Supplemental Guide: Neurotology

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Milestones Supplemental Guide

This document provides additional guidance and examples for the Neurotology 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: Internal Auditory Canal (IAC) and Cerebellopontine Angle (CPA) Lesions **Overall Intent:** To evaluate, surgically treat and treat surgical complications of patients with IAC and CPA pathology	
Milestones	**Examples**
Level 1 *Performs a history and physical examination in patients with IAC and CPA pathology*	• Differentiates between cranial nerve, cerebellar, peripheral, and central symptoms and signs; differentiates between sporadic, familial and syndromic pathologies
Assists in the initial approach to the temporal bone (e.g., soft tissue dissection, patient positioning incision planning)	• Assists in the initial approach to a soft tissue dissection
Recognizes common complications of surgery of the IAC/CPA	• Recognizes signs and symptoms of cerebral spinal fluid (CSF) leak, hematoma, wound infection, facial nerve paralysis, vestibular dysfunction, sensorineural hearing loss, ocular movement deficits
Level 2 *Formulates a diagnostic and treatment plan for a patient with IAC and CPA lesions*	• Orders and interprets magnetic resonance imaging (MRI) studies and sequences, vestibular tests, audiological tests, and facial nerve studies; formulates watchful waiting, medical, rehabilitative, and surgical strategies
Assists in approach to tumor exposure (e.g., labyrinthectomy, elevation of dura or decompression of sigmoid sinus)	• Assists in the decompression of sigmoid sinus
Initiates work-up of common complications of surgery of the IAC/CPA	• Orders and interprets radiologic and audiologic studies, consults appropriate services, performs wound cultures/aspirates
Level 3 *Explains the risks and benefits of treatment plans for IAC and CPA lesions*	• Discusses observation, radiation, and surgical approaches to lesions of the IAC/CPA including risks, alternatives, and benefits
Performs surgical approach to tumor exposure and cranial nerve dissection identification of IAC lesions	• Initiates approach to tumor exposure
Manages common complications and recognizes uncommon/infrequent complications of surgery of the IAC/CPA	• Manages CSF leak, places lumbar puncture (LP) drain or involves the appropriate service, re-opens wound and identifies then manages the source of CSF leak, performs eustachian tube obliteration) • Manages wound infections medically and surgically

	• Manages facial nerve palsy in the short term and long term, manages hearing loss and vestibular symptoms (vestibular suppressants and refers to rehabilitation) • Recognizes uncommon complications such as temporal lobe or cerebellar stroke/ischemia/hemorrhage, hydrocephalus, meningitis, cerebritis, venous sinus occlusion, chronic headaches, chronic vestibular dysfunction
Level 4 *Adapts standard treatment plans and techniques to atypical circumstances* *Performs complete tumor exposure and begins tumor dissection* *Manages uncommon/ infrequent complications of surgery of the IAC/CPA*	• Modifies treatment modality or surgical approach to the patient's specific circumstance, such as with an only hearing ear, vestibular dysfunction, atypical pathology • Completes tumor exposure • Orders and interprets radiologic studies, consults appropriate services, takes back to operating room if needed, initiates long term therapy (refers to rehabilitation or neurology)
Level 5 *Performs significant amount of tumor dissection including dissection along facial nerve* *Serves as a peer resource for managing uncommon/infrequent complications of surgery of the IAC/CPA*	• Performs tumor dissection • Teaches more junior learners, leads multidisciplinary conferences on complications, publishes review articles, presents at national meetings
Assessment Models or Tools	• Checklist evaluation of live or recorded performance • Direct observation • Objective structured clinical examination (OSCE) • Record review • Reflection • Simulation and models (temporal bone dissection, virtual models) • Standardized oral examination • Standardized patient examination
Curriculum Mapping	•
Notes or Resources	• Arriaga MA, Brackmann DE. Chapter 179: neoplasms of the posterior fossa. In: Flint PW, Francis HW, Haughey BH, et al., eds. *Cummings Otolaryngology: Head and Neck Surgery*. 7th ed. Philadelphia, PA: Elsevier; 2021. • Carlson ML, Link MJ, Wanna GB, Driscoll CLW. Management of sporadic vestibular schwannoma. *Otolaryngologic Clinics of North America* 2015;48(3,): 407-422. • Friedmann DR, Grobelny B, Golfinos JG, Roland JT, Nonschwannoma: tumors of the cerebellopontine angle. *Otolaryngologic Clinics of North America* 2015;48(3): 461-475.

	• Liu JK, Saedi T, Delashaw JB, McMenomey SC. Management of complications in Nneurotology. *Otolaryngologic Clinics of North America* 2007:40(3): 651-667.

Patient Care 2: Lateral Skull Base Tumors **Overall Intent:** To evaluate, surgically treat, and treat complications of patients with lateral skull base pathology	
Milestones	**Examples**
Level 1 *Performs a history and physical examination in patients with lateral skull base tumors*	• Differentiates between upper and lower cranial nerve and vascular compression symptoms and signs
Assists in the initial approach to the temporal bone (e.g., soft tissue dissection, patient positioning incision planning)	• Assists in initial approach to the temporal bone
Recognizes common complications	• Recognizes signs and symptoms of cranial nerve neuropathies, hematoma, wound infection, and CSF leak
Level 2 *Formulates a diagnostic and treatment plan for a patient with lateral skull base tumors*	• Orders and interprets radiologic studies (MRI, computed tomography (CT), angiography), audiograms, laboratory studies (e.g., blood and urine chemistry for paragangliomas), and formulates watchful waiting, medical, rehabilitative (dysphagia/dysphonia), and surgical strategies
Assists in approach to tumor exposure	• Assists in approach to tumor exposure
Initiates work-up of common complications	• Orders and interprets radiologic studies, speech and swallow consults, aspirates, or cultures wound
Level 3 *Explains the risks and benefits of treatment plans for lateral skull base tumors*	• Discusses risks, benefits, and alternatives of surgical and non-surgical treatments of lateral skull base tumors
Performs surgical approach up to tumor exposure and identification of critical structures	• Performs surgical approach to tumor exposure
Manages common complications and recognizes uncommon/infrequent complications	• For common complications, manages CSF leak, wound infection, or hematoma, conservatively and surgically; manages cranial nerve neuropathies and deficits in the short and long term • For uncommon complications, recognizes cerebral ischemia, vascular occlusion
Level 4 *Adapts standard treatment plans and techniques to atypical circumstances*	• Modifies treatment modality, surgical approach, or extent of resection to the patient's specific circumstance, taking into consideration factors such as pre-existing dysphagia/dysphonia, life expectancy, comorbidities, socioeconomic factors

Performs complete tumor exposure and begins tumor dissection *Manages uncommon/ infrequent complications*	• Performs tumor exposure • Orders and interprets radiologic studies, consults appropriate services, takes back to operating room if needed, initiates long term therapy (neurology, rehabilitative therapy)
Level 5 *Performs tumor dissection* *Serves as a peer resource for managing uncommon/infrequent complications*	• Performs tumor dissection • Teaches more junior learners, leads multidisciplinary conferences on complications, publishes review articles, presents at national meetings
Assessment Models or Tools	• Checklist evaluation of live or recorded performance • Direct observation • Objective structured clinical examination (OSCE) • Record review • Reflection • Simulations and models (temporal bone dissection, virtual models) • Standardized oral examination • Standardized patient examination
Curriculum Mapping	•
Notes or Resources	• Thomas AJ, Wiggins RH, Gurgel RK. Nonparaganglioma jugular foramen tumors. *Otolaryngologic Clinics of North America* 2015;48(2):343-359. • Wanna GB, Sweeney AD, Haynes DS, Carlson ML. Contemporary management of jugular paragangliomas. *Otolaryngologic Clinics of North America* 2015; 48(2): 331-341.

