

Study Guide
for the
CERTIFIED CLINICAL
NUTRITIONIST (CCN)
EXAMINATION



Prepared by:
Clinical Nutrition Certification Board
400 Chisholm Place #303
Plano, TX 75075

TABLE OF CONTENTS

The Development of an Examination	3
Constructing a Content-Valid Examination	3
Role Delineation	3
Construction of the Test Blueprint	3
Item Development and Validation	4
Analysis of Test Items	4
Examination Development	4
Examination Review and Revision	4
Summary and Conclusions	5
Documentation Explanation	5
The Examination	5
Major Categories of the Examination	5
Specific Breakdown of Examination Content	5
List of Reference Books for Exam	8
Sample Questions	9
Answer Key for Sample Questions	10
Code of Professional Ethics and Responsibility	11

>The Development of an Examination Constructing a Content-Valid Examination

The development of a valid examination begins with a clear and concise definition of the knowledge, skills, and abilities needed for competent job performance. Using interviews, surveys, observation, and group discussions, CAS worked with experts in the field of clinical nutrition to delineate critical job components. This analysis (the Role Delineation) determines test content. In addition, throughout the examination construction process, The CNCB Scientific Council maintains constant validity checks, thus assuring that the examinations produced are valid and reliable measures of the content knowledge and abilities required for one to function as a competent Clinical Nutritionist.

The Diagram below lists each of the steps involved in constructing a content-valid examination.

Role Delineation* Construction of a Test Blueprint* Item Development and Validation* Analysis of Test Items* Examination Development* Review and Revision* Cut Score* Content-Valid Exam

>Role Delineation

To realize the CNCB's commitment to developing a valid examination for its certification examination, CAS asked expert clinical practitioners to clearly and concisely define the knowledge, skills, and abilities that are the keystones of the profession. Using surveys, observation, and group discussions, CAS conducted the first Role Delineation study for the CNCB to obtain such a definition and to identify critical job components. The Role Delineation study ensures that the CCN examination measures the knowledge and skills required to be a Clinical Nutritionist. The results of the Role Delineation study are analyzed and incorporated into the CCN Certification Examination.

The following chart illustrates how major job components ("Performance Domains") are organized into tasks, knowledge areas, and skills.

The Hierarchical Arrangement of Components in a Role Delineation Study
Profession* Performance Domains* Knowledge Areas and Skills

The following are examples of major Performance Domains taken from the Role Delineation study for CNCB.

1. **Optimal Human Nutrition – PGSCN Session I
Covers Basic Knowledge Related to Nutrition**
2. **Human and Cognition Overload – PGSCN Session II
Covers Nutrition Assessment and Evaluation**
3. **Detoxification, Herbology & Homeopathic Therapy– PGSCN Session III**
4. **Laboratory Assessment – PGSCN Session IV**

Using the Role Delineation study, the CNCB Scientific Council sends a Validation Survey to randomly chosen professionals in the field of clinical nutrition. The survey asks these professionals to rate the importance and potential harm of each of the major Performance Domains as well as to predict the percentage of time devoted to it in the normal performance of job responsibilities.

>Construction of the Test Blueprint

In the next step, the results from both the Role Delineation study and the Validation Survey are used to construct a "blueprint" or a plan for the certification examination.

>Item Development and Validation

The next stage in the development of the CCN Certification Examination is to develop items, or questions, that pertain to the areas of performance outlined in the test blueprint. With the help of content area experts, the Scientific Council develops psychometrically-valid test items. Stringent criteria are used by experts in developing and evaluating items. The content of each item must be well-documented and represent current best practice. Items must be clearly written

and easily understood. Experts also classify items according to content area and cognitive level.

Three formal Item Validity Rating Scales are used to finalize test items. In order to be accepted, an item must be judged relevant to certification level performance. It also must be judged to tap knowledge critical in differentiating adequate from inadequate job performance. Finally, experts must judge that inadequate mastery of the knowledge covered in the items could result in performance errors that could cause harm. In addition to these validity scales, expert judges also review each item to assure that the correct answer has been accurately identified, that it does not discriminate against one group of examinees or another, and that all distractors (incorrect options) are plausible, but indeed wrong. The difficulty level of the item is also rated.

