



Annual NCE and SEE Report Calendar Year 2022

Summary of NCE and SEE Performance and Clinical Experience

January 1, 2022 - December 31, 2022

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Introduction

This report presents a summary of information on individual performance on the National Certification Examination (NCE) and the Self-Evaluation Examination (SEE) in the calendar year 2022 (CY2022), January 1, 2022 through December 31, 2022. It should be noted that starting in 2019, the NBCRNA has transitioned to align its fiscal year (FY) with the calendar year (CY).

Performance on the NCE is summarized first, with pass/fail outcomes presented according to several demographic variables: gender, age, clinical background, and type of graduate degree. Trend data summarizing pass rates over the past five years are also provided in the last column of each table for each demographic. Readers should note that there was no change to the NCE passing standard in 2022. The passing standard was last changed on January 1, 2014; the NBCRNA Board of Directors reviewed the results of the 2017 standard setting study and voted to retain the standard established in 2014.

NCE pass rate summaries are followed by an analysis of candidates' responses on a satisfaction survey administered at the end of the NCE. The survey requested information pertaining to candidates' satisfaction with their registration and test experience. Additionally, descriptive statistics (e.g., mean, standard deviation) are provided for the number of cases performed in various clinical areas by students of nurse anesthesia educational programs who graduated in 2022.

Finally, information about scaled scores for the SEE is presented in the last part of the report, summarizing performance by gender, age, clinical background, type of graduate degree, and year in program. Trend data summarizing the past five years in each demographic subgroup are also provided in the final column of each table.

Candidate Performance on the NCE

The information in **Table 1** addresses the performance of candidates on the NCE during the CY2022 reporting period. Pass rates appear separately for first-time candidates versus repeat candidates, based on the passing standard that took effect on January 1, 2014. The pass rate for the 2,794 first-time candidates is 83.4%. The pass rate is lower for repeat examinees, consistent with the previous year's data.

The CY2022 first-time pass rate (83.4%) is slightly lower than the CY2021 pass rate (84.1%). The cumulative first-time pass rate averaged over the previous five years is 84.0% as shown in the final column of **Table 1** (Years 2018–2022 represents January 1, 2018–December 31, 2022, total N = 22,455). First-time examinee pass rates for the NCE, by year since 2008, can be found in **Table A1** in Appendix A of this report.

The total number of NCE candidates testing increased in 2022 (3,548 in CY2022 vs. 3,259 in CY2021), of which 2,794 were first-time candidates, whereas in CY 2021 2,636 were first-time takers.

Table 1. Pass/Fail Summary for NCE Candidates, 2022

First-Time Candidates	Frequency	Percent	5-year Trend %
Pass	2,331	83.4%	84.0%
Fail	463	16.6%	16.0%
Total	2,794	100.0%	100.0%
Repeat Candidates	Frequency	Percent	5-year Trend %
Pass	436	57.8%	61.0%
Fail	318	42.2%	39.0%
Total	754	100.0%	100.0%

The NCE total scores and domain-level information for first-time candidates can be found in **Table A2** of Appendix A.

Table 2 shows the distribution of test length and pass/fail status. Only *first-time* candidates are included in Table 2. Of the candidates who passed, the majority (57.8%) were administered 70 items (not including the 30 unscored pretest items). Only 5.4% of NCE candidates failed the test in 70 items. Approximately 18.6% of the candidates took the maximum test length of 140 items.

The number of candidates getting a score determination in 70 items decreased slightly in CY2022 over CY2021. In 2022, 63.2% of candidates fell into this category compared to 64.4% in CY2021. The five-year trend is 58%.

Table 2. Pass/Fail Summary by Test Length for First-Time NCE Candidates, 2022

	Frequency	Percent	5-year Trend %
Pass in 70 items	1,614	57.8%	51.6%
Pass in 71 to 139 items	394	14.1%	14.7%
Pass in 140 items	323	11.6%	13.4%
Fail in 70 items	150	5.4%	6.4%
Fail in 71 to 139 items	115	4.1%	5.1%
Fail in 140 items	198	7.0%	8.8%
Total	2,794	100.0%	100.0%

Demographic Characteristics of NCE Candidate Population, 2022

The next several tables present pass rates on the NCE grouped by gender, age, clinical background, and degree earned. Only *first-time* candidates are included in these tables. **Table 3** indicates that 58.5% of the NCE candidates were female and 41.4% were male. The pass rates for females in 2023 were slightly lower than in 2022, and males continued to show a slightly higher pass rate than females: 2022 (85.4% vs. 82.0% for male and female, respectively); 2021 (85.7% vs. 83.0%); 2020 (86.3% vs. 84.6%); 2019 (85.1% vs. 83.9%), consistent with the five-year trend (final column of Table 3).

The distribution of females and males in the CRNA population is relatively consistent at approximately 60% vs. 40%.

Table 3. Gender of NCE Candidates, 2022

Gender	Pass		Fail		Total		5-year Trend
	N	Percent	N	Percent	N	Percent	Pass %
Female	1,339	82.0%	294	18.0%	1,633	58.5%	83.0%
Male	988	85.4%	169	14.6%	1,157	41.4%	85.7%
None	4	100%	0	0%	4	0.1%	--
Total	2,331	83.4%	463	16.6%	2,794	100.0%	84.2%

Table 4 presents the pass rate by age group. The pass rate decreased as examinee age increased, both for the 2022 sample and the five-year trend analysis. Younger students tend to perform better on the NCE. The average age of the 2022 *first-time* NCE candidates was 32.5 years.