Patient Care 3: Facial Nerve Disorders **Overall Intent:** To evaluate, surgically treat, and treat complications of patients with facial nerve disorders	
Milestones	**Examples**
Level 1 *Performs a history and physical examination in patients with facial nerve disorders*	• Accurately assesses and grade facial nerve function
Provides routine peri-operative care for patients with facial nerve disorders, including planning of surgical approach and coordination of care with subspecialties	• Provides routine eye care in patients with facial paralysis • Incorporates hearing status in the approach for facial nerve surgery
Recognizes common complications of facial nerve surgery	• Recognizes risks to hearing and vestibular function
Level 2 *Formulates a diagnostic and treatment plan for patients with facial nerve disorders, including neurophysiologic testing*	• Appropriately orders and interprets neurophysiologic testing (electroneuronography (ENoG), electromyography)
Surgically identifies and/or skeletonizes the facial nerve lateral to the geniculate ganglion	• Identifies the facial nerves
Initiates work-up of common complications	• Recognizes the effect of local anesthetics on facial nerve function • Assesses for exposure keratitis
Level 3 *Explains the risks and benefits of treatment plans for facial nerve disorders*	• Understands the risks and benefits of observation, steroids, antivirals, and surgery in the treatment of facial paralysis.
Performs surgical exposure of all segments of the facial nerve, including peri-geniculate, labyrinthine and intracanalicular (via middle fossa and transtemporal approaches)	• Understands transtemporal and middle fossa approaches
Manages common complications and recognizes uncommon/infrequent complications	• Manages hearing loss and vestibular complications • Recognizes epidural and subdural complications (hematoma)
Level 4 *Adapts standard treatment plans and techniques to atypical circumstances*	• Adopts a treatment plan to facial nerve disorders in an only hearing ear

Performs surgery on the nerve (separates nerve from tumor, performs primary repair of sheath)	• Surgically separates nerve from the tumor
Manages uncommon/ infrequent complications	• Manages intracranial complications of skull base surgery
Level 5 *Develops innovative techniques for management of facial nerve disorders; leads a multidisciplinary conference on facial nerve disorders*	• Publishes original research on facial nerve disorders
Performs facial nerve graft, including harvesting graft from local and distal sight, and performs nerve anastomosis	• Harvests and grafts facial nerves
Serves as a peer resource for managing uncommon/infrequent complications	• Teaches a course to manage intracranial complications
Assessment Models or Tools	• Checklist evaluation of live or recorded performance • Direct observation • Objective structured clinical examination (OSCE) • Record review • Reflection • Simulations and models (temporal bone dissection, virtual models) • Standardized oral examination • Standardized patient examination
Curriculum Mapping	•
Notes or Resources	• American Academy of Otolaryngology. OTOSource. Htpps://www.otosource.org/. Accessed 2021. • Guntinas-Lichius O, et al. Facial nerve electrodiagnostics for patients with facial palsy: A clinical practice guideline. Eur Arch Otorhinolaryngol. 2020; 277(7): 1855-1874. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7286870 • House JW, Brackmann DE. Facial nerve grading system. *Otolaryngol Head Neck Surgery* 1985;93(2):146-7..

Patient Care 4: Non-Operative Patient Care **Overall Intent:** To evaluate and treat patients with neurotology disorders	
Milestones	**Examples**
Level 1 *Evaluates patients; orders and interprets routine diagnostic testing*	• Interprets audiograms and videonystagmography (VNG) • Performs microscopic ear exam
Level 2 *Orders and interprets specialty testing*	• Appropriately orders and interprets ENoG, auditory brainstem response (ABR), vestibular evoked myogenic potential (VEMP)
Level 3 *Implements a plan to manage patients with typical presentation patterns, including medical and procedural options*	• Manages patients with conductive hearing loss, routine sensorineural hearing loss (SNHL) • Manages the dizzy patient with medications, intratympanic injections, and particle repositioning maneuvers
Level 4 *Implements a plan to manage patients with complex presentation patterns, including medical and procedural options, and refers to the multidisciplinary team*	• Recognizes and manages migraine-associated dizziness • Recognizes the need for multidisciplinary team involvement in pediatric hearing loss including speech-language pathology and audiology team members
Level 5 *Leads the multidisciplinary team for complex patients*	• Leads a vestibular case conference • Leads a neurofibromatosis 2 (NF2) case conference
Assessment Models or Tools	• Direct observation • Multisource feedback • Objective structured clinical examination (OSCE) • Record review • Reflection • Standardized oral examination • Standardized patient examination
Curriculum Mapping	•
Notes or Resources	• American Academy of Otolaryngology. OTOSource. https://www.otosource.org/. Accessed 2021. • Carlson, M, et al. *Comprehensive Management of Vestibular Schwannoma.* Thieme; 2019. • Furman J, Cass S, Whitney S. *Vestibular Disorders A Case Study Approach to Diagnosis and Treatment,* 3rd Edition. Oxford University Press; 2010.

Patient Care 5: Pediatric Neurotology **Overall Intent:** To provide up-to-date and evidence-based medical and surgical management in the diagnosis and treatment of pediatric neurotologic disease	
Milestones	**Examples**
Level 1 *Performs an age-appropriate history and physical examination with developmental assessment*	• Performs routine pre-operative care including binocular microscopy as well as interpretation of routine CT temporal bone and MRI of the internal auditory canals scans
Performs standard pediatric otology procedures (e.g., chronic ear, implants)	• Performs routine pediatric otologic procedures including tympanoplasty, mastoidectomy, and cochlear implants in the anatomically typical child
Provides routine peri-operative care for pediatric otology procedures	• Understands post-operative complications including cerebrospinal fluid leak, hematoma, infection, and/or meningitis
Level 2 *Formulates a diagnostic and treatment plan for a pediatric patient*	• Creates a differential diagnosis, diagnostic plan, and treatment plan including appropriate use of age and developmentally suitable audiologic testing and imaging as well as medical and surgical management
Assists with advanced otologic procedures and pediatric neurotology procedures	• Assists in the surgical management of the complex cochlear implantation (the malformed ear such as common cavity, cochlear hypoplasia, and incomplete partition), aural atresia, as well as skull base surgeries such as cerebrospinal fluid leaks, encephaloceles, or skull base tumors
Recognizes and initiates work-up of routine complications of treatment	• Identifies post-operative complications (cerebrospinal fluid leak, hematoma, infection), the patients at higher risk for post-operative complications and starts work-up including physical exam and imaging
Level 3 *Explains the risks and benefits of pediatric procedures; adapts diagnoses to age-related variations*	• Discusses with pediatric patients and families risks unique to congenital malformations including increased risk of CSF leak with enlarged vestibular aqueduct or misplacement of electrode array into the internal auditory canal with an incomplete partition type 3 (IP3) malformation
Performs advanced otology procedures and components of neurotology procedures	• Performs complex cochlear implantation (the malformed ear such as common cavity, cochlear hypoplasia, and incomplete partition), aural atresiaplasty, as well as components of skull base surgeries such as cerebrospinal fluid leaks, encephaloceles, or skull base tumors
Manages routine complications and recognizes complex complications of treatment	• Manages complications including post-operative CSF leak, hematoma, and infection

	• Recognizes meningitis and seizures as complex complications
Level 4 *Adapts standard treatment plans to special circumstances (e.g., syndromic children and infants)* *Performs pediatric neurotology procedures* *Manages uncommon complications of treatment*	• Adapts treatment plan for complex patients • Performs independently pediatric skull base surgeries such as cerebrospinal fluid leaks, encephaloceles, or skull base tumors • Manages complications including meningitis and seizure
Level 5 *Actively participates in discussion at an interdisciplinary pediatric case conference or specialty clinic* *Performs rare pediatric neurotology procedures* *Serves as a peer resource for managing uncommon/infrequent complications associated with pediatric procedures*	• Leads a multidisciplinary conference for pediatric patients with syndromic disorders • Performs acoustic tumor and NF2 removals • Preforms auditory brain stem implants • Creates a curriculum to manage uncommon complications
Assessment Models or Tools	• Direct observation • Multisource feedback • Objective structured clinical examination (OSCE) • Record review • Reflection • Standardized oral examination • Standardized patient examination
Curriculum Mapping	•
Notes or Resources	• House Institute Professional Education. Congenital aural atresia. YouTube. https://www.youtube.com/watch?v=93QjlTiMHi0&list=PL7aLGUtUaoDShTANAQt62Nyl0zzndD6vE&index=28. Published 2021. • Jahrsdoerfer RA, Yeakley JW, Aguilar EA, Cole RR, Gray LC. Grading system for the selection of patients with congenital aural atresia. *Am J Otol.* 1992 Jan;13(1):6-12. PMID: 1598988. • Sennaroğlu L, Bajin MD. Classification and current management of inner ear malformations. *Balkan Med J.* 2017Sep 29;34(5):397-411. doi:

	10.4274/balkanmedj.2017.0367. Epub 2017 Aug 25. PMID: 28840850; PMCID: PMC5635626. • Sennaroğlu L, Tahir E. A novel classification: anomalous routes of the facial Nerve in relation to inner ear malformations. *Laryngoscope* 2020Nov;130(11):E696-E703. doi: 10.1002/lary.28596. Epub 2020 Mar 5. PMID: 32134124.

