autopsy findings into an interpretive report	Plans and designs complex and special brain dissection and sampling, yielding an interpretive report
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>				Not yet achieved Level 1 <input type="checkbox"/>

**Suggested Evaluation Methods:** Direct observation; Feedback from clinical colleagues (360 evaluations), Narrative, Portfolio review, Quality management; Peer evaluation



PC3 — Procedure: Autopsy (Microscopic and reporting)				
Level 1	Level 2	Level 3	Level 4	Level 5
Possesses baseline knowledge of normal histology of central and peripheral nervous system	Recognizes common patterns of injury	Recognizes specific diseases  Determines appropriate studies as required for diagnosis	Integrates gross and microscopic findings into an interpretive report	Address novel or non-diagnostic autopsy findings in interpretive reports
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>				Not yet achieved Level 1 <input type="checkbox"/>

**Suggested Evaluation Methods:** Direct observation; Feedback from clinical colleagues (360 evaluations), Narrative, Portfolio review, Quality management; Peer evaluation

PC4 — Procedure: Surgical (Gross)				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Understands common neurosurgical procedures and derived specimens</p> <p>Recognizes the importance of gross examination for the interpretation of histology and management of patients</p>	<p>Ensures and maintains the integrity of specimens to avoid cross-contamination or identity errors</p> <p>Performs gross examination, description and sampling of routine neurosurgical specimens</p>	<p>Performs gross examination, description and samples of complex neurosurgical specimens (e.g., seizure resections, eyes)</p> <p>Prepares nerve and muscle specimens under supervision</p>	<p>Integrates gross findings into an interpretive report for both routine and complex specimens</p> <p>Prepares nerve and muscle specimens independently</p>	<p>Designs novel approaches to complex specimens through collaboration with other members of the health care team</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>				Not yet achieved Level 1 <input type="checkbox"/>

**Suggested Evaluation Methods:** Direct observation; Feedback from clinical colleagues (360 evaluations), Narrative, Portfolio review, Quality management; Peer evaluation

PC5 — Procedure: Surgical (Microscopic and reporting)				
Level 1	Level 2	Level 3	Level 4	Level 5
Possesses baseline knowledge of normal histology of central and peripheral nervous system	Recognizes common processes: neoplastic, infectious, inflammatory, vascular, malformative, traumatic, degenerative, demyelinating, neuromuscular, and ocular	With supervision, formulates diagnostic interpretations into an interpretive report  With supervision, determines appropriate studies as required for diagnosis	With minimal supervision, proficiently formulates diagnostic interpretations into an interpretive report  With minimal supervision, determines appropriate studies as required for diagnosis	Capable of recognizes new diagnostic entities
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>				Not yet achieved Level 1 <input type="checkbox"/>

**Suggested Evaluation Methods:** Direct observation; Feedback from clinical colleagues (360 evaluations), Narrative, Portfolio review, Quality management; Peer evaluation

PC6 — Procedure: Intra-operative Consultation				
Level 1	Level 2	Level 3	Level 4	Level 5
Understands common neurosurgical procedures and the role of intra-operative consultation, frozen section (FS), and intra-operative cytology (IOC)	<p>Selects and handles tissue for FS and IOC under supervision</p> <p>Prepares FS and IOC slides that are of good interpretive quality</p>	<p>Discusses with pathology attending staff member(s) any requests that are contraindicated</p> <p>Correctly selects tissue for frozen section diagnosis independently</p> <p>Able to perform high quality IOC/FS on technically difficult and multiple specimens; performs IOC/FS within turn-around time standards</p> <p>Effectively communicates the diagnosis under supervision</p>	<p>With minimal supervision, formulates and effectively communicates the diagnosis, and is cognizant of the impact of diagnosis on patient care</p> <p>Responds appropriately to the concerns of the surgeon</p> <p>Proficient in the performance of IOC/FS, including for technically difficult specimens</p>	Formulates and effectively communicates the diagnosis, and is cognizant of the impact of diagnosis on patient care, even in ambiguous situations
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>				Not yet achieved Level 1 <input type="checkbox"/>

**Suggested Evaluation Methods:** Direct observation; Feedback from clinical colleagues (360 evaluations), Narrative, Portfolio review, Quality management; Peer evaluation

MK1 — Diagnostic Knowledge				
Level 1	Level 2	Level 3	Level 4	Level 5
Identifies the resources for learning in neuropathology	Assimilates medical knowledge in neuropathology from various learning sources  Demonstrates textbook-level diagnostic knowledge for neuropathology	Performs scientific literature review and investigation of clinical cases to inform patient care (evidence-based medicine) and improve diagnostic knowledge of neuropathology	Applies and synthesizes medical knowledge from scientific literature review and investigation to inform patient care (evidence-based medicine)  Presents and discusses cases  Demonstrates proficiency in diagnostic knowledge of neuropathology	Contributes to medical knowledge of others and participates in life-long learning through literature review, continuing medical education [(CME), and Self-Assessment Modules (SAMs)]
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>				Not yet achieved Level 1 <input type="checkbox"/>

