



Certified Nephrology Nurse

Certification Preparation Guide



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Certification Commission

CNN Certification Preparation Guide

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About the Nephrology Nursing Certification Commission (NNCC)

Mission

The Nephrology Nursing Certification Commission (NNCC) exists to establish certification mechanisms to promote patient safety and to improve the quality of care provided to nephrology patients.

Philosophy

NNCC supports the philosophy that there should be a diversity of examinations that will effectively provide the opportunity for certification at various levels of education, experience, and areas of practice within nephrology nursing.

Commission

NNCC was established in 1987 to develop and implement certification examinations for nephrology nursing. NNCC is separately incorporated, and an independent organization that collaborates with the Center for Nursing Education and Testing (C-NET) in test development, test administration, and test evaluation. It is the goal of NNCC to promote the highest standards of nephrology nursing practice through the development, implementation, coordination, and evaluation of all aspects of the certification and recertification processes. NNCC is a charter member of the American Board of Nursing Specialties (ABNS). The ABNS is a membership organization that maintains a national peer review program for nursing specialty certifications.

Center for Nursing Education and Testing (C-NET)

NNCC collaborates with The Center for Nursing Education and Testing (C-NET) whose expertise in the areas of test development, administration, and evaluation is unequaled. C-NET works with the NNCC to ensure that all of the examinations offered are reliable, valid, and meet industry standards. C-NET provides a full range of test development and test administration services, including:

- Performing practice analysis surveys of specialty areas
- Developing test specifications (blueprint)
- Leading item-writing sessions
- Pilot testing of questions
- Statistical analysis of whole test and test questions
- Reporting results of testing to Board and test committees

Relationship to Professional Associations

A professional association is an organization of members for whom educational and professional offerings and events are provided. They promote professional growth, provide approved continuing education, promote, recognize, and endorse certification, but they do not administer certification examinations. Examples of professional associations are:

- American Nephrology Nurses Association (ANNA)
- National Kidney Foundation (NKF)
- National Association of Nephrology Technicians/Technologists (NANT)
- American Society of Nephrology (ASN)

The NNCC does *not* have members or provide educational programming. The NNCC promotes professional growth by developing and implementing certification examinations for nephrology nursing.

ABNS and ABSNC Accreditation

The American Board of Nursing Specialties (ABNS), established in 1991, is a not-for-profit, membership organization focused on consumer protection and improving patient outcomes by promoting specialty nursing certification. The Accreditation Board for Specialty Nursing Certification (ABSNC), formerly the ABNS Accreditation Council, is the only accrediting body specifically for nursing certification. ABSNC accreditation is a peer-review mechanism that allows nursing certification organizations to obtain accreditation by demonstrating compliance with the highest quality standards in the industry.

The NNCC is a charter member of the ABNS, and the Certified Nephrology Nurse (CNN) certification program was one of the first national certification programs to be recognized and accredited. Currently, the CNN, CDN, and CCHT examinations are accredited by ABSNC.

Organizational Structure

The NNCC is composed of nine commissioners, including one public member. The commission is comprised of members of each examination board. Officers of the NNCC include the President, President-Elect, Secretary and Treasurer. The NNCC staff includes an Executive Director, Director of Certification Services, and Certification Specialists. The management firm is Anthony J. Jannetti, Inc. in Pitman, New Jersey.

Nursing Examination Board

The Nursing Examination Board is made up of representatives from both the CDN and CNN Testing Committees. The purpose of the Exam Board is to establish, review, and update eligibility criteria relevant to certification and recertification. The members develop knowledge and activity statements for practice analyses in collaboration with the testing agency (C-NET) and the commission (NNCC). In addition, the Exam Board participates in review of the practice analysis role delineation survey tool and data analysis, updates the examination blueprint, and completes audits of certification and recertification applications for quality assurance.

Nursing Test Committee

Members of the CNN Test Committee meet licensure and education requirements, must be NNCC certified, and have nephrology nursing expertise. They are responsible for writing and reviewing questions relevant to the examination. Along with the testing agency representative, members review current item statistics and develop and revise items as needed.

Examination Development

Valid and reliable tests do not arise spontaneously from item writers. They are carefully planned to ensure that they are legally defensible and psychometrically sound. A test has a specific blueprint, or test plan, which identifies what content needs to be included on the test. In addition, there is a list of the key content or activities performed by nephrology nurses. Both the blueprint and the key content/activities serve as item-writing guides or "test specifications" for the item writers.

Where do these test specifications come from? The content of the CNN examination is based on a practice analysis survey of nephrology nurses that identifies the key tasks/activities performed by nephrology nurses. A national task force is brought together to plan the survey content. This task force includes nephrology nurses, as well as clinical educators and clinical managers of nephrology nurses. Following data collection, the task force reviews the survey results and makes recommendations for the CNN test specifications. The practice analysis also delineates and differentiates the roles of CDN and CNN. Most importantly, a practice analysis is performed every five years to be sure the test reflects current practice and is kept up to date.

The group that oversees CNN test development is the Nursing Examination Board, which is made up of nurses with expertise in dialysis and nephrology nursing. There is also a CNN Test Committee that writes the actual test questions. Item writers, who are certified nephrology nurses from a variety of geographic and practice settings, write test questions to meet the CNN blueprint requirements. Members of both the Nursing Examination Board and the test committee are considered "content experts" concerning the knowledge and skills needed by nephrology nurses for safe practice.

Each question on the test can be linked directly to the tasks/activities in the practice analysis survey. The test committee meets in person twice a year to review, evaluate, and write test questions. To be certain that the test content is accurate, all questions are supported, using the most recent ANNA *Core Curriculum for Nephrology Nurses* and/or other references, including the regulations in the CMS *Conditions for Coverage for End-Stage Renal Disease Facilities*.

