

CCHTA[®]

**Certified Clinical
Hemodialysis Technician-Advanced**

Certification Preparation Guide

nncc[®]

Nephrology Nusing
Certification Commission

CCHT-A 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

The Nephrology Nursing Certification Commission (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

The Nephrology Nursing Certification 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. The 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 unequalled. 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:

- Certification testing for specialty nursing practice
- Preadmission testing for RN and LPN/LVN schools of nursing
- Clinical Judgement Series of tests for nursing practice settings
- Test construction workshops for nurse educators

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)

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.

ICE and NCCA Accreditation

NNCC also is a long-time member of the Institute for Credentialing Excellence (ICE), a non-profit professional membership association dedicated to providing educational, networking, and advocacy resources for the credentialing community. ICE is a leading developer of standards for both certification and certificate programs and is both a provider of and a clearing house for information on trends in certification, test development and delivery, assessment-based certificate programs, and other information relevant to the credentialing community.

To help ensure the health, welfare, and safety of the public, ICE created its accrediting body, the National Commission for Certifying Agencies (NCCA) in 1987. Certification programs (organizations that assess professional competence) that receive NCCA accreditation demonstrate compliance with its *Standards for the Accreditation of Certification Programs*, which were the first standards for professional certification programs developed by the industry. NCCA accreditation was granted for the CCHT examination in December 2015.

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.

Clinical/Technical Examination Board

The Clinical/Technical Exam Board is made up of representatives from the CCHT, CCHT-A, and CD-LPN/LVN Testing Committees. The purpose of the Exam Board is to establish, review, and update eligibility criteria relevant to certification. 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 job analysis role delineation survey tool and data analysis, updates to the examination blueprint, and completes audits of certification and recertification applications for quality assurance.

CCHT-A Test Committee

Members of the CCHT-A Test Committee have dialysis expertise, meet education requirements, and must be NNCC certified. 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 advanced technicians. 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 CCHT-A examination is based on a job analysis survey of advanced level technicians that identifies the key tasks/activities performed by advanced technicians. A national task force is brought together to plan the survey content. This task force includes technicians, as well as clinical educators and clinical managers of technicians. Following data collection, the task force reviews the survey results and makes recommendations for the CCHT-A test specifications. Most importantly, a job analysis is performed every five years to be sure the test reflects current practice and is kept up to date.

The group that oversees CCHT-A test development is the NNCC Clinical/Technical Examination Board, which is made up of technicians and nurses who work with technicians. There is also a CCHT-A Test Committee that writes the actual test questions. Item writers, who are certified CCHT-As from a variety of geographic and practice settings, write test questions to meet the CCHT-A blueprint requirements. Members of both the Clinical/Technical Board and the Test Committee are considered "content experts" concerning the knowledge and skills needed by CCHT-As for safe practice.

Each question on the test can be linked directly to the tasks/activities in the job 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 *Core Curriculum for the Dialysis Technician*, the regulations in the *CMS Conditions for Coverage for End-Stage Renal Disease Facilities*, and other references.

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 CCHT-As who serve as subject matter experts (SMEs). Both experienced and newly certified CCHT-As 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 74% correct is required to pass the CCHT-A 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 knowledge and competence in a specialty and is an essential component of specialty nursing practice. 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. Certification is a requirement by the Centers for Medicare and Medicaid Services (CMS) for dialysis technicians since 2008. Certified technicians 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.

Am I ready to earn the CCHT-A?

To be eligible to sit for the CCHT-A Exam, you must have:

- Five (5) years of continuous employment and a minimum of 5,000 hours as a clinical dialysis technician. *
- 30 contact hours of continuing education relevant to the practice of a hemodialysis technician, within the previous three years. **
- Current national certification as a CCHT, CHT or CCNT.

* Designated signatures are required

If you are taking the CCHT-A exam in lieu of renewing your CCHT credential, you should begin the application & testing process at least eight (8) months prior to your CCHT expiration date.

