



NCE Handbook

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Note: Where used in this Handbook, the phrases “irregular behavior” or “improper behavior” refer to (1) provision of false or incomplete information to the NBCRNA in relation to the credentialing process; (2) violation of any of the rules or regulations governing any NBCRNA examination; or (3) engaging in any activity that is grounds for disciplinary action as described in the NBCRNA Policies and Procedures for Discipline, Administrative Action and Appeals.

This publication contains information about NBCRNA’s National Certification Examination (NCE) required for primary certification by the NBCRNA. Candidates are responsible for knowing the contents of this handbook as well as any additional applicable NBCRNA policies (e.g., please see NBCRNA’s General Information and Policies Handbook).

All correspondence and requests for information should be sent to the NBCRNA at certification@nbcrna.com. The NBCRNA does not discriminate on the basis of age, sex, race, religion, national origin, ethnicity, disability, marital status, sexual orientation, and gender identity.

NBCRNA primary certification and recertification programs are accredited by the following organizations:



NBCRNA Overview

The National Board of Certification and Recertification for Nurse Anesthetists (NBCRNA) is a not-for-profit corporation organized under the laws of the state of Illinois. NBCRNA credentialing provides assurances to the public that certified individuals have met objective, predetermined qualifications for providing nurse anesthesia services. A nurse anesthetist who is certified by the NBCRNA is expected to respect basic human rights and the dignity of all patients; protect the patient from harm; advocate for the patient's welfare and collaborate with other members of the health professions; be responsible and accountable for his or her actions; maintain confidentiality of patient information, except when disclosure is required by law; and maintain the knowledge and skill necessary for competent nurse anesthesia practice.

While state licensure provides the legal credential for the practice of professional nursing, private voluntary certification indicates compliance with the professional standards for practice in this clinical nursing specialty. The certification credential for nurse anesthetists has been institutionalized in many position descriptions as a practice requirement or as the standard for demonstrating equivalency. It has been recognized in state nurse practice acts and state rules and regulations.

The primary purpose of the NBCRNA is to seek to ensure that nurse anesthetists have the necessary knowledge and skills to practice safely and effectively. In so doing, it also protects the value of the CRNA credential. The NBCRNA has designed objective criteria intended to determine whether an individual holding the NBCRNA-issued CRNA credential is properly licensed, has attested to engagement in the practice of nurse anesthesia; has participated in continuing education and other activities sufficient to indicate an effort to keep current with advances, and is free of any mental, physical, or other problems that may interfere with the practice of nurse anesthesia. Whenever program eligibility criteria are developed and/or revised, the NBCRNA engages multiple stakeholders to ensure appropriate consideration has been given as to the impact of NBCRNA decisions.

NCCA defines competence as "the ability to perform a task, function, or role up to a set of prescribed standards" (NCCA, 2014) and continuing competence as demonstrating "specified levels of knowledge, skills, or abilities not only at the time of initial certification but also throughout an individual's professional career" (NCCA, 2014). These concepts serve as the foundation underpinning the NBCRNA certification and continued certification programs.

Vision

The vision of the NBCRNA is to be recognized as the leader in advance practice nurse credentialing.

Mission

The mission of the NBCRNA is to promote patient safety through credentialing programs that support lifelong learning.

History

The primary certification program for nurse anesthetists was introduced by the American Association of Nurse Anesthetists (AANA) in 1945. It was initially administered by the Credentials Committee of the AANA. In 1975, the AANA approved the establishment of councils for the accreditation and certification processes, and the Council on Certification of Nurse Anesthetists (CCNA) assumed the responsibility for the National Certification Examination (NCE). By this action, the profession recognized that credentialing mechanisms, which include examination and certification, function to protect and benefit the public.

Realizing that evidence of continued professional excellence was becoming increasingly important in our society, the AANA Board of Directors in 1968 directed the AANA Education Committee to study the issue of recertification. At the AANA Annual Meeting in 1969, a bylaw was adopted to establish an optional program to provide certificates to members who had demonstrated they had completed clinical and didactic experiences reflective of the changes in nurse anesthesia practice within a five-year period. Recognizing that continuing education provides one means to assess current educational and knowledge levels of practitioners, a mandatory continuing education program was adopted by the AANA membership at the 1976 Annual Meeting, with full implementation effective August 1, 1978.

In September 1978, the AANA membership adopted the bylaw revisions providing for an organizational restructuring of the Association and establishing a Council on Recertification of Nurse Anesthetists (COR). Bylaw provisions granting the COR autonomy were adopted in 1983. In 2007, the CCNA and the COR became independent of the AANA, and together they incorporated as the National Board of Certification and Recertification for Nurse Anesthetists (NBCRNA).

With its continued mission to promote patient safety, the NBCRNA implemented the Nonsurgical Pain Management subspecialty certification in 2015 and the Continued Professional Certification (CPC) Program in 2016.

Purpose

The purpose of the NBCRNA includes, but is not limited to, seeking to ensure that nurse anesthetists have the necessary knowledge and skills to practice safely and effectively. In so doing, it also protects the value of the CRNA credential. The NBCRNA is responsible for:

- Formulating, adopting and confirming compliance of initial and subspecialty certification eligibility requirements for nurse anesthetists
- Formulating, adopting and confirming compliance of recertification and continued professional certification (CPC) eligibility requirements for nurse anesthetists
- Formulating, adopting and confirming compliance of the requirements for eligibility for admission to NBCRNA-administered examinations including, but not limited to, the SEE, NCE, NSPM exam, and the CPC exam
- Formulating, adopting and administering NBCRNA-created examinations to candidates who have met all requirements for examination and have been found eligible

No national organization can expect to determine the specific procedures that any individual nurse anesthetist is qualified to perform. Neither can any national organization determine whether an individual nurse anesthetist may have developed an impairment that could interfere with the proper administration of anesthesia. Ultimately, these judgments must be entrusted to the individual nurse anesthetist and to those with whom he or she works.

Structure

The NBCRNA Board of Directors is composed of nurse anesthetists who hold the NBCRNA-issued CRNA credential and who are actively engaged in clinical practice or in teaching or administration of a nurse anesthesia educational program; a board-certified surgeon and a board-certified anesthesiologist, both of whom have a current working relationship with nurse anesthetists; and a representative of the public at large.

NCCA Accreditation

The primary certification and recertification programs of the NBCRNA are accredited through April 2022 by the National Commission for Certifying Agencies (NCCA), a private not-for-profit organization. The NCCA is the accrediting branch of the Institute for Credentialing Excellence (ICE), which is the national standard setting organization for credentialing groups, including certification boards, licensing boards, and associations. The NBCRNA (and before it, the CCNA and COR) has been continuously accredited by the NCCA since 1980.

NCCA accreditation means that the NBCRNA credentialing programs meet the highest national voluntary standards for private certification. It means that the programs have been reviewed by an impartial commission and deemed to have met the nationally accepted criteria and guidelines of the NCCA.

ABSNC Accreditation

The primary certification and recertification programs of the NBCRNA are accredited through July 2022 by the Accreditation Board for Specialty Nursing Certification (ABSNC) of the American Board of Nursing Specialties (ABNS). The NBCRNA (and before it, the CCNA and COR) was one of the first national credentialing organizations to be recognized and accredited by the ABSNC.

The ABNS, established in 1991, is the national peer review program for specialty nursing credentialing organizations. ABNS serves as the national umbrella organization for nursing specialty certification boards authorized and recognized to certify nurse specialists in the United States. It promotes the highest quality of specialty nursing practice through the establishment of standards of professional specialty nursing certification.

General Information

Eligibility Requirements for the NCE

In order for an individual to be eligible to apply to take the NCE and to receive a certification eligibility notification, a candidate must:

1. Comply with all state requirements for current and unrestricted licensure as a registered professional nurse in all states in which he or she currently holds an active license
2. Complete a nurse anesthesia educational program accredited by the Council on Accreditation of Nurse Anesthesia Educational Programs (COA) (“accredited program”) within the previous two calendar years
3. Submit:
 - a. A complete and accurate examination application form electronically signed by the candidate, including the NBCRNA waiver of liability and agreement of authorization, confidentiality and nondisclosure statements.
 - b. An electronically prepared record of academic and clinical experience for the candidate from an accredited program. The academic and clinical experience requirements appear in [APPENDIX A](#) of this document. The record is permanently retained by the NBCRNA, and must:
 - (1) Be submitted directly by the nurse anesthesia educational program administrator within 30 days of completion of the program
 - (2) Be electronically signed by both the program administrator and the candidate
 - (3) Accurately show that all the minimum requirements have been met, and that the candidate completed the accredited program including all the COA-specified competencies. If the candidate attended more than one nurse anesthesia educational program, only one record should be submitted, clearly showing the academic and clinical information from both programs.
 - c. Information regarding the candidate’s current and unrestricted license to practice as a registered professional nurse (RN license number, issuing state and expiration date) in all states in which he or she currently holds an active license. At least one license must be current on the candidate’s requested examination date.

NOTE: If the nursing license expires between the date the candidate officially completes the nurse anesthesia educational program and the date the NCE is taken, the candidate will be found eligible, provided all of the other requirements for eligibility have been met. However, official NCE results will NOT be released until the NBCRNA has received information that a nursing license was current on the date of the NCE, or a written statement from the state nursing board attesting to the candidate’s valid licensure on that date.

