

Exam Blueprint and Specialty Competencies

Introduction – Blueprint for the Nephrology Nursing Certification Exam

The primary function of the blueprint for the CNA Nephrology 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 nephrology 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 nephrology 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 Nephrology 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 Nephrology Nursing Certification Exam, the content consists of the competencies of a fully competent practising nephrology 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

The final list of competencies was updated and approved by the Nephrology 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 nephrology nurses, the following assumptions, based on current national standards for nursing practice, were made:

The patient:

- Refers to the primary recipient(s) toward whom nursing activities are directed including the individual, the individual's family, legal guardian(s), substitute decision-maker(s) and the individual's community. The family and community are defined by the patient.
- Includes persons at risk for developing kidney disease, persons with kidney disease and persons receiving renal replacement therapy.
- Includes persons of all ages, stages of growth and development, and diverse backgrounds (e.g., gender, sexual orientation, religion, spiritual belief, socio-economic status, philosophy, geographical location, politics).

The environment:

- Includes a wide variety of practice settings across the kidney disease continuum from urban to rural (e.g., patient's home, hospital, ambulatory clinics, long-term/extended care facilities, the community, palliative care, educational institutions).
- Includes various telecommunication technologies to support the patient throughout the kidney disease continuum (e.g., telephone, e-mail, fax, video conferencing).

The nephrology nurse:

- Practises within professional and legal standards and upholds and promotes the ethical standards of the nursing profession in the care of patients with kidney disease.
- Respects the patient's rights, the patient's perception of kidney disease and self-determination of care.
- Engages in an active process of self-assessment and development in order to maintain knowledge, skills and judgment to provide the best care possible to patients with kidney disease.
- Facilitates health promotion and disease prevention in the general population by providing education about kidney disease and risk factors.

- Accepts personal responsibility and accountability for nursing performance.
- Performs a comprehensive health assessment for patients with kidney disease appropriate to the practice setting.
- Participates in and facilitates evidence-based practice and research initiatives to improve nephrology nursing practice and kidney disease care.
- Develops, implements and coordinates a plan of care in collaboration with the patient that is appropriate to the level of kidney disease and individualized to the biological, psychological, social, cultural and spiritual needs of the patient.
- Continually evaluates the care and outcomes for patients with kidney disease.
- Collaborates with the patient and all members of the health-care team across the continuum of care.
- Participates in quality improvement initiatives.
- Demonstrates leadership by providing, facilitating and promoting the best possible care for patients with kidney disease.
- Acts as a role model for students and other nursing staff.
- Recognizes the potential psychosocial impact of caring for patients with kidney disease and seeks appropriate support when necessary.
- Recognizes the impact of chronic illness on patients and strives to provide a caring, therapeutic environment for patients.
- Advocates for improvement in the care and quality of life of patients with kidney disease.
- Utilizes resources to provide effective and efficient patient care.
- Develops teaching strategies consistent with the needs of the patient.
- Empowers patients to advocate for themselves.

Competency Categories

The competencies are classified under a nine-category scheme commonly used to organize nephrology nursing.

Some of the competencies lend themselves to one or more of the categories; therefore, these nine 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
Renal Anatomy and Physiology	10	3.6%
Renal Disorders	51	18.5%
Kidney Disease Management	24	8.7%
Renal Replacement Therapies - Peritoneal dialysis	46	16.7%
- Hemodialysis	68	24.6%
- Renal transplant	38	14.3%
Advance Care Planning, etc.	7	2.5%
Pharmacology	19	6.8%
Adjunctive and Complementary Therapies	3	1.1%

Competency Sampling

Using the grouping and the guideline that the Nephrology Nursing Certification Exam will consist of approximately 165 questions, the categories have been given the following weights in the total examination.