Medical Knowledge 1: Hearing Loss **Overall Intent:** To demonstrate knowledge of the causes and treatment of hearing loss	
Milestones	**Examples**
Level 1 *Demonstrates understanding of the anatomy and physiology of the middle and inner ear, as well as common causes of pediatric and adult hearing loss*	• Understands the role of the GJB2 gene in the etiology of hearing loss • Understands the different causes of conductive hearing loss including otosclerosis and ossicular discontinuity
Demonstrates basic understanding of comprehensive audiologic testing	• Understands pure tone audiometry, speech testing, and immittance testing
Demonstrates basic understanding of non-surgical and surgical options for aural rehabilitation	• Understands basic hearing aid options
Level 2 *Demonstrates proficient knowledge of normal and abnormal temporal bone and cochleovestibular histopathology*	• Identifies the specific histologic elements involved in different types of hearing loss (inner hair cell versus outer hair cell)
Lists unusual causes for hearing loss in pediatric and adult patients, and orders/interprets appropriate advanced audiometric, laboratory, and imaging studies	• Understands third window hearing loss • Understands syndromic causes of hearing loss • Interprets ABR, CT, and MRI studies of the temporal bone
Demonstrates comprehensive knowledge of non-surgical and surgical options for aural rehabilitation	• Understands the indications for contralateral routing of signals hearing aids and implantable auditory devices
Level 3 *Demonstrates comprehensive understanding of the pathophysiology of cochlear hearing loss*	• Identifies molecular events leading to cochlear hearing loss
Demonstrates understanding of the medical and surgical management of conductive, mixed, and sensory-neural hearing loss	• Counsels patients on the surgical and non-surgical options to improve hearing

Demonstrates understanding of indications, outcomes, risks, and complications of cochlear implants and active middle/inner ear implants	• Understands risks of cochlear implants including facial nerve injury, perilymphatic leak, or dizziness
Level 4 *Demonstrates a comprehensive understanding of the pathophysiology of retrocochlear and central auditory disorders* *Demonstrates understanding of the medical and surgical management of complex conductive, mixed, and sensory-neural hearing loss* *Demonstrates understanding of indications, outcomes, risks, and complications of cochlear implantation in patients with temporal bone abnormalities and advanced surgical reconstruction of aural atresia*	• Understands the functional changes in the cochlea, auditory nerve and/or CNS that lead to SNHL • Understands the diagnosis and management of cochlear otosclerosis • Uses Jahrsdoerfer's criteria for aural atresia
Level 5 *Conducts original research related to hearing loss* *Develops a course or conference related to hearing loss for a regional or national meeting* *Demonstrates understanding of indications, outcomes, risks and complications of auditory brainstem implants*	• Performs basic science or genetic research to investigate causes of SNHL • Participates in a program planning committee meeting for a regional or national meeting • Presents an instructional course or panel discussion at a regional or national meeting • Understands risks of ABI including cranial nerve stimulation, brainstem edema and or bleeding
Assessment Models or Tools	• Direct observation • Multisource feedback • Objective structured clinical examination (OSCE) • Record review • Reflection • Standardized oral examination • Standardized patient examination
Curriculum Mapping	•
Notes or Resources	• Jahrsdoefer RA, Yeakley JW, Aguilar EA, Cole RR, Gray LC. Grading system for the selection of patients with congenital aural atresia. *AM J Otol* 1992;13(1):6-12.

	• McRackan TR and Brackmann DE. Historical perspective on evolution in management of lateral skull base tumors. *Otolaryngol Clin North Amer.* 2015June:48(3):397-405. • Moeller AR. Physiology of the ear and the auditory nervous system. In Jackler R and brackmann DE eds. *Neurotology*. 2nd edition. 2005;52-74. • O'Connell BP, Haynes SS, Wanna GB. Auditory rehabilitation in sporadic vestibular schwannoma. In *Comprehensive Management of Vestibular Schwannoma.* Carlson et al. eds. 2019:412-417. • Otto SN, Brackmann DE, Hitselberger WE, Shannon RV, Kuchta J. Multichannel auditory brainstem implant: Update on performance in 61 patients. *J Neurosurg*. 2002: 96(6);1063-1071. • Shearer AE, Hildebrand MS, Smith R. Hereditary hearing loss and deafness overview. 1999 February 14 (updated 2017 July 27). In *GeneReviews.* Seattle, Washington: University of Washington; 1993- 2022. Pubmed ID: 20301607.

Medical Knowledge 2: Dizziness **Overall Intent:** To develop knowledge of the evaluation and management of patients with dizziness	
Milestones	**Examples**
Level 1 *Describes normal anatomy and physiology of the peripheral vestibular system*	• Describes the excitatory and inhibitory roles of the vestibule and semicircular canals
Lists common causes of peripheral and central vertigo	• Common causes of peripheral vertigo include benign paroxysmal positional vertigo (BPPV), labyrinthitis and vestibular neuronitis • Common causes of central vertigo include vestibular migraine, stroke, and multiple sclerosis
Demonstrates understanding of non-surgical management of positional vertigo, labyrinthitis, vestibular neuritis, and Meniere's disease	• Lists common particle repositioning maneuvers for each type of BPPV • Lists medical management of labyrinthitis and vestibular neuronitis, Meniere's disease (oral and injected steroids, diuretics, antivirals, suppressants)
Level 2 *Describes the integration of the peripheral vestibular system with other sensory and motor systems (e.g., vision, proprioception)*	• Explains the mechanisms of the vestibulo-ocular and vestibulocollic reflex
Differentiates otologic from non-otologic causes of vertigo	• Discusses the classical history of vestibular neuronitis and the physical exam findings which differentiate it from a central etiology
Describes mechanisms underlying central compensation for peripheral vestibular disorders	• Explains adaptation in terms of sensory and behavioral substitution
Level 3 *Describes diagnostic criteria and treatment options for central vestibular disorders (e.g., multiple sclerosis, vestibular migraine, stroke)*	• Describes diagnostic criteria of migraine and vestibular migraine and lists abortive and prophylactic measures and medications including diet modifications, trigger avoidance, and sleep hygiene
Develops a complete differential diagnosis for a complicated dizzy patient and orders appropriate vestibular testing	• Considers multifactorial contributions to dizziness including concurrent Meniere's disease, vestibular migraine, vestibular hypofunction, and BPPV, and orders vestibular testing only to narrow the differential diagnoses
Demonstrates knowledge of physical therapy and other rehabilitative options for peripheral and central vestibular disorders	• Recognizes that physical therapy for vestibular hypofunction should include vestibulo-ocular reflex exercises

Level 4 *Demonstrates comprehensive understanding and interpretation of advanced vestibular testing* *Demonstrates understanding of a multidisciplinary approach to evaluate and manage complex cases of dizziness (e.g., vestibular rehabilitation, neurologic consultation)* *Demonstrates knowledge of the indications, outcomes, risks, and complications of ablative and non-ablative vestibular interventions (e.g., for semicircular canal dehiscence, Meniere's disease)*	• Explains the procedure and expected findings of VNG, ocular vestibular-evoked myogenic potential (oVEMP), cervical vestibular evoked myogenic potential (cVEMP), rotary chair, and posturography, video head impulse test (v-HIT) • Describes the importance of neurologic consultation for down-beat nystagmus in terms of coordinating additional diagnostic work-up and directing medication trials and for habituation exercises, respectively • Describes the role of vestibular rehabilitation for a post-concussion patient or post-ablative vestibular dysfunction • Lists intratympanic steroid injections and endolymphatic sac decompression as non-ablative options for Meniere's disease patients with persistent symptoms despite dietary changes and initial trials of medications, and identifies risks of tympanic membrane perforation and hearing loss, amongst others
Level 5 *Conducts original research related to dizziness* *Develops a course or conference related to dizziness for a regional or national meeting* *Demonstrates understanding of indications, outcomes, risks, and complications of emerging technology, including vestibular implants*	• Designs and publishes any type of study related to dizziness • Develops a multidisciplinary institution-sponsored dizziness course • From early literature on vestibular implants for patients with bilateral vestibular hypofunction, cites improvements in some measures of gait and posture and risks of hearing loss
Assessment Models or Tools	• Direct observation • Multisource feedback • Objective structured clinical examination (OSCE) • Record review • Reflection • Standardized oral examination • Standardized patient examination
Curriculum Mapping	•
Notes or Resources	• Basura GJ, et al. Clinical practice guideline: Ménière's disease. *Otolaryngol Head Neck Surg.* 2020;162(2_suppl):S1-S55. doi: 10.1177/0194599820909438. PMID: 32267799. • Chow MR, et al. Posture, gait, quality of life, and hearing with a vestibular implant. *N Engl J Med.* 2021;384(6):521-532.

