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Recommended Curriculum Guidelines for Family Medicine Residents

Conditions of the Nervous System

This document is endorsed by the American Academy of Family Physicians (AAFP).

Introduction

Each family medicine residency program is responsible for its own curriculum. The AAFP Commission on Education's Subcommittee on Graduate Curriculum has created this guide as an outline for curriculum development, and it should be tailored to the needs of the program.

Through a series of structured and/or longitudinal experiences, the curricula below will support the overall achievement of the core educational competencies defined by the Accreditation Council for Graduate Medical Education (ACGME) and provide guideposts to program requirements specific to family medicine. For updates and details, please refer to the ACGME website at www.acgme.org. Current AAFP Curriculum Guidelines may be found online at www.aafp.org/cg. These guidelines are periodically updated and endorsed by the AAFP and, in many instances, other specialty societies, as indicated on each guideline.

Preamble

A solid understanding of normal neurological development, anatomy, and neurophysiology is imperative to the treatment of neurological pathology. The goal of these guidelines is to introduce family medicine residents to the role of neurological disease in patients and familiarize residents with its place in the overall practice of family medicine. Neurological problems are estimated to comprise 10-15 percent of a family physician's workload. Taking a neurological history and performing a comprehensive neurological examination are essential skills for all family physicians. Emphasis on good diagnostic and therapeutic skills and appropriate consideration of biopsychosocial and cultural factors must be

included in the curriculum.

The nervous system is complex, and it changes based on genetic, environmental, learned, and acquired influences. Variability in presentation and degree of pathophysiology can make diagnosis difficult. Many of the processes are marked by slow episodic degeneration, which patients often learn to overcome or hide. While some disorders are genetic, detailed family history may not always be helpful. Neurological diseases can carry a significant social stigma, and family physicians must address both the medical and often severe psychosocial stress that each disorder can cause in the patient and his or her family. Family medicine residents should be aware of social-cultural variations and be sensitive to the differences in cultural perceptions of disease. Teaching residents to learn and study differences in belief systems should be a goal of family medicine education.

This curriculum guideline provides an outline of the attitudes, knowledge, and skills that should be among the objectives of training programs in family medicine and will lead to optimal care of patients with neurological disorders by future family physicians.

Competencies

At the completion of residency training, a family medicine resident should demonstrate proficiency in the following domains:

Patient Care

At the completion of residency, a family medicine resident should be able to:

1. Diagnose and manage neurological concerns, such as:
    - Take an appropriate focused and comprehensive history (including obtaining necessary information from others) and communicate it verbally, in writing, and in summary form
    - Perform standardized comprehensive neurological assessments and perform necessary further investigation for common neurological conditions, including:
        - Mini-Mental State Exam
        - Mini-Cog©, Montreal Cognitive Assessment (MoCA), Saint Louis University Mental Status (SLUMS) exam
        - Glasgow Coma Scale
        - National Institutes of Health (NIH) Stroke Scale
        - Confusion Assessment Method
        - Pediatric Developmental Exam
            - Modified Checklist for Autism in Toddlers (MCHAT)
            - Ages and Stage Questionnaire
2. Recognize urgent and emergent neurological situations and coordinate appropriate diagnostic strategies and team-based care for:
        - Stroke
        - Meningitis, encephalitis, brain abscess
        - Seizure disorder
        - Status epilepticus
        - Central nervous system (CNS) trauma, including spinal cord injury, and

epidural and subdural hematomas
    - Increased intracranial pressure
    - Acute visual loss
    - Rapidly progressive neurological deficit
    - Neurological respiratory failure
    - Altered mental status
    - Cauda Equina Syndrome
    - Neural Tube Defects
    - Abnormalities of the cerebral vasculature, including cerebral aneurysm
3. Diagnose and manage patients with the following chronic illnesses and monitor for neurological complications:
    - Diabetes
    - HIV
    - End-stage renal disease (ESRD)
    - Syphilis
    - Autoimmune Conditions
4. Coordinate collaborative treatment for those with undifferentiated neurological conditions
5. Apply clinical knowledge to identify problems and formulate an ordered differential diagnosis based on an appreciation of the patient, their history, current problems, and likely causes for the following symptoms:
    - Altered mental status (encephalopathy)
    - Auditory changes (tinnitus, hearing loss)
    - Dizziness (vertigo, lightheadedness, syncope)
    - Focal neurologic deficits
    - Headache
    - Memory loss
    - Myalgia
    - Generalized muscle weakness
    - Chronic pain
    - Neuropathy
    - Seizure
    - Tremor
    - Vision changes
6. Procedural care
    - Identify, in collaboration with appropriate specialists, patients needing a neurological test or procedure
    - Describe the procedure, along with indications, limitations, and contraindications of the following:
        - Lumbar puncture
        - Electroencephalogram
        - Visual, brain stem auditory, and somatosensory evoked potential
        - Nerve conduction study and electromyography
        - Muscle and nerve biopsy
        - Computed axial tomography (CAT), with and without contrast
        - Magnetic resonance imaging (MRI), with and without contrast
        - CT or MR angiography
        - Myelography