**** If you are unsuccessful on the CCHT-A examination and need to renew your CCHT credential, you may use your accrued contact hours for CCHT renewal.**

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

How do I apply for the CCHT-A 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. Attach clear copies of contact hour certificates to total 30 contact hours specific to your position/scope of practice.
3. Attach a copy of your high school diploma/GED.
4. Attach a copy or a verification of your current national certification as a dialysis technician, with the expiration date clearly visible.
5. Have your employer complete his/her portion of the application.
6. Mail the application form, signed and dated, with the appropriate payment, to NNCC.

How will I know my application was received?

Within a four (4) week processing time, 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 if I need to test right away?

Expedited Review is a service for applicants who need to test right away. Instead of your application being processed in the order in which it was received, The NNCC pulls your application to the front of the line for immediate processing. *Expedited Review* exam permits will be issued within 1 to 3 business days from the time the application is received by C-NET. Examination permits are issued only to applicants with completed, approved applications. (Note: there is an additional fee for *Expedited Review*.)

What study resources are available?

- The test blueprint and practice questions included in this booklet.
- The following list of reference used by the CCHT-A item writers:
 - Core Curriculum for the Dialysis Technician, 5th edition.
 - Kallenbach's Review of Hemodialysis for Nurses and Dialysis Personnel, 9th edition.
 - The regulations in the CMS Conditions for Coverage for End-Stage Renal Disease Facilities.
 - The references listed before the Prep Test on page 12 of this booklet.
- The online practice test (found on www.nncc-exam.org).

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 "short cut methods for test preparation" are specifically avoided when creating this exam. NNCC tests candidates on content and not on their "test taking skills." If you have any questions about the best methods to prepare, please call us at 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 are contained 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 NNCC Certified Directory. If you were unsuccessful on the exam, the report will reflect your score and a breakdown of the test subareas – the Dialysis Practice Areas on the CCHT-A 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?

There is no limit to the number of times you can take the exam. If you are unsuccessful on the exam, you may reapply by mailing in a new application. You can avoid the 3-4 week processing time by checking the *Expedited Review* box to have your application pulled to the front of the line for immediate processing.

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 alert and open to learning.
- 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

C-NET:

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, gender, 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

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 members 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 CCHT-A Examination

The CCHT-A examination is designed to test the knowledge needed to provide safe care to patients who are receiving hemodialysis treatments. There are two dimensions in the test blueprint, Dialysis Practice Areas and Cognitive Levels. Dialysis Practice Areas include four sections: I. Clinical, II. Technical, III. Role Responsibilities, and IV. Environment. Specific CCHT-A activities are tested in each dialysis area. There are also three Cognitive Levels: Knowledge, Comprehension, and Application. These are described in this booklet in the section, "Types of Questions on the CCHT-A Examination."

Each question on the test fits into one Dialysis Practice Area and one Cognitive Level. This is shown on the blueprint grid. The entire test is mapped out in this manner to guide the item writers when they are developing the test.

I. Clinical (50-54%)

Questions in the Clinical area deal with patient care before, during, and after a dialysis treatment. Examples of the kinds of technician activities tested in the Clinical area include:

1. Monitor dialysis equipment during treatment.
2. Identify relationship of blood pressure changes to fluid volume status.
3. Follow protocol for treating hypotension.
4. Question patient regarding problems/events since last treatment.
5. Recognize and report potential or actual adverse patient occurrences.

II. Technical (23-27%)

Questions in this area deal with principles of water treatment, components of the extracorporeal circuit, and actions to take when alarms sound or machine-related problems occur. Examples of the kinds of technician activities tested in the Technical area include:

1. Ensure safe and proper use of equipment.
2. Recognize principles related to water treatment (ion exchange, absorption).
3. Participate in monitoring the water treatment system.
4. Take corrective action when equipment malfunctions ("troubleshoot").
5. Perform quality control checks on equipment (test strips, glucose meter).

III. Role Responsibilities (13-17%)

Questions in this area deal with roles of various staff members in the dialysis facility, as well as communication skills. These skills include interactions between technicians and patients that maintain professional boundaries, as well as respect the patients' privacy, dignity, and confidentiality. Examples of the kinds of technician activities tested in the Role Responsibilities area include:

1. Maintain patient's confidentiality.
2. Participate as a member of the unit-based cannulation team.
3. Participate in quality improvement initiatives (QAPI).
4. Prepare and/or present inservice education topic.
5. Participate in precepting new technicians.