- d. Color digital photo of the candidate taken within the previous six months and approved by the candidate and the program administrator

4. Make the following eligibility certifications:

- a. That all current registered nurse and/or advanced nurse practice license(s) are in good standing, are not suspended or limited by any state, have never been surrendered or relinquished (whether voluntarily or involuntarily) and are not the subject of a pending action or investigation
- b. That he or she has not been adjudicated by a court or regulatory authority to be mentally or physically incompetent
- c. That he or she does not currently suffer from substance use disorder (SUD) [drug or alcohol addiction or abuse]
- d. That he or she has not been convicted of, or pleaded no contest to, a crime
- e. That, except for incidents occurring during the nurse anesthesia educational program that were thereafter satisfactorily resolved, he or she has not been the subject of any documented allegations of misconduct, incompetent practice or unethical conduct
- f. That he or she has never been the subject of disciplinary action, placed on probation, suspended, or dismissed from a nurse anesthesia educational program for unethical conduct, questions of academic integrity or documented evidence of cheating
- g. That the application and all corresponding content being submitted is accurate

If the candidate does not so certify, he or she must provide full documentation of the reasons therefore with sufficient specificity to allow the NBCRNA to evaluate the possible impact of the problem on the candidate's current ability to take the NCE or practice nurse anesthesia, and to resolve the issue to the NBCRNA's satisfaction

5. Sign the waiver of liability and agreement of authorization, confidentiality and nondisclosure statements clarifying that the individual has read, understands and intends to be legally bound by those statements. These statements include, but are not limited to:
- a. Understanding that any cards and/or certificates issued by NBCRNA shall remain the property of the NBCRNA, and any cards and/or certificates, when issued, are only valid while the holder maintains his/her NBCRNA certification. Understands that if certification is not maintained, a card and/or a certificate is/are no longer valid and is/are subject to forfeiture and redelivery.
 - b. Agreeing to disqualification from examination, to denial, suspension or revocation of certification, and to forfeiture and redelivery of any certificate granted by the NBCRNA in the event that any of the statements or answers made in this application are false or incomplete or in the event that any of the rules or regulations governing such examination are violated.

- c. Understanding that he or she can be disqualified from taking or continuing to sit for an examination, or from receiving examination scores, if the National Board of Certification and Recertification for Nurse Anesthetists (NBCRNA) determines, through proctor observation, statistical analysis or any other means, that he or she was engaged in collaborative, disruptive, or other irregular behavior before, during the administration of, or following the examination.
- d. Understanding that the content of the NCE, and each individual NCE item, is the property of the NBCRNA, is copyrighted and is strictly confidential information.
- e. Understanding that any retention, possession, copying, distribution, disclosure, discussion, or receipt of any examination question, in whole or in part, by written, electronic, oral or other form of communication, including but not limited to emailing, copying, or printing of electronic files, and reconstruction through memorization and/or dictation, before, during, or after an examination, is **strictly prohibited**. In addition to constituting irregular behavior subject to disciplinary action such as denial, suspension or revocation of eligibility or denial, suspension or revocation of certification, such activities violate the NBCRNA's proprietary rights, including copyrights, and may subject the responsible individuals to legal action resulting in monetary damages.
- f. Acknowledging that he or she has not been the recipient of any NCE questions, nor has he or she been involved in any disclosure, distribution or discussion of any NCE questions, and after taking the NCE he or she will not disclose, distribute, or discuss any NCE question. Further, he or she will inform the NBCRNA if he or she is aware of anyone who discloses any NCE question(s) or asks him or her to disclose any NCE question(s).

Significance of Eligibility Status

A candidate who holds "certification eligible" status with the NBCRNA has successfully completed an accredited nurse anesthesia educational program and has been granted eligibility status to take the NCE by the NBCRNA. The candidate with certification eligible status has **not** passed the NCE required to be a certified registered nurse anesthetist, is **not certified** by the NBCRNA, and may not use the designation "CRNA" after his or her name.

Candidates should be aware of state laws governing nurse anesthesia practice prior to certification. It is recommended that the NCE be taken as soon after graduation as possible.

Ineligibility to Take the NCE

Candidates will be found ineligible to take the NCE for any one or more of the following reasons:

- The record of academic and clinical experience does not show that the minimum academic and clinical requirements have been met and that the candidate has completed an accredited program
- If the record of academic and clinical experience is not submitted in the manner prescribed by the NBCRNA, or is not completed accurately

- If, in the determination by the NBCRNA, the candidate is guilty of cheating on the NCE
- Failure to make the required eligibility certifications and to provide sufficient documentation to resolve the issue to the satisfaction of the NBCRNA
- Failure to meet any of the other eligibility requirements, including failure to sign or accept the waiver of liability and agreement of authorization, confidentiality and nondisclosure statements
- Failure to pass the NCE within two years following graduation from an accredited nurse anesthesia educational program

Conditional Eligibility

Grant of Conditional Eligibility

Candidates who hold a restricted license to practice as a registered professional nurse or who are required to participate in a recovery program or other non-disciplinary monitoring program may, at the discretion of the NBCRNA, be granted conditional eligibility to take the NCE, provided that all other certification eligibility requirements have been fulfilled.

Examples of conditions include requirements for supervision and requirements that a candidate remain in a substance use disorder or recovery program for a specified period of time.

Conditional Eligibility Period

Conditional eligibility shall remain in effect for the eligibility period described below, as long as the candidate complies with all terms of the conditions on his or her license. It shall be revoked for failure to comply.

Expiration of Eligibility Status

Eligibility to sit for the NCE lasts for a period of 90 days, or until the candidate takes the NCE, whichever occurs first. Eligibility will expire 90 days from the date of issue of the certification eligibility notification or on the date that the candidate takes the NCE.

Denial, Suspension or Revocation of Eligibility Status

The NBCRNA will automatically deny, suspend or revoke a candidate's eligibility to take the NCE in the following circumstances:

- Failure by the candidate to maintain current and unrestricted licensure as a registered professional nurse in at least one state
- Loss or surrender of licensure or other authority to practice nurse anesthesia in any state for any reason that, in the judgment of the NBCRNA, relates to the anesthetist's safe or ethical practice of nurse anesthesia
- Withdrawal by a school official of his or her affirmation signature from the candidate's official record of academic and clinical experience
- Failure by the candidate to complete an accredited nurse anesthesia educational program

- Adjudication by a court or regulatory authority that the candidate is mentally or physically incompetent
- Suspension or termination from participation in a federal health care program for reasons relating to the, unsafe, unlawful or unethical practice of nurse anesthesia
- Conviction of, or pleading no contest to, a crime which, in the judgment of the NBCRNA, relates to the candidate's safe or ethical practice of nurse anesthesia
- Failure by the candidate to successfully pass the NCE within two years after graduation

The NBCRNA may, at its discretion, deny, suspend or revoke a candidate's eligibility to take the NCE for any of the following reasons:

- Circumstances change so as to render one of the eligibility certifications made by the candidate invalid
- Falsification of the NCE application, intentional misstatement of material fact or deliberate failure to provide relevant information on the examination application or to the NBCRNA at any time, or assisting another person to do any of the above
- Provision of false or incomplete information to the NBCRNA in connection with the credentialing process
- Failure by the candidate to maintain current and unrestricted licensure as a registered professional nurse in every state of practice
- Loss or surrender of licensure or authority to practice nurse anesthesia in any state for any reason other than retirement or cessation of practice unrelated to any disciplinary action or concern about possible disciplinary action
- Cheating or assisting another person to cheat on the NCE, or otherwise engaging in dishonest or other improper behavior at any time in connection with the NCE
- Dishonest or deceptive behavior or unethical conduct related to any NBCRNA examination, database, or intellectual property, cheating on an examination administered by the NBCRNA, inappropriate use of examination questions, or assisting another individual to engage in any such conduct
- Engaging in unethical conduct
- Unauthorized use of any NBCRNA credential or other health professional designation or false claim of certification or other professional designation
- Violation of any NBCRNA policy or failure to cooperate with an NBCRNA investigation or audit

- Conviction of, or pleading no contest to, a crime
- Documented evidence of retention, possession, copying, distribution, disclosure, discussion, or receipt of any NCE question, in whole or in part, by written, electronic, oral or other form of communication, including but not limited to emailing, copying or printing of electronic files, and reconstruction through memorization and/or dictation, before, during or after the NCE
- Any other conduct that, in the judgment of the NBCRNA, calls into question the ability of the candidate to serve patients in an honest, competent, and professional manner

Requirements for Certification

The NBCRNA has established the following requirements for certification. The candidate must:

- Fulfill all eligibility requirements for admission to the NCE
- Pass the NCE

Denial, Suspension or Revocation of Certification

The NBCRNA will automatically deny, suspend or revoke a candidate's certification for any of the following reasons:

- Failure by the candidate to maintain current and unrestricted licensure as a registered professional nurse in at least one state
- Loss or surrender of licensure or authority to practice nurse anesthesia in any state for any reason that, in the judgment of the NBCRNA, relates to the anesthetist's safe or ethical practice of nurse anesthesia
- Failure by the candidate to pass the NCE
- Adjudication by a court or regulatory authority that the candidate is mentally or physically incompetent
- Suspension or termination from participation in a federal health care program for reasons relating to the, unsafe, unlawful or unethical practice of nurse anesthesia
- Conviction of, or pleading no contest to, a crime, which, in the judgment of the NBCRNA, relates to the candidate's safe and ethical practice of nurse anesthesia

The NBCRNA may, at its discretion, deny, suspend or revoke a candidate's certification for any of the following reasons:

