

# The Neurotology Milestone Project

*A Joint Initiative of*

The Accreditation Council for Graduate Medical Education  
and  
The American Board of Otolaryngology



Allergy • Facial Plastic & Reconstructive Surgery • Head & Neck Surgery  
Laryngology • Neurotology • Otolaryngology • Pediatric Otolaryngology  
Rhinology • Sleep Medicine



ACGME

July 2015

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The Milestones are designed only for use in evaluation of the fellow 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 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.

## **Neurotology 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 a 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.

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 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/acgmeweb/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.

Cerebellopontine Angle (CPA) Tumors - PC				
Level 1	Level 2	Level 3	Level 4	Level 5
<ul style="list-style-type: none"> <li>Performs complete neurologic history and physical</li> <li>Identifies normal temporal bone and posterior fossa anatomy on magnetic resonance imaging (MRI) and computed tomography (CT)</li> <li>Describes surgical approaches to the CPA</li> </ul>	<ul style="list-style-type: none"> <li>Formulates a differential diagnosis of CPA tumors</li> <li>Counsels patient regarding the indications, outcomes, risks, and complications of surgery of the CPA</li> <li>Performs pre-operative setup including positioning and monitoring</li> <li>Performs initial portion of the temporal bone approach</li> </ul>	<ul style="list-style-type: none"> <li>Differentiates lesions based on imaging characteristics</li> <li>Interprets auditory and vestibular testing in the management of CPA tumors (electronystagmography [ENG], VEMP, auditory brainstem response [ABR])</li> <li>Performs surgical approach up to tumor exposure and cranial nerve dissection (e.g., labyrinthectomy, identification of the internal auditory canal [IAC])</li> </ul>	<ul style="list-style-type: none"> <li>Interprets intraoperative ABR monitoring</li> <li>Performs complete tumor exposure and identifies cranial nerves</li> <li>Counsels patient regarding the indications, outcomes, risks, and complications of radiosurgery of the CPA</li> <li>Recognizes and manages intra-operative and post-operative complications (e.g., CSF leak, cranial nerve injuries, vascular injury)</li> </ul>	<ul style="list-style-type: none"> <li>Performs variations of standard approaches (transcranial, transcochlear, transotic)</li> <li>Proficient at tumor removal</li> </ul>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments:				

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 demonstrated as well as **some** milestones in the higher level(s).

Internal Auditory Canal (IAC) and Cerebellopontine Angle (CPA) Lesions – Patient Care				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Performs complete neurotologic history and physical</p> <p>Identifies normal temporal bone and posterior fossa anatomy on magnetic resonance imaging (MRI) and computed tomography (CT)</p> <p>Describes standard surgical approaches to the IAC/CPA (translab, middle cranial fossa [MCF], Retrosigmoid)</p>	<p>Formulates a differential diagnosis of CPA tumors</p> <p>Counsels patient regarding the indications, outcomes, risks, and complications of surgery of the CPA</p> <p>Performs pre-operative setup, including positioning and monitoring</p> <p>Performs initial portion of the temporal bone approach</p> <p>Identifies the advantages and disadvantages of standard surgical approaches to the CPA</p> <p>Identifies pertinent anatomy related to IAC dissections in the temporal bone laboratory</p>	<p>Differentiates lesions based on imaging characteristics</p> <p>Interprets auditory and vestibular testing in the management of CPA tumors (videonystagmography [VNG], vestibular evoked myogenic potential [VEMP], auditory brainstem response [ABR])</p> <p>Performs surgical approach up to tumor exposure and cranial nerve dissection (e.g., labyrinthectomy, identification of the IAC)</p>	<p>Interprets intra-operative ABR monitoring</p> <p>Performs complete tumor exposure and identifies cranial nerves</p> <p>Counsels patient regarding the indications, outcomes, risks, and complications of radiosurgery of the CPA</p> <p>Recognizes and manages intra- and post-operative complications (e.g., cerebrospinal fluid [CSF] leak, cranial nerve injuries, vascular injury)</p>	<p>Proficient at tumor removal</p> <p>Demonstrates ability to perform variations of standard transtemporal approaches (transcochlear, subtotal petrosectomy)</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>				

Lateral Skull Base Tumors – Patient Care				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Identifies normal jugular foramen, petrous apex, and infratemporal fossa anatomy on MRI and CT</p> <p>Identifies cranial nerve deficits on history and physical examination</p>	<p>Formulates a differential diagnosis of lateral skull base tumors</p> <p>Performs pre-operative setup, including positioning and monitoring</p> <p>Performs initial portion of the temporal bone approach</p> <p>Utilizes a multidisciplinary approach to diagnosis and management of lateral skull base tumors (e.g., radiation oncology, endovascular surgical neuroradiology, neurosurgery)</p> <p>Describes surgical approaches to lateral skull base tumors</p>	<p>Differentiates lesions based on imaging characteristics</p> <p>Counsels patient regarding the indications, outcomes, risks, and complications of surgery of the lateral skull base</p> <p>Stages temporal bone carcinoma and paragangliomas</p>	<p>Creates a comprehensive management plan (e.g., pre-operative work-up, multi-modality treatment) for paragangliomas</p> <p>Performs appropriate temporal bone resection (e.g., lateral, subtotal)</p> <p>Performs approach for petrous apex lesions</p> <p>Identifies and manages intra- and post-operative complications (e.g., CSF leak, cranial nerve injuries, vascular injury)</p>	<p>Develops innovative management of lateral skull base tumors</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>				



