

Exam Blueprint and Specialty Competencies

Introduction – Blueprint for the Neuroscience Nursing Certification Exam

The primary function of the Blueprint for the CNA Neuroscience Nursing Certification Exam is to describe how the exam is to be developed. Specifically, this blueprint provides explicit instructions and guidelines on how the competencies are to be expressed within the exam in order for accurate decisions to be made on the candidates' competence in neuroscience nursing.

The blueprint has two major components: (1) the content area to be measured and (2) the explicit guidelines on how this content is to be measured. The content area consists of the list of competencies (i.e., the competencies expected of fully competent practising neuroscience nurses with at least two years of experience), and the guidelines are expressed as structural and contextual variables. The blueprint also includes a summary chart that summarizes the exam guidelines.

Description of Domain

The CNA Neuroscience Nursing Exam is a criterion-referenced exam.¹ A fundamental component of a criterion-referenced approach to testing is the comprehensive description of the content area being measured. In the case of the Neuroscience Nursing Certification Exam, the content consists of the competencies of a fully competent practising neuroscience nurse with at least two years of experience.

This section describes the competencies, how they have been grouped and how they are to be sampled for creating an exam.

Developing the List of Competencies

A working group of eight highly experienced neuroscience nurses from various regions in Canada revised and updated the current list of competencies during a five-day meeting. These competencies were reviewed by a group of three neuroscience nurses in Eastern Canada and a subsequent group of four neuroscience nurses from Western Canada. The existing framework of the competencies was modified and the competencies were updated to reflect current practise. The final list of competencies was approved by the Neuroscience Nursing Certification Exam Committee.

¹ Criterion-referenced exam: An exam that measures a candidate's command of a specified content or skills domain or list of instructional objectives. Scores are interpreted in comparison to a predetermined performance standard or as a mastery of defined domain (e.g., percentage correct and mastery scores), independently of the results obtained by other candidates (Brown, 1983).

Assumptions

In developing the set of competencies for neuroscience nurses, the following assumptions were made:

- Neuroscience nursing is the specialized care of clients with or at risk for developing nervous system dysfunction along the continuum of care.

The Client:

- May be an individual and/or a family as identified by the client. This may also include a caregiver or substitute decision-maker;
- Has a focus of care that may extend to a group or a community;
- Includes individuals of all ages; and
- May experience alterations that are acute, sub-acute and/or chronic in at least one of the following areas: motor, sensory, consciousness, cognition/perception and/or behavioural functions.

The Environment:

- Is an integrated system with the client. The environment and client impact on one another in predictable and unpredictable ways;
- Is a healthy workplace conducive to the provision of quality client care; and
- Represents settings across the continuum of care.

The Neuroscience Nurse:

- Possesses general knowledge of normal nervous system functioning, as well as dysfunction;
- Practises according to the Canadian Nurses Association *Code of Ethics* (2008) and/or provincial/territorial code of ethics, standards and legislation;
- Respects and promotes the autonomy of neuroscience clients to help them express their health needs and values and to obtain desired information and services in order to make informed decisions;
- Recognizes and respects the inherent worth of each client, advocating for respectful treatment of all clients;
- Protects client privacy by ensuring that information is not shared outside the health-care team without the client's informed consent. Information may be shared if failure to disclose such information would cause significant harm to self or others or if legally required;

- Advocates for fair treatment and distribution of resources for those clients in their care;
- Values and advocates for best practice guidelines and quality practice environments, ensuring optimal outcomes;
- Formulates, coordinates and implements a plan of care in partnership with the client and the interprofessional team to accommodate biological, sexual/intimacy, psychological, social, cultural and spiritual needs;
- Responds to the changing needs of the client, including life-threatening health crises and end-of-life care;
- Incorporates a variety of teaching and learning principles as appropriate to the needs of the client;
- Implements rehabilitation principles and strategies, according to the client's needs including coordination of services and community reintegration;
- Contributes positively to the image of neuroscience nursing by providing specialized care, being accountable for his/her own practice, acting as a mentor, maintaining competency, and actively seeking opportunities for professional development;
- Demonstrates a commitment to research and evidence-informed practice;
- Demonstrates a commitment to health promotion and injury prevention; and
- Recognizes the personal psychological impact of caring for the client and the need to seek support when appropriate.