Table 2: Competency Sampling

Categories	Approximate weights in the total examination
Renal Anatomy and Physiology	5-10%
Renal Disorders	15-25%
Kidney Disease Management	15-20%
Renal Replacement Therapies	15-20%
- Peritoneal dialysis	
- Hemodialysis	
- Renal transplant	15-20%
Advance Care Planning, etc.	5-10%
Pharmacology	5-10%
Adjunctive and Complementary Therapies	1-5%

Technical Specifications

In addition to the specifications related to the competencies, other variables are considered during the development of the Nephrology 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 format) and special functions of exam questions (e.g., case-based or independent questions).

Contextual Variables: Contextual variables specify the nursing contexts in which the exam questions will be set (e.g., patient culture, patient health situation and 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 four questions associated with a brief health-care scenario (i.e., a description of the patient's health-care situation). Independent questions stand alone. In the Nephrology Nursing Certification Exam, 65 to 75 per cent of the questions are presented as independent questions and 25 to 35 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 Nephrology Nursing Certification Exam is aimed at one of three levels: knowledge/comprehension, application and 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 patient's record).

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 in providing care to patients (e.g., applying nursing principles to the care of patients).

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 nephrology 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 concerning the needs of patients.

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 Nephrology Nursing Exam
Knowledge/Comprehension	15-25%
Application	50-60%
Critical Thinking	20-30%

Contextual Variables

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

² These levels are adapted from the taxonomy of cognitive abilities developed in Bloom (1956).

Patient Health Situation: In the development of the Nephrology Examination, the patient is viewed holistically. The patient health situations presented also reflect a cross-section of health situations encountered by nephrology nurses.

Health-Care Environment: It is recognized that nephrology nursing is practised primarily in the hospital setting. However, nephrology nursing can also be practised in other settings. Therefore, for the purposes of the Nephrology Examination, the health-care environment is only specified where it is required for clarity or in order to provide guidance to the examinee.

Conclusions

The blueprint for the Nephrology Nursing Certification Exam is the product of a collaborative effort between CNA, ASI and a number of nephrology nurses across Canada. Their work has resulted in a compilation of the competencies required of practising nephrology nurses and has helped determine how those competencies will be measured on the Nephrology Nursing Certification Exam. A summary of these guidelines can be found in the summary chart Nephrology Nursing Certification Development Guidelines.

Nephrology nursing practice will continue to evolve. As this occurs, the blueprint may require revision so that it accurately reflects current practices. CN1A will ensure that such revision takes place in a timely manner and will communicate any changes in updated editions of this document.

Summary Chart

Nephrology Nursing Exam Development Guidelines

STRUCTURAL VARIABLES			
Exam Length and Format	Approximately 165 objective questions		
Question Presentation	65-75% independent questions 25-35% case-based questions		
Cognitive Ability Levels of Questions	Knowledge/Comprehension		15-25% of questions
	Application		50-60% of questions
	Critical Thinking		20-30% of questions
Category	Renal Anatomy and Physiology		5-10% of questions
	Renal Disorders		15-25% of questions
	Kidney Disease Management		15-20% of questions
	Renal Replacement Therapies		
	- Peritoneal dialysis		15-20% of questions
	- Hemodialysis		15-20% of questions
	- Renal transplant		15-20% of questions
	Advance Care Planning, etc.		5-10% of questions
	Pharmacology		5-10% of questions
	Adjunctive and Complementary Therapies		1-5% of questions
CONTEXTUAL VARIABLES			
Age	Age Group		
	Child & Adolescent	(0-18 years old)	1-5%
	Adult	(19 and up)	95-99%
Patient Culture	Questions measuring awareness, sensitivity, and respect for different cultural values, beliefs, and practices, without introducing stereotypes, are included on the exam.		
Patient Health Situation	In the development of the Nephrology Nursing Exam, the patient is viewed holistically. The patient health situations presented reflect a cross section of the most common health situations encountered by perioperative nurses.		
Health-Care Environment	For the purpose of the Nephrology Nursing Exam, the primary health-care environment will be the hospital setting unless otherwise specified.		

The Nephrology Nursing Exam

List of Competencies

I. Renal anatomy and Physiology

The nephrology nurse...