	• Goebel JA. The ten-minute examination of the dizzy patient. *Semin Neurol.* 2001;21(4):391-8. doi: 10.1055/s-2001-19410. PMID: 11774054. • House Institute Professional Education. Practical assessment of the dizzy patient. YouTube. https://www.youtube.com/watch?v=DXC3qZG-foo&list=PL7aLGUtUaoDShTANAQt62Nyl0zzndD6vE&index=16. Published 2021.

Medical Knowledge 3: Clinical Reasoning **Overall Intent:** To consistently develop a complete and prioritized differential diagnosis while minimizing the impact of cognitive errors	
Milestones	**Examples**
Level 1 *Demonstrates sound clinical reasoning in common neurotology problems*	• Relates physiology and pathophysiology of the auditory and vestibular systems as well as anatomy of the skull base to common neurotologic conditions • Effectively performs evaluation, recommends testing, and diagnoses common skull base tumors
Level 2 *Identifies errors in clinical reasoning within neurotology*	• Identifies atypical presentations of common skull base pathology and displays knowledge of uncommon pathology along with diagnostic and treatment paradigms • Identifies and explains common errors in the evaluation or treatment of neurotologic conditions
Level 3 *Applies clinical reasoning principles to direct patient care in complex neurotology problems*	• Identifies and directs roles for multidisciplinary team for all phases of treatment of neurotologic pathology
Level 4 *Reviews the clinical decision making of oneself and the team to identify areas for improvement*	• Identifies and incorporates emerging literature into clinical decision making • Identifies and explains alternate treatment paradigms for common and uncommon neurotologic conditions along with the benefits and trade-offs of each
Level 5 *Coaches and mentors others in clinical reasoning and helps them to recognize and avoid cognitive errors*	• Actively participates in the medical and surgical education of residents for diagnosis and treatment of relevant pathology • Identifies areas of need for clinical research and can develop study designs that might answer outstanding clinical questions
Assessment Models or Tools	● Chart-stimulated recall ● Direct observation ● Medical record (chart) audit ● Multisource feedback ● Reflection ● Simulation • Evaluation of formal case presentations incorporating explicit discussion of clinical reasoning (case conferences, morbidity and mortality (M and M) conferences, etc.)
Curriculum Mapping	•
Notes or Resources	● American College of Physicians. Getting it Right: Cases to Improve Diagnosis. https://www.acponline.org/cme-moc/online-learning-center/getting-it-right-cases-to-improve-diagnosis. Accessed 2020.

	● American College of Physicians (ACP). Teaching Clinical Reasoning. https://store.acponline.org/ebiz/products-services/product-details/productid/21910?productId=21910. Accessed 2020. ● Bowen JL. Educational strategies to promote clinical diagnostic reasoning. *New England Journal of Medicine*. 2006;355(21):2217-2225. https://www.researchgate.net/publication/6674220_Educational_Strategies_to_Promote_Clinical_Diagnostic_Reasoning. ● Charlin B, Tardif J, Boshuizen HP. Scripts and medical diagnostic knowledge: theory and applications for clinical reasoning instruction and research. *Academic Medicine*. 2000;75(2):182-190. https://www.ncbi.nlm.nih.gov/pubmed/10693854. ● Croskerry P. A universal model of diagnostic reasoning. *Academic Medicine*. 2009;84(8):1022-1028. http://files.neuroligase.webnode.com/200000215-5a1485bc7a/A_Universal_Model_of_Diagnostic_Reasoning-14.pdf. ● Docnomo, a phone app ● Graber ML, Franklin N, Gordon R. Diagnostic error in internal medicine. *Archives of Internal Medicine*. 2005;165(13):1493-1499. https://www.researchgate.net/publication/298348382_Diagnostic_Error_in_Internal_Medicine. ● Mamede S, Schmidt HG, Penaforte JC. Effects of reflective practice on the accuracy of medical diagnosis. *Medical Education*. 2008;42(5):468-475. https://www.ncbi.nlm.nih.gov/pubmed/18412886. ● Norman GR, Monteiro SD, Sherbino J, Ilgen JS, Schmidt HG, Mamede S. The causes of errors in clinical reasoning: cognitive biases, knowledge deficits, and dual process thinking. *Academic Medicine*. 2017;92(1):23-30. https://www.researchgate.net/publication/309465770_The_Causes_of_Errors_in_Clinical_Reasoning_Cognitive_Biases_Knowledge_Deficits_and_Dual_Process_Thinking. ● Society to Improve Diagnosis in Medicine. https://www.improvediagnosis.org/. Accessed 2020.

Systems-Based Practice 1: Patient Safety and Quality Improvement (QI) **Overall Intent:** To engage in the analysis and management of patient safety events, including relevant communication with patients, families, and health care professionals; to conduct a QI project	
Milestones	**Examples**
Level 1 *Demonstrates knowledge of common patient safety events*	• Lists patient misidentification or medication errors as common patient safety events
Demonstrates knowledge of how to report patient safety events	• Describes how to report errors in your environment
Demonstrates knowledge of basic quality improvement methodologies and metrics	• Describes fishbone tool
Level 2 *Identifies system factors that lead to patient safety events*	• Identifies lack of deep vein thrombosis (DVT) prevention checklist
Reports patient safety events through institutional reporting systems (simulated or actual)	• Reports lack of DVT prevention checklist to the institution
Describes local quality improvement initiatives	• Summarizes protocols resulting in decreased incidence of DVTs
Level 3 *Participates in analysis of patient safety events (simulated or actual)*	• Participates in M and M conference
Participates in disclosure of patient safety events to patients and patients' families (simulated or actual)	• Participates in a family discussion regarding a patient safety events
Participates in local quality improvement initiatives	• Participates in project identifying root cause of patient flow delays
Level 4 *Conducts analysis of patient safety events and offers error prevention strategies (simulated or actual)*	• Collaborates with a team to conduct the analysis of medication administration errors and can effectively communicate with patients/families about those events
Discloses patient safety events to patients and patients' families (simulated or actual)	• Discloses a patient's DVT diagnosis to the family

Demonstrates the skills required to identify, develop, implement, and analyze a quality improvement project	• Participates in the completion of a QI project to improve interprofessional communication regarding DVT prevention
Level 5 *Actively engages teams and processes to modify systems to prevent patient safety events* *Role models or mentors others in the disclosure of patient safety events* *Creates, implements, and assesses quality improvement initiatives at the institutional or community level*	• Assumes a leadership role at the departmental or institutional level for patient safety • Conducts a simulation for disclosing patient safety events • Initiates and completes a QI project to improve interprofessional communication regarding DVT prevention and shares results with stakeholders
Assessment Models or Tools	• Direct observation • E-module multiple choice tests • Medical record (chart) audit • Multisource feedback • Portfolio • Reflection • Simulation
Curriculum Mapping	•
Notes or Resources	• Institute of Healthcare Improvement. http://www.ihi.org/Pages/default.aspx. Accessed 2021.

Systems-Based Practice 2: System Navigation for Patient-Centered Care **Overall Intent:** 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	
Milestones	**Examples**
Level 1 *Demonstrates knowledge of care coordination* *Identifies key elements for safe and effective transitions of care and hand-offs* *Demonstrates knowledge of population and community health needs*	• For a patient with a vestibular schwannoma, identifies medical and radiation oncologist, rehabilitation therapist, home health nurse, and social workers as members of the team • Lists the essential components of a standardized sign-out tool for care transition and hand-offs • Identifies that patients in rural areas may have different needs than urban patients
Level 2 *Coordinates care of patients in routine clinical situations effectively using the roles of interprofessional team members* *Performs safe and effective transitions of care/hand-offs in routine clinical situations* *Identifies specific population and community health needs for the local population*	• Coordinates care with radiation oncology and rehabilitation therapist at the time of discharge from the hospital • Routinely uses a standardized sign-out tool for a stable patient during night float sign-out • Identifies that limited transportation options may be a factor in rural patients getting to radiation and rehabilitation therapy appointments
Level 3 *Coordinates care of patients in complex clinical situations effectively using the roles of interprofessional team members* *Performs safe and effective transitions of care/hand-offs in complex clinical situations* *Uses local resources effectively to meet the needs of a patient population and community*	• Works with the social worker to coordinate care for a homeless patient that will ensure follow-up to the neurotologist, radiation oncologist and rehabilitation therapist after discharge from the hospital • Routinely uses a standardized sign-out tool when transferring a patient to the intensive care unit (ICU) • Refers patients to a local pharmacy which provides a sliding fee scale option and prints pharmacy coupons for patients in need
Level 4 *Role models effective coordination of patient-centered care among different disciplines and specialties* *Role models and advocates for safe and effective transitions of care/hand-offs within and*	• During inpatient rotations, leads team members in approaching consultants to review cases/recommendations and arranges multidisciplinary rounds for the team • Prior to going on vacation, proactively informs the covering resident about a plan of care for a post-operative ICU patient with hydrocephalus