Competency Categories

The competencies are classified under a twelve-category classification scheme. Some of the competencies lend themselves to one or more of the categories; therefore, these twelve categories should be viewed simply as an organizing framework. Also, it should be recognized that the competency statements vary in scope, with some representing global behaviours and others more discrete and specific nursing behaviours.

Percentage of Competencies in Each Group

The following table presents the number and the percentage of competencies in each category.

Table 1: Percentage of Competencies in Each Group

Category	Number of competencies	Percentage of the total number of competencies
Anatomy and Physiology	9	4%
Neurological Assessment and Diagnostics	20	10%
General Considerations for Neuroscience Nursing	18	9%
Traumatic Injuries of the Central Nervous System	38	19%
Spine Disorders	12	6%
Tumours	20	10%
Cerebrovascular Disorders	24	12%
Degenerative, Autoimmune and Movement Disorders	16	8%
Infectious Disorders	8	4%
Seizure Disorders	10	5%
Pain Disorders	7	3%
Congenital Disorders	19	9%

Competency Sampling

Using the grouping and guidelines, the Neuroscience Nursing Certification Exam will consist of approximately 165 questions; the categories have been given the following weights in the total exam.

Table 2: Competency Sampling

Categories	Approximate weights in the total exam
Anatomy and Physiology	7-12%
Neurological Assessment and Diagnostics	7-13%
General Considerations for Neuroscience Nursing	12-16%
Traumatic Injuries of the Central Nervous System	15-18%
Spine Disorders	4-6%
Tumours	5-8%
Cerebrovascular Disorders	10-13%
Degenerative, Autoimmune and Movement Disorders	10-15%
Infectious Disorders	3-5%
Seizure Disorders	3-6%
Pain Disorders	3-5%
Congenital Disorders	3-6%

Technical Specifications

In addition to the specifications related to the competencies, other variables are considered during the development of the Neuroscience Nursing Certification Exam. This section presents the guidelines for two types of variables: structural and contextual.

Structural variables: Structural variables include those characteristics that determine the general appearance and design of the exam. They define the length of the exam, the format and presentation of the exam questions (e.g., multiple-choice) and any special functions of exam questions (e.g., independent questions).

Contextual variables: Contextual variables specify the nursing contexts in which the exam questions will be set (e.g., client culture, client health situation or health-care environment).

Structural Variables

Exam Length: The exam consists of approximately 165 multiple-choice questions.

Question Presentation: The multiple-choice questions are presented in one of two formats: case-based or independent. Case-based questions are a set of approximately 4 questions associated with a brief health-care scenario (i.e., a description of the client's health-care situation). Independent questions stand alone. In the Neuroscience Nursing Certification Exam, 40 to 60 per cent of the questions are presented as independent questions and 40 to 60 per cent are presented within cases.

Taxonomy for Questions: To ensure that competencies are measured at different levels of cognitive ability, each question on the Neuroscience Nursing Certification Exam is aimed at one of three levels: knowledge/comprehension, application or critical thinking.²

1. Knowledge/Comprehension

This level combines the ability to recall previously learned material and to understand its meaning. It includes such mental abilities as knowing and understanding definitions, facts and principles, and interpreting data (e.g., knowing the effects of certain drugs or interpreting data appearing on a client's record).

¹ These levels are adapted from the taxonomy of cognitive abilities developed in Bloom, 1956.

2. Application

This level refers to the ability to apply knowledge and learning to new or practical situation. It includes applying rules, methods, principles and theories while providing care to clients (e.g., applying nursing principles to the care of clients).

3. Critical Thinking

The third level of the taxonomy deals with higher-level thinking processes. It includes the abilities to judge the relevance of data, to deal with abstraction and to solve problems (e.g., identifying priorities of care or evaluating the effectiveness of interventions). The neuroscience nurse with at least two years of experience should be able to identify cause-and-effect relationships, distinguish between relevant and irrelevant data, formulate valid conclusions and make judgments about the needs of clients.