IV. Environment (6-10%)

Questions in this area deal with infection control and other safety issues in the dialysis setting. These issues include chemical spills, transfer of patients from wheelchair to treatment chair, using correct body mechanics to avoid injury. Examples of the kinds of technician activities tested in the Environment area include:

1. Use dialysis/standard precautions.
2. Follow infection control precautions (isolation, vaccinations, supplies).
3. Disinfect dialysis equipment.
4. Assist with maintaining the Life Safety Code.
5. Maintain a therapeutic environment (noise reduction, temperature control).

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

Type of Questions on the CCHT-A Examination

Several different types of questions appear on the CCHT-A examination. Some questions require a basic recall of knowledge, while others test the technician's ability to comprehend a concept. Most of the questions ask the technician to apply knowledge in a clinical situation. The CCHT-A test blueprint specifies the percent of each type of question in the test. Examples of each of these types of questions appear below with the correct answer marked with a checkmark (✓).

A. Recall of Knowledge (3-7%)

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

1. When precepting a new staff member, the technician explains that dialysis adequacy refers to how effectively
 1. toxins are removed from the blood during dialysis. ✓
 2. patient morbidity is reduced by dialysis.
 3. fluid is removed from the blood during dialysis.
 4. patient mortality is reduced by dialysis.

B. Comprehension (18-22%)

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

2. A patient's adequacy study results are below target range. The technician should recognize that decreased adequacy can result from which of these treatment-related findings?
 1. The blood flow rate was maintained at 450 mL/min.
 2. The patient had an episode of diarrhea interrupting treatment. ✓
 3. The dialysate flow rate was maintained at 650 mL/min.
 4. The patient had an episode of hypotension post-treatment.

C. Application of Knowledge (73-77%)

Test questions at the application level ask the technician 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. Which of the following treatment orders would the technician expect to be written to improve the patient's dialysis adequacy?
 1. Set the patient's treatment for an ultrafiltration rate of 13 mL/h/kg.
 2. Change the hemodialysis needle size from 16-gauge to 18-gauge.
 3. Maintain the patient's vascular access flow at 600 mL/min.
 4. Switch the dialyzer size from a mass transfer coefficient of 1040 to 1580. ✓

Distribution of 150 Question in the CCHT-A Exam

(adopted in 2011)

Cognitive Level Dialysis Practice Area	A. Knowledge	B. Comprehension	C. Application	Total
I. Clinical	3-5	15-17	57-59	77-79 (50-54%)
II. Technical	1-3	7-9	28-30	37-39 (23-27%)
III. Role Responsibilities	0-2	4-6	16-18	22-24 (13-17%)
IV. Environment	0-1	3-4	8-10	11-13 (6-10%)
Total	6-8 (3-7%)	29-31 (18-22%)	112-114 (73-77%)	150

CCHT-A Certification Preparation Test

This Preparation Test has been developed to give you experience with the type of questions that are on the CCHT-A examination. None of these questions will appear on the actual exam. On page 12, the correct answers and rationales for each of the questions are given. Compare your answers with the correct answers.