The test consists of 150 questions that match the test blueprint. About 25 of the questions are new experimental or "pilot" questions that are not scored. Pilot testing of new questions allows for the evaluation of questions to determine if they are valid before they become scored questions.

The passing score of the test is determined by a panel of nephrology nurses who serve as subject matter experts (SMEs). Both experienced and newly certified nurses serve on this panel. This group performs a standard setting procedure (Angoff) in which each test question is reviewed to determine its level of difficulty. Finally, the passing score is determined. It is based on the SME panel's estimation of the level of difficulty required to identify individuals who have an acceptable level of knowledge and skill. Therefore, each candidate's test score is measured against a predetermined standard, not against the performance of other test takers. A score of about 72% correct is required to pass the CNN examination.

Frequently Asked Questions

What is certification?

Certification is the formal recognition of specialized knowledge, skills, and experience. It is demonstrated by the achievement of standards identified by a nursing specialty to promote optimal health outcomes. Certification validates advanced knowledge and competence in a specialty. Licensure validates the entry level competence of basic nursing knowledge and skill and provides the legal authority to practice nursing. Certification indicates a higher degree of professional competence than the minimal requirement for licensure. It must be designed to protect the public from unsafe and incompetent caregivers, and it allows consumers of health care to easily identify competent caregivers.

Why should I get certified?

The number one reason to become certified is to help ensure patient safety. Additional reasons include professional recognition, validation of skills, self-confidence in decision-making, and enhanced credibility. Certified nurses have an up-to-date knowledge base, in part due to required ongoing professional education. Certification has been linked to patient safety, optimal patient outcomes, decreased errors, improved patient satisfaction, increased staff retention, and job satisfaction. In an ideal world, employers would recognize, support, and reward certification.

What is the difference between the CDN and CNN exams?

The CDN exam is tailored specifically for RNs specializing in dialysis and the care of individuals with CKD stage 5. The CNN exam is for RNs practicing in multiple areas of nephrology and caring for individuals with CKD stages 3-5.

Am I ready to earn the CNN?

To be eligible to sit for the CNN Exam, candidates from the **United States (& US territories)** must:

- Hold a current, full, and unrestricted license as a registered nurse in the United States, or its territories.
- Have a minimum of 3000 hours of nephrology nursing experience as a registered nurse in a clinical, management/charge, patient education, staff education, case management, clinical outcomes/quality improvement/quality assurance/compliance, consulting, or research capacity within three (3) years prior to submitting the examination application.
 - If an applicant is working in an outpatient hemodialysis facility, at least 750 hours (25%) of the required 3000 hours of work experience must also include one or more of the following areas:
 - Home hemodialysis
 - Home peritoneal dialysis
 - Inpatient acute kidney injury on kidney replacement therapy
 - Inpatient critical care on kidney replacement therapy
 - CKD management NOT on kidney replacement therapy
 - Kidney transplant
 - Apheresis
- Possess a baccalaureate degree in nursing or a master's degree in nursing.
- Have completed thirty (30) contact hours of approved continuing education in nephrology nursing within three (3) years prior to submitting the exam application.

(Please refer to the Certification Application booklet for additional information.)

How do I apply for the CNN exam?

1. Download and complete all sections of the application from the NNCC website, www.nncc-exam.org. Be sure to include the last four (4) digits of your social security number as well as all required signatures.
2. Make certain your immediate supervisor completes the section on employment verification.
3. Attach to your application a copy of a baccalaureate degree in nursing or a master's degree in nursing diploma. If the diploma does not state nursing as area of study, then a transcript showing nursing as a major must be included along with a copy of the diploma.
4. Attach copies of contact hour certificates to total thirty (30) nephrology related contact hours.
5. Attach a photocopy of your current RN license. (If you are unable to obtain a photocopy of your license, submit a letter or printout from your state board of nursing verifying your licensure with license number and date of expiration.)
6. Mail the application form, with the appropriate payment, to the NNCC.
7. If you need special accommodations, please contact C-NET 800-463-0786

How will I know my application was received?

Within a four (4) week processing period, you will receive an examination permit containing instructions for scheduling your exam or an incomplete application letter, requesting further information or documentation. (Note: incomplete applications are subject to an incomplete application fee.)

What study resources are available?

- The test blueprint and practice questions included in this booklet
- The most recent edition of the following references used by the CNN item writers: *
 - Core Curriculum for the Nephrology Nurse
 - Daugirdas' Handbook of Dialysis
 - Review of Hemodialysis for Nurses and Dialysis Personnel
 - The regulations in the CMS Conditions for Coverage for End-Stage Renal Disease Facilities.
- The **Online Practice Test** (found on www.nncc-exam.org)
 - 50 multiple-choice questions available in two modes:
 - *Practice Mode*: provides the correct answer and rationale after each question
 - *Test Mode*: holds the results until the end of the test
 - Results display percentage correct by blueprint area
 - 90-day access to the test
 - Several scrambled versions of the same 50 questions are offered for retesting

*Please see page 14 and www.nncc-exam.org for the complete list.

Are there secrets or tricks to help me pass the exam?

Caution: Test preparation websites offering alternative and/or shortcuts to test preparation should be avoided. Exam content is confidential and is not shared with any individuals involved in test preparation activities. "Tricks" of testing and "shortcut" methods for test preparation are specifically avoided when creating this exam. We test candidates on content and not on their "test taking skills." If you have any questions about the best methods to prepare, please call NNCC toll free at (888) 884-6622. Our goal is that exam candidates will best use their time and money to reach the end result of demonstrating their excellence in nephrology nursing care through certification.

What should I expect the day of the test?