>Analysis of the Test Items

CNCB Scientific Council collects statistics about the performance of CCN Certification Examination questions as they are used on the examination. Referred to as item analysis, CNCB Scientific Council evaluates the difficulty of the question, the degree to which the question discriminates between knowledgeable and unknowledgeable candidates, and the effectiveness of incorrect response option relative to the correct answer.

Item analysis information plays a central role in revising questions and selecting questions of the highest quality when new versions of the examination are created. In this manner a test can be built to correspond to a specified difficulty level and to a desired level of reliability.

>Examination Development

Each version of the exam is created by randomly selecting the appropriate number of items from each content area, as specified in the test blueprint. The items are then incorporated into a preliminary examination, and this examination is reviewed by members of the CNCB knowledgeable about each content area for any duplication of items to evaluate whether any items may cause unforeseen problems. In essence, the item is again evaluated in terms of how psychometrically sound, fair, and content-valid it is with respect to the whole examination.

>Examination Review and Revision

As part of the item development procedures, the content area covered by each item is identified. When a new version of an examination is needed, a preliminary version is created by randomly selecting the appropriate number of items from each item pool for each content area, as specified in the test blueprint.

This preliminary version of a certification examination is then subjected to the scrutiny of content area experts. First, the entire examination is reviewed to identify items that are duplicates or that may present a problem. Second, even though each item has already been judged to be psychometrically sound, fair and content-valid, the same process used to screen items for the item pool is repeated by a second group of content experts. As in the development of the item pool, the content area experts must reach a consensus concerning the acceptability of each item. The use of Item Validity Rating Scales a second time provides further support for the acceptability of the item and documentation of its validity.

Following this, each item that has passed both the item development and test development review is reviewed a third and final time. Again, content area judges evaluate the validity, appropriateness for entry-level personnel, and correctness of each item.

At this point a final version of the examination has been developed. However, further safeguards are also built into the written examination to assure that certification candidates receive a content-valid examination. When examining a group of candidates' responses to one version of the certification examination, any items that might appear to be questionable could then be excluded. To elaborate, despite the rigorous screening procedures, any item may be confusing to entry-level candidates that was not confusing to the expert judges. An indicator of this confusion could be that a large number of examinees' scores on that item might be dropped from the total score.

>Summary and Conclusions

The procedures used to develop the CCN Examination are accepted procedures for developing fair and content-valid examinations. Each step in the test construction process, from Role Delineation to acceptance of the final version of an examination, is carefully documented. Through multiple reviews by content and psychometric experts and the use of stringent criteria, the validity of each step in the test construction process is assured.

The Examination

>Instructions

The questions on the CCN Examination are multiple-choice. The actual exam contains 150 questions with only one correct choice out of the five for each question. Carefully read each question and all of the choices before making a selection. You will have three hours to complete the exam.

When you take the exam, be sure to mark only **one** answer for each question, as questions with more than one choice selected will not count toward your final score.

You are advised to answer every question, since your final score will be determined by the total number of correct answers. ***There is no penalty for guessing.***

>Major Categories of the Examination

PERFORMANCE DOMAIN	Number of Questions
I. Optimal Human Nutrition	35
II. Cognition & Sensory Overload	32
III. Detoxification, Herbology and Homeopathic Therapy	55
IV. Laboratory Assessment	28
Total Number of Items	150

>Specific Breakdown of Examination Content

PERFORMANCE DOMAIN I: OPTIMAL HUMAN NUTRITION - PGSCN SESSION I

Knowledges:

- Knowledge of the biochemistry of Essential Vitamins.
- Knowledge of the biochemistry of Essential Minerals.
- Knowledge of the biochemistry of Essential Trace Minerals
- Knowledge of the biochemistry of Essential Amino Acids & Accessory Nutrients
- Knowledge of Optimal Human Nutrition
- Knowledge of Environmental Health Issues
- Knowledge of Drug Induced Nutritional Deficiencies