- Quality data comparing End Stage Renal Disease (ESRD) facilities can be found at which of these websites?
 - www.kidney.gov/kidney.
 - www.lifeoptions.org.
 - www.kidneyschool.org.
 - www.medicare.gov/dialysis.
- What is the main advantage of measuring Kt/V rather than URR?
 - It estimates how much fluid is removed during dialysis.
 - It is a more accurate measure of the delivered dose of dialysis.
 - It automatically calculates residual kidney function.
 - It is the simplest way to estimate the adequacy of dialysis.
- A patient tells the technician he received a voicemail message about answering a survey regarding his dialysis. He asks, "Why is this being done?" Which of these responses by the technician would be **best**?
 - "To ensure our facility is meeting CMS regulations."
 - "So we can develop goals for your plan of care."
 - "To improve patient-centered care."
 - "So the social worker will know your quality-of-life scores."
- A patient asks the technician, "I am considering nocturnal in-center hemodialysis. What are the advantages?" Which of these responses by the technician would be **most** appropriate?
 - "We encourage patients who have private insurance to choose this option."
 - "You're likely to have fewer restrictions on what you can eat and drink."
 - "You can increase or decrease the frequency of your treatments as you wish."
 - "There is no chance of a pyrogenic reaction occurring."
- According to CMS regulations, restraining a patient is permitted when the patient
 - threatens another patient.
 - is abusive to staff.
 - is in jeopardy for needle displacement.
 - changes settings on the dialysis machine.
- The patient asks if he may sit in the dialysis chair. The technician notices that the chair is slightly wet from cleaning with sodium hypochlorite (Clorox) solution. Which of these responses by the technician would be **most** appropriate?
 - "It needs to air dry before you can sit in it."
 - "Let me put a sheet down so you don't get wet."
 - "The bleach will ruin your clothes."
 - "You can sit in the chair after I dry it."
- The re-use technician explains that reprocessing a dialyzer can result in
 - decreased fiber length.
 - an increased dialyzer flow rate.
 - decreased clearance.
 - an increased mass transfer coefficient.

8. A patient new to dialysis has selected his life-saving options to allow for chest compressions but not to be placed on a ventilator. The technician should understand that this will be a part of the patient's
 1. consent for treatment.
 2. advance directives.
 3. last will and testament.
 4. action plan.

9. A new patient to the unit asks to see how the water is purified. Which of these responses by the technician would be appropriate?
 1. "Let me get permission from your physician."
 2. "Entry to the water area is not permitted by regulation."
 3. "I can arrange a tour when you are available."
 4. "I can only show you a video of the water system."

10. Currently, dialysis clinics receive payment from CMS for their services by using which of the following methods?
 1. The composite rate.
 2. The bundled rate.
 3. 80% of charges after one month of treatment.
 4. 100% of charges after six months of treatment.

11. The patients in the first five dialysis stations are experiencing hypertension with the most severe hypertension in the first three patients. The technician places all of the dialysis machines into bypass in order to interrupt
 1. a chain reaction.
 2. failure of the endotoxin filter.
 3. microbial growth.
 4. exposure to aluminum.

12. The sample for the post-dialysis BUN level is drawn after 15 seconds of slowing the blood flow. The technician understands that the rationale for this procedure is related to the
 1. solvent rebound.
 2. access recirculation.
 3. arterial clearance.
 4. ultrafiltration coefficient.

13. When obtaining pre-dialysis blood samples for a patient who has a central venous catheter access, the technician should take which of these measures?
 1. Aspirate the lock and discard it before drawing the sample.
 2. Flush the catheter with saline prior to drawing the sample.
 3. invert the blood tubes several times before drawing the sample.
 4. initiate dialysis and immediately draw the samples from the arterial port.

14. Within the first hour of a hemodialysis treatment, a patient develops symptoms that suggest a pyrogenic reaction. The technician would expect which of these tests to be performed to detect endotoxin?
 1. Inlet water culture.
 2. Outlet water culture.
 3. Stimulus amoebocyte lysate (SAL).
 4. Limulus amoebocyte lysate (LAL).

15. Which of these tests would measure a CKD patient's residual kidney function?
 1. Random urinalysis.
 2. 24-hour urine collection.
 3. Spot urine for glucose.
 4. Urine culture and sensitivity.