You should arrive at the testing center 30 minutes before your test is scheduled to begin. Bring your valid government-issued photo ID and examination permit. The name on your ID must match the name on your exam permit. Directions to the testing center can be found in the email confirming you have successfully scheduled your test. Be sure to know the best route to the testing center and pay attention to traffic reports.

- Nothing is permitted in the testing room, so you are encouraged to leave personal items at home or locked in your car. Lockers are available in some, but not all, testing centers to secure personal valuables, such as purses or wallets.
- Cell phones and all other electronic devices are not permitted.
- Upon arrival you will give the proctor your photo ID. You will then have your photo taken and sign a roster and other regulation sheets. The proctor will read the testing site rules upon registering you for the test.
- Once seated at your computer, you will take a short tutorial explaining the test setup and keyboard key functions just before your test begins.
- You will have three (3) hours to complete the exam.
- Your photo ID will be returned upon completion of the exam.

When will I get my results and how do I interpret them?

Your score report will be available to you at the end of your examination. If you pass the exam, the report will reflect your score as well as notify you of when to expect your certificate in the mail and when your name will appear in the online NNCC Certified Directory. If you were unsuccessful on the exam, the report will reflect your score and a breakdown of the test subareas – the Content Areas on the CNN Test Blueprint – with the percent of questions you answered correct in each. This breakdown of subarea scores will help you determine the blueprint areas in which you are weak and need further study.

What if I need to retest?

If you are unsuccessful on the exam, you have one opportunity within one year to retake the examination at a reduced rate. C-NET will mail a re-examination application to those applicants who do not pass.

Preparing to take the Examination

Physical and Emotional Preparation

- Think positively.
- Study and prepare for the examination so that you feel confident.
- Moderate anxiety is normal and may be helpful - you may be more mentally and physically alert.
- Even though some test takers may finish the exam early, use as much of the allotted time as you need to think through and answer the questions.
- Get a good night's sleep.
- Eat a good meal with protein before the examination.
- Gather all the materials you need to take the test the night before the exam.
- Allow plenty of time and arrive early.
- If you are distracted by other candidates, ask for a seat where you will be less likely to notice the other candidates.
- Reference books, notes, or other study materials may not be brought into the examination room.

Tips on Answering Examination Questions

- Read the questions carefully and focus on key words in the question such as "first," "most likely," "most important," "best."
- As you read the question, anticipate the correct answer.
- Read each of the four choices carefully. Even if the first option sounds correct, read all options before choosing the answer.
- Do not "read into" the question. Answer the question based only on the information presented, even if you think the answer is too obvious or too easy.
- Do not spend too much time on any one question. Make a note of the questions of which you are uncertain and return to them later if you have time.
- There is no penalty for guessing, so you should make an educated guess if you are not sure of an answer.

Resources

NNCC:

www.nncc-exam.org
(888) 884-6622
Like us on Facebook
Follow us on LinkedIn

CNET:

www.cnetnurse.com
(800) 463-0786

NNCC Policies

Statement of Nondiscrimination

It is the policy of NNCC that no individual shall be excluded from the opportunity to participate in the NNCC certification programs on the basis of race, ethnicity, national origin, religion, marital status, sexual orientation, gender identity, age, or disability.

Denial, Suspension, or Revocation of Certification/Recertification

The occurrence of any of the following actions will result in the denial, suspension, or revocation of the certification:

- Failure to meet all eligibility criteria for certification/recertification
- Falsification of the NNCC application
- Falsification of any materials or information requested by the NNCC
- Any restrictions such as revocation, suspension, probation, or other sanctions by a nursing or other regulatory authority
- Misrepresentation of certification status
- Cheating on the examination
- Applicable state and/or federal sanctions
- Failure to meet continuing education criteria
- Failure to meet work experience requirements

Falsifying any materials, including continuing education requirements for certification or recertification (number of contact hours or dates), may lead to denial or permanent loss of NNCC certification.

The NNCC reserves the right to investigate all suspected/reported violations and, if appropriate, notify the certificant's employer/State Board of Nursing or other regulatory authority. The certificant will be notified in writing of NNCC's decision(s)/action(s).

Appeal Process

An applicant who has been denied certification, failed an examination, or had certification revoked has the right of appeal. This appeal must be submitted in writing to the President of the NNCC within thirty (30) days of notification. The appeal shall state specific reasons why the applicant feels entitled to certification. At the applicant's request, the President shall appoint a committee of three (3) NNCC Commissioners who will meet with the applicant and make recommendations to the NNCC. The committee will meet in conjunction with a regularly scheduled NNCC meeting.

The applicant will be responsible for his/her own expenses. The final decision of the NNCC will be communicated in writing to the applicant within thirty (30) days following the NNCC meeting. Failure of the applicant to request an appeal or appear before the committee shall constitute a waiver of the applicant's right of appeal.

Content of the CNN Examination

The CNN examination is designed to test the knowledge needed to provide safe care to nephrology patients across the lifespan in a variety of settings. There are two dimensions in the test blueprint, Content and Objectives. Content include five sections: (A) Concepts of Kidney Disease, (B) Hemodialysis, (C) Peritoneal Dialysis, (D) Transplant, and (E) Acute Therapies. Specific nursing activities are tested in each Content area. The Exam also includes nine Objective areas: (1) Pathophysiology/Complications, (2) Interventions, (3) Physical/Technical, (4) Teaching, (5) Medications, (6) Interdisciplinary Team, (7) Psychosocial, (8) Infection control, and (9) Professional Practice. Specific nursing activities are tested in each of these areas.