PERFORMANCE DOMAIN II: COGNITION AND SENSORY OVERLOAD - PGSCN SESSION II

Knowledges:

- Knowledge of Free Radicals and Antioxidants
- Knowledge of the Biochemistry of Fats and Oils.
- Knowledge of client/patient selection techniques.
- Knowledge of the Human Microflora
- Knowledge of Cognitive Enhancing Drugs & Nutrients
- Knowledge of Alternative Cancer Therapies.
- Knowledge of Women's Health Conditions.
- Knowledge of Cardiovascular Disease.
- Knowledge of Hyperinsulinemia.
- Knowledge of Allergies and Asthma.
- Knowledge of ADD and ADHD.
- Knowledge of Assessment & Medical Symptom Questionnaires.

EXAM TEXT BOOK STUDY

Adrenal Fatigue: The 21st Century Stress Syndrome. Publisher: Smart Publications / 2001 Wilson

- Basic knowledge of digestive and absorptive functions.
- Knowledge of specific, naturally-occurring compounds in foodstuffs and their actions (e.g., bioflavonoids).
- Knowledge of effects of chemical pollution of air, water, food, etc. on nutritional status.
- Knowledge of client's/patient's chief complaints and current symptoms.
- Knowledge of saliva tests.
- Knowledge of other diagnostic tests (i.e., radiographs) related to nutritional assessment.
- Knowledge of physical signs of abnormal endocrine and neurologic functions.
- Knowledge of the impact of different food types on various illness states.
- Skill in instructing the client as to how his or her body responds biochemically and physiologically.
- Recommend to the client/patient, via a written list, the types, amounts, and method of administration of nutritional supplements to use in addition to foods, in order to achieve optimum nutrient intake and utilization.

PERFORMANCE DOMAIN III: DETOXIFICATION, HERBOLOGY AND HOMEOPATHIC THERAPY - PGSCN SESSION III

Knowledges:

- Knowledge of Human Toxicity.
- Knowledge of Bowel Terrain.
- Knowledge of toxic conditions, allergies and sensitivities.
- Knowledge of requirements needed for detoxification.
- Knowledge of Therapy Modality; Homeopathy, Phytotherapy.
- Knowledge of Therapy Modality; Herbology.
- Knowledge of limitations of research results.
- Knowledge of counseling using Alternative Therapies and Clinical Nutrition.

EXAM TEXT BOOK STUDY

Quick Access: Professional Guide to Conditions, Herbs and Supplements. Publisher: Integrative Medicine
ISBN# 0-9670-7725-7

- Knowledge of metabolic intermediates as nutrients, and their roles and actions (e.g., coenzyme Q10).
- Knowledge of pertinent clinical blood, serum, or plasma tests (will include chemistries, hematology, serology, immunology, etc.).
- Knowledge of effects of deviation from normal metabolic, physical, bioelectrical and case historical findings on nutritional status.

- Knowledge of physical signs of abnormal endocrine and neurologic functions.
- Knowledge of the amounts and types of supplemental nutrients that have been found beneficial for various diseases.
- Knowledge of the interactions between nutrients.
- Knowledge of uses, effects, toxicities, and suitability of botanicals as nutritional supplements.

EXAM TEXT BOOK STUDY

The Complete Homeopathic Resource for Common Illness. Chernin Publisher: N. Atlantic Books
ISBN# 1-5564-3-608-4

- Basic knowledge of vitamins, including the fat soluble vitamins (A, D, E, and K), the water soluble, and the B vitamins.
- Knowledge of physical signs of abnormal endocrine and neurologic functions.
- Knowledge of physical signs of abnormal musculoskeletal, integumentary, and connective tissue function.
- Knowledge of official homeopathic remedies, their uses, effects, manufacture, and suitability as nutritional supplements.