The following table presents the distribution of questions for each level of cognitive ability.

Table 3: Distribution of Questions for Each Level of Cognitive Ability

Cognitive Ability Level	Percentage of questions on the Rehabilitation Nursing Exam
Knowledge/Comprehension	15-25%
Application	50-60%
Critical Thinking	20-30%

Contextual Variables

Client Age: One of the contextual variables specified for the Neuroscience Certification Nursing Exam is the age of the clients. Providing specifications for the use of this variable ensures that the clients described in the exam represent the demographic characteristics of the population encountered by the neuroscience nurse. These specifications, listed in Table 4 as percentage ranges, serve as guidelines for test development.

Table 4: Specification for Client Age

Age Group	Percentage of questions on the Neuroscience Nursing Exam
Child/Adolescent (0 to 18 years old)	16-20%
Adult (19 to 64 years old)	35-45%
Older Adult (65+ years old)	35-45%

Client Culture: Questions are included that measure awareness, sensitivity, and respect for different cultural values, beliefs, and practices, without introducing stereotypes.

Client Health Situation: In the development of the Neuroscience Nursing Certification Exam, the client is viewed holistically. The client health situations reflect a cross-section of diseases within the continuum of advanced illness and address physical, emotional, social, and spiritual aspects of care which includes the individual, family, and caregiver.

Health-Care Environment: It is recognized that neuroscience nursing is practiced in a variety of settings. The health-care environment is specified only where it is required for clarity or in order to provide guidance to the examinee.

Conclusions

The Blueprint for the Neuroscience Nursing Certification Exam is the product of a collaborative effort between CNA, ASI, Canadian Association of Neuroscience Nurses (CANN) and a number of neuroscience nurses across Canada. Their work has resulted in a compilation of the competencies required of practising neuroscience nurses and has helped determine how those competencies will be measured on the Neuroscience Nursing Certification Exam. A summary of these guidelines can be found in the summary chart: Neuroscience Nursing Certification Exam Development Guidelines.

It is recognized that neuroscience nursing practice will continue to evolve. As this occurs, the blueprint may require revision so that it accurately reflects current practices. CNA will ensure that such revision takes place in a timely manner and will communicate any changes in updated editions of this document.

Summary Chart

Neuroscience Nursing Certification Exam Development Guidelines

Structural Variables		
Examination Length and Format	Approximately 165 multiple-choice questions	
Question Presentation	Independent Questions	40-60% of questions
	Case-based Questions	40-60% of questions
Cognitive Ability – Levels of Questions	Knowledge/Comprehension	15-25% of questions
	Application	50-60% of questions
	Critical Thinking	20-30% of questions
Competency Categories	Anatomy and Physiology	7-12% of questions
	Neurological Assessment and Diagnostics	7-13 % of questions
	General Considerations for Neuroscience Nursing	12-16% of questions
	Traumatic Injuries of the Central Nervous System	15-18% of questions
	Spine Disorders	4-6 % of questions
	Tumours	5-8 % of questions
	Cerebrovascular Disorders	10-13 % of questions
	Degenerative, Autoimmune and Movement Disorders	10-15 % of questions
	Infectious Disorders	3-5 % of questions
	Seizure Disorders	3-6 % of questions
	Pain Disorders	3-5 % of questions
Congenital Disorders	3-6 % of questions	
Contextual Variables		
Client Age	0 to 18 years	16-20% of questions
	19 to 64 years	35-45% of questions
	65+ years	35-45% of questions
Client Culture	Questions are included that measure awareness, sensitivity, and respect for different cultural values, beliefs and practices, without introducing stereotypes.	
Client Health Situation	In the development of the Neuroscience Nursing Certification Exam, the client is viewed holistically. The client health situations reflect a cross-section of conditions within the continuum of advanced illness and address physical, emotional, social and spiritual aspects of care which includes the individual, family and caregiver.	
Health-Care Environment	It is recognized that Neuroscience nursing is practiced in a variety of settings. The health-care environment is specified only where it is required for clarity or in order to provide guidance to the examinee.	