Each question on the test fits into one Content area and one Objective area. This is shown on the blueprint grid (see page 7). In the boxes next to Concepts of Kidney Disease, there are 9-10 questions under the Pathophysiology/Complications label. The entire test is mapped out in this manner to guide the item writers when they are developing the test.

Content Areas:

A. Concepts of Kidney Disease (38%)

Questions in the Concepts of Kidney Disease area deal with the nurse's ability to recognize normal kidney function along with pathologic processes and complications that occur in kidney disease. The Concepts of Kidney Disease area is the largest part of the test, making up 38% of the test content. Examples of the kinds of CNN activities tested in the Concepts of Kidney Disease area include:

1. Monitoring for progression of chronic kidney disease (CKD) from Stage 3 through Stage 5.
2. Implementing measures to preserve residual kidney function in CKD.
3. Teaching patient and significant others the actions and side effects of prescribed and over-the-counter drugs.
4. Teaching patient life-style modifications to optimize blood pressure control.

B. Hemodialysis (30%)

Questions in this area deal with physiologic and technical principles of hemodialysis and require the nurse to select appropriate actions while caring for patients being treated with this modality. The nurse is required to apply concepts of infection control and water treatment, safely administer medications, and provide monitoring and surveillance for vascular accesses. The Hemodialysis area is the second largest part of the test, making up 30% of the test content. Examples of the kinds of CNN activities tested in the Hemodialysis area include:

1. Assessing/evaluating patient's fluid volume status to achieve target weight per treatment.
2. Teaching patient, significant others, and other health professionals to protect and care for the dialysis access.
3. Evaluating competency of patient/significant others to perform home dialysis therapies.
4. Providing follow-up care and 24-hour support for home dialysis patients.

C. Peritoneal Dialysis (22%)

The questions in the Peritoneal Dialysis area include the nurses' ability to teach, perform and manage the therapy and its related complications. The Peritoneal Dialysis area makes up 22% of the test content. Examples of the kinds of nursing activities tested in the Peritoneal Dialysis area are:

1. Assessing for signs and symptoms of complications of peritoneal dialysis and implement treatment per protocol/algorithm.
2. Teaching patient and significant other about complications related to peritoneal dialysis.
3. Managing patient-related problems over the telephone or other means of communication.

D. Transplant (5%)

The questions about transplant include pre-transplant preparation, postoperative care, and long-term follow-up care. The Transplant area makes up 5% of the test content. Examples of the kinds of nursing activities tested in the Transplant area include:

1. Collaborating with interdisciplinary team to evaluate suitability of potential transplant donors and/or recipients.
2. Assessing patient for complications post-transplantation.
3. Teaching patient and significant others about details of long-term follow-up post-transplant.

E. Acute Therapies (5%)

The questions about acute therapies include care of acutely ill patients receiving therapies such as CRRT, SLEDD, or apheresis. The Acute Therapies area makes up only 5% of questions. Examples of the kinds of activities tested in this area include:

1. Initiating, monitoring, and discontinuing CRRT or apheresis treatment.
2. Assessing for complications that occur during CRRT or apheresis and treat per protocol.

The complete list of activities can be found on the NNCC website in the CNN section. Click on "The Exam," then on "Exam Specifications."

Test Specifications (Blueprint) for the CNN Examination

Objectives:

1. Recognize pathologic processes and complications that occur with kidney disease and/or treatment modalities. **(18%)**
2. Select interventions appropriate to the pathologic processes and complications that occur with kidney disease and/or treatment modalities. **(15%)**
3. Apply physiologic and technical principles of kidney replacement therapies. **(10%)**
4. Select appropriate teaching/learning strategies to educate patient, family, other health professionals, and the public. **(14%)**
5. Select appropriate actions in administering medication(s) to the patient being treated for kidney disease. **(12%)**
6. Recognize the importance of an interdisciplinary approach to promote optimum functioning across the continuum of care. **(7%)**
7. Select interventions appropriate to the psychological and sociocultural effects of kidney disease. **(6%)**
8. Apply principles of infection control. **(12%)**
9. Recognize the importance of professional nursing practice in promoting patient outcomes (e.g., consultation, staff development, quality improvement, and research). **(6%)**

Distribution of 150 Question in the CNN Exam

(Accepted 4/2018, Effective 1/2019)

Objective Content Area	1. Path/ Comp	2. Interven- tions	3. Phys/ Tech	4. Teach	5. Meds	6. Interdis- ciplinary	7. Psycho- social	8. Infection Control	9. Profes- sional	Total
A. Concepts of Kidney Disease	10-11	8-9	5-6	8-9	7-8	4-5	3-4	7-8	3-4	56-58 (38%)
B. Hemodialysis	8-9	7-8	4-5	6-7	5-6	3-4	3-4	5-6	3-4	44-46 (30%)
C. Peritoneal Dialysis	6-7	5-6	3-4	4-5	4-5	2-3	2-3	4-5	2-3	32-34 (22%)
D. Transplant	1-2	1-2	0-1	1-2	0-1	0-1	0-1	0-1	0-1	6-8 (5%)
E. Acute Therapies	1-2	1-2	0-1	1-2	0-1	0-1	0-1	0-1	0-1	6-8 (5%)
Total	27-29 (18%)	21-23 (15%)	14-16 (10%)	20-22 (14%)	17-19 (12%)	9-11 (7%)	8-10 (6%)	17-19 (12%)	8-10 (6%)	150

Types of Questions on the CNN Examination

Several different types of questions appear on the CNN examination. Some questions require a basic recall of knowledge, while others test the nurse's ability to comprehend a concept. However, most of the questions ask the nurse to apply knowledge in a clinical situation. Examples of each of these types of questions appear below with the correct answer marked with a checkmark (✓).

A. Recall of Knowledge

Test questions at the knowledge level ask the nurse to remember specific facts, common terms, basic concepts, and principles. Definitions of terms are examples of recall items.