**Suggested Evaluation Methods:** Direct observation, Pre- and post-test, Rotation exams, Narrative, 360 evaluation, Board examination, Maintenance of certification/SAMs, Resident In-Service Examination (RISE) and Pathologist Recertification Individualized Self-Assessment Exam (PRISE)

MK2 — Teaching				
Level 1	Level 2	Level 3	Level 4	Level 5
Participates in active learning	Understands and begins to acquire the skills needed for effective teaching  Teaches medical students and learners from pathology and other disciplines, as needed	Teaches peers as needed	Teaches across departments and at all levels, including to clinicians, patients, and families	Models teaching across departments and at all levels, including to clinicians, patients, and families
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>				Not yet achieved Level 1 <input type="checkbox"/>

**Suggested Evaluation Methods:** Direct observation, 360 evaluations, Teaching evaluations, Student performance on exams, Simulations, Conference presentation evaluation portfolio

SBP1 — Regulatory				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Understands that laboratories are regulated by state, federal, and professional organizations</p> <p>Understands the use of proficiency testing</p> <p>Understands the basics of quality assurance</p> <p>Demonstrates compliance with national regulations for patient privacy and confidentiality (e.g., HIPPA, state laws, institutional policies)</p>	<p>With substantial guidance implements state, federal, and professional organizations standards or elements of checklists in the laboratory</p> <p>Reviews proficiency testing results</p>	<p>With minimal guidance implements state, federal, and professional organizations standards or elements of checklists in the laboratory</p> <p>Able to implement corrective action based on proficiency testing results</p>	<p>Participates as a team member in mock or actual inspection of a laboratory, or equivalent (e.g., tracers, self-inspection)</p>	<p>Actively participates in, or performs, inspections of a laboratory at an outside facility</p> <p>Able to lead an inspection of a laboratory</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>				Not yet achieved Level 1 <input type="checkbox"/>

SBP2 — Health Care Teams				
Level 1	Level 2	Level 3	Level 4	Level 5
Understands the importance of the pathologist’s role in the health care team	With substantial guidance, plays a role in the health care team (e.g., case presentation, consultation, test selection guidance)	With minimal guidance, plays a role in the health care team (e.g., case presentation, consultation, test selection guidance)	Independently plays a role in the health care team (e.g., case presentation, consultation, test selection guidance)	Effectively plays a lead role in the health care team (e.g., case presentation, consultation, test selection guidance)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>				Not yet achieved Level 1 <input type="checkbox"/>

SBP3 — Lab Management: Resource Utilization (personnel and finance)				
Level 1	Level 2	Level 3	Level 4	Level 5
Aware of the roles of a pathologist in managing personnel; interprets an organizational chart  Recognizes different budget types (e.g., capital vs. operating budget)	Knows the personnel and lines of reporting in the laboratory  Describes the elements of a budget (e.g., personnel, capital equipment)	Describes the process of personnel management and employment laws (e.g., interview questions, Family and Medical Leave Act, termination policies)  Understands the basics of pathology practice finance (e.g., Part A and Part B, Centers for Medicare & Medicaid Services [CMS])	Participates in employee interviews/performance evaluation (real or simulated experiences)  Participates in a budget cycle exercise (draft, defend, and propose logical cuts and/or additions)	Manages personnel effectively  Develops a budget
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>				Not yet achieved Level 1 <input type="checkbox"/>



PBLI1 — Evidence-based Utilization				
Level 1	Level 2	Level 3	Level 4	Level 5
Understands the importance of evidence-based utilization of laboratory tests and results	With substantial guidance, critically reviews the literature addressing evidence-based utilization of laboratory tests and results	With minimal guidance, critically reviews the literature addressing evidence-based utilization of laboratory tests and results	Independently performs a critical review of the literature addressing evidence-based utilization of laboratory tests and results and designs utilization guidelines	Implements institutional utilization guidelines for laboratory tests and results
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>				Not yet achieved Level 1 <input type="checkbox"/>

PBL12 — Process Improvement and Patient Safety				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Demonstrates awareness of common sources of error in laboratory processes and transitions in care</p> <p>Understands the importance of identity and integrity of the specimen and requisition form and verifies the identity</p>	<p>Consistently demonstrates work habits that minimize error; consistently and promptly communicates discrepancies to clinicians</p> <p>Consistently checks identity and integrity of specimen; independently obtains clinical information when needed; incorporates other resources, such as electronic medical record (EMR) and radiology; handles deviations from policies (waivers) with supervision</p>	<p>Contributes to practice change based on an identified error or systematic problem (e.g., post-analytic, pre-analytic, laboratory, or interpretative)</p> <p>Trouble-shoots pre-analytic problems, including deviations from policies (waivers) with minimal supervision</p>	<p>Participates in and completes a laboratory quality improvement project</p> <p>Trouble-shoots patient safety issues (including pre-analytic, analytic and post-analytic)</p>	<p>Routinely uses identified errors and discrepancies to improve practice and laboratory processes</p> <p>Models patient safety practices; able to write and implement policies on patient safety; completes MOC patient safety module</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p><b>Comments:</b></p>				<p>Not yet achieved Level 1 <input type="checkbox"/></p>