PERFORMANCE DOMAIN IV: LABORATORY ASSESSMENT – PGSCN SESSION IV

Knowledges:

- Knowledge of the rationale needed for Laboratory Assessment.
- Knowledge of Vitamins as related to Enzymes.
- Knowledge of Mineral Laboratory Testing.
- Knowledge of Amino Acid Laboratory Testing.
- Knowledge of Fatty Acid Laboratory Testing.
- Knowledge of Organic Acid Laboratory Testing.
- Knowledge of Gastrointestinal Disorder Laboratory Testing.
 - Digestion & Absorption Testing
 - Microbial Flora Testing
 - Gastric and Pancreatic Function Testing.
 - Intestinal Function & Permeability.
 - Leaky Gut Syndrome.
 - Dysbiosis
 - Bacterial & Protozoal Markers
 - Food Allergy & Test Results.
- Knowledge of Detoxification Testing.
 - Urinary Markers
- Knowledge of Hormones and Laboratory Testing
- Knowledge of Aging and Oxidant Stress Testing.
- Knowledge of Urinary Metabolic Markers.
- Knowledge of Case Reports and Case Outcomes.

EXAM TEXT BOOK STUDY

The Basic 100. Queen, H.L.

For ordering contact Betty Queen 407-566-1276 BAQueen@Designed2Win.com

**CERTIFIED CLINICAL NUTRITIONIST (CCN)
EXAMINATION REFERENCE TEXT LIST**

As listed within the above Domains I-IV

Chernin. **The Complete Homeopathic Resource for Common Illness.** Publisher: N. Atlantic Books ISBN# 1-5564-3-608-4

Integrative Medicine. **Quick Access: Professional Guide to Conditions, Herbs and Supplements.** Publisher: Integrative Medicine ISBN# 0-9670-7725-7

Queen, H.L. **The Basic 100.** Contact Betty Queen 407-566-1276
CustomerService@Designed2Win.com Discount available after Credential Review application is approved, contact ddc@clinicalnutrition.com.

Wilson. **Adrenal Fatigue: The 21st Century Stress Syndrome.** Publisher: Smart Publications ISBN# 1-890572-15-2

CCN Practice Quiz

- 1. Which of the essential amino acids is a precursor for the production of melatonin?**
 - A. Phenylalanine
 - B. Tyrosine
 - C. Tryptophan
 - D. Valine
- 2. Which air ions have the greatest positive health benefit?**
 - A. Negative ions
 - B. Positive ions
 - C. Divalent ions
 - D. Neutral ions
- 3. Diabetic individuals who are taking a biguanide medication may develop**
 - A. Osteoporosis
 - B. An inability to convert tryptophan to serotonin
 - C. Kidney stones
 - D. A permanent inability to absorb vitamin B12
- 4. Wilson's disease is a condition characterized by elevated levels of**
 - A. Lead
 - B. Chromium
 - C. Copper
 - D. Mercury
- 5. Studies report that conjugated linoleic acid (CLA) may be helpful for**
 - A. Weight loss
 - B. Lowering blood pressure
 - C. Improving insomnia
 - D. Elevating depression
- 6. On a world-wide basis, one of the most severe consequences of vitamin A deficiency is?**
 - A. Childhood deaths from nyctalopia
 - B. Childhood deaths from malaria
 - C. Childhood deaths from diarrhea
 - D. Childhood deaths from measles
- 7. The neutrophilic hyper-segmentation index is a lab test to measure**
 - A. 25-hydroxy vitamin D levels
 - B. Vitamin B6 levels
 - C. Vitamin B12 levels
 - D. Folic acid levels
- 8. Oral contraceptive users who take additional daily calcium supplements may**
 - A. Develop orthostatic hypotension
 - B. Be at increased risk for blood clots
 - C. Develop insomnia
 - D. Develop cervical dysplasia