- Ultrasound (carotid, pediatric care)
- Polysomnogram
- Genetic testing
- Positron emission tomography (PET) scanning
- Single-photon emission computed tomography (SPECT) scanning

Medical Knowledge

In the appropriate setting, the resident should demonstrate the ability to apply knowledge of the following:

1. Normal anatomy and physiology that allows for localization of neurological disease

2. Normal growth, development, and senescence of the nervous system

3. Recognition of the physician's own level of competence in handling neurological problems and the need for further consultation, as appropriate

4. Diagnosis, initial evaluation, and long-term management of the following conditions in the primary care setting, and with neurological consultation when indicated:
   a. Stroke (hemorrhagic, thrombotic, embolic)
   b. Headache
      - Tension
      - Cluster
      - Migraine
      - Rebound/medication withdrawal
      - Idiopathic intracranial hypertension
      - Emergent headache
   c. Dizziness/lightheadedness/vertigo
      - Benign paroxysmal positional vertigo
      - Meniere’s disease
      - Vestibular neuronitis/labyrinthitis
      - Vestibular migraine
      - Cardiovascular etiologies
   d. Neurocognitive disorder
      - Dementia
        - Alzheimer
        - Frontotemporal
        - Parkinson
        - Vascular
        - Lewy body
        - Pick disease
        - Wernicke-Korsakoff syndrome
        - Creutzfeldt-Jakob disease
        - Pseudodementia
        - Limbic-predominant age-related TDP-43 encephalopathy (LATE)
      - Delirium
      - Cerebral palsy/developmental delay/learning disability

e. Seizure
- Febrile seizure
- Focal and generalized seizure
- Epilepsy
- Non-epileptiform seizure

f. Neurological trauma (concussion, traumatic brain injury [TBI], spinal cord trauma)

g. Extrapyramidal/movement disorders
- Tremor – essential, intentional
- Parkinson disease
- Huntington disease
- Multiple system atrophy
- Restless leg syndrome
- Tics/Tourette syndrome

h. Peripheral neuropathy
- Diabetes
- Vitamin deficiency
- Toxin (alcohol-induced, chemotherapy)
- Autoimmune
- Viral (Guillain-Barre syndrome)

i. Nerve palsies
- Bell's palsy
- Brachial plexus palsy
- Horner syndrome
- Carpal tunnel syndrome
- Nerve entrapment syndromes
- Radiculopathy

j. Neuralgia
- Trigeminal neuralgia
- Postherpetic neuralgia

k. Neuromuscular disorders
- Multiple sclerosis
- Myasthenia gravis
- Polymyositis/dermatomyositis
- Muscular dystrophy
- Amyotrophic lateral sclerosis
- Multi-system atrophy

l. Central nervous system (CNS) infections
- Meningitis
- Encephalitis
- Brain abscess
- Post-infection encephalitis

m. CNS tumor

n. Structural defects
- Aneurysm
- Hydrocephalus

- Arnold-Chiari malformation
- Neural tube defect
- Microcephaly/macrocephaly
- Craniosynostosis

5. Genetic basis of certain neurological disorders as they affect the patient and his or her family, and education of the family regarding the benefits of genetic counseling

6. Potential drug interactions and adverse drug effects, especially in elderly patients

Systems-Based Practice

At the completion of residency, the family medicine resident will be able to:

- Optimize treatment plans utilizing resources that include local, state, and federal agencies

- Coordinate ambulatory, inpatient, and institutional care across health care providers, institutions, and governmental agencies