Table 4. Age of NCE Candidates, 2022

Age	Pass		Fail		Total		5-year Trend
	N	Percent	N	Percent	N	Percent	Pass %
Under 30	792	88.1%	97	11.9%	899	32.2%	90.2%
30 - 35	1,073	83.6%	210	16.4%	1,283	46.0%	84.5%
36 - 39	291	80.4%	71	19.6%	362	12.5%	78.0%
40 or more	175	67.3%	85	32.7%	260	9.3%	69.2%
Total	2,331	83.4%	463	16.6%	2,794	100.0%	84.2%

Table 5 displays pass rates for candidates' clinical background. Approximately 27.8% of the candidates reported their clinical background as ICU/CCU, increasing from 27.1% in 2021. Pass rate comparisons between different clinical settings should be made with caution, however, because some subgroups for the 2022 data feature small sample sizes. Also, the clinical background categories tend not to be mutually exclusive. While examinees report their clinical background as discrete categories, actual experience may be more diverse and complex (e.g., SICU in some facilities may include CVICU patients, and many other permutations can exist). Finally, this data is self-reported and could be subject to inaccuracies.

When comparing pass rates across clinical background subgroups, readers are advised to refer to the 5-year trend column of Table 5. The pass rates in this column are more reliable for comparisons because they are based on a much larger sample. For instance, over the past five years, first-time NCE examinees with NEURO ICU, CCU, PICU, and SICU clinical backgrounds respectively have demonstrated the highest rates of success on the NCE

Table 5. Clinical Background of NCE Candidates, 2022

Clinical Background	Pass		Fail		Total		5-year Trend
	N	Percent	N	Percent	N	Percent	Pass %
CCU	232	83.5%	46	16.5%	278	9.9%	85.8%
ER	28	71.8%	11	28.2%	39	1.4%	78.7%
ICU/CCU	653	84.1%	123	15.9%	776	27.8%	82.8%
MICU	347	84.8%	62	15.2%	409	14.6%	85.4%
NEURO ICU	119	83.8%	23	16.2%	142	5.1%	85.6%
NICU	21	84.0%	4	16.0%	25	0.9%	81.9%
OR	13	72.2%	5	27.8%	18	0.6%	81.2%
PACU	44	75.9%	14	24.1%	58	2.1%	77.9%
PICU	110	84.6%	20	15.4%	130	4.7%	86.7%
SICU	494	82.9%	102	17.1%	596	21.3%	85.0%
TRAUMA ICU	202	84.2%	38	15.8%	240	8.6%	84.9%
Other	68	81.9%	15	18.1%	83	3.0%	82.1%
Total	2,331	83.4%	463	16.6%	2,794	100.0%	84.2%

Table 6 displays distribution of pass rates by degree attained. Of 2,794 first-time NCE takers in 2022, 8.9% (n=248) were from programs that awarded a Master of Science in Nursing degree; 8.9% (n=250) graduated from programs awarding a Master of Science in Nurse Anesthesia degree; 7.6% (n=212) were from other master's programs; and 74.6% (n=2,084) were from programs that awarded a doctoral degree. The takers from doctoral degrees continued to grow and constituted over 74% of all first-time takers in 2022. This is an increase of 12.5 percentage points from the 62.1% that doctoral candidates comprised in 2021.

When comparing pass rates across clinical background subgroups, pass rate differences across degrees should be viewed with caution because some demographic subgroups feature small sample sizes (Table 6). Readers are advised to refer to the 5-year Trend column of Table 6. For instance, over the past five years, first-time NCE examinees coming out of MSN programs appear to exhibit the highest rates of success on the NCE.

Table 6. Types of Graduate Degrees Reported by NCE Candidates, CY 2022

Degree Upon Completion	Pass		Fail		Total		5-year Trend
	N	Percent	N	Percent	N	Percent	Pass %
MS Nursing	210	84.7%	38	15.3%	248	8.9%	87.1%
MS Nurse Anesthesia	184	73.6%	66	26.4%	250	8.9%	80.5%
Other Masters	169	79.7%	43	10.3%	212	7.6%	83.2%
Doctoral Degree	1,768	84.8%	316	15.2%	2,084	74.6%	84.4%
Total	2,331	83.4%	463	16.6%	2,794	100.0%	84.2%

Descriptive Information on Number of Clinical Experiences, 2022

The tables in this section report data collected about the number of anesthesia cases performed in clinical areas, as submitted by program directors to the NBCRNA for individuals completing nurse anesthesia programs in the reporting period. *This data reflects records of clinical experiences submitted for individuals with a graduation date in 2022, and not the sample of NCE candidates during this time frame.* As a result, sample sizes presented in this section (2,810) will not equal the number of first-time NCE candidates (2,331) as reported in Tables 1 through 6.

In previous years, there were different academic requirements for Doctoral and Master’s candidates, so results were reported separately. While requirements are now the same, results in this section still break out by Doctoral and Master’s candidates to allow analysis of differences as well as comparison to previous periods. For clarity, these two groups of students are reported separately in Tables 7a through 15a for Master’s students (n=682), and in Tables 7b through 15b, for Doctoral students (n=2,128), respectively. Clinical experiences are aligned in the table pairs to easily compare the degree types.