- Circumstances change so as to render one of the eligibility certifications made by the candidate invalid
- Falsification of the NCE application, intentional misstatement of material fact or deliberate failure to provide relevant information on the examination application or to the NBCRNA at any time, or assisting another person to do any of the above
- Provision of false or incomplete information to the NBCRNA in connection with the credentialing process
- Failure by the candidate to maintain current and unrestricted licensure as a registered professional nurse in every state of practice
- Loss or surrender of licensure or authority to practice nurse anesthesia in any state for any reason other than retirement or cessation of practice unrelated to any disciplinary action or concern about possible disciplinary action
- Cheating or assisting another person to cheat on the NCE, or otherwise engaging in dishonest or other improper behavior at any time in connection with the NCE
- Dishonest or deceptive behavior related to any NBCRNA examination, database, or intellectual property, cheating on an examination administered by the NBCRNA, inappropriate use of examination questions, or assisting another individual to engage in any such conduct
- Unauthorized use of any NBCRNA credential or other health professional designation or false claim of certification or other professional designation
- Violation of any NBCRNA policy or failure to cooperate with an NBCRNA investigation or audit
- Conviction or pleading no contest to, a crime
- Documented evidence of retention, possession, copying, distribution, disclosure, discussion or receipt of any examination question, in whole or in part, by written, electronic, oral or other form of communication, including but not limited to emailing, copying or printing of electronic files, and reconstruction through memorization and/or dictation, before, during or after the NCE
- Engaging in unethical conduct
- Any other conduct that, in the judgment of the NBCRNA, calls into question the ability of the candidate to serve patients in an honest, competent, and professional manner

Conditional Certification

Grant of Conditional Certification

Nurse anesthetists who have a restricted license to practice as a registered professional nurse and, where applicable, as a nurse anesthetist, or who are required to participate in a recovery program or other non-disciplinary monitoring program, may be granted conditional certification, provided that all other certification requirements have been fulfilled. The conditional certification will reflect any conditions imposed by the appropriate state licensure authority.

Examples of conditions include requirements for supervision and requirements that the anesthetist remain in a substance use disorder or recovery program for a stated period of time. The conditional certification card and certificate shall state that certification is conditioned on the anesthetist's compliance with the terms of his or her license conditions.

Conditional Certification Period

Conditional certification shall remain in effect as long as the anesthetist complies with all terms of the conditions on his or her license. It shall be revoked for failure to comply. The anesthetist shall be responsible for providing the NBCRNA with adequate documentation that he or she has complied with all licensure conditions for the requisite period of time. A request to change conditional certification to full certification must be accompanied by written documentation sufficient to demonstrate to the NBCRNA that all conditions have been removed.

Recognition of Certification by the NBCRNA

Each nurse anesthetist who passes the NCE and fulfills the requirements for certification by the NBCRNA may use "CRNA" after his or her name. The term stands for Certified Registered Nurse Anesthetist. CRNA is not punctuated with periods.

A newly certified registered nurse anesthetist receives an initial certification card and a wall certificate with his or her official notification of certification by the NBCRNA. The certification card and wall certificate are the property of the NBCRNA and must be returned to the NBCRNA if the bearer is found to be noncompliant with the NBCRNA-specified certification eligibility criteria. Unauthorized use of any NBCRNA credential or false claim of certification may result in denial, suspension or revocation of certification.

A list of all registered nurse anesthetists who are newly certified by the NBCRNA is posted monthly on the NBCRNA website.

CPC Compliance

Graduates of nurse anesthesia educational programs accredited by the Council on Accreditation of Nurse Anesthesia Educational Programs who achieve a passing score on the NCE are granted initial certification by the NBCRNA. A newly certified registered nurse anesthetist is eligible to apply for CPC

compliance within the required time frame after initial certification. Requirements for CPC compliance are available in the CPC Handbook.

Examination Information

Purpose of the NCE

The NBCRNA administers the NCE to measure the knowledge, skills and abilities necessary for entry-level nurse anesthesia practitioners.

Description of the Examination

The NCE for registered nurse anesthetists is a variable-length computerized adaptive test. The examination is for entry into nurse anesthesia practice. Each candidate will take a minimum of 100 test questions — 70 questions representing the NCE content outline and 30 random, non-graded pretest questions. The maximum number of questions is 170 questions, which includes the 30 random, non-graded pretest questions. A maximum of three hours is allowed for the test period.

In addition to multiple-choice question formats (consisting of a stem and four response options), the NCE includes alternative question formats, which consist of the following:

- **Multiple Correct Response (MCR):** This question format is similar to a multiple-choice (MC) question. However, MCR questions consist of a stem and four to eight response options, and a correct response consists of more than just one option. The examinee must select all of the correct response options in order to be awarded credit. The question stem will indicate how many response options are correct.
- **Calculation:** Examinees are asked to respond by typing in a numerical response, typically a whole number (no decimals) or a number consisting of 1 or 2 decimal places. It is very important that the response to calculation questions be entered in the form of a number (e.g., 2 or 2.11), and NOT the word form of a number (e.g., “two” or “two point one-one”).

Example: What is 2+2?

Correct: 4

Incorrect: Four

A calculator application will be available for calculation items that may be computationally complex.

- **Drag and Drop:** These questions involve clicking and dragging objects to corresponding targets, and may take the form of matching or placing objects in order.
- **Hotspot:** Examinees indicate their answer by using their mouse to click on a region of a presented image or figure. When a region is selected, an “X” appears on the selected region. Examinees can

change their answer (before moving to the next question) simply by clicking on another region in the image.

- **Graphics/Video:** Any of the question formats described above may be augmented with multimedia as stimuli for the question.

The questions are presented one at a time on a computer screen. Each question may be viewed as long as the candidate wishes, but the candidate cannot go back to previous questions once an answer choice has been recorded; nor can the candidate leave a question unanswered.

An important principle of test construction is that only questions that demonstrate acceptable performance are used to compute examinee scores. Questions that have never been used before have unknown performance characteristics, and it would be unfair to use such questions in computing examinee scores.

Therefore, it is necessary to pretest these questions and evaluate their performance. There are 30 such questions on the NCE. They appear throughout the examination and are not necessarily the first 30 or last 30 questions. Those questions that survive the complex evaluation process are retained for use on future examinations. The pretest questions are not used to score the examination.

The NBCRNA Board of Directors appoints a representative group of certified registered nurse anesthetists to serve on the Certification Examination Subcommittee. This subcommittee meets annually to write and review test questions for the approved item bank and to update the item bank each year. Performance statistics for questions are continually monitored by the NBCRNA.

Computerized Adaptive Testing

The NCE is administered by computer using a methodology called computerized adaptive testing (CAT). CAT is a method of administering tests that uses current technology and is based on the psychometric framework of Item Response Theory (IRT). With CAT, each candidate's test is individualized; it is assembled interactively as the candidate is taking the test. Test questions are stored in a large item bank and classified by content category and level of difficulty. After a candidate answers a question, the computer calculates an estimate of competence and chooses the next question of appropriate content and difficulty. This process is repeated for each question, thus creating an examination that both fulfills the test plan requirements and is tailored to each individual's knowledge and skills.

Each test conforms to the content outline, which assures inclusion of test questions in all of the major content areas. All questions are chosen from the same item bank. The passing point is identical for all candidates, assuring that the difficulty level to pass the NCE is consistent for all candidates. All candidates have the opportunity to demonstrate their ability level, as the NCE will not end until a pass or fail decision is determined.

Administration

The NBCRNA contracts with Pearson VUE to administer the NCE at test centers located in major cities throughout the United States.

Examination Content

The NBCRNA maintains responsibility for the examination content outline and test specifications, maintains an item bank of approved test questions, and sets the passing score. In addition, the NBCRNA determines individual eligibility for admission to the NCE.

Content validity for the NCE has been documented through a professional practice analysis (PPA) initially performed by the CCNA in 1987 and subsequently every 4 to 5 years. The PPA ensures that the NCE reflects the knowledge of an entry-level nurse anesthesia practitioner. Content validation is provided by linkages between the PPA, knowledge and skill statements, and the test items. The job analysis is essential to the continued accreditation of the certification program and validation that the NCE is fair, job-related, and legally defensible.

The following outline, developed from responses to the 2016 PPA and a review by the NBCRNA, is provided to assist candidates in preparing for the NCE. The test content outline is only a guide that suggests topics and topical areas used to generate and categorize examination questions. It is not all-inclusive, as some elements apply to more than one area. This means that not only must candidates validate their knowledge of a subject, but they also must be able to integrate this knowledge across the spectrum of anesthesia practice. Candidates should be aware that anesthetics and anesthesia adjuncts are constantly evolving. It may be appropriate for the content to include older agents as a mechanism to compare and contrast with new agents. Drug dosing is, of course, an essential part of pharmacologic knowledge and application.

The NBCRNA reserves the right to determine examination content, to classify examination questions and to determine the percentage of test questions from each topical area. The approximate percentages of questions in each major content area are provided in the Examination Content Outline.