- 1.1 Identifies normal renal anatomy, including the structure and characteristics of:
 - 1.1a Kidneys
 - 1.1b Urinary tract
 - 1.1c Renal vasculature

- 1.2 Identifies normal renal physiology including:
 - 1.2a Urine formation
 - 1.2b Fluid balance
 - 1.2c Electrolyte balance
 - 1.2d Acid-base balance
 - 1.2e Blood pressure regulation
 - 1.2f Vitamin D synthesis
 - 1.2g Secretion of various hormones (e.g., renin, erythropoietin)

II. Renal Disorders

Acute Kidney Injury

The nephrology nurse...

- 2.1 Describes the etiology and pathophysiology of acute kidney injury:
 - 2.1a Prerenal
 - 2.1b Intrarenal
 - 2.1c Postrenal

- 2.2 Describes the diagnostic tests for a patient with acute kidney injury:
 - 2.2a Blood work (e.g., chemistry, hematology, virology, eGFR)
 - 2.2b Urine tests (e.g., urinalysis, protein/creatinine ratio)
 - 2.2c Renal biopsy
 - 2.2d Vascular studies (e.g., renal scan)
 - 2.2e Ultrasound studies
 - 2.2f Renal MRI and CT

Chronic Kidney Disease

The nephrology nurse...

- 2.3 Describes the etiology and pathophysiology of chronic kidney disease:
- 2.3a Diabetes
 - 2.3b Nephrotic and nephritic syndromes
 - 2.3c Interstitial diseases
 - 2.3d Vascular diseases
 - 2.3e Cystic diseases
 - 2.3f Obstructive disorders
 - 2.3g Infectious diseases
 - 2.3h Toxic nephropathies
 - 2.3i Renal disease in pregnancy
 - 2.3j Neoplasms
 - 2.3k Autoimmune disorders
 - 2.3l Glomerular disorders
 - 2.3m Congenital, developmental and genetic disorders
 - 2.3n Hemolytic uremic syndrome
- 2.4 Identifies the stages of chronic kidney disease:
GFR = glomerular filtration rate (mL/min/1.73 m²)
- 2.4a Stage 1 – Kidney damage with normal GFR or $GFR \geq 90$
 - 2.4b Stage 2 – Kidney damage with $GFR = 60-89$
 - 2.4c Stage 3 – Moderate kidney damage with $GFR = 30-59$
 - 2.4d Stage 4 – Severe kidney damage with $GFR = 15-29$
 - 2.4e Stage 5 – Kidney failure with $GFR < 15$
- 2.5 Recognizes the effects of chronic kidney disease on the following aspects:
- 2.5a Growth and development
 - 2.5b Cardiovascular
 - 2.5c Neurological
 - 2.5d Immunological
 - 2.5e Gastrointestinal
 - 2.5f Endocrine
 - 2.5g Hematological
 - 2.5h Integumentary
 - 2.5i Pulmonary
 - 2.5j Musculoskeletal
 - 2.5k Reproductive (e.g., sexual function)
 - 2.5l Genitourinary
 - 2.5m Metabolic
 - 2.5n Peripheral vascular
 - 2.5o Psychosocial (e.g., cultural, psychological, support, financial)

- 2.6 Describes the diagnostic tests for a patient with chronic kidney disease:
 - 2.6a Blood work (e.g., chemistry, hematology, virology, eGFR)
 - 2.6b Urine tests (e.g., urinalysis, protein/creatinine ratio)
 - 2.6c Renal biopsy
 - 2.6d Vascular studies (e.g., renal scan, renal arteriogram, renal venogram, angiography)
 - 2.6e Ultrasound studies
 - 2.6f Radiologic studies (e.g., kidney, ureter and bladder (KUB), bone density)
 - 2.6g Renal MRI and CT
 - 2.6h Cystographic studies (e.g., cystogram, cystoscopy)

III. Kidney Disease Management

Acute Kidney Injury

The nephrology nurse...