The Neuroscience Nursing Certification Exam List of Competencies

1. Anatomy and Physiology

The neuroscience nurse:

- 1.1 Demonstrates knowledge of the development of the central nervous system including the embryonic stage.
- 1.2 Demonstrates knowledge of structure, characteristics and functions of the following:
 - 1.2a central nervous system
 - i) brain (e.g., brain stem, cortex, cerebellum)
 - ii) spinal cord
 - iii) nerve impulse transmission (e.g., neural chemical transmission)
 - 1.2b peripheral nervous system
 - i) cranial nerves
 - ii) spinal nerves
 - 1.2c autonomic nervous system (sympathetic, parasympathetic)
 - 1.2d cerebral spinal fluid production, circulation and absorption
 - 1.2e cerebrovascular circulation (e.g., anterior, posterior, circle of Willis, venous)
 - 1.2f blood-brain barrier
 - 1.2g cranial and spinal bones
 - 1.2h meninges

2. Neurological Assessment and Diagnostics

The neuroscience nurse:

- 2.1 Demonstrates knowledge of and performs the following neurological assessments as they relate to neurological disorders, including initial findings and appropriate developmental stages:
 - 2.1a level of consciousness
 - 2.1b mental status/cognition/perception and behaviour
 - 2.1c cranial nerves
 - 2.1d motor function
 - 2.1e sensory functions
 - 2.1f cerebellar functions
 - 2.1g vital signs
 - 2.1h pain
 - 2.1i speech and language
 - 2.1j swallowing
 - 2.1k gait
 - 2.1l reflexes
- 2.2 Demonstrates knowledge of common assessment measures (e.g., Glasgow Coma Scale, stroke assessment scale, spinal cord assessment scales, cognitive and functional assessments).
- 2.3 Demonstrates knowledge of the following diagnostic studies, provides pre- and post-procedure care and understands the implications of abnormal results:
 - 2.3a imaging (e.g., X-rays, CT, CTA, MRI, MRA, angiogram, videofluoroscopy)
 - 2.3b cerebrospinal fluid evaluation (e.g., lumbar puncture, ventricular sample)
 - 2.3c electrophysiologic studies (e.g., EEG, EMG, evoked potentials)
 - 2.3d nuclear medicine studies (e.g., SPECT scan, PET scan, shunt studies)
 - 2.3e ultrasound studies (e.g., transcranial/carotid Doppler)
 - 2.3f biopsy (e.g., brain, skin, muscle, nerve, hair)
 - 2.3g laboratory testing (e.g., routine/therapeutic blood monitoring, urine studies, genetics)

3. General Considerations for Neuroscience Nursing

The neuroscience nurse:

- 3.1 Demonstrates knowledge of intracranial pressure principles, (e.g., Monroe-Kellie, cerebral perfusion pressure, autoregulation).
- 3.2 Identifies the pathophysiology and manifestations of the stages of increased intracranial pressure:
 - 3.2a early signs
 - 3.2b late signs (e.g., herniation syndromes)
- 3.3 Recognizes the following factors that may impact on intracranial pressure/cerebral perfusion pressure (CPP) and implements nursing strategies accordingly:
 - 3.3a hemodynamic status (e.g., blood pressure, fluid volume)
 - 3.3b suctioning
 - 3.3c positioning and alignment
 - 3.3d CO₂ and O₂ levels
 - 3.3e external drainage devices (e.g., lumbar drain, external ventricular devices, Hemovac, Jackson-Pratt)
 - 3.3f pharmacological agents (e.g., osmotic agents, corticosteroids, neuroleptics, sedation, analgesics)
 - 3.3g hyper/hypothermia (e.g., antipyretics, cooling measures)
 - 3.3h noxious stimuli (e.g., environment, lighting, noise)
- 3.4 Implements nursing strategies, including pharmacology, to prevent and manage the following concerns in neuroscience clients:
 - 3.4a neurological dysfunction
 - i) seizures
 - ii) cerebrospinal fluid leak
 - iii) hydrocephalus
 - iv) behavioural/cognitive changes/agitation (e.g., Rancho Los Amigos Scale, environmental stimuli, family involvement)
 - v) cerebral edema (e.g., I.V. solution selection)
 - vi) altered level of consciousness