The columns are the same in Tables 7 through 15, presenting the following information:

- The first column contains the clinical area in which cases were performed.
- The *N* column represents the number of master’s or doctoral records submitted in the reporting period.
- The *Number of Cases Required* column indicates the minimum number of cases that must be completed by an applicant for the applicant to be deemed eligible to take the NCE. If a minimum number of cases is not required, a “0” is entered in this column.
- The *Mean* column indicates the average number of cases reported on the 2022 records.
- The *Standard Deviation* column describes the dispersion in the number of cases reported on the 2022 records.
- The *Median* column indicates the median number of cases (50th percentile) reported on the records in the reporting period. Half the records contained values higher than this number and half contained a value below this number.
- The *Minimum* column indicates the smallest number of cases reported on the 2022 records.

Table 7a. Sections I, II and III: Clinical Experience (Master’s)

Area	N	Number of Cases Required	Mean	Standard Deviation	Median	Minimum
Total Number of Cases	682	600	873.9	145.5	858	611
Total Hours of Anesthesia	682	0	1,764.8	362.0	1,742	353
Total Clinical Hours	682	0	2,570.1	345.4	2,534	2,002

Table 7b. Sections I, II and III: Clinical Experience (Doctoral)

Area	N	Number of Cases Required	Mean	Standard Deviation	Median	Minimum
Total Number of Cases	2,128	600	855.1	141.0	864.5	608
Total Hours of Anesthesia	2,128	0	1,768.0	357.1	1,715.5	470
Total Clinical Hours	2,128	0	2,731.5	329.6	2,703	2,000

Table 8a. Section IV: Patient Physical Status (Master's)

Area	N	Number of Cases Required	Mean	Standard Deviation	Median	Minimum
Class I	682	0	79.2	42.2	73	3
Class II	682	0	343.6	92.6	332.5	15
Class III-VI Total	682	200	464.5	136.7	446.5	204
Class III	682	50	368.0	94.6	360	128
Class IV	682	10	89.6	60.5	75	15
Class V	682	0	6.2	15.3	2	0
Class VI	682	0	0.7	1.7	0	0

Table 8b. Section IV: Patient Physical Status (Doctoral)

Area	N	Number of Cases Required	Mean	Standard Deviation	Median	Minimum
Class I	2,128	0	73	32.3	68	2
Class II	2,128	0	342.0	86.2	334	115
Class III-VI Total	2,128	200	470.1	103.4	459	208
Class III	2,128	50	383.5	89.2	359	168
Class IV	2,128	10	83.1	35.1	75	19
Class V	2,128	0	3.0	3.4	2	0
Class VI	2,128	0	0.5	2.3	0	0

Table 9a. Section V: Special Cases (Master's)

Area	N	Number of Cases Required	Mean	Standard Deviation	Median	Minimum
Geriatric, 65+ years	682	100	291.6	82.7	277.5	129
Pediatric, 2-12 years	682	30	62.4	29.3	54	30
Pediatric, under 2 years	682	10	20.6	11.3	17	10
Neonatal, under 4 weeks	682	0	1.1	2.6	0	0
Trauma/Emergency	682	30	54.0	22.1	48	30
Obstetrical Management	682	30	69.0	34.2	61	30
Cesarean delivery	682	10	33.8	16.1	31	10
Analgesia for labor	682	10	35.3	22.6	30	10
Pain Management Encounters	682	15	53.0	54.1	36.5	15

Table 9b. Section V: Special Cases (Doctoral)

Area	N	Number of Cases Required	Mean	Standard Deviation	Median	Minimum
Geriatric, 65+ years	2,128	100	279.0	72.4	271.5	116
Pediatric, 2-12 years	2,128	30	62.9	26.2	62.9	30
Pediatric, under 2 years	2,128	10	20.3	10.0	18	10
Neonatal, under 4 weeks	2,128	0	1.2	1.7	0	0
Trauma/Emergency	2,128	30	53.0	21.5	48	30
Obstetrical Management	2,128	30	66.5	32.1	59	30
Cesarean delivery	2,128	10	29.7	14.9	26	10
Analgesia for labor	2,128	10	36.7	23.7	30	10
Pain Management Encounters	2,128	15	51.8	42.2	40	15

Table 10a. Section VI: Anatomical Categories (Master's)

Area	N	Number of Cases Required	Mean	Standard Deviation	Median	Minimum
Intra-abdominal	682	75	189.6	61.4	180	83
Intracranial Total	682	5	14.2	8.3	12	5
Intracranial Open	682	3	10.4	6.2	9	3
Intracranial Closed	682	0	3.8	4.3	3	0
Oropharyngeal	682	20	88.0	48.0	80	20
Intrathoracic Total	685	15	46.3	26.8	41	15
Heart	685	5	30.8	17.4	27	5
Open Heart Total	682	5	14.8	8.0	13	5
Open Heart with CPB	682	0	13.0	7.4	12	1
Open Heart without CPB	682	0	1.8	2.4	1	0
Closed Heart	682	0	16.1	14.0	12	0
Lung	682	5	10.4	5.8	9	5
Other	682	0	5.1	18.4	3	0
Neck	682	5	21.3	10.3	21	5
Neuroskeletal	682	20	47.4	28.2	41	20
Vascular	682	10	36.7	19.5	33	10

Table 10b. Section VI: Anatomical Categories (Doctoral)