Examination Content Outline (effective 1/1/18)

I. Basic Sciences (25%)

A. Anatomy, physiology and pathophysiology

1. Cardiovascular

- a. Ischemic heart disease
- b. Valvular heart disease
- c. Congenital heart defects
- d. Cardiac conduction and rhythm abnormalities
- e. Cardiovascular and peripheral vascular complications
- f. Infectious diseases
- g. Pericardial diseases
- h. Cardiomyopathy and heart failure

2. Respiratory

- a. Obstructive diseases
- b. Restrictive diseases
- c. Infectious diseases
- d. Pulmonary vascular complications
- e. Altered airway anatomy
- f. Genetic respiratory disorders

3. Central nervous system

- a. Neurodegenerative diseases
- b. Myelin diseases
- c. Cerebrovascular diseases
- d. Neuropathies and myopathies
- e. Psychiatric disorders
- f. Spinal cord disorders
- g. Intracranial tumor

- h. Congenital anomalies (e.g., cerebral palsy)
- i. Seizure disorders
- j. Genetic nervous system disorders
- k. Intracranial hypertension
- l. Thermoregulation

4. Musculoskeletal

- a. Myopathies/metabolic complications
- b. Neuromuscular diseases
- c. Skeletal diseases
- d. Musculoskeletal disorders
- e. Genetic musculoskeletal disorders

5. Endocrine

- a. Thyroid and parathyroid disorders
- b. Pituitary disorders
- c. Adrenal disorders
- d. Pancreatic disorders
- e. Metabolic disorders
- f. Genetic endocrine disorders

6. Hepatic

- a. Infectious diseases
- b. Biliary tract and bilirubin disorders
- c. Cirrhotic disorders
- d. Hepatovascular complications

7. Renal

- a. Primary kidney diseases and disorders
- b. Acute kidney injury
- c. Chronic kidney injury

8. Hematologic

- a. Anemias
- b. Hemoglobin disorders
- c. Coagulation disorders
- d. Infectious diseases

9. Gastrointestinal

- a. Esophageal disorders
- b. Gastric disorders
- c. Pancreatic disorders
- d. Intestinal disorders
- e. Tumors/secretory lesions
- f. Malabsorption disorders

10. Immune

- a. Infectious disorders
- b. Hyper- and hypo-immune disorders (allergic response)
- c. Autoimmune diseases

11. Other conditions

- a. Cancer
- b. Glaucoma
- c. Burns
- d. Trauma
- e. Substance abuse (alcohol, tobacco, other)

B. Pharmacology

- 1. General principles**
 - a. Pharmacodynamics
 - b. Pharmacokinetics
 - c. Drug interactions
- 2. Inhalation anesthetics**
- 3. Intravenous agents**
 - a. Barbiturates
 - b. Sedative/hypnotics
 - c. Opioid agonists
 - d. Opioid agonist-antagonists
 - e. Opioid antagonists
 - f. Benzodiazepines
 - g. Benzodiazepine antagonists
- 4. Local anesthetics**
- 5. Muscle paralytics**
- 6. Anticholinesterase agents**
- 7. Selective relaxant binding agents**
- 8. Neuraxial analgesics**
- 9. Anticholinergics/Cholinergic agonists**
- 10. Nonsteroidal antiinflammatory drugs**
- 11. Miscellaneous analgesics**
- 12. Sympathomimetics**
- 13. Inotropes**
- 14. PDE inhibitors**
- 15. Digitalis and related drugs**
- 16. Alpha- and beta-receptor antagonists**
- 17. Antihypertensives**
 - a. Sympatholytics
 - b. Centrally acting α_2 -adrenergic agonists
 - c. ACE inhibitors
 - d. Angiotensin II receptor inhibitors
 - e. Nitrovasodilators
 - f. Nitric oxide
- 18. Antidysrhythmics**
- 19. Calcium channel blockers**
- 20. Bronchodilators**
- 21. Psychopharmacologic therapy**
 - a. Selective serotonin reuptake inhibitors
 - b. Tricyclic antidepressants
 - c. MAO inhibitors
 - d. Lithium
- 22. Prostaglandins**
- 23. Histamine receptor antagonists**
- 24. Serotonin antagonists**
- 25. Insulin**
- 26. Oral hypoglycemic**
- 27. Diuretics**
- 28. Antacids**
- 29. Gastrointestinal prokinetic medications (metoclopramide)**
- 30. Anticoagulants**
 - a. Heparin and low-molecular-weight heparins
 - b. Heparin reversal protamine
 - c. Antiplatelet medications
 - d. Oral anticoagulants
 - e. Oral anticoagulant reversal
 - f. Thrombolytics
 - g. Thrombin inhibitors
- 31. Antimicrobials**
- 32. Chemotherapeutics**
- 33. Antiepileptic drugs**
- 34. Antiparkinsonian drugs**
- 35. Lipid-lowering agents**
- 36. Herbal remedies and dietary supplements**
- 37. Minerals and electrolytes**
- 38. Dantrolene**
- 39. Corticosteroids**
- 40. Tocolytics**
- 41. Uterotonics**
- 42. Antifibrinolytics**
- 43. Intravenous dyes**

C. Applied chemistry, biochemistry, physics

1. Chemistry

- a. Aqueous solutions and concentrations
- b. Acids, bases and salts
- c. Chemical reactions: oxidation, reduction, hydrolysis, and conjugation

2. Biochemistry

- a. Metabolism
- b. Cellular mechanisms for action
- c. Drug receptor interaction

3. Physics

- a. Units of measurement
- b. Gases and gas laws

- c. Solubility, diffusion and osmosis
- d. Pressure and fluid flow
- e. Electricity and electrical safety
- f. Vaporization and humidification
- g. Measurement of oxygen, carbon dioxide and hydrogen ion

II. Equipment, Instrumentation and Technology (15%)

A. Anesthetic delivery systems

1. High/low pressure gas sources

2. Regulators/manifolds

3. Flowmeters, valves, floats

4. Vaporizers

5. Proportioning systems

6. Pressure failure safety devices

7. Fail-safe devices

8. Ventilator

9. Carbon dioxide absorbent

10. Anesthetic circuits

- a. Rebreathing, circle system
- b. Nonrebreathing
- c. Modified nonrebreathing

11. Pneumatic and electronic alarm devices

B. Airway equipment

1. Face masks

2. Laryngoscope

- a. Rigid
- b. Videoscope
- c. Optically enhanced scopes

3. Flexible fiberoptic bronchoscope

4. Endotracheal tube

5. Endobronchial tube

- a. including double lumen tubes

6. Airways

- a. Oral
- b. Nasal

7. Supraglottic Airways (i.e., LMA)

8. Intubating supraglottic airways

9. Jet ventilation

10. Intubating stylets

11. Lighted stylet

12. Cricothyrotomy (needle and surgical)

11. Other

- a. Eschmann catheter (i.e., "bougie")
- b. Combitube
- c. Exchange catheter

C. Monitoring devices

1. Central nervous system

- a. Evoked potential
- b. Intracranial pressure
- c. Modified EEG monitor (BIS, PSArray)
- d. Cerebral oximetry

2. Cardiovascular

- a. Electrocardiogram
- b. Arterial pressure monitoring
- c. Noninvasive blood pressure monitoring
- d. Central venous pressure monitoring

- e. Pulmonary artery pressure monitoring/SvO₂
- f. Cardiac output
- g. Precordial/esophageal stethoscope/Doppler

3. Pulmonary/airway monitoring

- a. Capnography
- b. Airway gas analysis
- c. Pulse oximetry
- d. Airway pressure
- e. Blood gas analysis

4. Peripheral nerve stimulator

5. Urinary output monitoring

6. Temperature monitoring

7. Maternal/fetal monitoring issues

8. Others

- a. Fluid/blood warmers
- b. Forced air warming blanket
- c. Heat and moisture exchanger (HME)
- d. Blood salvage (cell saver)

D. Imaging

1. Ultrasound

2. Fluoroscopy

3. Radiography

III. General Principles of Anesthesia (30%)

A. Ethical considerations

B. Legal issues

C. Safety and wellness

- 1. Substance abuse (impairment, disorder and other considerations)
- 2. Issues surrounding patient safety

D. Preoperative assessment and preparation of patient

E. Fluid volume assessment and management

- 1. Fluid/blood component therapy replacement
- 2. Bloodless medicine (including cell saver and hemodilution techniques)

F. Positioning

- 1. Techniques
- 2. Physiologic alterations
- 3. Complications

G. Utilization and interpretation of data

- 1. Lab tests
- 2. Diagnostic exams
- 3. Intraoperative monitoring data

H. Airway management

- | | | |
|---|---------------------------------------|---------------------------------|
| 1. Assessment | 3. Complications | 5. Retrograde intubation |
| 2. Techniques, procedures, and devices | 4. Difficult airway management | |

I. Local/regional anesthetics (technique, physiologic alterations, complications)

- | | | |
|------------------------|-----------------------------|---|
| 1. Anatomy | 3. Topical | 6. Other blocks (airway, retrobulbar) |
| 2. Infiltration | 4. Neuraxial blocks | 7. Ultrasound and/or nerve stimulator guided concepts and techniques |
| | 5. Peripheral blocks | |

J. Light, moderate and deep sedation (monitored anesthesia care)

K. Pain management

- | | | |
|-----------------|---|--|
| 1. Acute | 2. Chronic (pathophysiology, techniques, management of patients) | a. Pathophysiology
b. Techniques
c. Management of Patients |
|-----------------|---|--|

L. Pain Theory (Anatomy, physiology, pathology, and psychodynamics)

M. Other Techniques

- | | |
|-----------------------|--|
| 1. Hypotensive | 2. Enhanced recovery after surgery (ERAS) |
|-----------------------|--|

N. Postanesthesia care/respiratory therapy

IV. Anesthesia for Surgical Procedures and Special Populations (30%)

A. Surgical and diagnostic anesthesia, including management of complications

1. Intraabdominal-

laparoscopic versus open

- a. Hepatobiliary system
- b. Gastrointestinal tract procedures
- c. Endocrine organ procedures
- d. Renal/genitourinary
- e. Gynecologic procedures
- f. Peritoneal procedures (including hernia repair)