- 3.4b systemic dysfunctions and/or infection
 - i) airway/respiratory
 - ii) cardiovascular/ peripheral vascular,
 - iii) endocrine (e.g., glucose monitoring)
 - iv) fluid volume status
 - v) gastrointestinal (GI)
 - vi) genitourinary (GU)
 - vii) integumentary
 - viii) musculoskeletal
 - ix) sexual function and intimacy
 - x) psychosocial

- 3.5 Identifies the pathophysiology, manifestations and treatment options for managing clients with the following fluid/electrolyte imbalances:
 - 3.5a syndrome of inappropriate antidiuretic hormone (SIADH)
 - 3.5b cerebral salt wasting (CSW)
 - 3.5c diabetes insipidus (DI)

- 3.6 Provides education and support to the client regarding nervous system dysfunction, including prevention strategies, pathophysiology, manifestations, treatment options, resources and ongoing recovery.

- 3.7 Implements nursing rehabilitation principles for the client with any type of nervous system dysfunction (e.g., cognitive, physical).

4. Traumatic Injuries of the Central Nervous System

Brain

The neuroscience nurse:

- 4.1 Identifies the pathophysiology and manifestations of traumatic brain injury, including:
 - 4.1a mechanism of injury (e.g., coup, contre-coup, shearing, penetrating)
 - 4.1b primary vs. secondary injury
 - 4.1c classification of brain injury (e.g., mild vs. moderate vs. severe)
 - 4.1d diffuse axonal injury (e.g., shaken baby syndrome)
 - 4.1e hemorrhage (e.g., epidural, subdural, intracerebral, subarachnoid, intraventricular)
 - 4.1f concussions
 - 4.1g contusions
 - 4.1h skull fractures (e.g., basal, open, depressed, linear)
- 4.2 Identifies treatment options and goals for the client with traumatic brain injury (e.g., surgery, symptom management, pharmacology, rehabilitation, palliative care).
- 4.3 Describes complications and implements nursing strategies, including pharmacology, to prevent and manage the following in clients with traumatic brain injury:
 - 4.3a seizures
 - 4.3b cerebrospinal fluid leak
 - 4.3c hydrocephalus
 - 4.3d airway/respiratory compromise
 - 4.3e increased intracranial pressure
 - 4.3f infection
 - 4.3g fluid and electrolyte imbalances
 - 4.3h systemic dysfunctions
 - 4.3i agitated behaviour
 - 4.3j cerebral edema
 - 4.3k altered level of consciousness

4.3l emotional ability

4.3m depression

4.4 Identifies the importance of injury prevention programs and risk reduction for traumatic brain injury (e.g., bike helmet safety, seat belt safety).

4. Spinal Cord

The neuroscience nurse:

4.5 Identifies the pathophysiology and manifestations of spinal trauma, including:

4.5a mechanism of injury (e.g., rotational, hyperextension, hyperflexion, compression)

4.5b level of injury (i.e., evaluation of sensory and motor function)

4.5c injury classification (e.g., complete vs. incomplete)

4.5d spinal cord syndromes (e.g., central cord syndrome, Brown-Séquard's syndrome)

4.5e spinal shock

4.5f neurogenic shock

4.5g vertebral fractures (e.g., hangman's, odontoid, compression, stable, unstable)

4.6 Identifies treatment options and goals for the client with spinal trauma (e.g., symptom management, supportive care, pharmacology, surgery, stabilization).

4.7 Describes complications of and implements nursing strategies, including pharmacology, to prevent and manage the following in clients with spinal trauma:

4.7a neurogenic bowel and bladder

4.7b immobility

4.7c autonomic dysreflexia/hyperreflexia

4.7d systemic dysfunctions

4.8 Identifies principles of care and implements nursing strategies for the client with spinal trauma, including:

4.8a immobilization (e.g., spinal precautions, cervical traction, halo vest, stabilization surgery, collars/braces)

4.8b pharmacological management

- 4.9 Identifies the importance of injury prevention programs and risk reduction for traumatic spinal cord injury (e.g., water and sport safety, seat belt safety).