- 3.1 Integrates the plan of care in collaboration with the patient in acute kidney injury during the:
 - 3.1a Initiating stage
 - 3.1b Oliguric stage
 - 3.1c Diuretic stage
 - 3.1d Recovery stage

Chronic Kidney Disease

(Stages 1 through 5 – patients that are not receiving renal replacement therapy)

The nephrology nurse...

- 3.2 Integrates the plan of care in collaboration with the patient with respect to:
 - 3.2a Blood pressure management
 - 3.2b Diabetes management
 - 3.2c Dietary management
 - 3.2d Fluid management
 - 3.2e Anemia management
 - 3.2f Hyperlipidemia management
 - 3.2g Renal osteodystrophy management
 - 3.2h Pain management
 - 3.2i Cardiac management
 - 3.2j Immunologic and serologic status (e.g., hepatitis, HIV)
 - 3.2k MRSA/VRE status
 - 3.2l Integumentary care (e.g., foot care)
 - 3.2m Infection prevention
 - 3.2n Psychosocial issues (e.g., cultural, psychological, support, financial)
 - 3.2o Sexual function
 - 3.2p Access assessment, creation, placement and care

- 3.3 Educates and supports the patient regarding:
 - 3.3a Health promotion and kidney function
 - 3.3b Self-management (e.g., building capacity, chronic illness management models)
 - 3.3c Strategies to delay kidney disease progression
 - 3.3d Treatment options for kidney disease (e.g., renal replacement therapies, conservative management, palliative care, end-of-life care)

IV. Renal Replacement Therapies: Nursing Management of the Peritoneal Dialysis Patient

The nephrology nurse...

- 4.1 Educates the patient regarding self-management of peritoneal dialysis
- 4.2 Explains the principles of peritoneal dialysis with respect to solvent and solute removal/transport (e.g., diffusion, osmosis, convection, clearance)
- 4.3 Identifies the contraindications and selection considerations for peritoneal dialysis (e.g., previous abdominal surgeries, physical/psychosocial limitations, support)
- 4.4 Demonstrates the proper care of peritoneal dialysis catheters (e.g., abdominal, pre-sternal)
- 4.5 Identifies the indications, advantages and disadvantages for the following peritoneal dialysis modalities:
 - 4.5a Continuous ambulatory peritoneal dialysis (CAPD)
 - 4.5b Intermittent peritoneal dialysis (IPD)
 - 4.5c Continuous cyclic peritoneal dialysis (CCPD)
 - 4.5d Tidal peritoneal dialysis (TPD)
- 4.6 Identifies the elements and implications of the peritoneal dialysis prescription:
 - 4.6a Composition of peritoneal dialysis solutions (e.g., osmotic agents, amino acids, buffers)
 - 4.6b Number of exchanges
 - 4.6c Volume of exchanges
 - 4.6d Timing of exchanges
 - 4.6e Dialysate temperature
- 4.7 Assesses the peritoneal dialysis patient with respect to:
 - 4.7a Clinical assessment (e.g., history, physical)
 - 4.7b Adequacy (e.g., Kt/V, PET, CrCl)
 - 4.7c Fluid volume balance
 - 4.7d Nutritional status
 - 4.7e Metabolic status
 - 4.7f Immunologic and serologic status (e.g., hepatitis, HIV)
 - 4.7g MRSA/VRE status (e.g., antibiotic-resistant organisms)
 - 4.7h Anemia management
 - 4.7i Catheter (e.g., function, appearance, exit site)

- 4.7j Psychosocial response (e.g., coping, prescription adherence/fatigue, behaviour management issues)
- 4.7k Educational needs (e.g., physical environment, promotion of self- management)
- 4.7l Failed kidney transplant (e.g., immunosuppressive medications)

- 4.8 Initiates the plan of care in collaboration with the peritoneal dialysis patient for:
 - 4.8a Peritoneal catheter care (e.g., newly inserted, established, buried)
 - 4.8b Prescription management (e.g., fluid balance, preparation of solutions, medications)
 - 4.8c Nutritional management
 - 4.8d Infection control measures
 - 4.8e Identification and management of complications
 - 4.8f Equipment preparation (e.g., dialysate, tubing)