- Describe the role played by the neurology consultant and appropriate collaborative care for certain neurological conditions

- Recognize times when limiting further investigation and treatment is in the best interest of the patient and communicate that with coordinating specialists

- Show awareness of the importance of a multidisciplinary approach to enhancing individualized care

- Formulate a diagnostic and management plan and assess the need for expert advice with an awareness of the risks, benefits, and costs of evaluation

- Describe the role of a neurology specialist, the implications of special testing for patients who have a neurological disease, and the implications of the test results for the patient

- Manage psychological and rehabilitation aspects of patient care, especially for chronic neurological conditions, which may include the use of other modalities such as manipulation, physical therapy, occupational therapy, and alternative/complementary medicine adjuncts

- Attend to end-of-life issues in neurological disorders, the role of palliative care services, and ethical and legal aspects of terminal care

Practice-Based Learning

At the completion of residency, a family medicine resident should be able to:

- Apply evidence-based diagnostic and treatment strategies when managing a patient who has a suspected neurological disease
- Apply self-directed learning to increase knowledge and competence in neurology
- Recognize times when limiting further investigation and treatment is in the best interest of the patient and communicate that with coordinating specialists
- Recognize the importance of lifelong learning and contribution to the body of knowledge about neurological diseases, health, and the medical management of patients who have neurological impairments

Professionalism

At the completion of residency, a family medicine resident should be able to:

- Be accessible to and accountable for their patients
- Balance personal and professional life to optimize well-being
- Address patient and family concerns in a timely manner

Interpersonal Communication

At the completion of residency, a family medicine resident should be able to:

- Communicate in a compassionate, knowledgeable manner and address complex psychosocial issues based on the patient and their family unit
- Approach care of the patient who has a neurological disease within the patient's own cultural, religious, and social context
- Support the patient through the process of consultation, neurological evaluation, treatment, rehabilitation, and possible progression of neurological illness

Implementation

Implementation of this curriculum guideline is best achieved within the capabilities of the particular residency program and at the discretion of the residency director. The resident must have the opportunity to diagnose and manage (under appropriate supervision) patients who have known neurological disorders, as well as patients who have signs and symptoms suggestive of nervous system pathology. Neurology consultation should supplement the educational process in the care of patients who have neurological

disorders. Communication among all members of the multidisciplinary management team should be emphasized to facilitate diagnosis and management.

A range of learning methods and activities are appropriate to the curricular objectives. These substantially overlap but include the following:

- Observation of and case discussion with faculty and fellow residents
- Supervised clinical practice (inpatient, outpatient, primary care, emergency department, referral, on-call)
- Clinical and other presentations; preparation of case reports
- Participation in clinical lectures, seminars, and tutorials
- Self-directed learning via reading evidence-based resources
- Research and presentation of research
- Teaching undergraduates and postgraduates (medical and other health care professionals)

Resources

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American Academy of Neurology

Interactive, online guide for the neurological exam. neuroexam.com

Harvard University. The Whole Brain Atlas. www.med.harvard.edu/AANLIB/home

Review Articles and Guidelines by Topic:

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McGinley MP, Goldschmidt CH, Rae-Grant AD (2021). Diagnosis and treatment of multiple sclerosis: a review. *JAMA*. 2021;325(8):765-779.

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Padua L, Coraci D, Erra C, et al. Carpal tunnel syndrome: clinical features, diagnosis, and management. *Lancet Neurol*. 2016;15(12):1273-1284.

Parkinson Disease
Halli-Tierney AD, Luker J, Carroll DG. Parkinson disease. *Am Fam Physician*. 2020;102(11):679-691.

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prognosis. *Am Fam Physician*. 2019;99(7):445-450.

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Kleindorfer DO, Towfighi A, Chaturvedi S, et al. 2021 Guideline for the prevention of stroke in patients with stroke and transient ischemic attack: a guideline from the American Heart Association/American Stroke Association. *Stroke*. 2021;52(7):e364-e467.

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Revised 08/2013 by Banner Good Samaritan Family Medicine Center
Revised 07/2017 by Sky Ridge Family Medicine Residency, Lone Tree, CO
Revised 10/2022 by Columbia St. Mary's-Medical College of Wisconsin, Family Medicine Residency, Milwaukee, WI