2. Extrathoracic

- a. Breast
- b. Plastics and/or reconstructive

3. Head

- a. Extracranial
 - i. Otolaryngological
 - ii. Ophthalmologic
 - iii. Nasal
 - iv. Craniofacial
 - v. Plastics and/or reconstructive
 - vi. Orthodontic/dental
- b. Intracranial
 - i. Decompression (burr holes, ventriculoperitoneal shunt)
 - ii. Space-occupying lesion
 - iii. Vascular
 - iv. Transsphenoidal hypophysectomy
 - v. Stereotactic procedures

4. Intrathoracic (including open and thoracoscopic approach)

- a. Diaphragm

- b. Endoscopic procedures (bronchoscopy, mediastinoscopy)
- c. Esophagus
- d. Heart
- e. Lung
- f. Mediastinal

5. Neck

- a. Larynx/trachea (including tracheostomy)
- b. Lymph node biopsies
- c. Parathyroid/thyroid
- d. Neck tumors
- e. Radical neck dissection

6. Neuroskeletal

- a. Cervical spine (anterior and posterior approach)
- b. Laminectomy/discectomy fusions at all levels
- c. Pain management procedures
- d. Spinal cord procedures
- e. Surgical sympathectomy
- f. Vertebroplasty
- g. Scoliosis repair

7. Orthopedic

- a. Arthroscopic procedures
- b. Closed reduction
- c. Fractures
- d. Total joint replacements/arthroplasty
- e. Procedures of the hand and foot

8. Perineal and pelvic procedures

- a. Gynecologic
- b. Genitourinary
- c. Anal/rectal

9. Vascular (open versus endovascular)

- a. Carotid
- b. Thoracic
- c. Abdominal (including renal)
- d. Extremity
 - i. Occlusive disease
 - ii. Vascular access
 - iii. Vein stripping
- e. Thromboembolic prevention
- f. Surgical management of portal hypertension

10. Diagnostic/therapeutic

- a. Venous/arterial catheterization
- b. Interventional cardiology
 - i. Cardioversion
 - ii. Defibrillation (including AED)
 - iii. Pacemakers
 - iv. Automated internal cardiac defibrillator devices
- c. Diagnostic imaging
- d. Electroconvulsive therapy
- e. Interventional radiology
- f. Radiation therapy
- g. Endoscopy

11. Other surgical procedures

- a. Trauma
- b. Burns
- c. Resuscitation
- d. Organ transplants (including management of posttransplant patient for nontransplant surgery)
- e. Organ procurement
- f. Laser procedures

B. Anesthesia for special populations

1. Pediatrics

- a. Anatomy, physiology and pathophysiology
 - i. Normal
 - ii. Prematurity
 - iii. Congenital anomalies
- b. Pharmacology
- c. Anesthesia techniques/procedures
- d. Management of complications

2. Obstetrics

- a. Anatomy, physiology and pathophysiology

- b. Pharmacology
- c. Anesthesia techniques/procedures
- d. High-risk parturients
- e. Nonobstetric surgery in the parturient
- f. Management of complications

3. Geriatrics

- a. Anatomy, physiology and pathophysiology
- b. Pharmacology

- c. Anesthesia techniques/procedures
- d. Management of complications

4. Obesity

- a. Anatomy, physiology and pathophysiology
- b. Pharmacology
- c. Anesthesia techniques/procedures (including bariatric)
- d. Management of complications

Sample questions and answers appear at the end of this handbook.

References for Review

The principal anesthesia textbooks used in nurse anesthesia educational programs should provide information related to all the major content areas on the NCE. Research articles and review books are not used as references. The NBCRNA does not sponsor or endorse any review courses, review manuals or particular texts that can be used in preparation for the NCE. The NBCRNA does not make old tests or retired questions available to anyone.

Registration Information

Examination Dates

The NCE is offered year-round and may be taken after the candidate has been deemed eligible by the NBCRNA and has scheduled an appointment with Pearson VUE to take the test. Candidates may schedule an appointment to take the NCE on any date that space is available at any Pearson VUE test center of their choice. Attention should be paid to the fact that not all test centers are open seven days a week or operate on the same schedule. Immediate scheduling is not guaranteed by either NBCRNA or Pearson VUE.

Fees

The NCE application fee (at time of publication \$725) and any other applicable fees must be paid electronically through the NBCRNA website. All fees must accompany the online application form. Institutional checks, personal checks or money orders will not be processed. The NBCRNA does not directly invoice individuals or institutions for payment of any examination fees.

Application Process

For a candidate to be considered for eligibility to take the NCE, all of the following materials must be submitted to the NBCRNA by the candidate's nurse anesthesia educational program administrator:

- A completed, electronically signed application
- All candidates must sign the waiver of liability and agreement of authorization, confidentiality and nondisclosure statements on the application form.
- Information regarding the candidate's current and unrestricted license to practice as a registered professional nurse (RN license number, issuing state and expiration date) in all states in which he or she currently holds an active license. At least one license must be current on the candidate's examination date.
- A record of academic and clinical experiences.
- A color digital photo taken within the previous six months.
- Written requests for reasonable accommodations, if applicable.

Application Procedure – Program Administrators

The program administrator must submit all the necessary materials upon official completion of the nurse anesthesia educational program. The official completion date is the date that the student has completely finished the nurse anesthesia educational program and all degree requirements (i.e., there are no makeup days, hours, classes, comprehensive exams or thesis for which the student is responsible).

The decision as to when to submit completed application materials is at the discretion of the program administrator. Regardless of when application materials are submitted, they must document that the candidate has met the Council on Accreditation of Nurse Anesthesia Educational Programs (COA) minimum academic and clinical requirements, as well as the COA-specified competencies.

Application Procedure – Candidates

An online application must be reviewed and completed by the candidate, including payment of all fees, prior to being submitted by the nurse anesthesia educational program administrator. An application that is incomplete, incorrectly filled out, without the correct fee or without a current and unrestricted professional nursing license will not be processed. **No application materials may be submitted directly by the candidate.**

Notification of Candidate Eligibility

Notification of eligibility or ineligibility is sent to a candidate after verification of completion of a nurse anesthesia educational program has been received and his or her application has been approved. This process should be completed within five business days after graduation verification from the nurse anesthesia educational program.

Eligible candidates will receive an official NBCRNA certification eligibility notification via email. The information in the notification is used to schedule an appointment to take the examination with Pearson VUE, either via its website or its Candidate Call Center. All scheduling must be done by the candidate directly with Pearson VUE; the NBCRNA is not responsible for resolving scheduling conflicts. The certification eligibility notification expires 90 days from the date of issue, or on the date on which the candidate takes the NCE, whichever comes first.

Requests for State Board of Nursing Notification of Eligibility

The NBCRNA does not automatically notify state boards of nursing of a candidate's **eligibility** to take the NCE. Any requests a candidate may have regarding eligibility verification to state boards of nursing must be submitted with the application. Requests for eligibility verification to state boards generally will be processed within business days from the time a candidate has been deemed eligible to sit for the NCE.

The candidate is expected to be familiar with the state board of nursing requirements for licensure to practice as a nurse anesthetist in the state where he or she intends to practice. Therefore, candidates are responsible for submitting requests for verification to the NBCRNA so they can be completed at the time the NCE application is processed.

Acknowledgment of Receipt of Materials or Confirmation of Eligibility

Due to the large volume of correspondence the NBCRNA receives, email and telephone confirmation of receipt of NCE application materials, eligibility status, and when eligibility verifications to state boards of nursing were sent cannot be acknowledged.

A candidate who has not received an electronic eligibility notification from the NBCRNA within four weeks of the completion date of the nurse anesthesia educational program is requested to contact the NBCRNA by email at certification@nbcna.com.

Change of Name and Address

The name that the candidate used on the official NBCRNA NCE application is the name that is submitted to Pearson VUE on the eligibility file.

When a candidate appears at the test center, the first and last name, as they appear on the original NBCRNA certification eligibility notification, and two pieces of identification (both bearing a signature and one bearing a photo) must all match. Candidates will not be allowed to take the test if their identification does not bear the same first and last names as their eligibility file at the test center.

Name or address changes are not accepted at the test center. If a candidate changes his or her name and/or address after the certification eligibility notification has been sent, the NBCRNA should be notified immediately by email at certification@nbcna.com of the change.

Reasonable Accommodation for Persons with Documented Disabilities

A candidate with a documented disability may request a reasonable accommodation for the NCE by submitting his or her request and supporting documentation in writing to the NBCRNA with his or her completed application, or as soon thereafter as the candidate learns of the need for the accommodation. Candidates must submit documentation from a licensed health care provider who specializes in evaluating and treating the specific disability for which the accommodation is being requested. The documentation must be on the health care provider's letterhead, and must include a description of the evaluative process used in determining the disability and any testing modifications that are being requested (e.g., reduced distraction room). In addition, if the candidate is currently enrolled or a recent graduate, an official letter from the nurse anesthesia educational program administrator documenting the types of accommodation provided during the nurse anesthesia educational program is required.

The NBCRNA will work directly with the candidate and Pearson VUE to attempt to make reasonable accommodations in the testing environment and procedures to make it possible for a candidate with a documented disability to take the NCE under conditions that will accurately reflect the candidate's aptitude or achievement level. The inability to read English is not considered a disability and does not make a candidate eligible for accommodations.