Area	N	Number of Cases Required	Mean	Standard Deviation	Median	Minimum
Intra-abdominal	2,128	75	185.5	57.2	176	76
Intracranial Total	2,128	5	14.4	7.3	13	5
Intracranial Open	2,128	3	10.3	5.4	9	3
Intracranial Closed	2,128	0	4.1	4.3	3	0
Oropharyngeal	2,128	20	97.9	49.8	91	20
Intrathoracic Total	2,128	15	46.9	33.5	41	15
Heart	2,128	5	28.0	15.0	25	5
Open Heart Total	2,128	5	13.7	7.0	12	5
Open Heart with CPB	2,128	0	12.1	6.5	11	0
Open Heart without CPB	2,128	0	1.6	2.1	1	0
Closed Heart	2,128	0	14.3	12.1	12	0
Lung	2,128	5	10.7	5.6	9	5
Other	2,128	0	8.6	30.5	4	0
Neck	2,128	5	23.7	10.7	22	5
Neuroskeletal	2,128	20	44.3	22.5	40	20
Vascular	2,128	10	39.4	18.7	36	10

Table 11a. Section VII: Methods of Anesthesia (Master's)

Area	N	Number of Cases Required	Mean	Standard Deviation	Median	Minimum
General Anesthesia	682	400	628.8	128.1	612	402
Inhalation Induction	682	25	73.4	48.7	62.5	25
Mask Management	682	25	51.6	37.3	39.5	25
Supraglottic Airway Devices (total of a & b)	682	35	120.2	50.8	111	36
a. Laryngeal mask	682	0	115.8	50.6	106	0
b. Other	682	0	4.3	15.3	0	0
Tracheal Intubation (total of a & b)	682	250	404.4	92.2	392.5	251
a. Oral	682	0	388.9	88.1	373.5	241
b. Nasal	682	0	15.4	15.6	11	0
Alternative Tracheal Intub/Endo (total of a & b)	682	25	77.5	46.7	68	25
a. Endoscopic techniques, total	682	5	19.8	35.0	9	5
1. Actual Placement	682	0	17.5	34.8	7	0
2. Simulated Placement	682	0	2.3	3.4	1	0
3. Airway Assessment	682	0	17.5	73.3	6	0
b. Other techniques	682	5	57.7	41.2	52	5
Emergence from Anesthesia	682	300	603.2	138.5	592	311
Regional Techniques	682					
Actual Administration (total of a, b, c & d)	682	35	154.6	100.3	127	36
a. Spinal (total of 1 & 2)	682	10	54.6	30.7	48	10
1. Spinal Anesthesia	682	0	50.3	29.4	44	1
2. Spinal Pain Management	682	0	4.3	8.4	1	0
b. Epidural (total of 1 & 2)	682	10	33.3	21.4	28	10
1. Epidural Anesthesia	682	0	8.3	11.3	4	0
2. Epidural Pain Management	682	0	25.0	20.1	19	0
c. Peripheral (total of 1, 2, 3 & 4)	682	10	57.1	78.0	33.5	10
1. Anesthesia Upper	682	0	12.6	19.3	8	0
2. Anesthesia Lower	682	0	13.5	38.5	6	0
3. Pain Management Upper	682	0	11.2	18.4	5	0
4. Pain Management Lower	682	0	19.7	37.3	9	0
d. Other	682					
1. Anesthesia	682	0	7.3	13.5	3	0
2. Pain Management	682	0	2.7	6.5	0	0
Management (total of 1 & 2)	682	35	100	53.7	91	35
1. Anesthesia	682	0	56.0	40.3	47.5	0
2. Pain Management	682	0	44.0	37.4	35	0
Moderate/deep sedation	682	25	139.7	90.8	126.5	25

Table 11b. Section VII: Methods of Anesthesia (Doctoral)

Area	N	Number of Cases Required	Mean	Standard Deviation	Median	Minimum
General Anesthesia	2,128	400	632.2	112.7	620	400
Inhalation Induction	2,128	25	75.6	37.9	67	25
Mask Management	2,128	25	55.8	55.7	39	25
Supraglottic Airway Devices (total of a & b)	2,128	35	121	55.6	113	35
a. Laryngeal mask	2,128	0	116.2	49.9	110	3
b. Other	2,128	0	4.7	25.5	0	0
Tracheal Intubation (total of a & b)	2,128	250	408.2	76.8	398.5	256
a. Oral	2,128	0	390.3	74.4	380	236
b. Nasal	2,128	0	16.8	13.4	14	0
Alternative Tracheal Intub/Endo (total of a & b)	2,128	25	85.5	46.2	76	25
a. Endoscopic techniques, total	2,128	5	14.5	19.2	8	5
1. Actual Placement	2,128	0	10.6	18.0	6	0
2. Simulated Placement	2,128	0	3.8	8.4	2	0
3. Airway Assessment	2,128	0	8.4	19.5	6	0
b. Other techniques	2,128	5	71.1	45.4	64	5
Emergence from Anesthesia	2,128	300	609.1	137.5	589	311
Regional Techniques	2,128					
Actual Administration (total of a, b, c & d)	2,128	35	94.7	56.5	78	35
a. Spinal (total of 1 & 2)	2,128	10	44.4	25.2	39	10
1. Spinal Anesthesia	2,128	0	40.1	23.4	35	0
2. Spinal Pain Management	2,128	0	4.4	8.8	1	0
b. Epidural (total of 1 & 2)	2,128	10	33.9	22.3	27	10
1. Epidural Anesthesia	2,128	0	10.1	13.7	5	0
2. Epidural Pain Management	2,128	0	23.8	19.5	19	0
c. Peripheral (total of 1, 2, 3 & 4)	2,128	10	49.1	44.0	36	10
1. Anesthesia Upper	2,128	0	11.4	12.8	8	0
2. Anesthesia Lower	2,128	0	12.5	16.6	8	0
3. Pain Management Upper	2,128	0	9.6	15.2	5	0
4. Pain Management Lower	2,128	0	15.6	23.2	8	0
d. Other	2,128					
1. Anesthesia	2,128	0	2.5	6.2	0	0
2. Pain Management	2,128	0	6.1	12.3	1	0
Management (total of 1 & 2)	2,128	35	94.7	56.5	78	35
1. Anesthesia	2,128	0	48.8	36.2	40	0
2. Pain Management	2,128	0	45.9	38.6	36	0
Moderate/deep sedation	2,128	25	149.7	92.4	134	25