PBLI3 — Scholarly Activity				
Level 1	Level 2	Level 3	Level 4	Level 5
Develops knowledge of the basic principles of research (study design, statistical analysis, IRB issues)	Applies evidence-based medicine in presentations (internal)  Maintains portfolio of internal presentations  Identifies research projects	Applies evidence-based medicine in presentations (external)  Maintains portfolio of external presentations  Designs research protocol and implement study	Prepares and submits articles for peer-reviewed publication  Has a well-developed portfolio of scholarly activity  Proficient in critical evaluation of the literature  Participates in life-long learning	Serves as a peer reviewer for journals and funding agencies
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>				Not yet achieved Level 1 <input type="checkbox"/>

**Suggested Evaluation Methods:** Direct observation; Feedback from clinical colleagues (360 evaluations), Narrative, Portfolio review, Quality management; Peer evaluation

PROF1 — Receiving and Providing Feedback				
Level 1	Level 2	Level 3	Level 4	Level 5
Receives feedback constructively	Modifies practice in response to feedback	Consistently receives feedback and modifies practice	Modifies and maintains changes in practice based on feedback  Provides constructive feedback	Encourages and actively seeks and provides feedback to improve performance
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>				Not yet achieved Level 1 <input type="checkbox"/>

PROF2 — Accountability, Honesty, and Integrity				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Completes assigned tasks on time</p> <p>Is honest and understands the concepts of ethical behavior; seeks counsel when ethical questions arise</p>	<p>Reliably completes assigned tasks in a timely manner; assists team members when requested; respects assigned schedules</p> <p>Acknowledges personal limitations, near misses and errors, and putting the needs of patients first; engages in ethical behavior</p>	<p>Anticipates team needs and steps in to assist as needed</p> <p>Identifies personal limitations and takes responsibility for errors</p>	<p>Anticipates team needs and takes leadership role to independently implement solutions</p> <p>Institutes corrective measures for errors</p> <p>Is viewed by members of the health care team as accepting personal responsibility and always putting the needs of the patient above his/her own interests</p>	<p>Exemplifies effective management of multiple competing tasks, with reliable follow-up; is a source of support/guidance to other members of health care team</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p><b>Comments:</b></p>				<p>Not yet achieved Level 1 <input type="checkbox"/></p>

PROF3 — Cultural Competency				
Level 1	Level 2	Level 3	Level 4	Level 5
Respects diversity and autonomy; recognizes vulnerable populations	Embraces diversity and respects vulnerable populations; aware of potential for bias or cultural differences to affect care and the workplace  Understands and complies with institutional policies affecting cultural competency	Demonstrates cultural competency; recognizes cultural differences that may affect care and the workplace, and identifies and avoids biases	Exemplifies cultural competency; recognizes cultural differences, and identifies and avoids biases that may affect care and the workplace	Models cultural competency and recognition of cultural differences that may affect care and the workplace; works with peers to avoid biases
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>				Not yet achieved Level 1 <input type="checkbox"/>

ICS1 — Communication with Health Care Providers, Families, and Patients (as applicable)				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Understands the importance of timely and effective communication with health care providers, families, and patients (as applicable)</p> <p>Understands that the written report is a form of communication that must be clear and understandable</p> <p>Effectively utilizes the electronic health record</p>	<p>With substantial guidance, provides timely and effective communication with health care providers, families, and patients (as applicable)</p> <p>With substantial guidance, produces a clear and understandable written report</p>	<p>With minimal guidance, provides timely and effective communication with health care providers, families, and patients (as applicable)</p> <p>With minimal guidance, produces a clear and understandable written report</p>	<p>Effectively communicates complex, difficult, or challenging information (e.g., errors, complications, adverse events, and bad news)</p> <p>Independently and consistently produces a clear and understandable written report</p>	<p>Serves as a role model for effective and professional communication to health care providers, families, and patients (as applicable)</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p><b>Comments:</b></p>				<p>Not yet achieved Level 1 <input type="checkbox"/></p>

ICS2 — Personnel Management and Conflict Resolution				
Level 1	Level 2	Level 3	Level 4	Level 5
Understands the importance of conflict and complaint resolution	With substantial guidance, manages conflicts and complaints	With minimal guidance, manages conflicts and complaints	Independently manages conflicts and complaints	Anticipates, mitigates, and manages potential conflicts and complaints
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>				Not yet achieved Level 1 <input type="checkbox"/>