across health care delivery systems, including outpatient settings *Participates in changing and adapting practice to provide for the needs of specific populations*	• Assists to design post-operative pain management protocols for prescribing standard regimens to patients to reduce variations in opioid prescribing habits
Level 5 *Analyzes the process of care coordination and leads in the design and implementation of improvements* *Improves quality of transitions of care within and across health care delivery systems to optimize patient outcomes* *Leads innovations and advocates for populations and communities with health care needs*	• Leads a program to create standardized CSF leak precautions teaching for family members of patients after skull base surgery • Develops a protocol to improve transitions to long-term care facilities • Leads development of telehealth diagnostic services for a rural ears, nose, and throat (ENT) clinic
Assessment Models or Tools	• Direct observation • Medical record (chart) audit • Multisource feedback • OSCE • Quality metrics and goals mined from electronic health records (EHR) • Review of sign-out tools, use and review of checklists
Curriculum Mapping	•
Notes or Resources	• Centers for Disease Control and Prevention (CDC). Population Health Training. https://www.cdc.gov/pophealthtraining/whatis.html. Accessed 2021. • Skochelak SE, Hawkins RE, Lawson LE, Starr SR, Borkan J, Gonzalo JD. *Health Systems Science*. 1st ed. Philadelphia, PA: Elsevier; 2016. ISBN:9780702070372.

Systems-Based Practice 3: Physician Role in Health Care Systems **Overall Intent:** To understand the physician's role in the complex health care system and how to optimize the system to improve patient care and the health system's performance	
Milestones	**Examples**
Level 1 *Identifies key components of the complex health care system (e.g., hospital, skilled nursing facility, finance, personnel, technology)*	• Articulates differences between skilled nursing and long-term care facilities
Describes basic health payment systems, including government, private, public, uninsured care, and practice models	• Understands the impact of health plan coverage on prescription drugs for individual patients
Level 2 *Describes how components of a complex health care system are interrelated, and how they impact patient care*	• Explains how improving patient satisfaction impacts patient adherence and payment to the health system
Delivers care with consideration of each patient's payment model (e.g., insurance type)	• Takes into consideration patient's prescription drug coverage when choosing a therapy for treatment of Meniere's disease
Level 3 *Discusses how individual practice affects the broader system (e.g., length of stay, readmission rates, clinical efficiency)*	• Ensures that patient comorbidities are addressed at time of discharge to reduce readmission rate
Engages with patients in shared decision making, informed by each patient's payment model	• Discusses risks and benefit of repeat surveillance MRI in the setting of identified schwannoma
Level 4 *Manages various components of the complex health care system to provide efficient and effective patient care and transitions of care*	• Ensures proper documentation of three-day qualifying hospital stay prior to discharging a patient to a skilled nursing facility for physical therapy
Advocates for patient care needs (e.g., community resources, patient assistance resources) with consideration of the limitations of each patient's payment model	• Works collaboratively to improve patient assistance resources for a patient with cranial nerve def and limited resources
Level 5 *Advocates for or leads systems change that enhances high-value, efficient, and effective patient care and transitions of care*	• Works with community or professional organizations to advocate for hearing loss rehabilitation services

Participates in health policy advocacy activities	• Improves informed consent process for non-English-speaking patients requiring interpreter services
Assessment Models or Tools	• Direct observation • Medical record (chart) audit • Patient satisfaction data • Portfolio
Curriculum Mapping	•
Notes or Resources	• Agency for Healthcare Research and Quality (AHRQ). Measuring the Quality of Physician Care. https://www.ahrq.gov/professionals/quality-patient-safety/talkingquality/create/physician/challenges.html. Accessed 2021. • AHRQ. Major Physician Measurement Sets: https://www.ahrq.gov/professionals/quality-patient-safety/talkingquality/create/physician/measurementsets.html. Accessed 2021. • The Commonwealth Fund. Health System Data Center. https://datacenter.commonwealthfund.org/#ind=1/sc=1. Accessed 2021. • Dzau VJ, McClellan M, Burke S, et al. Vital directions for health and health care: priorities form a national academy of medicine initiative. *JAMA*. 2017;317(14):1461-1470. https://nam.edu/vital-directions-for-health-health-care-priorities-from-a-national-academy-of-medicine-initiative/. • The Kaiser Family Foundation. www.kff.org. Accessed 2021. • The Kaiser Family Foundation. Topic: health reform. https://www.kff.org/topic/health-reform/. Accessed 2021.

Practice-Based Learning and Improvement 1: Evidence-Based and Informed Practice **Overall Intent:** To incorporate evidence and patient values into clinical practice	
Milestones	**Examples**
Level 1 *Demonstrates how to access available evidence, and incorporates patient preferences and values to take care of routine neurotologic conditions*	• Identifies evidence-based guidelines for Bell's palsy from American Academy of Otolaryngology – Head and Neck Surgery (AAO-HNSF)
Level 2 *Articulates clinical questions and elicits patient preferences and values to guide evidence-based care*	• Assists patients in accessing reliable online educational content
Level 3 *Locates and applies the best available evidence, integrated with patient preference, to manage complex neurotologic conditions*	• Utilizes AAO-HNSF guidelines for sudden sensorineural hearing loss
Level 4 *Critically appraises the current literature and presents management in either a grand rounds or journal club setting*	• Evaluates the primary literature to categorize the level of evidence in treating neurotologic disorders
Level 5 *Coaches others to critically appraise and apply evidence for complex patients, and/or participates in the development of guidelines*	• Leads clinical teaching on the application of best practices in critical appraisal of vestibular schwannoma
Assessment Models or Tools	• Direct observation • Oral or written examinations • Presentation evaluation • Research portfolio
Curriculum Mapping	•
Notes or Resources	• Institutional Review Board (IRB) guidelines • National Institutes of Health. Write Your Application. https://grants.nih.gov/grants/how-to-apply-application-guide/format-and-write/write-your-application.htm. Accessed 2021. • US National Library of Medicine. PubMed Tutorial. https://www.nlm.nih.gov/bsd/disted/pubmedtutorial/cover.html. Accessed 2021. • Various journal submission guidelines

Practice-Based Learning and Improvement 2: Reflective Practice and Commitment to Personal Growth **Overall Intent:** To seek clinical performance information with the intent to improve care; reflects on all domains of practice, personal interactions, and behaviors, and their impact on colleagues and patients (reflective mindfulness); develop clear objectives and goals for improvement in some form of a learning plan	
Milestones	**Examples**
Level 1 *Accepts responsibility for personal and professional development by establishing goals* *Identifies the factors that contribute to gap(s) between expectations and actual performance* *Actively seeks opportunities to improve*	• Sets a goal to improve management of skull base lesions • Asks for feedback from patients, families, and patient care team members • Identifies opportunities to observe additional skull base surgeries
Level 2 *Demonstrates openness to performance data (feedback and other input) to inform goals* *Analyzes and reflects on the factors that contribute to gap(s) between expectations and actual performance* *Designs and implements a learning plan, with prompting*	• Accepts constructive feedback in the management of skull base lesions • Assesses time management skills and how they impact timely completion of clinic notes and literature reviews • When prompted, develops individual education plan to improve evaluation of skull base lesions
Level 3 *Seeks performance data episodically, with adaptability* *Analyzes, reflects on, and institutes behavioral change(s) to narrow the gap(s) between expectations and actual performance* *Independently creates and implements a learning plan*	• Conducts a chart audit to assess the hearing results in patients undergoing cochlear implant • Completes a comprehensive literature review to address gaps in knowledge in the treatment of skull base lesions • Using web-based resources, creates a personal curriculum to improve personal evaluation of vestibular schwannoma patients
Level 4 *Intentionally seeks performance data consistently, with adaptability* *Challenges assumptions and considers alternatives in narrowing the gap(s) between expectations and actual performance*	• Completes a quarterly chart audit to assess facial nerve outcomes in acoustic tumor removal • After patient encounter, debriefs with the attending and other patient care team members to optimize future collaboration in the care of the patient and family