- 4.9 Demonstrates nursing strategies for the prevention and management of the following complications of peritoneal dialysis:
 - 4.9a Fluid volume imbalances
 - 4.9b Ultrafiltration failure
 - 4.9c Metabolic imbalances
 - 4.9d Membrane inadequacy or failure (e.g., encapsulating peritoneal sclerosis)
 - 4.9e Malnutrition (e.g., protein)
 - 4.9f Hyper/Hypoglycemia
 - 4.9g Pain (e.g., non-infectious, infectious)
 - 4.9h Infection (e.g., peritonitis, exit site, tunnel)
 - 4.9i Catheter complications (e.g., malfunction, malposition, cuff extrusion)
 - 4.9j Leaks (e.g., pericatheter, extraperitoneal)
 - 4.9k Hemoperitoneum
 - 4.9l Increased intra-abdominal pressure
 - 4.9m Hernias
 - 4.9n Alterations in gastrointestinal function (e.g., constipation)
 - 4.9o Psychosocial impact

V. Renal Replacement Therapies: Nursing Management of the Hemodialysis Patient

The nephrology nurse...

- 5.1 Explains the components of hemodialysis:
 - 5.1a Ultrafiltration
 - 5.1b Osmosis
 - 5.1c Hydrostatic pressure
 - 5.1d Backfiltration
 - 5.1e Clearance
 - 5.1f Diffusion
 - 5.1g Convection
 - 5.1h Water quality
 - 5.1i Transmembrane pressure

- 5.2 Describes the advantages, disadvantages and selection considerations for hemodialysis:
 - 5.2a In-centre (e.g., conventional, nocturnal, short daily, self-care)
 - 5.2b Home (e.g., conventional, nocturnal, short daily)
 - 5.2c Satellite/community

- 5.3 Describes the indications, advantages and disadvantages for the following hemodialysis access:
 - 5.3a Native arteriovenous fistula
 - 5.3b Arteriovenous graft (e.g., PTFE, saphenous vein)
 - 5.3c Central venous catheter (e.g., tunnelled, non-tunnelled)

- 5.4 Describes the arteriovenous fistula/graft assessment (e.g., auscultation, palpation, appearance, maturation)

- 5.5 Differentiates cannulation techniques (e.g., rotating sites, buttonhole, rope ladder)

- 5.6 Identifies arteriovenous fistula/graft complications (e.g., infections, steal syndrome, thrombosis, aneurysm)

- 5.7 Implements nursing strategies for preventing and managing arteriovenous fistula/graft complications (e.g., site rotation, aseptic technique, cannulation, pressure)

- 5.8 Identifies the indications and tools available for access surveillance
 - 5.8a Access flow monitoring/recirculation studies (e.g., in-line dialysance, crit-line monitor, ultrasound dilution technique, blood work)
 - 5.8b Angiography (e.g., fistulogram, fistuloplasty)

- 5.9 Indicates advantages and disadvantages for single needle dialysis

- 5.10 Describes the central venous catheter assessment (e.g., exit/insertion site, position)

- 5.11 Demonstrates an understanding of central venous catheter complications (e.g., infection, central vein stenosis, catheter malfunction)

- 5.12 Implements nursing strategies for preventing and managing central venous catheter complications (e.g., aseptic technique, aspiration, flushing, securement)

- 5.13 Demonstrates an understanding of the importance of the hemodialysis prescription:
 - 5.13a Structure and characteristics of the dialyzer
 - 5.13b Composition of dialysate
 - 5.13c Frequency and length of treatment
 - 5.13d Blood flow and dialysate flow rate
 - 5.13e Anticoagulation therapy
 - 5.13f Dialysate temperature
 - 5.13g Dialysate conductivity
 - 5.13h Ultrafiltration profiling
 - 5.13i Sodium profiling
 - 5.13j Dry weight (e.g., target, goal)