Mary Jane Russell, 4 years old, is admitted with hemolytic uremic syndrome (HUS).

1. HUS is **most** commonly caused by which of these microorganisms?

1. *Pseudomonas aeruginosa*.
2. *Staphylococcus aureus*.
3. *Streptococcus viridans*.
4. *Escherichia coli*. ✓

B. Comprehension

Test questions at the comprehension level go beyond basic recall to determine the nurse's deeper understanding of a concept. Examples of words used to describe comprehension might include interpret, compare, contrast, explain, estimate, and translate.

2. HUS is characterized by hemolytic anemia, acute kidney injury, and

1. hypoplastic kidneys.
2. thrombocytopenia. ✓
3. neutropenia.
4. aplastic kidneys.

C. Application of Knowledge

Test questions at the application level ask the nurse to apply previously learned facts and concepts to new situations and to solve problems. These questions present an on-the-job situation and ask what problem is occurring or what action to take in the situation.

3. The nurse would anticipate which of the following treatments for Mary Jane?

1. Red blood cell transfusions. ✓
2. IV antibiotic therapy.
3. Oral antidiarrheal therapy.
4. Platelet transfusions.

CNN Certification Preparation Test

This Preparation Test has been developed to give you experience with the type of questions that are on the CNN examination. None of these questions will appear on the actual exam. On page 14, the correct answers and rationales for each of the questions are given. Compare your answers with the correct answers.

1. The goal of ultrafiltration profiling is to decrease
 1. the incidence of hypotension.
 2. the incidence of hypertension.
 3. serum sodium concentration.
 4. dialysate sodium concentration.
2. A patient is receiving acute peritoneal dialysis with rapid hypertonic exchanges. The patient complains of cramping and abdominal pain during infusion of the dialysate. One intervention to reduce the discomfort would be to
 1. use conscious sedation.
 2. infuse cool dialysis solution.
 3. increase the fill volume.
 4. warm the solutions.
3. Which of the following is an example of evidence-based practice?
 1. Adhering to the ANA's *Code of Ethics for nurses with interpretive statements*.
 2. Reviewing reports of legal cases to identify areas of nurse liability in malpractice cases in hemodialysis facilities.
 3. Using the *KDOQI Clinical practice guidelines for hemodialysis adequacy* to evaluate treatment outcomes.
 4. Seeking the advice of an experienced colleague to solve clinical problems.
4. C-reactive protein is a marker of
 1. inflammation.
 2. nutrition.
 3. allergic response.
 4. muscle metabolism.
5. A patient with acute kidney injury (AKI) has a central venous catheter emergently placed for hemodialysis. Which of the following would put the patient at risk of developing an infection at the catheter site?
 1. A leak from the insertion site.
 2. Failure to mask the patient during the procedure.
 3. Failure to lock the catheter with ceftazidime (Fortaz).
 4. Use of alcohol as a skin disinfectant.
6. Which of the following pathogenic microorganisms can be stable for several months on dry surfaces in areas where infected patients have been treated?
 1. *Pseudomonas aeruginosa*.
 2. *Clostridium difficile*.
 3. *Escherichia coli*.
 4. *Staphylococcus aureus*.
7. A 35-year-old female has been on peritoneal dialysis for several months. The patient calls to report pink-tinged dialysate. The **most** common cause of this finding is
 1. a ruptured arteriole.
 2. bleeding from catheter tip irritation.
 3. diverticuli or bowel erosion.
 4. ovulation or menstruation.

Kenneth Mason, a 68-year-old patient with chronic kidney disease (CKD), has been referred to a nephrology practice.

8. Mr. Mason asks why epoetin alfa (Procrit) has been prescribed. The nurse should explain that the **primary** reason he needs Procrit is because
1. his diseased kidneys no longer make enough erythropoietin.
 2. his diseased kidneys no longer reabsorb endogenous erythropoietin.
 3. patients with chronic kidney disease have bone marrow resistance to endogenous erythropoietin.
 4. patients with kidney disease need more erythropoietin than healthy individuals.
9. Mrs. Mason asks the nurse if their children are at increased risk for developing CKD. Their children would be at risk if Mr. Mason had which of these conditions?
1. Glomerular disease.
 2. Pyelonephritis.
 3. Polycystic kidney disease.
 4. Nephrosclerosis.
10. Mr. Mason returns to clinic after three months. As the nurse discusses his medications with Mr. Mason, he states that he is not taking the calcium carbonate (Tums®) with his meals as prescribed because he has not had any indigestion. The nurse explains that patients with chronic kidney disease take calcium carbonate because it
1. replaces calcium lost in the urine.
 2. corrects acidosis.
 3. decreases the risk of cardiac arrhythmias.
 4. reduces serum phosphorus levels.

11. The charge nurse reviews normal kidney physiology with a new nurse assigned to follow Mr. Mason. The charge nurse should emphasize that the kidney removes creatinine both by filtration and
1. osmosis.
 2. secretion.
 3. transcapillary transfer.
 4. tubular reabsorption.

Vivian Todd, 77 years old, has CKD stage 5 secondary to diabetic nephropathy. She has selected peritoneal dialysis for kidney replacement therapy.

12. Mrs. Todd has a peritoneal catheter implanted and begins peritoneal dialysis with cycler exchanges every two hours. She develops watery diarrhea. A dipstick of the diarrheal stool is ordered. A positive result for which of these substances would confirm a bowel perforation?
1. Glucose.
 2. Protein.
 3. Creatinine.
 4. Leukocytes.
13. The nurse performs weekly dressing changes for Mrs. Todd. Which of the following findings would indicate normal progression of healing of a peritoneal catheter exit site?
1. Development of exuberant granulation tissue.
 2. Formation of a "lip" of skin over the catheter.
 3. Progression of epithelium into the sinus tract.
 4. Development of a cuticle around the catheter.