16. A patient arrives for dialysis with an interdialytic weight gain of 6.7 kg (14.7 lb). The technician should encourage the patient to reduce dietary sodium intake in order to
1. reduce dependent edema.
 2. avoid increasing estimated dry weight.
 3. increase the osmotic gradient.
 4. prevent the need to use reverse sequential diafiltration.
17. Prior to cannulation, a technician noted a newly developed, irregular pulsatile mass on the surface of the AV fistula. The technician suspects the patient has developed which of these conditions?
1. An aneurysm in the outflow vein.
 2. A stenosis in the subclavian vein.
 3. An access infection.
 4. A pseudoaneurysm.
18. CMS requires that the brine tank must be sufficiently filled with salt, since inadequate fill may result in
1. premature exhaustion of calcium.
 2. increased pH of incoming water.
 3. elevated water hardness.
 4. latent chlorine breakthrough.
19. A female patient is sitting in the waiting room before her treatment. The patient becomes diaphoretic, tremulous, and somewhat confused. She responds slowly and hesitantly to verbal stimuli. Her blood pressure is 120/84 mm Hg, and her heart rate is 115 bpm. Which of these actions would the technician expect to be taken **next**?
1. Immediately initiate treatment.
 2. Call the designated emergency contact.
 3. Give the patient a cup of water.
 4. Obtain the patient's blood glucose level.
20. After placement of a tunneled central venous catheter for dialysis, which of the following procedures must be performed prior to first use?
1. Magnetic resonance imaging (MRI).
 2. Chest x-ray.
 3. Computerized tomography (CT) scan.
 4. Echocardiogram.
21. The technician understands that a stethoscope used on a patient positive for hepatitis B virus (HBV) must be disinfected because the virus can remain viable on environmental surfaces for at least
1. 2 hours.
 2. 48 hours.
 3. 7 days.
 4. 1 month.
22. When starting up the water system in the morning, the technician notes that the reverse osmosis (RO) membrane seal is broken and leaking. Which of the following actions would be appropriate to take?
1. Test the water post microfilter for pyrogens.
 2. Place the water system in deionization (DI) bypass.
 3. Continue the start-up as long as pressures are within normal limits.
 4. Delay dialysis until membrane is repaired by the technician.
23. A patient is found slumped over in a chair in the unit's waiting room. After determining that the patient is unresponsive and pulseless, the technician calls 911 and positions the patient on the floor. Which of these actions should the technician take **next**?
1. Open the patient's airway.
 2. Give two quick breaths.
 3. Check the femoral pulse.
 4. Start chest compressions.

24. During preparation for dialysis treatment using a tunneled central venous catheter access, the technician notices the cuff extruding at the entry site of the catheter beneath the sterile dressing. Which of the following actions would the technician expect to be taken?
1. Refer the patient for evaluation and possible replacement.
 2. Gently reinsert catheter by pushing with steady pressure.
 3. Apply an antibiotic ointment on the cuff.
 4. Perform the patient's treatment with the lines reversed.
25. A patient on dialysis has gained 22 lb (10 kg) over the weekend. The physician is notified and has ordered an additional hour of treatment in "ultrafiltration only." After informing the patient of the orders, the patient asks, "What does this extra procedure do?" Which of these responses by the technician would be correct?
1. "It facilitates the removal of potassium."
 2. "It facilitates the removal of phosphorus."
 3. "It cleans the blood without removing fluid."
 4. "It removes fluid without diffusion of solutes."
26. The new technician asks what the difference is between chlorine and chloramine. The preceptor responds that chloramine is a combination of chlorine and
1. ammonia.
 2. hypochloride.
 3. amino acids.
 4. sodium bicarbonate.
27. During the dialysis treatment, a patient with a right internal jugular central venous catheter has an arterial pressure of -305 mmHg. Which of the following actions should the technician take **first** to improve the blood flow through the catheter?
1. Administer additional heparin.
 2. Obtain an order for alteplase.
 3. Ask the patient to cough.
 4. Raise the patient's head.
28. Which of the following electrolytes is included in the acid concentrate to reduce catabolism and help those patients who may be malnourished?
1. Magnesium.
 2. Calcium.
 3. Chloride.
 4. Glucose.
29. People in kidney failure develop a state of metabolic acidosis. The technician would expect the physician to order which of the following to help correct this condition?
1. Potassium.
 2. Magnesium.
 3. Chloride.
 4. Bicarbonate.
30. What of these actions can the technician take to prevent the possibility of precipitate formation in bicarbonate that is a result of altered pH?
1. Do not over-mix the bicarbonate.
 2. Do not use bicarbonate that was mixed 10 hours earlier.
 3. Mix bicarbonate with water that is 74-80°F (23.3-26.7°C).
 4. Mix bicarbonate using water purified by a reverse osmosis system.

