Introduction

The ARRT offers two eligibility pathways for certification and registration: primary and postprimary. This report summarizes the results of examinations taken through the primary eligibility pathway in 2019 for Radiography (RAD), Nuclear Medicine (NMT), Radiation Therapy (THR), Sonography (SON), and Magnetic Resonance Imaging (MRI). This report uses an annual cycle from January to December that aligns with updates to the content specifications and clinical experience requirements for these exams. During the reported cycle, both the Sonography and Magnetic Resonance Imaging exams could be taken through either the primary or postprimary eligibility pathway. Only results for those taking the exams though the primary eligibility pathway are reported here.

This report summarizes exam volume, first-time candidate exam performance, individual percentile ranks, and school percentile ranks for each examination separately. Each following section presents a brief content outline for the exam and the number of items in each category. Specific results for 2019 are presented including mean scaled section scores, mean total scaled scores, and pass rates as well as charts with historical pass rates and candidate volumes for each exam. Finally, a map detailing first-time candidate volume, mean scaled score, and percent passing for educational programs in each state is included.

Data in this report are not intended to be used as the sole source for educational program evaluation. When interpreting performance at the educational program or state level, it is important to acknowledge that these results are sensitive to multiple factors. These factors may include but are not limited to the number of candidates upon which the means are computed, characteristics of those candidates, educational program admissions criteria, and the emphasis of an educational program's curriculum.

Interpretation of Scores

Total Scaled Score: The ARRT uses scaled scores to report exam results. Total scaled scores can range from 1 to 99.

Scaled scores are desirable because they account for any differences in difficulty between two or more versions of an exam. The use of scaled scores adjusts for differences in exam difficulty such that a given scaled score corresponds to the same level of performance regardless of exam form and permits comparison of exam results over time. Using scaled scores also ensures that those taking different forms are not penalized for taking a slightly more difficult exam.

Scaled scores are sometimes mistaken for percent correct scores. This confusion likely arises because ARRT scaled scores and percentages share a similar range of values. However, a scaled score of 75 does not mean that a candidate correctly answered 75% of the test items.

Section Scores: Scaled scores are used to report performance on each section of the exam. The primary purpose of the section scores is to provide general information to candidates regarding their strengths and weaknesses in particular content categories. Section scores can range from 0.1 to 9.9 and are reported in one-tenth point intervals (e.g., 8.1, 8.6). Section scores are intentionally placed on a narrower scale because they are often based on a small number of test

items. Therefore, section scores are not as reliable as the total scaled score and should be interpreted with some caution.

Passing Score: A total scaled score of 75 is required to pass all ARRT exams. This pass-fail point, called the "cut score," is established by ARRT's Board of Trustees through a process called standard setting. During the standard setting process, the Board receives input from a panel representing a broad constituency of radiologic technologists. The cut score represents the performance standard required to obtain certification and registration; those who meet or exceed the standard pass the exam. Beginning in 2013, the Sonography exam also requires a section scaled score of 7.5 or greater in both the Abdomen and OB/GYN sections.

Readers interested in more detailed reporting, such as an explanation of ARRT's scaling procedures, or past years' reports are encouraged to visit the exam statistics page on the ARRT website.

Updates

On January 1, 2019, ARRT began using a new cut score for the Radiation Therapy examination. Although we'll continue to report the exam's cut score as a scaled score of 75, the new cut score requires passing candidates to answer a few more questions correctly than they had to in the past.

Updated content specifications were implemented for the Sonography examination on January 1, 2019.

Summary Statistics

Exam Volume

Exam	First-time Candidates	Repeat	State	Reinstatement	Total
Radiography	11769	1737	39	429	13974
Nuclear Medicine	394	51	0	13	458
Radiation Therapy	823	131	0	18	972
Sonography	397	94	0	2	493
Magnetic Resonance Imaging	514	88	0	2	604

Note: The "State" category includes non-ARRT candidates who take an exam only for state licensure. The "Reinstatement" category includes all reinstatement by re-examination candidates.

First-time Candidate Exam Performance

Exam	Approximate % Correct to Pass	Mean Scaled Score	Pass %
Radiography	67	83.4	89.0
Nuclear Medicine	61	83.2	89.6
Radiation Therapy	68	81.9	86.6
Sonography*	67	78.5	63.5
Magnetic Resonance Imaging	66	80.3	76.8

*The Sonography exam requires a passing candidate to achieve a scaled score of 75 or greater on the whole exam, and in addition, achieve section scaled scores of 7.5 or greater in both the Abdominal and OB/GYN sections.