Facial Nerve Disorders – Patient Care				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Assesses and grades facial nerve function</p> <p>Identifies normal facial nerve anatomy on MRI and CT</p>	<p>Formulates a differential diagnosis of facial nerve disorders</p> <p>Counsels patient regarding the indications, outcomes, risks, and complications of surgery involving the facial nerve</p>	<p>Orders and interprets appropriate facial nerve electrodiagnostic and imaging tests, and makes management decisions based on results</p> <p>Surgically identifies the facial nerve lateral to the geniculate ganglion</p> <p>Manages the sequelae of acute facial nerve injury (e.g., eye care)</p>	<p>Performs surgical exposure of all segments of the facial nerve, including medial to the geniculate ganglion (e.g., middle fossa, translabyrinthine)</p> <p>Performs facial nerve graft</p> <p>Seeks appropriate consultation and counsels patient regarding the indications, outcomes, risks, and complications of surgery involving facial nerve rehabilitation</p> <p>Provides comprehensive management of neoplasms involving the facial nerve</p>	<p>Develops innovative techniques for the management of facial nerve disorders</p> <p>Designs evidence-based clinical pathways</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>				

Hearing Loss – Medical Knowledge				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Demonstrates understanding of the anatomy and physiology of the middle and inner ear</p> <p>Demonstrates basic understanding of comprehensive audiologic testing (e.g., pure tone audiometry, speech testing, immittance testing)</p> <p>Demonstrates basic understanding of common causes of pediatric and adult hearing loss</p> <p>Demonstrates basic understanding of non-surgical and surgical options for aural rehabilitation</p>	<p>Demonstrates proficient knowledge of normal and abnormal temporal bone and cochleovestibular histopathology</p> <p>Lists unusual causes for hearing loss in pediatric and adult patients, and orders/interprets appropriate advanced audiometric, laboratory, and imaging studies</p> <p>Demonstrates comprehensive knowledge of non-surgical and surgical options for aural rehabilitation</p>	<p>Demonstrates understanding of the pathophysiology and treatment options for auditory neuropathy/dysynchrony</p> <p>Demonstrates understanding of the implications of unilateral hearing loss and management options</p> <p>Demonstrates understanding of indications and outcomes of active middle ear implants</p>	<p>Demonstrates comprehensive understanding of the medical management for hearing loss (e.g., autoimmune disease, sudden hearing loss)</p> <p>Demonstrates understanding of the surgical management of complex causes of conductive hearing loss (e.g., ossicular malformations, aural atresia)</p> <p>Demonstrates understanding of indications, outcomes, risks, and complications of cochlear implantation in patients with temporal bone abnormalities</p>	<p>Publishes original peer-reviewed research related to hearing loss</p> <p>Develops a course or conference related to hearing loss for a regional or national meeting</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>				

Dizziness – Medical Knowledge				
Level 1	Level 2	Level 3	Level 4	Level 5
<p>Describes normal anatomy and physiology of the peripheral vestibular system</p> <p>Lists common causes of peripheral vertigo</p> <p>Demonstrates understanding of non-surgical management of positional vertigo, labyrinthitis, vestibular neuritis, and Meniere’s disease</p>	<p>Describes the integration of the peripheral vestibular system with other sensory and motor systems (e.g., vision, proprioception)</p> <p>Differentiates otologic from non-otologic causes of vertigo</p> <p>Describes mechanisms underlying central compensation for peripheral vestibular disorders</p>	<p>Describes diagnostic criteria and treatment options for central vestibular disorders (e.g., multiple sclerosis, migraine associated dizziness, stroke)</p> <p>Demonstrates understanding of a multidisciplinary approach to evaluate and manage dizziness (e.g., vestibular rehabilitation, neurologic consultation)</p>	<p>Demonstrates comprehensive understanding and interpretation of vestibular testing (e.g., VNG, ocular vestibular-evoked myogenic potential [oVEMP], cervical vestibular evoked myogenic potential [cVEMP], rotary chair, posturography)</p> <p>Demonstrates knowledge of the indications, outcomes, risks, and complications of ablative and non-ablative vestibular interventions (e.g., semicircular canal dehiscence, Meniere’s disease)</p>	<p>Publishes original peer-reviewed research related to dizziness</p> <p>Develops a course or conference related to dizziness for a regional or national meeting</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>				