Scheduling Information

The certification eligibility notification contains detailed information about scheduling an appointment with Pearson VUE to take the NCE. This information will include the expiration date of the candidate's eligibility for the NCE. Appointments cannot be scheduled prior to receipt of this email eligibility notification from the NBCRNA, or after the expiration date.

It is strongly recommended that candidates contact Pearson VUE to make an appointment for the NCE **as soon as possible after receipt** of the NBCRNA certification eligibility notification. Candidates may schedule an appointment to take the NCE on any day that space is available at a Pearson VUE test center. When making an appointment, candidates should take into account that not all test centers are open seven days a week, operate on the same schedule or have the same seating capacity. Pearson VUE usually schedules appointments at least two weeks in advance. A confirmation number for the scheduled appointment will be given to the candidate by Pearson VUE and should be retained until the NCE has been taken.

Scheduling an appointment to take the NCE is strictly between the candidate and Pearson VUE; the NBCRNA will not intervene in these arrangements. No refunds will be made if a candidate is unable to schedule the NCE before his or her eligibility expiration date. If the candidate does not take the NCE within the 90-day eligibility period, or takes the NCE and fails it, he or she will have to reapply, pay the full application fee and complete the registration process.

Refunds for Cancellations and No-Shows

There are no refunds issued for **any** of the following reasons:

- Not scheduling the exam
- Canceling a scheduled examination less than 48 hours in advance of the date and time of the scheduled appointment
- Arriving more than 15 minutes after the scheduled starting time for the test
- Failing to appear for the scheduled test
- Not taking the NCE on or before the eligibility expiration date.

The previous application fee cannot be applied to another examination.

If the student experiences an emergency, he or she must provide the NBCRNA with a written description and documentation for review by email at certification@nbcrna.com. Requests must be submitted within 48 hours of the scheduled test date.

NOTE: Recording the wrong date or time for the scheduled appointment or forgetting to bring the required current, valid identification is not considered an emergency.

Examination Administration

Admission to the Test Center

Candidates arriving at the test center will be asked for the following before admission to the test: presentation of two separate forms of **current**, valid identification (ID), both of which must bear a signature and one of which must bear a photo. The photo ID must be a current government-issued ID such as a passport, driver's license, state ID or military ID; an unexpired school ID or employee ID . Both pieces of ID must have the same first and last names as they appear on the certification eligibility notification sent via email by the NBCRNA. Candidates who appear without the specified identification will not be permitted to take the NCE and will be required to pay the reauthorization fee (at time of publication \$75) in order to receive a new eligibility notice.

Admission Procedures

After the initial verification of identity, the candidate will be asked to sign a roster, to place both palms on a palm vein scanner, and to have his or her photo taken. The use of biometric technology at Pearson VUE test centers for added security is a part of the admission procedures for all NBCRNA examinations.

Electronic devices (including but not limited to cell phones, tablets and e-readers), reference books, notes and other study materials may not under any circumstances be brought into the test center. Personal belongings (including bags, watches and wallets) may not be taken into the testing room; they must be stored in designated areas. An erasable note board will be available at the test center for use during the examination; scratch paper is not permitted.

Test Center Environment

It is unlikely that an NBCRNA certification candidate will be the only person taking an examination in the test room. Individuals taking other examinations may be present. Some examinations may require full use of the computer keyboard, and there may be accompanying keyboard noise. In addition, Pearson VUE personnel and other individuals may leave and enter the test room during the certification candidate's test period.

Test centers will make every effort to keep movement of personnel and noise levels to a minimum during examination administrations. However, if a certification candidate believes that noise may be a distraction, he or she should request earplugs at the test center to use during the NCE. Individual test rooms are not available at test centers.

Candidates with a documented disability shown to require special testing services should refer to the "Reasonable Accommodation for Persons with Documents Disabilities" section.

Taking the test

At the beginning of the NCE, a *Statement of Confidentiality and Nondisclosure Agreement* will appear that candidates must read, acknowledge and agree to. If the candidate does not indicate agreement, he or she will not be allowed to begin the NCE and will have to contact the NBCRNA in writing for reauthorization and pay the reauthorization fee. The content of the NCE, and each individual NCE question, is the property of the NBCRNA, is copyrighted and is strictly confidential information. The retention, possession, copying, distribution, disclosure, discussion or receipt of any NCE question, in whole or in part, by written, electronic, oral or other form of communication, including but not limited to emailing, copying or printing of electronic files, and reconstruction through memorization and/or dictation, before, during or after the NCE is strictly prohibited.

Candidates should read the directions for entering responses carefully before beginning the test. There is a tutorial with practice questions. The NCE then begins with the appearance of the first exam question. There is a "help" screen that can be referred to at any time during the examination to refresh a candidate's memory as to how to enter responses. At any time before or during the NCE, candidates may request help regarding the use of the computer.

Questions are presented one at a time on the computer screen. Each question must be answered as it is presented. The question on the screen must be answered before the candidate can move on to the next screen. Candidates should consider each answer carefully and make their best choice.

Once a candidate confirms an answer and goes on to the next question, he or she is not allowed to go back to any previous questions. Psychometric research has shown that, in general, candidates do not significantly improve their scores by reviewing and changing answers.

Examination Length

Each candidate must answer a minimum of 100 questions. As a candidate takes the NCE, questions are selected based on his or her responses to previous questions. Once 100 questions have been answered, the test will continue, if necessary, until the candidate's performance is estimated as being either above or below the passing standard with a predetermined level of certainty. Thus, different candidates will have to answer varying numbers of questions and use varying amounts of time. The maximum number of questions is 170 during a three-hour maximum testing period.

Improper Behavior in Connection with the Examination

When applying for the NCE, each candidate must agree to the NBCRNA waiver of liability and agreement of authorization, confidentiality and nondisclosure statements.

The consequences of violating this agreement may include, but are not limited to, the following:

- Loss of eligibility to take the NCE now and in the future
- Invalidation of NCE results
- Denial, Suspension or Revocation of certification
- Assessment of monetary damages

During the NCE, the performance of all candidates will be monitored. Any candidate who gives or receives assistance, or otherwise engages in dishonest or improper behavior during the NCE, will be required to cease taking the NCE and leave the test center. Test center personnel will notify the NBCRNA office of any improper behavior during the NCE.

After reviewing a reported incident, the NBCRNA will determine whether there is reason to believe that a candidate has engaged in cheating or other improper behavior, or has otherwise violated the security of the NCE. If the NBCRNA determines that there is reason to so believe, it may, at its discretion, take any of the following actions:

- Order the candidate to retake the NCE at a time and place to be determined by the NBCRNA
- Refuse to release the test results of the candidate and, thereby, deny his or her current application for certification
- Require the candidate to wait a specified period of time before reapplying to take the NCE
- Deny, suspend or revoke the candidate's eligibility to sit for the NCE in the future
- Take a combination of any of the above actions or such other action that the NBCRNA may deem appropriate

Candidates who are aware of improper behavior should report it to NBCRNA's anonymous, third-party tip line at 844-703-1790 or <https://nbcna.tnwreports.com/>.

Post Examination

Improper Behavior After the Examination

Any individual who removes or attempts to remove materials from the test center, or who receives, discusses, discloses, reproduces, distributes, displays or otherwise misuses a test question or any part of a test question from the NCE by written, electronic, oral or other form of communication, including but not limited to emailing, copying or printing of electronic files, and reconstruction through memorization and/or dictation, will be subject to legal action and monetary damages. Any candidate who engages in such improper behavior also may face denial, suspension or revocation of eligibility for certification, or denial, suspension or revocation of certification.

Problems at Test Centers

Candidates will have access to a proctor at the test center. As a rule, if a problem occurs with the computer and a candidate has to restart his or her test on the scheduled test day, the test will be resumed at the point of interruption since the questions and answers are saved. However, if the test cannot be resumed on the same day and the candidate has to reschedule his or her test, a new NCE will be administered. There will be no charge to the candidate for rescheduling a test if the problem was caused by circumstances at the Pearson VUE test center.

Problems related to admission or administration of the NCE, including any problems related to conditions at a test center, should be reported immediately at the test center before leaving, and as soon as possible, **but no later than three business days after the examination**, by email to the NBCRNA office at certification@nbcna.com. Reports to the NBCRNA should include the candidate's full name and address, as well as a description of the conditions that caused the problem(s) at the test center. After reviewing a report of a problem at a test center, the NBCRNA may, at its discretion, determine whether a new NCE should be administered or another action should be taken. Reports submitted from a program administrator will be considered only if they are accompanied by the candidate's report. The NBCRNA will not consider notice of test administration problems that are received more than three business days after the examination date.

Report of Examination Results

The NCE is scored based on candidate performance in the form of a correct/incorrect response to each question and the difficulty of the questions that an examinee is administered. A numerical estimate of the test taker's ability is determined using Item Response Theory (IRT). A candidate's ability estimate is calculated after each item and is used to determine when the NCE will stop and the pass/fail decision for

the candidate. A candidate must obtain a minimum ability estimate, determined by the NBCRNA in order to pass the examination. A pass/fail decision is made when ONE of the following conditions has been met:

- The candidate has clearly demonstrated competence. This decision may be reached at any point between 100 and 170 items.
- The candidate has clearly demonstrated incompetence. This decision may be reached at any point between 100 and 170 items.
- The maximum number of questions (170) has been administered. The pass/fail decision is based on whether the candidate's ability level is above or below the pass/fail point.
- The maximum amount of time (three hours) is reached. A fail decision is made if the candidate has not completed the minimum 100 questions in this time period. If the candidate has completed more than 100 questions, the pass/fail decision is based on whether the candidate's ability level is above or below the pass/fail point.