Rosa Flores, 45 years old, has CKD stage 5 secondary to glomerulonephritis. She began dialysis emergently and has a cuffed, tunneled, central venous catheter.

14. The preferred site for a central venous catheter for dialysis access is the

1. right external jugular
2. right internal jugular.
3. left external jugular.
4. left internal jugular.

Mrs. Flores continues maintenance hemodialysis in an outpatient clinic.

15. Three hours into dialysis, Mrs. Flores complains of leg cramps. Leg cramps are **most** often related to

1. rapid ultrafiltration.
2. high blood flow rates.
3. inadequate oral fluid intake.
4. inappropriate levels of electrolytes in dialysate.

16. Mrs. Flores' interdialytic weight gains are typically 3-4 kg. (6.6-8.8 lb). In discussing ways to decrease fluid intake, the nurse emphasizes the importance of reducing salt intake. The nurse should instruct Mrs. Flores that the **best** way to avoid salt, but enhance the flavor of food, is to

1. use salt substitutes.
2. eat foods with a naturally high sodium content.
3. add sauces, e.g., soy or Worcestershire, to cooked food.
4. use herbs and spices in cooking.

17. Mrs. Flores inquires about the new home hemodialysis program which offers nocturnal daily dialysis. Medications typically decreased or discontinued in patients on daily hemodialysis include

1. vitamin supplements.
2. cardiotoxic drugs.
3. phosphorus binders.
4. heparin requirements.

Questions 18-19 are individual items.

18. Which of these statements made by a patient home hemodialysis would be **most** indicative of independence?

1. "I have a dialysis access in my arm, and I can see it."
2. "If my weight goes up, I adjust my ultrafiltration."
3. "Dialysis becomes a daily habit, like brushing your teeth."
4. "I like to know what's going on, so I ask the nurses a lot of questions."

19. A patient on peritoneal dialysis has bacterial peritonitis confirmed by culture. During long (4-6 hour) exchanges, which of the following would be decreased?

1. Solute clearances.
2. Protein losses.
3. Glucose absorption.
4. Fluid removal.

The nurse is planning to teach emergency preparedness to small groups of hemodialysis patients.

20. After completion of the program, the learner will
1. understand the importance of an egress path.
 2. identify the location of the nearest fire exit.
 3. appreciate the importance of anticipatory planning for emergencies.
 4. have increased awareness of the unit's emergency procedure.
21. According to adult learning principles, patients learn **best** when the instruction
1. proceeds from abstract, theoretical concepts to basic information.
 2. occurs in hour-long sessions that permit covering topics in depth.
 3. helps patients deal with problems they are currently confronting.
 4. gives patients information in a lecture format with accurate medical terminology.
22. After completing the emergency preparedness teaching session, which of these approaches would be **most** effective in determining learning outcomes?
1. Ask the patients to describe in their own words their emergency preparedness plans.
 2. Administer a brief multiple-choice test on emergency preparedness.
 3. Survey the patients to determine their satisfaction with the emergency preparedness program.
 4. Ask the patients to evaluate each other's knowledge of emergency preparedness.

Questions 23-30 are individual items.

23. Which of the following is the appropriate replacement fluid to use during therapeutic plasma exchange (TPE) when treating severe Goodpasture's Syndrome?
1. 25% mannitol solution.
 2. Heparinized normal saline.
 3. Fresh frozen plasma.
 4. Cryoprecipitate-reduced infusion.
24. Which of the following is a complication of long-term immunosuppressive therapy?
1. Uveitis.
 2. Malignancy.
 3. Development of new allergies.
 4. Progressive neurological deficits.
25. A patient is started on ACE inhibitor once daily. In addition to controlling hypertension, this type of drug has the benefit of
1. reducing serum potassium level.
 2. reducing protein in the urine.
 3. increasing intraglomerular pressure.
 4. increasing serum sodium levels.
26. Which of the following is a cause of chronic rejection following kidney transplant?
1. Alcohol consumption.
 2. Elevated blood sugars.
 3. Sexual promiscuity.
 4. Medication non-adherence.

27. A 76-year-old female patient has been on chronic maintenance hemodialysis in-center for the past six years and has recently started missing treatments. During her assessment, the patient tells the nurse, "I don't want to do this anymore." Which of the following is an appropriate response by the nurse?
1. "Have you discussed this with your family?"
 2. "Your physician will need to make that decision."
 3. "You're only coming three times a week."
 4. "Would it help to shorten your treatment times?"
28. A 74-year-old patient has a left upper extremity AV graft. The dialysis staff has noted elevated venous pressure, prolonged bleeding post needle removal, and increased difficulty with cannulation. The **most** likely reason for the graft-related problem is
1. venous outflow stenosis.
 2. venous inflow stenosis.
 3. arterial outflow stenosis.
 4. arterial inflow stenosis.
29. A collaborative team meeting is scheduled to coordinate a patient's posttransplant care. The **most** critical member of the team is the
1. transplant surgeon.
 2. nephrology nurse.
 3. nephrologist.
 4. patient.
30. A 62-year-old patient asks the social worker in the dialysis unit, "Is peritoneal dialysis covered under Medicare?" Which of these responses by the social worker would be **most** accurate?
1. "You need to be enrolled in the Patient Protection and Affordable Care Act."
 2. "You need to be enrolled in Medicare Supplemental Part D."
 3. "Since your kidneys no longer work, Medicare will cover peritoneal dialysis."
 4. "Since you are sixty-two years old, Medicare will only cover home hemodialysis."