CCHT-A 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:

- American Heart Association. (2015). *Highlights of the 2015 American Heart Association Guidelines Update for CPR and ECC*. Dallas, TX: AHA.
- Association for the Advancement of Medical Instrumentation. (2004). *Dialysate for Hemodialysis. (ANSI/AAMI RD52:2004)*. Arlington, VA: AAMI.
- 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.
- Kallenbach, J. Z. (2016). *Review of Hemodialysis for Nurses and Dialysis Personnel*. 9th ed. St. Louis, MO: Elsevier Mosby.
- Medical Education Institute, Inc. (2012). *Core Curriculum for the Dialysis Technician: A Comprehensive Review of Hemodialysis* (5th ed.). Madison, WI: MEI.
- Association for Professionals in Infection Control and Epidemiology. Scientific Guidelines. www.apic.org
- Centers for Medicare & Medicaid Services. Conditions for Coverage. www.cms.gov
- Centers for Disease Control and Prevention. www.cdc.gov
- KDOQI Guidelines. www.kidney.org

1. **Answer: 4**

Blueprint Area: Role Responsibility/Knowledge

Medicare has a website, Dialysis Facility Compare (DFC), which compares all of the dialysis centers in the United States. Quality information is compared for adequacy, anemia, and survival.
Core Curriculum, p. 57

2. **Answer: 2**

Blueprint Area: Clinical/Comprehension

Urea kinetic modeling (Kt/V) is a more complex way to estimate the delivered dose of dialysis. It is more accurate than urea reduction ratio (URR) and provides more information about a patient's treatment needs. Kt/V can help the nephrology healthcare professional predict how much treatment time a patient should have, as well as if the patient is eating enough protein, since the calculation of Kt/V includes the patient's size and residual kidney function.
Core Curriculum, p. 209; *Review of Hemodialysis*, pp. 202-203

3. **Answer: 3**

Blueprint Area: Role Responsibility/Application

The goal of the ESRD Quality Initiative is to support higher quality dialysis care. Health care delivery and patient experience with health care remain significant challenges, even as our nation's health care system is undergoing complex changes. Through its Consumer Assessment of Healthcare Providers and Systems (CAHPS®) program, the U.S. Agency for Healthcare Research and Quality (AHRQ) is advancing patient-centered care by giving patients effective surveys and information to help them make better health care decisions. The CAHPS In-center Hemodialysis Survey is designed specifically to measure satisfaction among hemodialysis patients.
Core Curriculum, p. 7

4. **Answer: 2**

Blueprint Area: Role Responsibility/Application

With nocturnal hemodialysis, patients dialyze three nights a week for 7-8 hours per treatment. Thus, they receive twice as much hemodialysis as standard treatments, which results in fewer dietary and fluid restrictions.
Core Curriculum, p. 38

5. **Answer: 3**

Blueprint Area: Role Responsibility/Comprehension

Physical or chemical restraints may be imposed only upon the written, specific order of a physician or other licensed practitioner permitted by the state and facility to order restraints. In a dialysis unit, it may be appropriate to use physical restraints to keep a patient from dislodging or pulling out needles or to prevent a patient from falling out of a dialysis chair. The need for restraints should be reassessed at each treatment. If restraints are used, staff must document what, when, how, and why restraints are needed.
CMS CfC Interpretive Guidance, V452