5. Spine Disorders

The neuroscience nurse:

- 5.1 Identifies pathophysiology and manifestations in the client with degenerative spinal disease according to the anatomical level:
- 5.1a spinal stenosis
 - 5.1b spondylolisthesis
 - 5.1c osteoarthritis
 - 5.1d intervertebral disc disease/herniation
 - 5.1e myelopathy
 - 5.1f cauda equina syndrome
- 5.2 Identifies treatment options (e.g., pharmacology, complementary therapies, supportive care, interprofessional therapy, surgery) and utilizes nursing strategies in managing the client with degenerative spinal disease.
- 5.3 Describes the following complications and implements nursing strategies, including pharmacology, to prevent and manage the following in clients with degenerative spine disease:
- 5.3a cerebrospinal fluid leak
 - 5.3b sensorimotor deficits
 - 5.3c bowel/bladder/sexual dysfunction
- 5.4 Identifies the pathophysiology and manifestations of syrinxes (e.g., syringomyelia).
- 5.5 Identifies treatment options and utilizes nursing strategies for the client with syrinxes (e.g., surgery, conservative measures, complementary therapies).

6. Tumours

The neuroscience nurse:

- 6.1 Identifies the pathophysiology and manifestations of brain and spinal tumours related to their anatomical location:
 - 6.1a meningioma, gliomas, metastatic tumours, central nervous system (CNS) lymphoma
 - 6.1b cerebellar-pontine angle tumours (e.g., acoustic neuroma)
 - 6.1c pituitary tumours (e.g., pituitary adenoma)
 - 6.1d childhood tumours (e.g., cerebellar astrocytoma, medulloblastoma, ependymoma)
 - 6.1e intramedullary/extramedullary and intradural/extradural
- 6.2 Identifies treatment options and utilizes nursing strategies for the client with brain tumour (e.g., pharmacology, biopsy, craniotomy, transphenoidal surgery, radiosurgery, radiation, chemotherapy, palliative care).
- 6.3 Identifies treatment options and utilizes nursing strategies for the client with spinal tumour (e.g., pharmacology, biopsy, surgery, radiosurgery, radiation, chemotherapy, palliative care).
- 6.4 Describes the following complications and implements nursing strategies, including pharmacology, to prevent and manage the following in clients with brain tumour:
 - 6.4a seizures
 - 6.4b fluid and electrolyte imbalance
 - 6.4c cerebral edema
 - 6.4d cranial nerve deficit
 - 6.4e hydrocephalus
 - 6.4f pain
 - 6.4g sensory/cognitive and motor dysfunction
 - 6.4h cerebrospinal fluid leak (e.g., postoperative pituitary)
- 6.5 Describes the following complications and implements nursing strategies, including pharmacology, to prevent and manage the following in clients with spinal tumour:
 - 6.5a pain
 - 6.5b syring
 - 6.5c neurogenic bowel and bladder

- 6.5d cerebrospinal fluid leak
- 6.5e sensory and motor dysfunction

7. Cerebrovascular Disorders

The neuroscience nurse:

- 7.1 Identifies the pathophysiology and manifestations of various cerebrovascular disorders:
 - 7.1a transient ischemic attack
 - 7.1b ischemic stroke
 - 7.1c hemorrhagic stroke
 - 7.1d cerebral aneurysm (including subarachnoid hemorrhage (SAH))
 - 7.1e vascular malformations (e.g., arteriovenous malformation)
 - 7.1f cerebral venous sinus thrombosis
 - 7.1g vasculitis (e.g., temporal arteritis)
- 7.2 Demonstrates knowledge of the affected vascular territories and associated symptoms and syndromes.
- 7.3 Demonstrates an understanding of the classification systems used for grading ruptured cerebral aneurysms (e.g., Hunt-Hess, Fisher Grades, World Federation of Neurological Surgeons).
- 7.4 Identifies treatment options and implements nursing strategies for the client with cerebrovascular disorder (e.g., pharmacology, craniotomy/carotid endarterectomy, radiosurgery, interventional radiology).
- 7.5 Describes the pathophysiology of, and assesses complications of, cerebrovascular disorders:
 - 7.5a seizure
 - 7.5b rebleed
 - 7.5c cerebral edema
 - 7.5d hydrocephalus
 - 7.5e vasospasm
 - 7.5f increased intracranial pressure
 - 7.5g herniation (e.g., cerebellar stroke)
 - 7.5h reperfusion syndrome