Individual Performance Percentiles (First-time Candidates)

Percentile Rank	Scaled Score				
	RAD	NMT	THR	SON	MRI
95	93	93	92	91	93
90	92	91	90	89	91
85	91	90	89	87	90
80	90	89	88	86	89
75	89	88	87	85	88
70	88	88	86	84	87
65	87	87	85	83	86
60	86	86	84	82	84
55	85	85	83	81	83
50	84	84	82	80	82
45	83	83	82	79	81
40	83	82	81	77	80
35	82	81	80	76	78
30	80	80	79	75	77
25	79	78	78	74	75
20	78	78	77	71	73
15	76	76	76	69	69
10	74	74	73	67	67
5	70	71	70	61	62

Note: This percentile rank indicates the percentage of candidates scoring below a specified scaled score. Exams with fewer than 60 candidates are reported with fewer percentile categories.

Educational Program Mean Performance Percentiles (First-time Candidates)

Percentile Rank	Scaled Score				
	RAD	NMT	THR	SON	MRI
95	89	90	89	88	90
90	88	89	88	84	89
85	87	88	86	83	88
80	87	87	85	83	87
75	86	86	84	83	86
70	86	86	84	82	85
65	85	85	83	81	84
60	85	84	82	81	84
55	84	84	82	81	83
50	84	83	82	80	82
45	84	83	81	78	82
40	83	82	81	78	81
35	83	81	80	77	80
30	82	80	80	77	80
25	82	79	80	76	78
20	81	79	79	75	77
15	80	78	78	74	76
10	78	76	77	74	76
5	76	75	75	70	73

Note: This percentile rank indicates the percentage of educational programs below a specified scaled score. Exams with fewer than 60 educational programs are reported with fewer percentile categories.
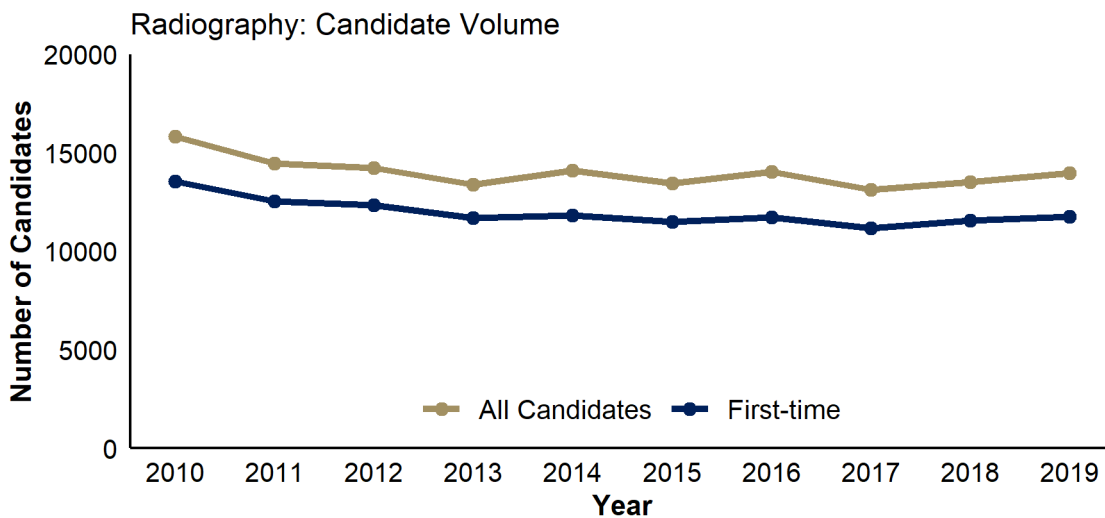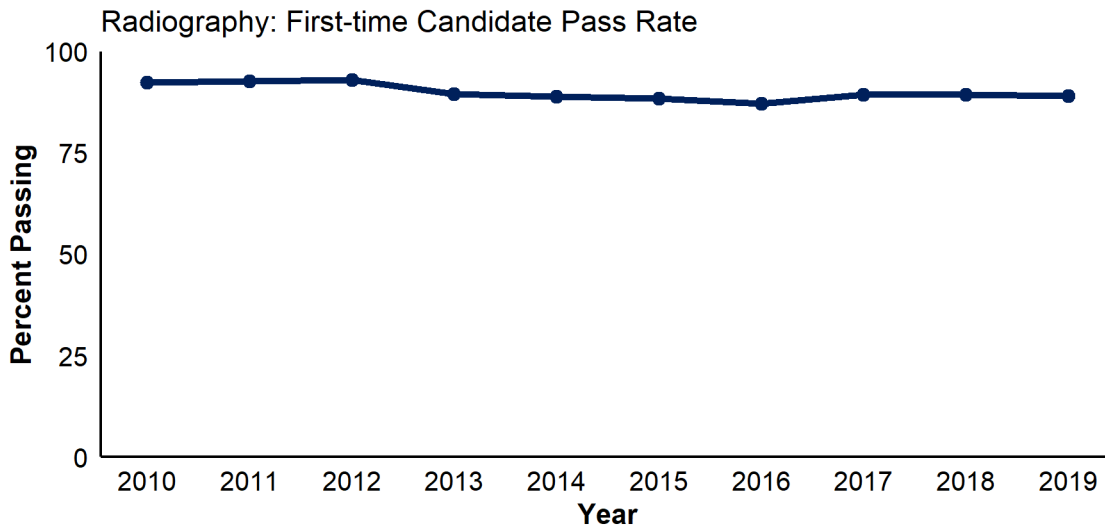
Exam Performance for Radiography