6. **Answer:** 1
Blueprint Area: Environment/Application
Disinfection must adhere to the minimum wet contact duration as specified by the product label. Patients should not be present at the station during disinfection.
Review of Hemodialysis, p. 131; *APIC Guidelines*, p. 21
7. **Answer:** 3
Blueprint Area: Technical/Comprehension
Each reprocessing of the dialyzer changes the membrane. In time, these changes can result in poor solute transport and ultrafiltration, so the patient does not receive the full dialysis prescription and clearance is reduced.
Core Curriculum, p. 233
8. **Answer:** 2
Blueprint Area: Role Responsibility/Application
An advance directive is a written document that specifies in advance what kind of medical treatments an individual wants or does not want in case the individual becomes too incapacitated or ill to make such choices. The Patient Self-Determination Act of 1991 requires that patients be given information concerning their legal right to make decisions about the medical care and treatment they are about to receive. The patient's family and members of the care team should be told of the patient's wishes when an advance directive is done and given a written copy to keep.
Core Curriculum, p. 306; *Review of Hemodialysis*, p. 304-305
9. **Answer:** 3
Blueprint Area: Environment/Application
Access to patient treatment areas, reprocessing areas, water treatment systems, supply storage, and dialysis equipment must be restricted to authorized personnel only. Access limitation does not preclude visits or tours by individual(s) authorized and supervised by facility personnel.
CMS CfC Interpretive Guidance, V402
10. **Answer:** 2
Blueprint Area: Environment/Knowledge
Since 2011, Medicare has used the ESRD Prospective Payment System (PPS), referred to as "the bundle," which combines the composite rate plus laboratory tests, medications, and home training into one payment.
Core Curriculum, p. 6; *Review of Hemodialysis*, p. 17
11. **Answer:** 1
Blueprint Area: Technical/Application
Hypertension can be caused by exposure to calcium, magnesium, copper, and sodium in product water. If two or more patients have similar symptoms at the same time, there may be a problem with the water treatment or delivery system.
Core Curriculum, p. 262
12. **Answer:** 2
Blueprint Area: Clinical/Comprehension
At the completion of hemodialysis, some of the blood remaining in the access and extracorporeal circuit is actually recirculated blood. If the blood sample is drawn immediately upon completion of the treatment, just-dialyzed blood that has recirculated into the access will dilute the sample. Access recirculation occurs when the cleaned blood is coming back through the venous needle and is pulled back into the arterial needle, instead of going to the blood stream. The consequence of sampling this admixture of venous and arterial blood is a falsely decreased BUN value and an artificially elevated Kt/V and URR.
Core Curriculum, p. 211
13. **Answer:** 1
Blueprint Area: Clinical/Application
In patients with catheters, draw and discard a small amount of blood before drawing a blood for tests. The first blood from a catheter will have heparin, which may change the results of some blood tests.
Core Curriculum, p. 196

14. **Answer:** 4
Blueprint Area: Clinical/Application
The limulus amoebocyte lysate (LAL) test is used to detect endotoxin. This test will reveal the presence of endotoxin derived from the breakdown of the cell walls of gram negative bacteria.
Core Curriculum, p. 259; *Review of Hemodialysis*, p. 71; AAMI RD52:2004, p. 3
15. **Answer:** 2
Blueprint Area: Clinical/Comprehension
Residual kidney function (RKF) can be measured by a 24-hour urine test for creatinine or urea. RKF is an important contributor to dialysis adequacy, and adequacy has been shown to impact morbidity and mortality in patients with CKD Stage 5. In contrast to hemodialysis, RKF provides continuous clearance of both large and small solutes and helps avoid the large fluctuations in fluid balance and blood pressure that are more pronounced in anuric patients.
Handbook of Dialysis, p. 60; KDOQI Guideline 6, Adequacy, Preservation of residual renal function
16. **Answer:** 1
Blueprint Area: Clinical/Application
Patients must take in less sodium and water if they have swelling in their face, hands, or feet.
Core Curriculum, p. 45
17. **Answer:** 1
Blueprint Area: Clinical/Application
Aneurysms are more likely to occur upstream (toward the heart) from a venous stenosis. In a fistula, stenosis can occur anywhere along the outflow vein.
Core Curriculum, p. 139
18. **Answer:** 3
Blueprint Area: Technical/Comprehension
The water softener system protects RO membranes by removing calcium and magnesium ("hardness ions"), adding sodium ions in their place. If the salt level is too low, the concentration of brine may be too weak to regenerate the water softener.
Core Curriculum, p. 254; *Review of Hemodialysis*, p. 95; *Handbook of Dialysis*, p. 91
19. **Answer:** 4
Blueprint Area: Clinical/Application
The patient shows signs and symptoms of low blood sugar (hypoglycemia), which include nervousness, sweating, confusion, trembling, intense hunger, weakness, palpitations, and trouble speaking. The patient's blood sugar level should be tested if any of these symptoms occur.
Core Curriculum, p. 196; *Review of Hemodialysis*, p. 208
20. **Answer:** 2
Blueprint Area: Clinical/Comprehension
A chest x-ray must be done to confirm that the catheter is in the right place before the initial hemodialysis treatment in order to reduce errors and prevent complications.
Core Curriculum, p. 150; *Review of Hemodialysis*, p. 158; KDOQI, Vascular Access Guidelines, #6
21. **Answer:** 3
Blueprint Area: Clinical/
The hepatitis B virus (HBV) is hardy and can live for 7 days or more on surfaces.
Core Curriculum, p. 175
22. **Answer:** 2
Blueprint Area: Technical/Application
Deionization (DI) is often used as an emergency backup to the RO system. Chemical analysis for contaminants should be done after the RO system membranes are replaced.
Core Curriculum, p. 249