Notification of Examination Results

Candidates will receive a preliminary pass/fail report when they check out of the test center. **This is preliminary only.** Validated, official results will be sent by the NBCRNA via first-class mail within two to four weeks after the test date. The pass/fail test results will be sent to the name and address listed in the candidate's NBCRNA profile.

Passing candidates will receive notification that they have passed the NCE, along with the official certification documents from the NBCRNA. They will not receive score information. Pass score data is not available to candidates because that information is often misused by employers and other parties to distinguish among candidates.

Failing candidates will receive notification of failing the NCE. The official result documents from the NBCRNA will also include their total scaled score and diagnostic scaled scores for the four content areas of the NCE — not the actual number of questions answered correctly. The total scaled score reflects the candidate's performance with respect to the content standard (passing score) that has been established by the NBCRNA. The content area scores reflect relative performance compared to other content areas.

The only information available to candidates regarding the results of the NCE will be the information provided on the official results documents from the NBCRNA. Because of the need to maintain test security, test questions cannot be made available for review. Neither the NBCRNA nor Pearson VUE provides a list of the questions.

Not everyone who tests on the same day at the same center will receive their official validated results at the same time because results are sent via USPS and may take differing amounts of time. Verification procedures for individual records may also take differing amounts of time.

Any candidate who does not receive the pass/fail test results within four weeks of taking the NCE should contact the NBCRNA by email at certification@nbcna.com.

Program administrators. Program administrators can access their students' scores on the NBCRNA website. Examination results will not be released to any other persons without written authorization from the candidate.

State Boards of Nursing. Certification verifications to state boards of nursing are processed with a candidate's results and sent electronically to the state boards of nursing within two business days following NCE results processing.

Employers/Third Parties. The NBCRNA does not share examination results with employers. Employers are able to verify a potential employee's certification status free of charge on the NBCRNA website at <https://portal.nbcna.com/credential-verification>.

Candidates should carefully consider making time-sensitive employment-related commitments that require immediate verification of certification (i.e., passing the NCE). Processing of results may, at times, take up to four weeks following the date of the examination, and processing will not be altered for individual requests.

Verification of Examination Results

Because of the sophistication of computerized online scoring and extensive quality-control procedures, errors in scoring are virtually nonexistent. However, candidates who answer the maximum number of questions administered and who receive a failing score may request that their NCE results be verified. Requests for verification of NCE results must be made in writing within six months after the test date and must include the following information: candidate's name, ID number, last four digits of the Social Security number, date of birth, test date and signature. Requests should be sent via email to certification@nbcna.com.

Reapplication Procedures

Candidates who fail the NCE must reapply for eligibility to take the examination. An NCE Retake Application will be available online to the candidate once his/her official NCE results have been processed by the NBCRNA.

The following materials must be submitted online to the NBCRNA to retake the NCE:

- completed NCE Retake Application
- current and unrestricted professional nursing license information
- if it has been one year or more since the last submission of a color digital photo, a new, color, digital photo (e.g., passport type) of the candidate taken within the last six months.

Once the examination fees and required materials have been submitted, candidates should allow two to four weeks for retake application processing. Processing time frames may vary and will not be altered for individual requests.

Candidates granted eligibility will receive a new certification eligibility notification, which must be used to schedule an appointment with Pearson VUE to take the test.

The NCE must be taken and passed within two years of official completion of an accredited nurse anesthesia educational program as on file with the NBCRNA and submitted by the program

administrator. The NCE may be taken up to four times within each of the two years following the official completion date. The application fee will be required each time a candidate reapplies for the NCE.

Candidates who do not take and pass the NCE within two years of completion of their nurse anesthesia educational program will not be eligible to apply to take the NCE unless they enter and complete another unabridged accredited nurse anesthesia educational program.

Discipline, Administrative Action and Appeals

Pursuant to NBCRNA Policies & Procedures for Discipline, Administrative Action and Appeals (*"Policies"*), Certified Registered Nurse Anesthetists, examinees, and applicants for Certification, Recertification or Continued Professional Certification (collectively "certification") are subject to disciplinary or administrative action for engaging in conduct that NBCRNA regards as inconsistent with unrestricted recertification. The *Policies* sets forth the conduct that can lead to sanctions, the procedures that will govern, the sanctions that can be imposed, the appeal rights of any individual who is sanctioned, and provisions for reinstatement of certification. The *Policies* can be accessed on the NBCRNA website, www.NBCRNA.com, or requested from the NBCRNA.

Sample Questions

The following questions are examples of the type of multiple-choice (MC) questions that appear on the NCE. An answer key is provided on [the following page](#). For samples of the alternative question format types — multiple correct response (MCR), calculation, hotspot, and drag and drop questions — see the Exam Tutorial and Item-writing section of the NBCRNA website at www.NBCRNA.com.

- 1. In the elderly, the time needed for clinical recovery from neuromuscular blockade is significantly increased for:**
 - A. Cisatracurium
 - B. Vecuronium
 - C. Pipecuronium
 - D. Mivacurium
- 2. Considerations for the management of a patient with myotonic dystrophy under general anesthesia should include a(an):**
 - A. Anticholinesterase reversal
 - B. Midazolam premedication
 - C. Short-acting nondepolarizer
 - D. Succinylcholine infusion
- 3. Which drug would have a normal pharmacokinetic profile in a patient with severe liver disease?**
 - A. Pancuronium
 - B. Succinylcholine
 - C. Mivacurium
 - D. Atracurium
- 4. Which of the following neuromuscular blocking agents is a benzylisoquinoline compound?**
 - A. Vecuronium
 - B. Succinylcholine
 - C. Pancuronium
 - D. Mivacurium
- 5. When providing positive pressure ventilation via a bag-valve-mask device, inspiratory pressure should be limited to:**
 - A. 15 cm H₂O
 - B. 25 cm H₂O
 - C. 40 cm H₂O
 - D. 50 cm H₂O
- 6. What is the first sign of magnesium toxicity when used for seizure prophylaxis in preeclampsia?**
 - A. Respiratory depression
 - B. Hypotension
 - C. Cardiac conduction defects
 - D. Loss of deep tendon reflexes

7. In the hypothermic patient undergoing left atrial to femoral bypass for repair of a thoracolumbar aneurysm, the most common dysrhythmia encountered with atrial cannulation is:

- A. Atrial fibrillation.
- B. Bradycardia.
- C. Junctional rhythm.
- D. Ventricular tachycardia.

8. Intrathecal narcotic administration is associated with:

- A. Loss of proprioception
- B. Skeletal muscle weakness
- C. Selective sensory blockade
- D. Sympathetic nervous system denervation

9. A mass spectrometer measures the concentrations of inhaled agents by measuring:

- A. Intensity of transmitted light
- B. Paramagnetism
- C. Molecular weight
- D. pH sensitivity

10. The BEST indicator for CAD in the pre-operative assessment for vascular surgery patients is:

- A. Electrocardiogram
- B. History and physical
- C. Presence of S₃ gallop
- D. Exercise tolerance

11. An increase in the drug half-life in the geriatric population is usually due to:

- A. Age-associated induction of cytochrome P₄₅₀ activity
- B. A shift from first-order to zero-order kinetics
- C. Reduced liver blood flow
- D. Increased volume of distribution

12. What is the MOST likely complication of combined spinal/epidural analgesia during labor and delivery?

- A. Higher than anticipated dermatome level of analgesia
- B. Epidural catheter insertion into the intrathecal space
- C. Epidurally administered drug leakage into the intrathecal space
- D. Higher incidence of fetal bradycardia

13. Which agent is MOST likely to maintain renal blood flow during periods of induced hypotension?

- A. Nitroglycerin
- B. Nitroprusside
- C. Fenoldopam
- D. Trimethaphan

14. What is the threshold pressure (PSI) for a primary pressure fail-safe device on an anesthesia machine?

- A. 10
- B. 20
- C. 30
- D. 40

15. Radial nerve block often can be determined by the patient's inability to perform which of the following actions of the arm?

- A. Flexion
- B. Extension
- C. Pronation
- D. Adduction

16. The check valve in the low pressure system is designed to:

- A. Prevent excessive airway pressures
- B. Prevent scavenged gases from reentering the circuit
- C. Facilitate equipment testing before induction of anesthesia
- D. Minimize the pumping effect associated with positive-pressure ventilation

17. Autonomic hyperreflexia can:

- A. Develop immediately after spinal cord injury
- B. Result in hypotension and tachycardia
- C. Be prevented by "light" anesthesia
- D. Be treated with vasodilators or alpha blockers

18. The MOST common preventable critical incident associated with anesthesia equipment is:

- A. Failure to ventilate caused by circuit disconnection
- B. Barotrauma caused by excessive positive pressures
- C. Hypoxia caused by a delivery piping misconnection
- D. Overdose due to vaporizer cross fill contamination

19. A patient in the PACU is found to have residual neuromuscular blockade despite reversal with neostigmine and glycopyrrolate. Which of the following would further impair reversal?