Uses performance data to measure the effectiveness of the learning plan, and, when necessary, improves it	• Performs a chart audit on personal documentation of facial nerve outcome results in vestibular schwannoma surgery
Level 5 *Role models consistently seeking performance data with adaptability* *Coaches others on reflective practice* *Facilitates the design and implementation of learning plans for others*	• Models practice improvement and adaptability • Develops educational module for collaboration with other patient care team members • Assists residents in developing individualized learning plans
Assessment Models or Tools	• Direct observation • Review of learning plan
Curriculum Mapping	•
Notes or Resources	• Burke AE, Benson B, Englander R, Carraccio C, Hicks PJ. Domain of competence: Practice-based learning and improvement. *Acad Pediatr.* 2014;14:S38-S54. https://linkinghub.elsevier.com/retrieve/pii/S1876-2859(13)00333-1. • Hojat M, Veloski JJ, Gonnella JS. Measurement and correlates of physicians' lifelong learning. *Academic Medicine*. 2009;84(8):1066-1074. https://journals.lww.com/academicmedicine/fulltext/2009/08000/Measurement_and_Correlates_of_Physicians__Lifelong.21.aspx. • 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. *Academic Medicine*. 2013;88(10):1558-1563. https://journals.lww.com/academicmedicine/fulltext/2013/10000/Assessing_Residents__Written_Learning_Goals_and.39.aspx.

Professionalism 1: Professional Behavior and Ethical Principles **Overall Intent:** To recognize and address lapses in ethical and professional behavior, demonstrates ethical and professional behaviors, and use appropriate resources for managing ethical and professional dilemmas	
Milestones	**Examples**
Level 1 *Identifies and describes potential triggers for lapses in professionalism* *Demonstrates knowledge of the ethical principles underlying patient care*	• Identifies fatigue as a potential cause for a lapse in professionalism • Understands being late to sign-out has adverse effect on patient care and on professional relationships • Identifies principles to include informed consent, surrogate decision making, advanced directives, confidentiality, error disclosure, stewardship of limited resources, and related topics
Level 2 *Demonstrates insight into professional behavior in routine situations and how to appropriately report lapses in professionalism* *Analyzes straightforward situations using ethical principles*	• Respectfully approaches a colleague who is late to sign-out about the importance of being on time • Notifies appropriate supervisor when a colleague is routinely late to sign-out • Identifies and applies ethical principles involved in informed consent when the colleague is unclear of all the risks
Level 3 *Demonstrates professional behavior in complex or stressful situations* *Analyzes complex situations using ethical principles and recognizes the need to seek help in managing and resolving complex ethical situations*	• Appropriately responds to a distraught family member following an unsuccessful resuscitation attempt of a relative • After noticing a colleague's inappropriate social media post, reviews policies related to posting of content and seeks guidance • Offers treatment options for a terminally ill patient, while recognizing own limitations, and consistently honoring the patient's choice
Level 4 *Recognizes situations that might trigger lapses in professionalism and intervenes to prevent lapses in oneself and others* *Recognizes and uses appropriate resources for managing and resolving ethical dilemmas as needed*	• Actively considers the perspectives of others • Models respect for patients and promotes the same from colleagues, when a patient has been waiting an excessively long time to be seen • Recognizes and uses ethics consults, literature, risk-management/legal counsel to resolve ethical dilemmas
Level 5 *Coaches others when their behavior fails to meet professional expectations*	• Coaches others when their behavior fails to meet professional expectations and creates a performance improvement plan to prevent recurrence

Identifies and seeks to address system-level factors that induce or exacerbate ethical problems or impede their resolution	• Engages stakeholders to address excessive wait times in the clinic to decrease patient and provider frustrations that lead to unprofessional behavior
Assessment Models or Tools	• Direct observation • Global evaluation • Multisource feedback • Oral or written self-reflection • Simulation
Curriculum Mapping	•
Notes or Resources	• American Board of Internal Medicine (ABIM) Foundation. American Board of Internal Medicine. Medical professionalism in the new millennium: a physician charter. *Annals of Internal Medicine*. 2002;136(3):243-246. https://annals.org/aim/fullarticle/474090/medical-professionalism-new-millennium-physician-charter. Accessed 2021. • American Medical Association. Ethics. https://www.ama-assn.org/delivering-care/ama-code-medical-ethics. Accessed 2021. • Bynny RL, Paauw DS, Papadakis MA, Pfeil S, Alpha Omega Alpha. *Medical Professionalism Best Practices: Professionalism in the Modern Era*. Menlo Park, CA: Alpha Omega Alpha Honor Society; 2017. https://alphaomegaalpha.org/pdfs/Monograph2018.pdf. • Levinson W, Ginsburg S, Hafferty FW, Lucey CR. *Understanding Medical Professionalism*. 1st ed. New York, NY: McGraw-Hill Education; 2014. https://accessmedicine.mhmedical.com/book.aspx?bookID=1058.

Professionalism 2: Accountability/Conscientiousness **Overall Intent:** To take responsibility for one's own actions and the impact on patients and other members of the health care team	
Milestones	**Examples**
Level 1 *Performs tasks and responsibilities in a timely manner with appropriate attention to detail in routine situations*	• Completes administrative tasks, documents safety modules, procedure review, and licensing requirements by specified due date
Responds promptly to requests or reminders to complete tasks and responsibilities	• Responds promptly to reminders from program administrator to complete work hour logs • Has timely attendance at conferences • Completes pre-rounding lists
Level 2 *Takes responsibility for failure to complete tasks and responsibilities, identifies potential contributing factors, and describes strategies for ensuring timely task completion in the future*	• Responds to pages and emails in a timely fashion
Recognizes situations that might impact one's own ability to complete tasks and responsibilities in a timely manner	• Before going out of town, completes tasks in anticipation of lack of computer access while traveling
Level 3 *Performs tasks and responsibilities in a timely manner with appropriate attention to detail in complex or stressful situations*	• Notifies attending of multiple competing demands on call, appropriately triages tasks, and asks for assistance from other fellows or faculty members as needed
Proactively implements strategies to ensure that the needs of patients, teams, and systems are met	• In preparation for being out of town, forwards patient care notifications to another colleague
Level 4 *Recognizes situations that might impact others' ability to complete tasks and responsibilities in a timely manner*	• Takes responsibility for inadvertently omitting key patient information during sign-out
Gives appropriate feedback to individuals or groups to facilitate task completion in a timely manner	• Identifies a backlog of consult requests and offers advice to junior learners on time management
Level 5 *Leads a conference on accountability and task completion*	• Sets up a meeting with the nurse manager to streamline patient discharges and leads team to find solutions to the problem

Leads a quality improvement study on accountability	
Assessment Models or Tools	• Compliance with deadlines and timelines • Direct observation • Global evaluations • Multisource feedback • Self-evaluations and reflective tools • Simulation
Curriculum Mapping	•
Notes or Resources	• Code of conduct from fellow/resident institutional manual • Expectations of residency program regarding accountability and professionalism

Professionalism 3: Knowledge of Systemic and Individual Factors of Well-Being **Overall Intent:** To identify, use, manage, improve, or seek help for personal and professional growth within self and others	
Milestones	**Examples**
Level 1 *Recognizes the importance of getting help when needed to address personal and professional well-being* *Recognizes departmental factors affecting well-being*	• After concerns are expressed by a program leader regarding well-being or burnout, is receptive to considering options for assistance • Identifies the influence of administrative support, clinic resources, call-handling procedures on well-being
Level 2 *Lists resources to support personal and professional well-being* *Participates in departmental well-being committee activities*	• In annual advisor meeting, discusses institutional resources that support personal and professional well-being • Attends departmental well-being events
Level 3 *With prompting, reflects on how personal and professional well-being can impact one's clinical practice* *Recognizes the institutional factors affecting well-being*	• After hearing a speaker discuss physician well-being at a retreat, writes a brief reflection on the impact of well-being on own current and future practice of medicine • At semiannual review, identifies specific institutional factors that positively or negatively affect personal well-being including lack of access to healthy food in the cafeteria and insufficient social work support for complex discharges • Identifies the need for additional mentorship to enhance personal and professional development after discussion with the associate program director reveals that initial career plans do not align with personal goals
Level 4 *Reflects on actions in real time to proactively respond to the inherent emotional challenges of physician work* *Describes institutional factors that affect one's own well-being and that of others*	• Proactively reaches out to program leadership for support when the fellow grieves a personal loss of a family member, including requesting resources for psychological support • Identifies fear of leading a surgical team as a "stress point" in education and seeks advice from an experienced physician • Identifies access to childcare, time allotted for personal health care, and mandatory training activities as institutional factors that can affect well-being • Describes mistreatment and microaggressions committed by the interprofessional team and patients as negatively impacting well-being