Table 12a. Section VIII: Arterial Technique (Master's)

Area	N	Number of Cases Required	Mean	Standard Deviation	Median	Minimum
Arterial Puncture/Catheter Insertion	682	25	54.4	25.0	49	25
Intraarterial Blood Pressure Monitoring	682	30	76.3	26.8	73	30

Table 12b. Section VIII: Arterial Technique (Doctoral)

Area	N	Number of Cases Required	Mean	Standard Deviation	Median	Minimum
Arterial Puncture/Catheter Insertion	2,128	25	56.9	25.0	51	25
Intraarterial Blood Pressure Monitoring	2,128	30	82.5	27.6	79	30

Table 13a. Section IX: Central Venous Pressure Catheter (Master's)

Area	N	Number of Cases Required	Mean	Standard Deviation	Median	Minimum
Placement—Non-PICC (total of a & b)	682	10	14.6	6.6	12	10
a. Non-PICC, Actual	682	0	10.4	7.6	10	0
b. Non-PICC, Simulated	682	0	4.2	5.1	2	0
Placement—PICC (total of a & b)	682	0	1.1	4.6	0	0
a. PICC, Actual	682	0	0.8	3.3	0	0
b. PICC, Simulated	682	0	0.3	2.0	0	0
Monitoring	682	15	22.5	9.0	20	15

Table 13b. Section IX: Central Venous Pressure Catheter (Doctoral)

Area	N	Number of Cases Required	Mean	Standard Deviation	Median	Minimum
Placement—Non-PICC (total of a & b)	2,128	10	14.7	6.3	13	10
a. Non-PICC, Actual	2,128	0	10.6	7.6	10	0
b. Non-PICC, Simulated	2,128	0	4.1	4.1	3	0
Placement—PICC (total of a & b)	2,128	0	0.5	2.0	0	0
a. PICC, Actual	2,128	0	0.4	1.8	0	0
b. PICC, Simulated	2,128	0	0.1	0.6	0	0
Monitoring	2,128	15	22.2	8.3	20	15

Table 14a. Section X: Pulmonary Artery Catheter (Master's)

Area	N	Number of Cases Required	Mean	Standard Deviation	Median	Minimum
Placement	682	0	4.7	5.9	3	0
Monitoring	682	0	10.1	8.4	9	0

Table 14b. Section X: Pulmonary Artery Catheter (Doctoral)

Area	N	Number of Cases Required	Mean	Standard Deviation	Median	Minimum
Placement	2,128	0	5.0	6.2	4	0
Monitoring	2,128	0	9.9	7.4	9	0

Table 15a. Section XI: Other (Master's)

Area	N	Number of Cases Required	Mean	Standard Deviation	Median	Minimum
Ultrasound (US)-Guided Techniques (total of a & b)	682	0	62.0	74.3	40	0
a. Regional	682	0	45.5	67.0	24.5	0
b. Vascular	682	0	16.5	18.4	11	0
Intravenous Catheter Placement	682	100	172.2	78.5	145	100
Advanced Noninvasive Hemodynamic Monitoring	682	0	17.7	88.4	2	0

Table 15b. Section XI: Other (Doctoral)

Area	N	Number of Cases Required	Mean	Standard Deviation	Median	Minimum
Ultrasound (US)-Guided Techniques (total of a & b)	2,128	0	58.5	60.6	43	0
a. Regional	2,128	0	38.4	52.9	21	0
b. Vascular	2,128	0	20.1	19.6	15	0
Intravenous Catheter Placement	2,128	100	168.2	74.6	145	100
Advanced Noninvasive Hemodynamic Monitoring	2,128	0	22.1	100.8	2	0

NCE Exit Survey Results

Candidates provide important ongoing sources of evaluative information about the examination process. This information serves as essential input for the continuous quality improvement initiatives of the NBCRNA. Candidates are asked to complete a post-examination survey regarding their testing experience. The post-examination survey addressed the following four areas:

- Pre-examination activities such as scheduling, registration, locating the testing center, and interaction with test center staff;
- Examination and testing experience such as content fairness, content readability, test-center experience, and use of testing software;
- Examinee perception of the alternative question formats; and
- Personal preparation prior to examination.

Most of the questions employ a Likert-type rating scale, where respondents are asked to indicate their level of agreement with the survey statements. For the purposes of this report, the Likert response categories, *Strongly Agree* and *Agree*, are combined into a single *Agree* category, and *Strongly Disagree* and *Disagree* are combined into *Disagree*. Completion of the survey is not required as part of the examination process and is not part of the three-hour time limit for the NCE.

Responses were analyzed based NCE candidates who were administered the exit survey during the period of CY2022. The responses represent tests administered. If a candidate tested more than once during 2022, their responses would be counted each time they completed the survey.