CNN Certification Preparation Test Answers

Below, you will find the correct answer to each of the Preparation Test questions, as well as a rationale explaining the correct answer. Also indicated is the blueprint area that each question falls under, and a reference where the correct answer can be found. The references used are:

- Bodin, S.M. (Ed.) (2017). *Contemporary Nephrology Nursing*. 3rd ed. Pitman, NJ: ANNA.
- Counts, C.S. (Ed.) (2015). *Core Curriculum for Nephrology Nursing*. 6th ed. Pitman, NJ: ANNA.
- Daugirdas, J.T., Blake, P.G., & Ing, T.S. (2015). *Handbook of Dialysis*. 5th ed. Philadelphia, PA: Wolters Kluwer/Lippincott Williams & Wilkins.
- Gilbert, S.J., et al. (2018). *NKF's Primer on Kidney Diseases*, 7th ed. Philadelphia: Elsevier and National Kidney Foundation
- Gomez, N.J. (Ed.). (2017). *Nephrology Nursing Scope and Standards of Practice*. 8th ed. Pitman, NJ: ANNA.
- Kallenbach, J. Z. (2016). *Review of Hemodialysis for Nurses and Dialysis Personnel*. 9th ed. St. Louis, MO: Elsevier Mosby.
- Shields, K.M., Fox, K.L., & Liebrecht, C. (2019). *Pearson Nurse's Drug Guide 2019*. Hoboken, NJ: Pearson
- CMS Medicare Coverage of Kidney Dialysis and Kidney Transplant Services. www.medicare.gov

1. **Answer:** 1

Blueprint Area: Hemodialysis - Interventions

Ultrafiltration profiling or modeling is a method of systematically controlling ultrafiltration to minimize the symptoms a patient might experience with ultrafiltration, e.g., hypotension.

Core Curriculum, Module 3, p. 133; *Review of Hemodialysis*, p.169

2. **Answer:** 4

Blueprint Area: Peritoneal Dialysis - Interventions

Cool dialysis solution can cause chills, acrocyanosis, decreased body temperature and increased risk of cardiac arrhythmias. The solution should be warmed as with the chronic PD population.

Core Curriculum, Module 3, p. 268; *Handbook of Dialysis*, p. 458

3. **Answer:** 3

Blueprint Area: Hemodialysis - Professional

Evidence-based practice involves using research evidence and clinical expertise in patient care. In nephrology, one of the best examples of evidence-based practice is the use of the NKF KDOQI clinical practice guidelines.

Core Curriculum, Module 1, p. 69; *Scope and Standards of Practice*, p. 55

4. **Answer:** 1

Blueprint Area: Concepts of Kidney Disease - Infection Control

C-reactive protein is a general marker of infection and inflammation.

Core Curriculum, Module 2, p. 124; *Handbook of Dialysis*, p. 539; *Review of Hemodialysis*, p.197

5. **Answer:** 2

Blueprint Area: Acute Therapies - Infection Control

Sterile technique during catheter insertion is essential in preventing access infection. Both patient and caregiver should wear a surgical mask or face shield during the procedure.

Core Curriculum, Module 2, p. 339; *Review of Hemodialysis*, p. 129

6. **Answer:** 2

Blueprint Area: Concepts of Kidney Disease - Infection Control

Clostridium difficile is an anaerobic spore-forming bacillus. The spores are stable for up to 5 months on floors, toilets, and furniture. *C. difficile* spores are transferred to patients mainly via the hands of healthcare personnel who have touched a contaminated surface or item

Core Curriculum, Module 2, p. 343

7. **Answer:** 4

Blueprint Area: Peritoneal Dialysis - Physiologic/Technical

Blood-tinged dialysate may occur before or during menses and at ovulation.

Core Curriculum, Module 3, p. 270

8. **Answer:** 1
Blueprint Area: Concepts of Kidney Disease - Medications
Anemia is a complication of kidney failure and generally worsens as kidney function deteriorates. The major cause of anemia is related to the decreased production of erythropoietin.
Core Curriculum, Module 2, p. 303; Handbook of Dialysis, p. 592; NKF's Primer on Kidney Diseases, p. 515
9. **Answer:** 3
Blueprint Area: Concepts of Kidney Disease - Pathology/Complications
Polycystic kidney disease is a common genetic cause of kidney failure accounting for approximately 5% of hemodialysis patients worldwide.
Core Curriculum, Module 2, p. 17, Module 5, p. 9; Review of Hemodialysis, p. 41; NKF's Primer on Kidney Diseases, p. 375
10. **Answer:** 4
Blueprint Area: Concepts of Kidney Disease - Medications
Phosphate binding medications are required for most patients for adequate phosphate control. Calcium based binders, such as calcium carbonate (Tums®), bind with dietary phosphorus and promote excretion of phosphorus through the gastrointestinal tract.
Core Curriculum, Module 2, pp. 318-319; Handbook of Dialysis, p. 667
11. **Answer:** 2
Blueprint Area: Concepts of Kidney Disease - Pathology/Complications
As the glomerular filtrate passes through the renal tubules, creatinine is not reabsorbed at all. In fact creatinine is secreted into the proximal tubules, raising the total quantity of creatinine removed by about 20%.
Core Curriculum, Module 2, p. 29, 33-34; Review of Hemodialysis, p. 35
12. **Answer:** 1
Blueprint Area: Peritoneal Dialysis - Pathology/Complications
Dextrose-containing peritoneal dialysis solutions are very high in glucose. If there is a bowel perforation and dialysate is entering the gastrointestinal tract and causing diarrhea, the stool content will have an unusually high glucose level.
Handbook of Dialysis, p. 516
13. **Answer:** 3
Blueprint Area: Peritoneal Dialysis - Physiologic/Technical
As the new catheter exit site heals, epithelium progresses into the sinus tract. Although there is occasionally a cuticle-like rim around the external exit site or a "lip" of skin over the catheter, these are seen only in mature exit sites.
Core Curriculum, Module 3, p. 239
14. **Answer:** 2
Blueprint Area: Hemodialysis - Physiologic/Technical
The preferred site is the right internal jugular vein because this site offers a more direct route to the right atrium than the left-sided great veins. Catheter insertion and maintenance in the right internal jugular vein are associated with a lower risk for complications compared with other potential catheter insertion sites.
Core Curriculum, Module 3, p. 207; Handbook of Dialysis, pp. 122-123
15. **Answer:** 1
Blueprint Area: Hemodialysis - Pathology/Complications
Leg cramps are usually due to a high ultrafiltration rate.
Core Curriculum, Module 3, p. 153; Handbook of Dialysis, pp. 222-223
16. **Answer:** 4
Blueprint Area: Concepts of Kidney Disease - Teaching/Learning
It is vital that patients receive education on sodium and fluid restriction, with the emphasis on sodium. Herbs and spices effectively replace sodium to enhance the flavor of food.
Core Curriculum, Module 2, p. 274