Level 5 *Participates in institutional changes to promote personal and professional well-being* *Suggests potential solutions to institutional factors that affect well- being*	• When pandemic conditions limit options for communication and socialization with peers, actively explores new approaches such as telecommunication and distanced socializing to build and maintain relationships that offer peer emotional support • When important future personal or religious events are anticipated, works with program leadership to develop a plan that balances personal and professional responsibilities • Leads a committee to address inefficiencies in the EHR • Advocates with hospital leadership as a Well-Being Committee leader to provide educational interventions and mental health services to address experiences of shame during residency and fellowship education
Assessment Models or Tools	• Direct observation • Group interview or discussions for team activities • Individual interview • Institutional online training modules • Reflective writing • Self-assessment and personal learning plan • Semi-annual evaluation
Curriculum Mapping	•
Notes or Resources	• This subcompetency is not intended to evaluate a fellow's well-being. Rather, the intent is to ensure each fellow has the fundamental knowledge of factors that affect well-being, the mechanism by which those factors affect well-being, and available resources and tools to improve well-being. • ACGME. "Well-Being Tools and Resources." https://dl.acgme.org/pages/well-being-tools-resources . Accessed 2022. • ACP. Imposter Syndrome: Break on Through to the Other Side. https://www.acponline.org/about-acp/about-internal-medicine/career-paths/residency-career-counseling/impower/imposter-syndrome-break-on-through-to-the-other-side. Accessed 2021. (Need Login) • ACP. Know Your Colleagues, Know Yourself: Checking in on Mental Health. https://www.acponline.org/about-acp/about-internal-medicine/career-paths/residency-career-counseling/impower/know-your-colleagues-know-yourself-checking-in-on-mental-health. Accessed 2021. • ACP. Physician Well-being for Residents and Fellows. https://www.acponline.org/meetings-courses/acp-courses-recordings/acp-

	leadership-academy/acp-leadership-academy-webinars/physician-well-being-for-residents-and-fellows. Accessed 2021. • ACP. Physician Well-Being and Professional Fulfillment. https://www.acponline.org/practice-resources/physician-well-being-and-professional-fulfillment. Accessed 2021. • Bynum WE 4th, Artino AR Jr, Uijtdehaage S, Webb AMB, Varpio L. Sentinel emotional events: The nature, triggers, and effects of shame experiences in medical residents. *Acad Med*. 2019;94(1):85-93. https://journals.lww.com/academicmedicine/fulltext/2019/01000/sentinel_emotional_events__the_nature,_triggers,.28.aspx. • Cook AF, Arora VM, Rasinski KA, Curlin FA, Yoon JD. The prevalence of medical student mistreatment and its association with burnout. *Acad Med*. 2014;89(5):749-754. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4401419/pdf/nihms-650423.pdf. • Hicks PJ, Schumacher D, Guralnick S, Carraccio C, Burke AE. Domain of competence: personal and professional development. *Acad Pediatr*. 2014;14(2 Suppl):S80-97. https://www.sciencedirect.com/science/article/abs/pii/S187628591300332X. • Hu YY, Ellis RJ, Hewitt DB, et al. Discrimination, abuse, harassment, and burnout in surgical residency training. *N Engl J Med*. 2019;381(18):1741-1752. https://www.nejm.org/doi/full/10.1056/NEJMsa1903759. • Journal of Graduate Medical Education. Hot Topics: Remediation. https://jgme.org/page/hottopics/remediation. Accessed 2021. • Journal of Graduate Medical Education. Hot Topics: Resident Well-Being. https://jgme.org/page/hottopics/resident_well_being. Accessed 2021. • Local resources, including employee assistance programs (EAPs) • Thomas LR, Ripp JA, West CP. Charter on physician well-being. *JAMA*. 2018;319(15):1541-1542. https://jamanetwork.com/journals/jama/article-abstract/2677478.

Interpersonal and Communication Skills 1: Patient- and Family-Centered Communication **Overall Intent:** To use language and behaviors deliberately to form constructive relationships with patients, to identify communication barriers including self-reflection on biases, and minimize them in the doctor-patient relationships; to organize and lead communication around shared decision making	
Milestones	**Examples**
Level 1 *Uses language and non-verbal behavior to demonstrate respect and establish rapport* *Identifies common barriers to effective communication (e.g., language, disability) while accurately communicating one's own role within the health care system* *Identifies the need to adjust communication strategies based on assessment of a patient's/patient's family's expectations and understanding of their health status and treatment options*	• Introduces self and faculty members, identifies patient and others in the room, and engages all parties in health care discussion • Identifies need for trained interpreter with non-English-speaking patients • Uses age-appropriate language when discussing procedures/surgery with pediatric patients
Level 2 *Establishes a therapeutic relationship in straightforward encounters using active listening and clear language* *Identifies complex barriers to effective communication (e.g., health literacy)* *Organizes and initiates communication with a patient/patient's family by introducing stakeholders, setting the agenda, clarifying expectations, and verifying understanding of the clinical situation*	• Avoids medical jargon and restates patient perspective when discussing preventive measures, such as weight loss • Recognizes the need for handouts with diagrams and pictures to communicate information to a patient who is unable to read • Assesses patient's understanding of their diagnosis and treatment plan
Level 3 *Establishes a therapeutic relationship in challenging patient encounters* *When prompted, reflects on biases while attempting to minimize communication barriers*	• Acknowledges patient's request for an MRI for new dizziness or hearing loss without red flags and arranges timely follow-up visit to align diagnostic plan with goals of care • Recognizes biases related to ableism, ageism, weight, etc.

With guidance, sensitively and compassionately delivers medical information; elicits a patient's/patient's family's values, goals, and preferences; and acknowledges uncertainty and conflict	• Organizes a family meeting to determine a plan for withdrawal of treatment in a neurologically devastated patient
Level 4 *Easily establishes therapeutic relationships, with attention to a patient's/patient's family's concerns and context, regardless of complexity* *Independently recognizes biases while attempting to proactively minimize communication barriers* *Independently, uses shared decision-making to align the patient's/patient's family values, goals, and preferences with treatment options to make a personalized care plan*	• Continues to engage representative family members with disparate goals in the care of a patient with growing vestibular schwannoma • Reflects on bias related to vestibular schwannoma treatment of colleague's family member • Uses patient and family input to develop a plan for vestibular schwannoma management, aligned with the patient's values
Level 5 *Mentors others in situational awareness and critical self-reflection to consistently develop positive therapeutic relationships* *Role models self-awareness while identifying a contextual approach to minimize communication barriers* *Role models shared decision making in patient/family communication including those with a high degree of uncertainty/conflict*	• Leads a discussion group on personal experience of moral distress • Develops a fellowship curriculum on social justice which addresses bias • Serves on a hospital bioethics committee
Assessment Models or Tools	• Direct observation • Kalamazoo Essential Elements Communication Checklist (Adapted) • Multisource feedback • Self-assessment including self-reflection exercises • Skills needed to Set the state, Elicit information, Give information, Understand the patient, and End the encounter (SEGUE)
Curriculum Mapping	•

Notes or Resources	• Laidlaw A, Hart J. Communication skills: an essential component of medical curricula. Part I: Assessment of clinical communication: AMEE Guide No. 51. *Med Teach*. 2011;33(1):6-8. https://www.researchgate.net/publication/49706184_Communication_skills_An_essential_component_of_medical_curricula_Part_I_Assessment_of_clinical_communication_AMEE_Guide_No_511. • Makoul G. Essential elements of communication in medical encounters: The Kalamazoo consensus statement. *Acad Med*. 2001;76(4):390-393. https://www.researchgate.net/publication/264544600_Essential_elements_of_communication_in_medical_encounters_The_Kalamazoo_Consensus_Statement. • Makoul G. The SEGUE Framework for teaching and assessing communication skills. *Patient Educ Couns*. 2001;45(1):23-34. https://www.researchgate.net/publication/11748796_The_SEGUE_Framework_for_teaching_and_assessing_communication_skills. • Symons AB, Swanson A, McGuigan D, Orrange S, Akl EA. A tool for self-assessment of communication skills and professionalism in residents. *BMC Med Educ*. 2009;9:1. https://bmcmededuc.biomedcentral.com/articles/10.1186/1472-6920-9-1.