For the purpose of streamlining the post-exam survey, the NBCRNA removed some redundant survey items removed in September 2022. For completion of reporting, responses to both current and removed survey items are included; however, removed items will have smaller *Ns*. Additionally, the *N* across items may be slightly inconsistent due to the following.

- Candidates did not always answer every question because they are optional.
- Prior to September 2022, the survey was split into two unique question sets and randomly administered. Thus, there were small differences in the final numbers of candidates exposed to each of these two question sets.

Candidates continue to indicate satisfaction with scheduling dates and locations. Both dates and locations were rated acceptable by 92.5% of candidates. However, this is slightly less than CY2021 (94.5% for date and 93.2% for location), likely due to testing sites being restricted again after an initial expansion during the COVID pandemic. Other pre-examination activities were rated acceptable by over 97% of candidates. Regardless of how they responded, candidates can contact the NBCRNA office after each test administration to address any problems or concerns.

Table 16. Responses to Survey Questions: Scheduling and Registration

Survey Question	Agree		Disagree	
	Count	Percent	Count	Percent
I was able to schedule an acceptable test date.	3,286	92.5%	231	6.5%
I was able to schedule an acceptable test center location.	3,285	92.5%	231	6.5%
The exam reservation process was easy to use.	3,466	97.6%	52	1.5%
The test center was easy to locate.	3,458	97.4%	60	1.7%
The testing center registration/check-in process was handled in a professional and efficient manner.	3,463	97.5%	53	1.5%

Six items relate to topics such as content alignment with curricula, content readability, and test-center operations. **Table 17** summarizes the responses to these survey items. Overall, the CY2022 NCE candidates were satisfied with their testing experience (97.0% agreement). Agreement concerning the content alignment with curricula increased from 90.8% in CY2021 to 92.7% in CY2022. Image content readability also increased from 88.4% in CY2021 to 95.1% in CY2022.

Table 17. Responses to Survey Questions: Examination and Testing Experience

Survey Question	Agree		Disagree	
	Count	Percent	Count	Percent
The questions on my test today reflected the knowledge and subject matter I have been taught in my educational program.	3,291	92.7%	213	6.0%
The graphs, figures, and diagrams in the questions were legible.	3,376	95.1%	127	3.6%
The graphs, figures, and diagrams in the questions fit onto the screen.	3,434	96.7%	63	1.8%
My testing environment was clean, quiet, and comfortable.	3,440	96.9%	76	2.1%
I encountered no technical problems with the test administration software.	3,441	96.9%	74	2.1%
Overall, I was satisfied with my testing experience.	3,444	97.0%	67	1.9%

In addition to traditional multiple-choice items, the NCE includes the following alternative-item formats.

- Multiple correct response (MCR): the key is a *set* of options. Examinees are instructed how many options to select.
- Short answer/calculation (SA): there are no options to select—the key is a short numerical response.
- Drag and drop (DND): options are ordered or matched using the mouse.

- Hotspot (HS): the key is a region on an image that must be selected with the mouse. Boundaries indicating keyable areas are hidden from examinees.

Table 18 summarizes candidate ability to understand and respond to alternative items. In September 2021, the survey was revised to ask one general question about alternative items instead of one question per item type. Overall, candidates continue to respond positively with 98.3% agreeing that they understand how to use alternative items compared to 97.2% in CY2021.

Table 18. Responses to Survey Questions: Alternative Item Formats

Survey Question	Agree		Disagree	
	Count	Percent	Count	Percent
I understood how to respond to the questions in the alternative formats.	3,488	98.3%	18	0.5%

Responses to items regarding NCE preparation are summarized in **Table 19**. Of the NCE examinees tested in CY2022, 83.6% agreed that the SEE helped them in their certification examination preparation. This is an increase from 81.4% in CY2021 and continues the steady increase in the past several years (from under 60% in FY2017). Of the various review courses available to examinees, APEX Anesthesia Review was most frequently identified as being utilized by candidates (79.6%) for preparation for the NCE.

Table 19. Responses to Survey Questions: Preparation for the NCE

Survey Question	Response	Count	Percent
Taking the SEE helped prepare me to take the certification examination.	Agree	2,968	83.6%
	Disagree	479	13.5%
If you took a review course in preparation for this examination, please indicate below which review course you took. If you attended more than one review course, please select the review course you attended which was of the longest duration.	A. Valley Anesthesia Review	204	5.7%
	B. Core Concepts Anesthesia Review	69	1.9%
	C. Prodigy Anesthesia Certification Exam Simulator (PACES)	152	4.3%
	D. APEX Anesthesia Review	2,828	79.6%
	E. Storm Anesthesia	2	0.1%
	F. Another commercial course	10	0.3%
	G. A review course organized by my nurse anesthesia program	59	1.7%
	H. I did not take a review course before this examination	143	4.0%

Demographic Characteristics of the SEE Examinee Population, 2022

The following section summarizes examinee performance on the SEE according to demographics and program year. Variables include gender, age, clinical background, and degree. Scores are from CY2022 with a column on the right of each table displaying five-year trend averages (Year 2018 through 2022; January 1, 2018–December 31, 2022, $N = 25,489$). **Table A3** of Appendix A summarizes SEE domain-level scores according to program year.