- 7.6 Describes the pathophysiology of, and assesses, vasospasm in the client with SAH, including:
 - 7.6a pharmacology
 - 7.6b hypertension, hypervolemia, hemodilution (triple H therapy)
 - 7.6c Interventional treatment (e.g., angioplasty/stenting)
- 7.7 Identifies the risk factors for cerebrovascular disorders:
 - 7.7a modifiable (e.g., hypertension, diabetes, dyslipidemia, obesity, smoking)
 - 7.7b non-modifiable (e.g., family history, gender, ethnicity)
- 7.8 Provides relevant health promotion strategies for the primary/secondary prevention of cerebrovascular disorders.

8. Degenerative, Autoimmune and Movement Disorders

The neuroscience nurse:

- 8.1 Identifies pathophysiology and manifestations of the client with the following:
 - 8.1a dementia
 - i) Alzheimer's disease
 - ii) vascular dementia
 - 8.1b degenerative neuromuscular disease
 - i) amyotrophic lateral sclerosis (ALS)
 - ii) muscular dystrophy (e.g., Duchenne, Becker's)
 - 8.1c autoimmune
 - i) myasthenia gravis
 - ii) multiple sclerosis (e.g., relapsing/remitting, secondary progressive, primary progressive)
 - iii) Guillain-Barré syndrome
 - 8.1d movement disorders
 - i) Huntington disease
 - ii) Parkinson's disease
 - iii) dystonia
 - iv) Tourette syndrome

- 8.1e Bell's palsy
- 8.1f normal pressure hydrocephalus
- 8.2 Differentiates between delirium, dementia and depression.
- 8.3 Identifies treatment options, including pharmacology, and utilizes nursing strategies in managing the client with the following:
 - 8.3a dementia
 - i) Alzheimer's disease (e.g., safety, behaviour management, use of cholinergic agents)
 - ii) vascular dementia
 - 8.3b delirium (e.g., safety, behaviour management, family education)
 - 8.3c degenerative neuromuscular disease
 - i) ALS (e.g., nutrition, communication, respiratory, skin)
 - ii) muscular dystrophy (e.g., respiratory, mobility)
 - 8.3d autoimmune
 - i) myasthenia gravis (e.g., plasma exchange, intravenous immunoglobulin, thymectomy, anticholinesterases)
 - ii) multiple sclerosis (e.g., symptomatic versus disease modifying treatment)
 - iii) Guillain-Barré syndrome (e.g., plasma exchange, immunoglobulin, pain, respiratory compromise, autonomic dysfunction, cranial nerve dysfunction)
 - 8.3e movement disorders
 - i) Huntington disease (e.g., swallowing, safety)
 - ii) Parkinson's disease and dystonia (e.g., deep brain stimulation/pallidotomy, safety, nutrition, swallowing)
 - iii) Tourette syndrome (e.g., behavioural/coping strategies)
 - 8.3f Bell's palsy (e.g., psychological)
 - 8.3g normal pressure hydrocephalus (e.g., surgery)
- 8.4 Implements nursing strategies to manage myasthenic crisis and cholinergic crisis.
- 8.5 Describes factors believed to exacerbate symptoms of multiple sclerosis (e.g., heat, infection, stress) and implements nursing strategies accordingly.