Interpersonal and Communication Skills 2: Interprofessional and Team Communication **Overall Intent:** To communicate effectively with the health care team, including consultants, in both straightforward and complex situations	
Milestones	**Examples**
Level 1 *Respectfully requests/receives a consultation*	• When asking for a cardiology consultation for a patient with elevated troponin post-operation, respectfully relays the diagnosis and need for assistance in management • When receiving a consult request for a patient with hearing loss, asks clarifying questions politely, and expresses gratitude for the consult
Uses language that values all members of the health care team	• Acknowledges the contribution of each member of the ICU team
Level 2 *Clearly and concisely requests/responds to a consultation*	• Communicates diagnostic evaluation recommendations clearly and concisely in an organized and timely manner
Communicates information effectively with all health care team members	• Performs debrief in the post-anesthesia care unit • Sends a message in EHR to other teams (ICU or neurological surgery) regarding care of medically complex skull base patients
Respectfully receives feedback on performance as a member of the health care team	• Shows changes in practice habits based on feedback from the attending
Level 3 *Receives follow-up and feedback on the outcome of the consultation*	• Asks if the consult addressed the needs of the primary team
Uses active listening to adapt communication style to fit team needs	• When receiving treatment recommendations from an attending physician, repeats back the plan to ensure understanding
Solicits feedback on performance as a member of the health care team	• Asks for feedback from operating room nurses or anesthesiologists on communication in the operating room
Level 4 *Coordinates recommendations from different members of the health care team to optimize patient care*	• Initiates a multidisciplinary meeting to developed shared care plan for a patient with a new skull base tumor
Facilitates health care team-based feedback in routine situations	• States that family members were hoping to meet with attending surgeon after the surgery ended • Shares feedback from other disciplines to attending neurotologist

Communicates concerns and provides feedback to peers, learners, and superiors	• Asks other members of the health care team to repeat back recommendations to ensure understanding
Level 5 *Role models flexible communication strategies that value input from all health care team members, resolving conflict when needed* *Facilitates health care team-based feedback in complex situations* *Facilitates teaching of team-based communication and feedback*	• Mediates a conflict resolution between different members of the health care team • Acts as a lead participant in preoperative time-out, modeling attention, use of clarifying questions and encouraging feedback.
Assessment Models or Tools	• Direct observation • Global assessment • Medical record (chart) audit • Multisource feedback • Simulation
Curriculum Mapping	•
Notes or Resources	• Braddock CH, Edwards KA, Hasenberg NM, Laidley TL, Levinson W. Informed decision making in outpatient practice: time to get back to basics. *JAMA* 1999;282(24):2313-2320. https://jamanetwork.com/journals/jama/fullarticle/19K2233. Accessed 2021. • Dehon E, Simpson K, Fowler D, Jones A. Development of the faculty 360. *MedEdPORTAL*. 2015;11:10174. https://www.mededportal.org/doi/10.15766/mep_2374-8265.10174. Accessed 2021. • Fay D, Mazzone M, Douglas L, Ambuel B. A validated, behavior-based evaluation instrument for family medicine residents. *MedEdPORTAL*. 2007. https://www.mededportal.org/doi/10.15766/mep_2374-8265.622. • François, J. Tool to assess the quality of consultation and referral request letters in family medicine. *Can Fam Physician*. 2011;57(5):574–575. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3093595/pdf/0570574.pdf. • Green M, Parrott T, Cook G. Improving your communication skills. *BMJ*. 2012;344:e357. https://www.bmj.com/content/344/bmj.e357. • Henry SG, Holmboe ES, Frankel RM. Evidence-based competencies for improving communication skills in graduate medical education: a review with suggestions for implementation. *Med Teach*. 2013;35(5):395-403. https://www.tandfonline.com/doi/full/10.3109/0142159X.2013.769677.

	• Lane JL, Gottlieb RP. Structured clinical observations: a method to teach clinical skills with limited time and financial resources. *Pediatrics*.2000;105:973-7. https://pediatrics.aappublications.org/content/pediatrics/105/Supplement_3/973.full.pdf. • Roth CG, Eldin KW, Padmanabhan V, Freidman EM. Twelve tips for the introduction of emotional intelligence in medical education. *Med Teach.* 2018:1-4. https://www.tandfonline.com/doi/full/10.1080/0142159X.2018.1481499.

Interpersonal and Communication Skills 3: Communication within Health Care Systems **Overall Intent:** To communicate effectively using a variety of methods	
Milestones	**Examples**
Level 1 *Accurately records information in the patient record*	• Creates accurate documentation but may include extraneous information
Safeguards patients' personal health information	• Shreds patient list after rounds; avoids talking about patients in the elevator
Level 2 *Demonstrates organized diagnostic and therapeutic reasoning through notes in the patient record*	• Creates organized and accurate documentation outlining clinical reasoning supporting the treatment plan
Documents required data in formats specified by institutional policy	• Uses approved institutional templates to capture all required data elements
Level 3 *Concisely reports diagnostic and therapeutic reasoning in the patient record*	• Concisely documents complex clinical thinking but may not contain anticipatory guidance at discharge
Appropriately selects direct (e.g., telephone, in-person) and indirect (e.g., progress notes, text messages) forms of communication based on context	• Communicates with patient's care team immediately about potentially critical test result
Level 4 *Communicates clearly, concisely, timely, and in an organized written form, including providing anticipatory guidance*	• Creates consistently accurate, organized, and concise documentation and frequently incorporates anticipatory guidance at discharge
Produces written or verbal communication (e.g., patient notes, email) that serves as an example for others to follow	• Creates exemplary notes that are used by the chief resident to teach others • Speaks directly to referring physicians and ensures recommendations are clear and understood
Level 5 *Models feedback to improve others' written communication*	• Coaches residents on written communication
Guides departmental or institutional communication around policies and procedures	• Leads a task force established by the hospital QI committee to develop a plan to improve house staff hand-offs
Assessment Models or Tools	• Direct observation • Medical record (chart) audit • Multisource feedback

Curriculum Mapping	•
Notes or Resources	• 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. *Teach Learn Med.* 2017;29(4):420-432. https://www.tandfonline.com/doi/full/10.1080/10401334.2017.1303385. • Haig KM, Sutton S, Whittington J. SBAR: a shared mental model for improving communication between clinicians. *Jt Comm J Qual Patient Saf*. 2006;32(3)167-175. https://www.ncbi.nlm.nih.gov/pubmed/16617948. • Starmer AJ, Spector ND, Srivastava R, et al. I-PASS, a mnemonic to standardize verbal handoffs. *Pediatrics*. 2012;129(2):201-204. https://ipassinstitute.com/wp-content/uploads/2016/06/I-PASS-mnemonic.pdf.

To help programs transition to the new version of the Milestones, the ACGME has mapped the original Milestones 1.0 to the new Milestones 2.0. Indicated below are where the subcompetencies are similar between versions. These are not exact matches, but are areas that include similar 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.

Milestones 1.0	Milestones 2.0
PC1: Internal Auditory Canal and Cerebellopontine Angle Lesions	PC1: Internal Auditory Canal and Cerebellopontine Angle Lesions
PC2: Lateral Skull Base Tumors	PC2: Lateral Skull Base Tumors
PC3: Facial Nerve Disorders	PC3: Facial Nerve Disorders
No match	PC4: Non-Operative Patient Care
No match	PC5: Pediatric Neurotology
MK1: Hearing Loss	MK1: Hearing Loss
MK2: Dizziness	MK2: Dizziness
No match	MK3: Clinical Reasoning
SBP1: Patient Safety	SBP1: Patient Safety and Quality Improvement
SBP2: Resource Utilization	SBP3: Physician Role in Health Care Systems
PBLI1: Evidence-based Medicine	PBLI1: Evidence-Based and Informed Practice
PBLI2: Self-directed Learning	PBLI2: Reflective Practice and Commitment to Personal Growth
PROF1: Behavior	PROF1: Professional Behavior and Ethical Principles PROF2: Accountability/Conscientiousness
PROF2: Leadership	No match
No match	PROF3: Knowledge of Systemic and Individual Factors of Well-Being
ICS1: Health Care Team Communications	SBP2: System Navigation for Patient-Centered Care ICS2: Interprofessional and Team Communication
ICS2: Patient-and Family-centered Care	ICS1: Patient- and Family-Centered Communication
No match	ICS3: 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/
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