- 5.14 Assesses the hemodialysis patient with respect to:
 - 5.14a Clinical assessment (e.g., history, pre/post vital signs, chest auscultation, fluid volume, vascular access)
 - 5.14b Adequacy (e.g., Kt/V, PRU)
 - 5.14c Nutritional and metabolic status
 - 5.14d Isolation status (e.g., MRSA, VRE, hepatitis B)
 - 5.14e Anemia management
 - 5.14f Psychosocial response (e.g., coping, prescription adherence/fatigue, behaviour management issues)
 - 5.14g Educational needs (e.g., dietary, vascular access, promotion of self-management)
 - 5.14h Pre-, intra- and post-dialysis monitoring (e.g., vascular access pressures, patient symptoms)
 - 5.14i Failed kidney transplant (e.g., immunosuppressive medications)

- 5.15 Implements nursing strategies for the prevention and management of hemodialysis complications:
 - 5.15a Air embolism
 - 5.15b Hemolysis
 - 5.15c Bleeding, hemorrhage and exsanguination
 - 5.15d Blood leak
 - 5.15e Blood loss due to clotting
 - 5.15f Dialyzer reactions
 - 5.15g Pyrogenic reactions
 - 5.15h Disequilibrium syndrome
 - 5.15i Muscle cramps and restless leg syndrome
 - 5.15j Blood pressure management
 - 5.15k Nausea, vomiting and dizziness
 - 5.15l Cardiac events (e.g., dysrhythmias, angina, uremic pericarditis)
 - 5.15m Infections
 - 5.15n Seizures
 - 5.15o Hypoxemia

- 5.16 Integrates the plan of care in collaboration with the hemodialysis patient for:
 - 5.16a Self-management (e.g., empowerment, informed decision-making, self-cannulation)
 - 5.16b Vascular access management
 - 5.16c Prescription management (e.g., fluid balance, medication, adherence)
 - 5.16d Nutritional management (e.g., oral supplements, parental nutrition)
 - 5.16e Infection control measures
 - 5.16f Identification and management of hemodialysis complications
 - 5.16g Dialysis schedule management (e.g., adherence, transportation, finances)
 - 5.16h Equipment preparation (e.g., dialysate and extracorporeal circuit)
 - 5.16i Advance care planning

VI. Renal Replacement Therapies: Nursing Management of the Transplant Patient

The nephrology nurse...

- 6.1 Identifies transplant options available for kidney disease patients:
 - 6.1a Living donor (e.g., related, unrelated)
 - 6.1b Deceased donor (e.g., single vs. double kidney, kidney-pancreas)
 - 6.1c Living Donor Paired Exchange (LDPE)

- 6.2 Assesses the potential transplant recipient with respect to:
 - 6.2a Kidney disease stage and progression
 - 6.2b Clinical assessment and history (e.g., physical, psychosocial)
 - 6.2c Laboratory tests (e.g., ABO, HLA typing, antibody status, serology)
 - 6.2d Diagnostic tests (e.g., cardiac, radiologic, vascular)
 - 6.2e Educational needs (e.g., promotion of self-management)

- 6.3 Identifies the potential contraindications for renal transplantation:
 - 6.3a Malignancy
 - 6.3b Infection (e.g., active, chronic)
 - 6.3c Severe comorbidities (e.g., cardiac, hepatic, vascular, active autoimmune)
 - 6.3d Severe hyperparathyroidism, untreated
 - 6.3e Morbid obesity
 - 6.3f Non-adherence
 - 6.3g Ongoing substance abuse
 - 6.3h Unstable psychiatric status
 - 6.3i Social and cultural issues

- 6.4 Assesses the potential living kidney donor with respect to:
 - 6.4a Clinical assessment and history (e.g., physical, psychosocial)
 - 6.4b Laboratory tests (e.g., ABO, HLA typing, antibody status, serology)
 - 6.4c Diagnostic tests (e.g., cardiac, radiologic, vascular)
 - 6.4d Educational needs (e.g., promotion of self-management)