Patient Safety – Systems-based Practice				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates an understanding of the importance of patient safety and the occurrence of medical errors in neurotology patients  Participates in an effective patient hand-off and surgical time-out processes  Presents at quality improvement conference (organizes data and identification of pertinent patient safety issues)	Recognizes medical errors as systemic events and facilitates reporting in a blame-free environment  Uses multidisciplinary approaches for patient care	Anticipates potentially dangerous situations and intervenes appropriately  Analyzes quality improvement findings and provides feedback to improve patient safety	Advocates for quality patient care and optimal patient care systems  Educates other services about patient safety issues related to neurotology	Participates as an advocate on local, regional, or national levels for patient safety  Designs evidence-based clinical pathways to decrease medical errors
<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"/>

Resource Utilization – Systems-based Practice				
Level 1	Level 2	Level 3	Level 4	Level 5
Understands the resources (e.g., social work, case manager) necessary to coordinate patient care	<p>Considers socio-economic issues when developing patient care plans</p> <p>Appropriately collaborates with allied health practitioners (e.g., nurse practitioners, physician assistants)</p>	<p>Incorporates cost issues into care decisions</p> <p>Uses technology and other hospital/clinic resources to improve patient care</p> <p>Understands the principles of insurance coverage and access to care</p>	<p>Practices cost-effective care (e.g., managing length of stay, operative efficiency)</p> <p>Understands issues of transition to practice (e.g., coding, quality measures, documentation, compensation)</p>	<p>Develops and implements cost efficient clinical pathways</p> <p>Advocates on local, regional, or national levels for health care policy</p>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>				

Evidence-based Medicine – Practice-based Learning and Improvement				
Level 1	Level 2	Level 3	Level 4	Level 5
Understands currently available evidence-based guidelines relevant to neurotology  Understands the quality and limitations of available literature and data	Incorporates evidence-based guidelines into clinical decisions	Synthesizes a clinical plan from multiple sources of evidence	Recognizes gaps in current evidence	Formulates an outcomes-based quality improvement project to answer a clinical question
<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"/>

Self-directed Learning – Practice-based Learning and Improvement				
Level 1	Level 2	Level 3	Level 4	Level 5
Takes responsibility for actions  Acknowledges own errors	Committed to self-improvement  Responds well to feedback	Is self-reflective about academic, professional, and personal needs, strengths, and limitations  Analyzes and interprets own experience	Applies critical analysis of literature to patient care	Publishes original research  Contributes to regional or national educational activities
<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"/>

Behavior – Professionalism				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates behavior that conveys caring, honesty, and genuine interest in patients and families  Demonstrates respect for patients and families  Exhibits professional behavior (e.g., reliability, industry, integrity, confidentiality)  Maintains respect for patient confidentiality  Completes paperwork, administrative tasks, and assignments in a timely manner	Is aware of ethical issues in patient care, including issues of beginning and end-of-life care  Recognizes individual limits in clinical situations and asks for assistance when needed  Understands and manages the issues related to fatigue and sleep deprivation  Recognizes issues related to research ethics  Demonstrates respect for all members of the health care team	Discusses, analyzes, and manages <b>common</b> ethical situations  Displays sensitivity and responsiveness toward all patient populations  Demonstrates respectful behavior in challenging situations and earns the respect of other providers within the system	Discusses, analyzes, and manages ethical issues in complicated and <b>challenging</b> situations  Develops a mutually agreeable care plan in the context of conflicting physician, patient, and caregiver values and beliefs  Understands the ethical implications of incorporating new interventions into practice	Helps lead institutional and organizational ethics programs  Mentors and teaches integrity, altruism, individual responsibility, and professionalism
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>				

Leadership – Professionalism				
Level 1	Level 2	Level 3	Level 4	Level 5
Works effectively with others on the treatment team	Manages team efficiently and effectively	Demonstrates leadership skills in adverse situations and environments	Demonstrates advanced skills in leading multidisciplinary teams  Motivates the team to high performance	Models leadership qualities and teaches others to be leaders  Develops the talents of others
<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"/>



Health Care Team Communications – Interpersonal and Communication Skills				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates an understanding of the importance of effective communication with other providers	Communicates effectively with attending staff members, peers, and other health care providers  Conducts appropriate transitions of care (e.g., hand-offs, sign-outs, transfers of care)	Resolves disagreements with other health care providers in a professional manner  Generates clear and concise documentation of patient interactions	Negotiates and manages conflict among care providers  Communicates effectively in times of crises	Is viewed as an exemplary communicator, problem solver, and ambassador for the neurotology service
<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"/>

Patient- and Family-centered Care – Interpersonal and Communication Skills				
Level 1	Level 2	Level 3	Level 4	Level 5
Demonstrates an understanding of the value of patient- and family-centered care  Obtains thorough informed consent for routine procedures  Demonstrates sensitivity in caring for culturally diverse patients	Communicates effectively with patients and families in the inpatient and outpatient settings, with special consideration for communication with the hearing-impaired patient  Uses interpreter services appropriately	Demonstrates effective communication with challenging families  Obtains thorough informed consent for complex procedures  Appropriately uses multiple forms of communication (e.g., e-mail, patient portal, social media) with respect for patient privacy	Facilitates and participates in patient/family/health care team conferences  Mentors and teaches others patient and family-centered communication skills	Serves on local, regional, or national committees addressing ethical or advocacy issues
<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"/>