Table 20 summarizes SEE scores by gender and program year. SEE examinees responded 61.9% female, 37.8% male, and 0.2% other. The mean total scores increased by program year: 399.8 ($n = 98$) for year 1, 407.7 ($n = 1857$) for year 2, 429.8 ($n = 4258$) for year 3 and above, and 422.7 ($n = 6213$) overall. The five-year trend information (last column) shows a similar pattern. 399.4 for year 1, 410.2 for year 2, 428.3 for year 3 and above, and 420.9 overall.

When subdivided by gender, examinees responding male or other consistently scored higher than examinees responding female.

Table 20. SEE Candidate Performance by Gender and Program Year, 2022

Program Year	Gender	Count	Mean	Standard Deviation	5-year Trend Mean*
Year 1	Female	55	393.4	41.4	391.8
	Male	43	407.9	44.5	408.9
	Other	-	-	-	-
	Not Provided	-	-	-	367.0
	Total	98	399.8	43.2	399.4
Year 2	Female	1160	404.5	42.9	406.1
	Male	687	412.9	46.7	416.3
	Other	9	431.4	37.8	438.3
	Not Provided	1	401.0	-	398.8
	Total	1857	407.7	44.5	410.2
Year 3 and above	Female	2632	426.2	42.3	425.2
	Male	1619	435.7	40.8	433.0
	Other	5	428.8	31.7	428.8
	Not Provided	2	491.5	34.6	491.5
	Total	4258	429.8	42.0	428.3
Total	Female	3847	419.2	43.7	417.5
	Male	2349	428.5	44.0	426.1
	Other	14	430.5	34.5	435.1
	Not Provided	3	461.33	57.7	412.3
	Total	6213	422.7	44.0	420.9

*Nonbinary gender choices were introduced to NAEP students entering programs after January, 2020. Five-year trends for the *Other* category will include data only from 2020-2022.

Table 21 summarizes SEE scores by age group and program year. The mean age of year-1 SEE examinees was 31.0 years. The mean age of year-2 SEE examinees was 31.1 years. The mean age of year-3 and beyond SEE examinees was 32.3 years. The mean age of all SEE examinees during the period was 31.9 years, compared to first-time NCE examinees (32.5 years) over the same period. The largest age groups were composed of examinees under the age of 30 (38.4%) and examinees between the ages of 30 and 35 (41.8%). In 2022, younger examinees scored higher than older examinees overall and within the same training year (except for the group of 5 examinees 40 or older in year 1). Similar results were found in the five-year trending sample.

Table 21. SEE Candidate Performance by Age and Program Year, 2022

Program Year	Age	Count	Mean	Standard Deviation	5-year Trend Mean
Year 1	Under 30	46	402.5	45.3	403.0
	30 - 35	35	396.5	43.1	399.8
	36 - 39	12	396.4	45.4	389.2
	40 or above	5	405.8	20.3	387.1
	Total	98	399.8	43.2	399.4
Year 2	Under 30	851	409.9	43.3	413.6
	30 - 35	717	408.7	44.5	409.7
	36 - 39	166	404.6	46.6	406.3
	40 or above	123	391.3	47.1	398.2
	Total	1857	407.7	44.5	410.2
Year 3 and above	Under 30	1486	432.8	43.0	432.3
	30 - 35	1845	429.7	41.9	428.2
	36 - 39	530	426.0	39.1	423.0
	40 or above	396	424.6	41.2	420.5
	Total	4257	429.8	42.0	428.3
Total	Under 30	2383	424.0	44.6	423.5
	30 - 35	2597	423.4	43.8	421.3
	36 - 39	708	420.5	42.1	416.7
	40 or above	524	416.6	44.8	412.8
	Total	6212	422.7	44.0	420.9

Table 22 displays summaries of SEE scores by clinical background and program year. Overall, the most commonly identified clinical settings were ICU/CCU (30.3%) and SICU (21.0%).

When comparing SEE performance across clinical background subgroups, be aware of the small counts which can make comparisons spurious. The five-year trend columns and overall means tend to be more reliable because they are based on much larger sample sizes.

Table 22. SEE Candidate Performance by Clinical Background and Program Year, 2022

	Clinical Background	Count	Mean	Std Dev	5-Yr Mean	Program Year	Clinical Background	Count	Mean	Std Dev	5-Yr Mean
Year 1	CCU	8	386.8	50.7	396.6	Year 3 & Above	CCU	392	434.1	41.0	431.0
	ER	2	409.0	26.9	411.2		ER	64	425.8	46.9	424.4
	ICU/CCU	20	401.5	55.0	400.5		ICU/CCU	1252	428.3	44.4	427.5
	MICU	6	413.2	33.2	395.1		MICU	602	429.4	42.5	426.9
	NEURO ICU	0	-	-	401.4		NEURO ICU	214	426.8	38.7	426.1
	NICU	0	-	-	393.7		NICU	46	418.0	37.8	423.2
	OR	0	-	-	387.8		OR	12	436.3	26.6	427.2
	PACU	2	409.0	8.5	388.1		PACU	89	423.5	42.6	423.9
	PICU	1	468.0	-	394.6		PICU	206	434.0	35.8	428.6
	SICU	45	390.5	40.7	400.1		SICU	821	430.4	40.5	430.0
	TRAUMA ICU	14	421.43	25.6	403.7		TRAUMA ICU	430	431.9	41.0	433.0
	Other	0	-	-	411.7		Other	0	-	-	424.1
	Not Provided	0	-	-	392.5		Not Provided	130	430.8	42.8	429.9
	Total	98	399.8	43.2	399.4		Total	4258	429.8	42.0	428.3
Year 2	CCU	143	416.9	46.3	413.8	Total	CCU	543	428.9	43.5	423.8
	ER	40	395.8	57.4	408.2		ER	106	414.1	52.5	418.0
	ICU/CCU	610	406.6	45.1	408.8		ICU/CCU	1882	421.0	45.9	420.0
	MICU	232	412.5	40.5	412.0		MICU	840	424.7	42.5	420.3
	NEURO ICU	62	399.9	42.3	412.4		NEURO ICU	276	420.8	41.1	420.7
	NICU	20	397.3	55.8	405.1		NICU	66	411.7	44.6	415.4
	OR	6	415.0	64.8	401.1		OR	18	429.2	42.4	418.9
	PACU	37	410.6	45.5	403.7		PACU	128	419.6	43.4	416.3
	PICU	86	412.5	38.5	413.4		PICU	293	427.8	37.8	422.4
	SICU	441	403.6	45.4	409.4		SICU	1307	419.9	44.4	421.4
	TRAUMA ICU	158	412.3	39.9	410.8		TRAUMA ICU	602	426.5	41.3	424.0
	Other	0	-	-	414.2		Other	0	-	-	420.7
	Not Provided	22	407.1	43.3	394.7		Not Provided	152	427.4	43.6	421.9
	Total	1857	407.7	44.5	410.2		Total	6213	422.7	44.0	420.9