9. Infectious Disorders

The neuroscience nurse:

- 9.1 Identifies pathophysiology and manifestations of the client with the following:
 - 9.1a meningitis (e.g., viral vs. bacterial)
 - 9.1b encephalitis (e.g., Creutzfeldt-Jakob disease, herpes)
 - 9.1c brain abscess
 - 9.1d spinal abscess

- 9.2 Identifies treatment options, including pharmacology, and utilizes nursing strategies in managing the client with the following:
 - 9.2a meningitis (e.g., seizures, decreased level of consciousness, infection control precautions, cognitive impairments)
 - 9.2b encephalitis (e.g., seizures, decreased level of consciousness, behavioural management, cognitive impairments)
 - 9.2c brain abscess (e.g., surgery, seizure management)
 - 9.2d spinal abscess (e.g., surgery, sensorimotor deficit)

10. Seizure Disorders

The neuroscience nurse:

- 10.1 Identifies the pathophysiology and manifestations of the client with the following:
 - 10.1a partial seizure disorders (simple vs. complex)
 - 10.1b generalized seizure disorders (e.g., tonic-clonic, absence, atonic, myoclonic)
 - 10.1c status epilepticus
 - 10.1d atypical seizures (e.g., non-epileptic)

- 10.2 Identifies treatment options, including pharmacology, and utilizes nursing strategies, including seizure precautions, in managing the client with the following:
 - 10.2a partial seizure disorder (e.g., surgery, psychosocial support)
 - 10.2b generalized seizure disorder (e.g., surgery, psychosocial support, ketogenic diet)

- 10.2c status epilepticus
- 10.2d atypical seizures
- 10.3 Demonstrates knowledge of the significance of assessment and documentation of the seizure activity (e.g., aura, pre-ictal, ictus, post-ictal).
- 10.4 Provides education to the client regarding seizure threshold, adherence to treatment and lifestyle modification (e.g., driving, personal safety, precipitating factors, medication regime).

11. Pain Disorders

The neuroscience nurse:

- 11.1 Identifies the pathophysiology and manifestations of the client with the following:
 - 11.1a headaches (e.g., migraine, tension, cluster, chronic daily, medication overuse/rebound)
 - 11.1b trigeminal neuralgia
 - 11.1c neurogenic/neuropathic pain
 - 11.1d back pain (e.g., acute, chronic)
- 11.2 Identifies treatment options, including pharmacology, and utilizes nursing strategies, in managing the client with the following:
 - 11.2a headaches (e.g., adjunctive therapies, identification of precipitating factors/triggers, lifestyle modification)
 - 11.2b trigeminal neuralgia (e.g., adjunctive therapies, posterior fossa decompression, percutaneous rhizotomy/nerve block, radiosurgery)
 - 11.2c neurogenic/neuropathic pain (e.g., nerve stimulation, adjunctive therapies)

12. Congenital Disorders

The neuroscience nurse:

- 12.1 Identifies the pathophysiology and manifestations of the client with the following:
 - 12.1a hydrocephalus (communicating vs. non-communicating)
 - 12.1b neural tube defects (spina bifida, tethered cord)

- 12.1c Chiari malformations
- 12.1d neurofibromatosis
- 12.2 Identifies treatment options, including pharmacology, and utilizes nursing strategies, in managing the client with the following:
 - 12.2a hydrocephalus (e.g., ventriculo-peritoneal (VP) shunt, external ventricular drainage (EVD), third ventriculostomy)
 - 12.2b neural tube defects (e.g., surgery, symptom management)
 - 12.2c Chiari malformations (e.g., surgery, conservative therapy)
 - 12.2d neurofibromatosis (e.g., surgery, radiosurgery, conservative therapy)
- 12.3 Describes the following complications and implements nursing strategies, including pharmacology, to prevent and manage the following in clients with an internal/external cerebrospinal fluid drainage device (e.g., lumbar drain, EVD, VP shunt):
 - 12.3a obstruction
 - 12.3b malfunction
 - 12.3c infection
 - 12.3d overdrainage
 - 12.3e underdrainage
- 12.4 Describes the following complications and implements nursing strategies, including pharmacology, to prevent and manage the following in clients with neural tube defects:
 - 12.4a neurogenic bowel and bladder
 - 12.4b immobility issues
 - 12.4c infection
 - 12.4d spasticity
 - 12.4e cerebrospinal fluid leak
 - 12.4f latex allergy