23. **Answer:** 4
Blueprint Area: Clinical/Application
The American Heart Association currently uses the acronym CAB (Circulation, Airway, Breathing) to help people remember the order to perform the steps of cardiopulmonary resuscitation (CPR). Chest compressions manually pump blood to the heart creating artificial circulation.
American Heart Association. Highlights of the 2015 Guidelines for CPR & ECC, p. 4
24. **Answer:** 1
Blueprint Area: Clinical/Application
Dislodgement of the central catheter is evidenced by cuff extrusion from the exit site. The catheter should not be pushed back into place. Instead, the catheter should be taped in place and the situation reported to vascular access team.
Core Curriculum, p. 153; *Core Curriculum for Nephrology Nursing*, Module 3, pp. 212-213
25. **Answer:** 4
Blueprint Area: Clinical/Application
Ultrafiltration only (or isolated ultrafiltration) removes water, but not solutes.
Core Curriculum, p. 327
26. **Answer:** 1
Blueprint Area: Technical/Application
Chlorine is used to kill microbes. Since chlorine gas evaporates, a more stable compound called chloramine (chlorine plus ammonia) may be used instead.
Core Curriculum, p. 242
27. **Answer:** 3
Blueprint Area: Clinical/Application
If pressure alarms signal that the blood flow cannot be kept at the prescribed rate the technician should move the patient, e.g., lower the head of the chair, have the patient turn his/her head, cough, etc. to help move the tip of the catheter for a better flow. Other actions include, looking for a kink or blockage, flushing with saline, and asking the nurse to assess the patient.
Core Curriculum, p. 153
28. **Answer:** 4
Blueprint Area: Clinical/Comprehension
Glucose in dialysate reduces the difference in gradient between the dialysate and the blood, which prevents the loss of blood glucose and reduces catabolism (muscle breakdown).
Core Curriculum, p. 94
29. **Answer:** 4
Blueprint Area: Clinical/Application
Metabolic acidosis is a condition that occurs when excess hydrogen ions build up in the blood. People with kidney failure are unable to excrete hydrogen ion and, therefore, develop metabolic acidosis. Bicarbonate is added to dialysate, and diffusion of bicarbonate from dialysate to blood helps to correct the patient's pH.
Core Curriculum, p. 95; *Review of Hemodialysis*, p. 59, 89
30. **Answer:** 1
Blueprint Area: Technical/Application
Manufacturers of bicarbonate powder for use in making the bicarbonate concentrate for dialysis specify the mixing time. Mixing longer (overmixing) can result in loss of carbon dioxide (CO₂) from the solution. The loss of CO₂ results in an increase in pH and favors the formation of carbonate that can lead to precipitation of calcium and magnesium carbonate in the fluid pathways of the dialysis machine. Use of overmixed bicarbonate concentrate can result in a low calcium level in the dialysate and a corresponding drop in patients' serum calcium levels.
CMS CfC Interpretive Guidance, V234



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