Table 23 displays summaries of SEE scores by degree upon completion and program year. The percentage of SEE examinees enrolled in MSN programs (as expected) continued to decrease in 2022 (6.4%) compared to 2021 (12.7%) and 2020 (16.2%). The number of SEE examinees in doctoral programs continued to increase (as expected) in 2022 ($N = 4916$; 79.1%) over the previous years: 2021 ($N = 4053$; 69.6%) and 2020 ($N = 2,620$; 58.9%). Exercise caution when comparing scores among subgroups with small counts.

Table 23. SEE Candidate Performance by Graduate Degree and Program Year, 2022

Program Year	Degree Upon Completion	Count	Mean	Standard Deviation	5-year Trend Mean
Year 1	MS Nurse Anesthesia	53	407.6	41.3	405.2
	MS Nursing Major	12	341.4	35.1	381.8
	Other Masters	22	411.6	28.3	412.9
	Doctoral	11	401.9	38.6	395.5
	Not Provided	0	-	-	328.7
	Total	98	399.8	43.2	399.4
Year 2	MS Nurse Anesthesia	329	410.6	51.2	413.3
	MS Nursing Major	165	432.8	48.5	419.6
	Other Masters	35	439.5	24.2	421.2
	Doctoral	1321	403.0	41.2	402.7
	Not Provided	7	412.3	21.7	382.4
	Total	1857	407.7	44.5	410.2
Year 3 and above	MS Nurse Anesthesia	249	430.6	56.2	428.6
	MS Nursing Major	219	430.8	38.0	434.4
	Other Masters	188	427.9	37.6	427.8
	Doctoral	3584	429.8	41.2	427.4
	Not Provided	18	425.5	49.4	415.3
	Total	4258	429.8	42.0	428.3
Total	MS Nurse Anesthesia	631	418.3	53.4	419.1
	MS Nursing Major	396	428.9	45.3	424.0
	Other Masters	245	428.1	35.7	424.5
	Doctoral	4916	422.6	42.9	420.5
	Not Provided	25	421.8	43.4	391.6
	Total	6213	422.7	44.0	420.9

Post-master's Certificate is reported together with *Other Master's*; *MS Nurse Anesthesia/Anesthesiology* is reported together with *MS Nurse Anesthesia*.

Appendix A - Additional NCE and SEE Performance Data

Table A1. NCE Pass Rate Trends—First-Time Candidates 2008 through December 31, 2022

Reporting Period	Percent Passing
2008* (Graduates 2007 – 2008)	89.9
2009 (Graduates after 2008)	87.7
2010	88.9
2011	89.1
FY2012	88.5
FY2013	88.4
FY2014**	87.8
FY2015	85.0
FY2016	84.5
FY2017	82.6
FY2018	84.3
CY2019	84.4
CY2020	85.2
CY2021	84.1
CY 2022	83.4

*Passing standard increased in August 2008

**Passing standard increased in January 2014

Table A2. Descriptive Statistics for NCE Total and Domain-Level Scores—First-Time Candidates 2022 (January 1, 2022 – December 31, 2022)

	Mean	Standard Deviation
Total Score	493.4	47.5
Basic Science	496.6	65.6
Equipment, Instrumentation and Technology	510.3	76.7
General Principles of Anesthesia	494.1	58.0
Anesthesia for Surgical Procedures and Special Populations	495.5	57.7

Table A3. Descriptive Statistics for SEE Scores and Domain-Level Information, 2022 (January 1, 2022 – December 31, 2022)

	1st Year in Program		2nd Year in Program		3rd Year in Program		All	
	Avg	SD	Avg	SD	Avg	SD	Avg	SD
Total	399.8	43.2	407.7	44.5	430.2	42.2	422.7	44.0
Basic Science	400.6	45.3	408.1	51.3	426.9	51.1	420.7	51.7
Equipment, Instrumentation and Technology	396.0	48.4	408.8	47.4	432.7	45.9	424.6	47.6
General Principles of Anesthesia	404.9	50.5	410.1	48.7	432.7	46.3	425.3	48.0
Anesthesia for Surgical Procedures and Special Populations	401.4	45.2	407.3	50.2	431.8	47.0	423.6	49.0