- 9. Which of the following nutrients is depleted by both major classes of oral hypoglycemic drugs?**
- A. Coenzyme Q10
 - B. Vitamin B1
 - C. Vitamin B6
 - D. Magnesium
- 10. Digestion of which class of macronutrients is likely to be impaired by anti-ulcer drugs?**
- A. Carbohydrates
 - B. Proteins
 - C. Fats
 - D. Phytochemicals
- 11. What other factor(s) than genetics predispose the health history of the unborn child?**
- A. Hygiene, Dietary factors and Stress
 - B. Hygiene, Dietary factors, Maternal Endotoxins, Stress and Genetic load
 - C. Dietary factors, Maternal Endotoxins and Stress
 - D. Maternal Endotoxins and Genetic load
- 12. Conditions that might benefit from toxic load reduction are:**
- A. Allergies, Headaches, Joint pain and Fatigue
 - B. Allergies and Headaches
 - C. Allergies, Headaches, Joint pain, Fatigue and Poor memory
 - D. Allergies and Joint pain
- 13. Bowel Terrain enhancement may be achieved by the use of _____.**
- A. Antioxidants and Digestive enzymes
 - B. Proanthocyanidins
 - C. Glutamine and FOS, Antioxidants, Caprylic Acid, Digestive enzymes and Proanthocyanidins
 - D. Glutamine and FOS and Antioxidants
- 14. Which complaint(s) suggest the therapeutic investigation of detoxification?**
- A. Headaches and Low back pain
 - B. Joint pain, Gastrointestinal distress and Low back pain
 - C. Joint pain, Gastrointestinal distress, Poor memory and Headaches
 - D. Low back pain
- 15. Kidney stone formation is said to be inhibited by ingestion of which nutrient(s).**
- A. B6 , Magnesium Citrate and Magnesium Orotate
 - B. B6
 - C. Magnesium Citrate, Magnesium Aspartate, Magnesium Oxide and Magnesium Orotate
 - D. B6, Magnesium Citrate, Magnesium Aspartate and Magnesium Oxide
- 16. Which of the following lab values might NOT be present in a patient presenting iron anemia?**
- A. Normal red blood cell count
 - B. High serum or red blood cell ferritin
 - C. Low red blood cell count
 - D. High or high normal red blood cell distribution width
 - E. Low or low normal serum iron

17. What is the most efficient and easiest way to evaluate melatonin levels?

- A. Salivary testing morning, evening and midnight
- B. Radio immune assay using plasma
- C. Pineal biopsy
- D. Urinary indole 3 carbinol
- E. Slit lamp ophthalmological testing

18. What is the best measure for long-term glucose control?

- A. Hemoglobin
- B. 24 hour urine glucose
- C. Finger stick
- D. Erythrocyte glucose 6 phosphatase
- E. Fructosamine

19. Which method of testing gives an overall body burden of mercury?

- A. Spot testing of urine for mercury levels, first morning void.
- B. Provocation testing taken prior to urinary collection of 6 or 24 hours.
- C. 24 hour urine collection for mercury levels
- D. Hair or toe nail clipping analysis, void of environmental contaminate
- E. Blood levels for mercury levels and or erythrocyte.

20. What in the brain controls extracellular glutamate levels?

- A. Interaction with selenomethionine
- B. Elimination by the kidney
- C. Glutamate Transporters
- D. Metabolic conversion to serotonin
- E. Redox inactivation within neurons

21. Which form of hydroxyestrogen is associated with an increased risk of breast and prostate cancer?

- A. Estriol
- B. Estrone
- C. DHEA
- D. Estradiol
- E. 16-hydroxyestrogen

22. What is an effective test for occult infection?

- A. Repeated blood culture
- B. High Sensitivity CRP
- C. PCR testing
- D. Hair analysis
- E. Sedimentation Rate

23. What is the primary contraindication to giving magnesium supplementation?

- A. Kidney dysfunction should be considered before providing magnesium
- B. High levels of magnesium are associated with pancreatitis
- C. High levels induce coronary artery vasospasm
- D. High levels can induce seizures
- E. High levels impair bone mineralization