17. **Answer:** 3
Blueprint Area: Hemodialysis - Medications
Nocturnal daily dialysis improves phosphorus control by increasing dialytic phosphorus removal. Therefore, the need for phosphorus binders is decreased.
Core Curriculum, Module 2, p. 263, Module 3, p. 288; *Handbook of Dialysis*, p. 315
18. **Answer:** 2
Blueprint Area: Hemodialysis - Psychosocial
Benefits of home dialysis include increased independence and better knowledge about one's illness and its treatment.
Core Curriculum, Module 2, p. 285, Module 3, p. 288; *Handbook of Dialysis*, p. 24
19. **Answer:** 4
Blueprint Area: Peritoneal Dialysis - Infection Control
Peritonitis causes changes in the peritoneal membrane structure and function. Increases in systemic glucose absorption during peritonitis result in a decrease in dialysate glucose concentration over the dwell time. This results in decreased ultrafiltration during long-dwell exchanges.
Core Curriculum, Module 6, p. 97; *Handbook of Dialysis*, p. 501
20. **Answer:** 2
Blueprint Area: Hemodialysis - Teaching/Learning
A behavioral objective should contain a performance behavior specifying what the learner will be able to do after the instruction is given. The verbs used in the objective should be active verbs, such as "identify," "demonstrate," and "describe," which can be measured to determine if the outcome was achieved.
Core Curriculum, Module 2, p. 215-218
21. **Answer:** 3
Blueprint Area: Concepts of Kidney Disease - Teaching/Learning
Theories on adult education consistently state that adults will devote energy to learn something in proportion to how they perceive it will help them perform tasks or deal with problems they are currently confronting.
Core Curriculum, Module 2, p. 214
22. **Answer:** 1
Blueprint Area: Concepts of Kidney Disease - Teaching/Learning
The most effective evaluation methods are to have patients demonstrate or describe in their own words (teach-back) what they learned. In this way, patients become active participants and any misconceptions can be dealt with immediately.
Core Curriculum, Module 2, p. 285
23. **Answer:** 3
Blueprint Area: Acute Therapies - Interventions
To prevent exacerbation of pulmonary hemorrhage, fresh frozen plasma is used as the replacement fluid for TPE to replace the clotting factors lost by the removal of the patient's plasma.
Core Curriculum, Module 4, p. 42
24. **Answer:** 2
Blueprint Area: Transplant - Medications
Malignancy is more common in people who are on immunosuppressive therapy than those who are not. Skin cancer is the most common malignancy.
Core Curriculum, Module 3, p. 25, Module 6, p. 67
25. **Answer:** 2
Blueprint Area: Concepts of Kidney Disease - Intervention
ACE inhibitors affect hemodynamics in the glomerulus by reducing pressure within the efferent arteriole that is associated with reduced proteinuria.
Core Curriculum, Module 2, p. 128, 308, Module 5, p. 24; *Contemporary Nephrology Nursing*, p. 438; *NKF's Primer on Kidney Diseases*, p. 259

26. **Answer:** 4

Blueprint Area: Transplant - Pathology/Complications

Low levels of immunosuppression related to medication nonadherence contribute to chronic allograft nephropathy (the preferred term for chronic rejection).

Core Curriculum, Module 3, p. 19

27. **Answer:** 1

Blueprint Area: Hemodialysis - Psychosocial

The nurse is often the facilitator of discussions including the patient and family when making decisions about continuing medical treatment. This can help guide the family in following the patient's wishes.

Core Curriculum, Module 2, p. 242; *Review of Hemodialysis*, p. 315

28. **Answer:** 1

Blueprint Area: Hemodialysis - Pathology/Complications

The outflow vein at the venous anastomosis is the most common site of stenosis. There can also be intimal thickening within the graft.

Core Curriculum, Module 3, p. 205; *Handbook of Dialysis*, p. 140

29. **Answer:** 4

Blueprint Area: Concepts of Kidney Disease - Interdisciplinary

A survey of American nephrologists and of members of the National Kidney Foundation Council on Dialysis identified patient preference as the most important factor in the decision-making process.

Core Curriculum, Module 1, p. 34, Module 2, p. 195

30. **Answer:** 3

Blueprint Area: Peritoneal Dialysis - Interdisciplinary

Home therapies are covered by Medicare Part B.

Core Curriculum, Module 2, p. 226; CMS Medicare Coverage of Kidney Dialysis and Kidney Transplant Services (medicare.gov)



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