- 6.5 Demonstrates nursing strategies for preventing and managing the following complications of renal transplantation:
 - 6.5a Delayed graft function (e.g., acute tubular necrosis)
 - 6.5b Surgical complications (e.g., lymphocele, renal artery stenosis, urine leaks)
 - 6.5c Rejection (i.e., hyperacute, acute, chronic)
 - 6.5d Immunosuppression-related (e.g., infection, malignancy)
 - 6.5e Steroid-related (e.g., diabetes, psychosis, bone disease, weight gain)
 - 6.5f Blood value abnormalities
 - 6.5g Blood pressure management
 - 6.5h Sexual function
 - 6.5i Psychosocial impact

- 6.6 Integrates the plan of care in collaboration with the renal transplant recipient in respect to:
 - 6.6a Graft function

- 6.6b Blood pressure management
- 6.6c Diagnostics (e.g., blood work, biopsy, radiology)
- 6.6d Medication management
- 6.6e Fluid management
- 6.6f Nutritional management
- 6.6g Educational needs (e.g., promotion of self-management)
- 6.6h Psychosocial support

VII. Advance care Planning, Conservative Management and Palliative care

The nephrology nurse...

- 7.1 Respects the patient's decision regarding:
 - 7.1a Initiating/not initiating dialysis
 - 7.1b Withdrawal from dialysis
 - 7.1c Resuscitation
- 7.2 Assesses patient readiness to participate in discussion regarding advance care planning and end-of-life care
- 7.3 Maximizes disease management while minimizing symptoms
- 7.4 Implements the plan of care in collaboration with the patient:
 - 7.4a Advance care planning
 - 7.4b End-of-life comfort measures (e.g., pain control, fluid management, spiritual and cultural beliefs)

VIII. Pharmacology

The nephrology nurse...

- 8.1 Understands considerations within the following medication classifications (e.g., dialyzability, side effects, cost, indication, dosage adjustment, route, dosing schedule, interactions, missed dose):
 - 8.1a Anti-infectives (e.g., antimicrobials, antivirals, vaccines)
 - 8.1b Antineoplastics (e.g., cyclophosphamide [Cytosan])
 - 8.1c Anemia therapy (e.g., erythropoiesis-stimulating agents, iron supplements)
 - 8.1d Anticoagulants (e.g., fibrinolytics, thrombolytics)
 - 8.1e Cardiovascular (e.g., antihypertensives, antihypotensives, antiarrhythmics)
 - 8.1f Diuretics (e.g., thiazides, loop diuretics)
 - 8.1g Dermatologic (e.g., antihistamines, emollients)
 - 8.1h Diagnostic and contrast media (e.g., iodine-based radiopaque dye, gadolinium)
 - 8.1i Endocrine (e.g., insulin/hyperglycemic agents, hormones)
 - 8.1j Gastrointestinal (e.g., antiemetics, laxatives, stool softeners)
 - 8.1k Immunosuppressive (e.g., calcineurin inhibitors, corticosteroids, antiproliferatives)

- 8.1l Vitamins (e.g., water soluble, fat soluble)
- 8.1m Bone metabolism (e.g., phosphate binders, calcimimetics, vitamin D analogs)
- 8.1n Central nervous system (e.g., analgesics, antidepressants, sedatives)
- 8.1o Local anesthetics (e.g., subcutaneous, topical)
- 8.1p Electrolytes (e.g., chelating agents, cation-exchange resins, potassium)
- 8.1q Minerals (e.g., calcium, magnesium, phosphate)
- 8.1r Nutritional supplements (e.g., enteral, parenteral, oral)
- 8.1s Blood products (e.g., albumin, packed red blood cells, immune globulin)

IX. Adjunctive and Complementary Alternative Health Care

The nephrology nurse...

- 9.1 Respects individual choices related to complementary alternative health care (e.g., acupuncture, homeopathy, herbal therapy)
- 9.2 Identifies advantages and disadvantages in the use of adjunctive and complementary alternative health care specific to kidney disease
- 9.3 Facilitates patient learning regarding the importance of reporting the use of complementary alternative health care (e.g., antioxidants, vitamins, herbal remedies)