CERTIFIED CLINICAL NUTRITIONIST (CCN) CODE OF PROFESSIONAL ETHICS AND RESPONSIBILITY

- 1) A Certified Clinical Nutritionist must both individually and collectively, maintain a high level of professional and ethical conduct and relationship with clients, colleagues, members of allied health professionals, and the public.
- 2) As clinical nutrition is a specialization in the science of nutrition, the Certified Clinical Nutritionist must be competent to work in the health care system with other professionals to make available expertise in the field of clinical nutrition.
- 3) A Certified Clinical Nutritionist must have an understanding of nutrition biochemistry that enables him/her to competently assess and evaluate signs of nutritional deficiency or imbalance, through the use or disuse of specific foods, vitamin, mineral, amino acid, or other food substances as necessary to maintain health.
- 4) A Certified Clinical Nutritionist must be trained to interpret and utilize certain non-invasive laboratory and non-laboratory tests and other evaluation techniques designed to assist in nutritional assessment.
- 5) A Certified Clinical Nutritionist, unless licensed pursuant to the Medical Practices Act of any state in the United States, shall not practice medicine, which means the diagnosis, treatment, operations or prescription for any disease, pain, injury, deformity, or other physical or mental condition.
- 6) A Certified Clinical Nutritionist will not hesitate to seek consultation with other professionals whenever advisable or requested by the client. If at any time the member believes that a client will be better served by a medical practitioner or another method of practice, the client will be referred immediately.
- 7) All information concerning clients shall be kept in strictest confidence, and shall be divulged only when required by law or when authorized by the client.
- 8) Honesty and integrity shall characterize all conduct with clients as clinical nutrition is a profession deserving or respect, honor, and dignity. Misleading, deceptive, irresponsible or fraudulent statements or advertising or otherwise are deemed unethical and shall not be condoned in any form.
- 9) Every profession has the responsibility to regulate itself, to determine and judge its own members. Such regulation is achieved largely through the requirements of certification boards and through the influence of professional societies. Every practicing professional has the dual obligation of following the directives of the certification board (Clinical Nutrition Certification Board), we well as becoming a part of a professional society and of observing its rules and ethics.

- 10) A Certified Clinical Nutritionist shall abide by all laws and regulations pertaining or relating to the practice of clinical nutrition.
- 11) A Certified Clinical Nutritionist shall not knowingly solicit the client to another nutritionist.
- 12) In any dispute between or among a Certified Clinical Nutritionists, involving ethical or professional matters that relate to the certification status of either party, the matter in controversy will be referred to the CNCB Judicial Committee.
- 13) A Certified Clinical Nutritionist may accept or reject a particular client, bearing in mind that whenever possible, a response should be made to any reasonable request for his/her services. Once a client has accepted, a duty is owed not to neglect, abandon or withdraw from the relationship. A provider may withdraw from the relationship only if he/she feels 1) that the client's needs exceed his/her skills and/or abilities, 2) a request is made to act illegally, immorally or unethically in the performance of professional services, 3) and irreconcilable or unhealthful conflict in personality exists between the client and a provider.
- 14) Any fee charged by a practicing Certified Clinical Nutritionist shall be reasonable and customary, or shall be agreed upon in advance by both client and the provider. Fees shall compensate for services actually rendered and the division of professional fees shall be deemed appropriate.
- 15) A Certified Clinical Nutritionist will seek to achieve the highest level of professional competence by attendance at CNCB appropriately designated and professional seminars, reading professional and scientific literature, and by all other reasonable means to avail him/herself of the latest scientific knowledge, skills and procedures of the profession and shall exercise tolerance toward those ideas and professionals who represent divergent clinical perspectives.
- 16) Illegal, unethical or incompetent conduct shall be in violation of the Code which is just cause for proceedings by the Judicial Committee (see CCN Professional Practice Guidelines & Disciplinary Procedures)
- 17) The enumerations of obligations in this CCN Code of Professional Ethics and Responsibility are not exhaustive and do not constitute a denial of the existence of other obligations, equally imperative, though not specifically mentioned herein.