- A. Hyperkalemia
- B. Hypoalbuminemia
- C. Respiratory acidosis due to hypoventilation
- D. Residual synthetic opioids

Answers to Sample Questions

- | | | | |
|------|-------|-------|-------|
| 1. B | 6. D | 11. D | 16. D |
| 2. C | 7. A | 12. C | 17. D |
| 3. D | 8. C | 13. C | 18. A |
| 4. D | 9. C | 14. B | 19. C |
| 5. B | 10. D | 15. B | |

APPENDIX A: Academic and Clinical Experience Requirements

Every individual who applies for eligibility to sit for the NCE must submit evidence of successful completion of a COA-accredited nurse anesthesia educational program. NBCRNA requires submission of an academic and clinical experience record as a component to determine NCE eligibility. This record must be submitted by the nurse anesthesia educational program administrator, and is not accepted directly from the NCE applicant.

All applicants for the NCE must report successful completion of Advanced Cardiac Life Support (ACLS) and Pediatric Advanced Life Support (PALS) courses. ACLS and PALS must be current at the time of NCE application submission and have expiration dates on or after the date of the nurse anesthesia educational program completion. This information will be submitted by the nurse anesthesia educational program administrator at the time the academic and clinical experience requirements are reported.

For students who enrolled on or BEFORE December 31, 2014, the following academic and clinical experiences must be met:

Academic

- Pharmacology of anesthetic agents and adjuvant drugs including concepts in chemistry and biochemistry (105 hours)
- Anatomy, physiology, and pathophysiology (135 hours)
- Professional aspects of nurse anesthesia practice (45 hours)
- Basic and advanced principles of anesthesia practice including physics, equipment, technology, and pain management (105 hours)
- Research (30 hours)
- Clinical correlation conferences (45 hours)
- Three separate comprehensive graduate level courses (one of each) in advanced physiology/pathophysiology, advanced health assessment, and advanced pharmacology

Clinical Experiences

The following table lists the minimum number of the types of clinical experiences a graduate from a COA-accredited nurse anesthesia program must report to the NCBRNA as part of the applicant's NCE application materials.

TITLE	MINIMUM NUMBER
Anesthesia Cases	550
Class I Patients	0
Class II Patients	0
Class III & IV Patients	100
Class V Patients	0
Anesthesia Delivery Hours	0
Total Anesthesia Hours	0

TITLE	MINIMUM NUMBER
Geriatric 65+ years	50
Pediatric 2-12 years	25
Pediatric (less than 2 years)	10
Neonate (less than 4 weeks)	0
Trauma/Emergency (E)	30
Ambulatory/Outpatient	100
Obstetrical Management	30 (total of A and B)
A. Cesarean Delivery	10
B. Analgesia for Labor	10

TITLE	MINIMUM NUMBER
Prone	20
Lithotomy	25
Lateral	5
Sitting	5

TITLE	MINIMUM NUMBER
Intra-abdominal	75
Extrathoracic	15
Extremities	50
Perineal	15
Extracranial	15
Intracranial	5
Oropharyngeal	20
Intrathoracic	15 (Total of A and B)
A. Heart	5
B. Lung	5
Neck	5
Neuroskeletal	20
Vascular	10

TITLE	MINIMUM NUMBER
General Anesthesia	350
Intravenous Induction	200
Inhalation induction	10
Mask Management	25
Laryngeal Mask Airways (or similar devices)	25
Tracheal Intubation: Oral	200
Tracheal intubation: Nasal	0
Total intravenous Anesthesia	10
Emergence from Anesthesia	200
Regional Techniques: Management	30
Regional Techniques: Administration	25 (Total of A, B and C)
A. Spinal	1
B. Epidural	1
C. Peripheral	1
Monitored Anesthesia Care	25

TITLE	MINIMUM NUMBER
Inhalation Agents	200
Intravenous Induction Agents	200
Intravenous Agent – Muscle Relaxants	200
Intravenous Agent - Opioids	200

TITLE	MINIMUM NUMBER
Arterial puncture/catheter insertion	25
Intra-arterial BP Monitoring	25

TITLE	MINIMUM NUMBER
Central Venous Catheter (CVC) Placement	5 (Total of A and B)
A. Actual	0
B. Simulated	0
CVC Monitoring	15

TITLE	MINIMUM NUMBER
Pulmonary Artery (PA) Catheter Placement	0
PA Catheter Monitoring	0

TITLE	MINIMUM NUMBER
Intravenous Catheter Placement	100
Mechanical Ventilation	200
Pain Management (Acute/Chronic)	0
Alternative Airway Management Techniques	10 (Total of 1 and 2)
1. Fiberoptic Techniques	5 (Total of A, B and C)
A. Actual	0
B. Simulated	0

C. Airway Assessment	0
2. Other techniques	5

For students enrolled on or AFTER January 1, 2015, who will be awarded a MASTER’S degree upon program completion, the following academic and clinical experiences must be met:

Academic

- Pharmacology of anesthetic agents and adjuvant drugs including concepts in chemistry and biochemistry (105 hours)
- Anatomy, physiology, and pathophysiology (135 hours)
- Professional aspects of nurse anesthesia practice (45 hours)
- Basic and advanced principles of anesthesia practice including physics, equipment, technology, and pain management (105 hours)
- Research (30 hours)
- Clinical correlation conferences (45 hours)
- Radiology (no minimum hour)
- Ultrasound (no minimum hour)
- Three separate comprehensive graduate level courses in advanced physiology/pathophysiology, advanced health assessment, and advanced pharmacology

Clinical Experiences

All students who enroll in a nurse anesthesia educational program on or AFTER January 1, 2015, have the same clinical experience requirements, regardless of the degree to be awarded upon completion of the program. Please refer to the table below that appears for students to be awarded a doctoral degree upon program completion.

For students who enrolled on or AFTER January 1, 2015, who will be awarded a DOCTORAL degree upon program completion:

Academic

- Advanced Physiology/Pathophysiology Course (120 hours)
- Advanced Pharmacology Course (90 hours)
- Advanced Health Assessment Course (45 hours)
- Basic and Advanced Principles in Nurse Anesthesia Course (120 hours)
- Research (75 hours)
- Human Anatomy
- Chemistry
- Biochemistry
- Physics
- Genetics
- Acute and Chronic Pain Management
- Radiology
- Ultrasound
- Anesthesia Equipment
- Professional Role Development
- Chemical Dependency and Wellness
- Informatics
- Ethical and Multicultural healthcare
- Leadership and Management
- Business of Anesthesia/Practice Management
- Health Policy
- Healthcare Finance
- Integration/Clinical Correlation

Clinical Experiences

For students enrolled on or AFTER January 1, 2015, the following table lists the minimum number of the types of clinical experiences a graduate from a COA-accredited nurse anesthesia program must report to the NCBRNA as part of the applicant's NCE application materials.

TITLE	MINIMUM NUMBER
Total Cases	600
Anesthesia Hours	0
Clinical Hours	2000
Class I/II	0/0
Class III-VI	200 (Total of A, B, C and D)
A. Class III	50
B. Class IV	10
C. Class V	0
D. Class VI	0

TITLE	MINIMUM NUMBER
Geriatric 65+ years	100
Pediatric 2 to 12 years	30
Pediatric (less than 2 years)	10
Neonate (less than 4 weeks)	0
Trauma/Emergency (E)	30
Obstetrical Management	30 (Total of A and B)
A. Cesarean Delivery	10
B. Analgesia for Labor	10
Pain Management Encounters	15

TITLE	MINIMUM NUMBER
Intra-abdominal	75
Intracranial (includes open)	5
Open	3
Oropharyngeal	20
Intrathoracic	15 (Total of A and B)
A. Heart	5 (Total of 1 and 2)
1. With Cardiopulmonary Bypass	0
2. Without Cardiopulmonary Bypass	0
B. Lung	5
Neck	5
Neuroskeletal	20
Vascular	10

TITLE	MINIMUM NUMBER
General Anesthesia	400
Inhalation Induction	25
Mask Management	25
Supraglottic Airway devices	35 (Total of A and B)
A. Laryngeal Mask	0
B. Other	0
Tracheal intubation	250 (Total of A and B)
A. Oral	0
B. Nasal	0
Alternative Tracheal Intubation Techniques	25 (Total of A and B)
A. Endoscopic Techniques	5 (Total of 1, 2 and 3)
1. Actual Placement	0
2. Simulated Placement	0
3. Airway Assessment	0
B. Other techniques	5
Emergence from Anesthesia	300

TITLE	MINIMUM NUMBER
Regional Techniques: Actual Administration	35 (Total of A, B and C)
A. Spinal	10 (Total of 1 and 2)
1. Anesthesia	0
2. Pain Management	0
B. Epidural	10 (Total of 1 and 2)
1. Anesthesia	0
2. Pain Management	0
C. Peripheral and Other	10 (Total of 1 and 2)
1. Anesthesia	
a. Upper	
b. Lower	
c. Other	
2. Pain Management	
a. Upper	
b. Lower	
c. Other	
Regional Techniques: Management	35 (Total of 1 and 2)
1. Anesthesia	0
2. Pain Management	0
Moderate/Deep Sedation	25

TITLE	MINIMUM NUMBER
Arterial Puncture/Catheter Insertion	25
Intra-arterial BP Monitoring	30
Central Venous Catheter (CVC) Placement – Non PICC	10 (Total of A and B)
A. CVC Non-PICC: Actual	0
B. CVC Non PICC: Simulated	0
CVC Placement – PICC	0 (Total of A and B)
A. CVC Placement PICC: Actual	0
B. CVC Placement PICC: Simulated	0
CVC Monitoring	15
Pulmonary Artery (PA) Catheter Placement	0
PA Catheter Monitoring	0
Ultrasound Guided Techniques: Regional	0
Ultrasound Guided Techniques: Vascular	0
Intravenous Catheter Placement	100