Content Categories and First-time Candidate Scores

Content Categories	# Items	Mean Score
Patient Care: Patient Interactions and Management	33	8.4
Safety: Radiation Physics and Radiobiology	22	8.2
Safety: Radiation Protection	31	8.2
Image Production: Image Acquisition and Technical Evaluation	21	8.1
Image Production: Equipment Operation and Quality Assurance	29	8.1
Procedures: Head, Spine, and Pelvis	18	8.5
Procedures: Thorax and Abdomen	21	8.4
Procedures: Extremity	<u>25</u>	<u>8.6</u>
Total	200	83.4

Pass Rate: 89.0%

Radiography: First-time Candidate Pass Rate

Radiography: Candidate Volume

Radiography
Number of First-time Candidates, Mean Scaled Score, and Percentage Passing*

182
85.5
92.9%

44
84.0
88.6%

28
89.6
100.0%

214
84.4
91.1%

43
81.0
83.7%

3
72.0
33.3%

58
84.6
93.1%

108
87.6
97.2%

78
85.3
93.6%

61
86.4
96.7%

234
84.6
91.9%

696
83.8
90.7%

202
81.4
81.7%

27
83.8
88.9%

144
83.8
90.3%

350
83.7
93.1%

469
82.7
88.1%

43
83.3
88.4%

109
83.5
92.7%

554
83.3
90.8%

238
85.2
94.5%

467
83.6
89.1%

240
84.1
90.8%

84
83.6
92.9%

141
85.1
92.2%

176
84.7
91.5%

105
84.3
92.4%

219
84.6
95.4%

201
84.7
96.0%

101
84.2
95.0%

271
83.6
89.7%

135
82.9
88.1%

791
85.4
94.1%

25
85.2
100.0%

375
85.8
96.3%

158
80.9
78.5%

142
83.3
90.1%

321
82.7
84.4%

271
83.4
90.8%

85
81.3
80.0%

164
82.4
83.5%

145
82.7
89.7%

188
83.2
92.0%

434
82.9
88.5%

191
83.6
89.5%

1112
82.0
83.7%

235
82.8
90.2%

DC
11
78.6
63.6%

22
81.5
86.4%

890
82.7
87.4%

12
89.2
100.0%
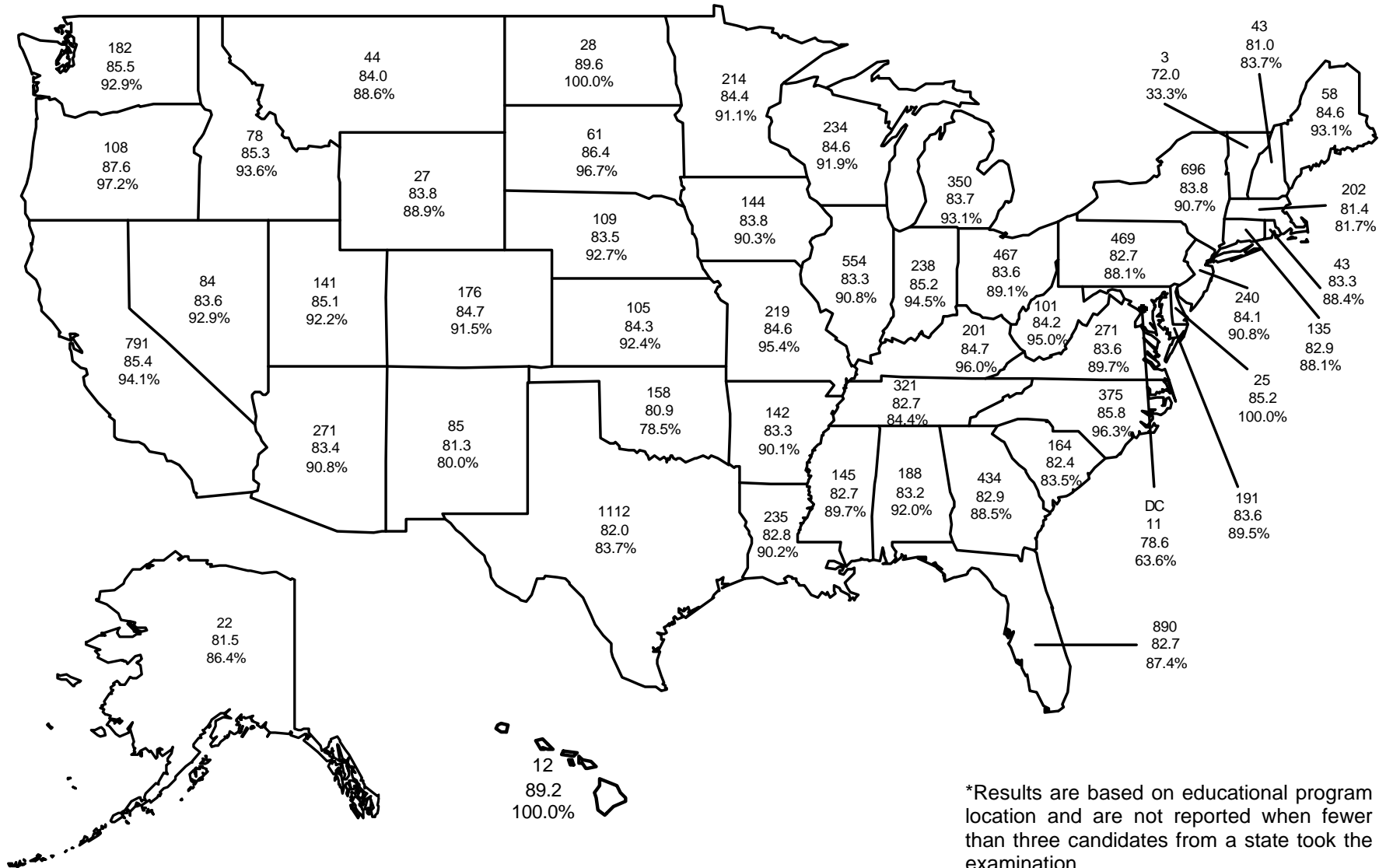
*Results are based on educational program location and are not reported when fewer than three candidates from a state took the examination.
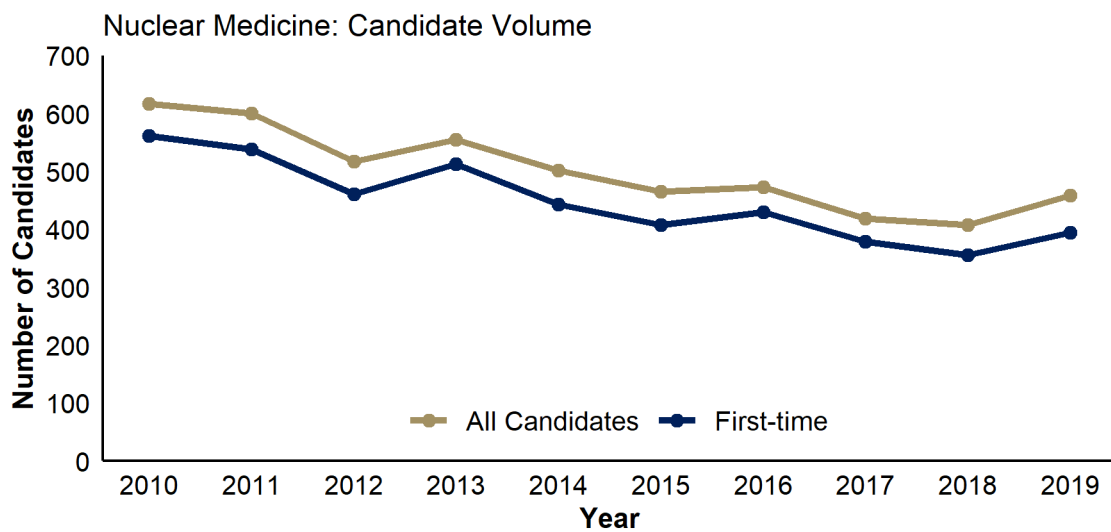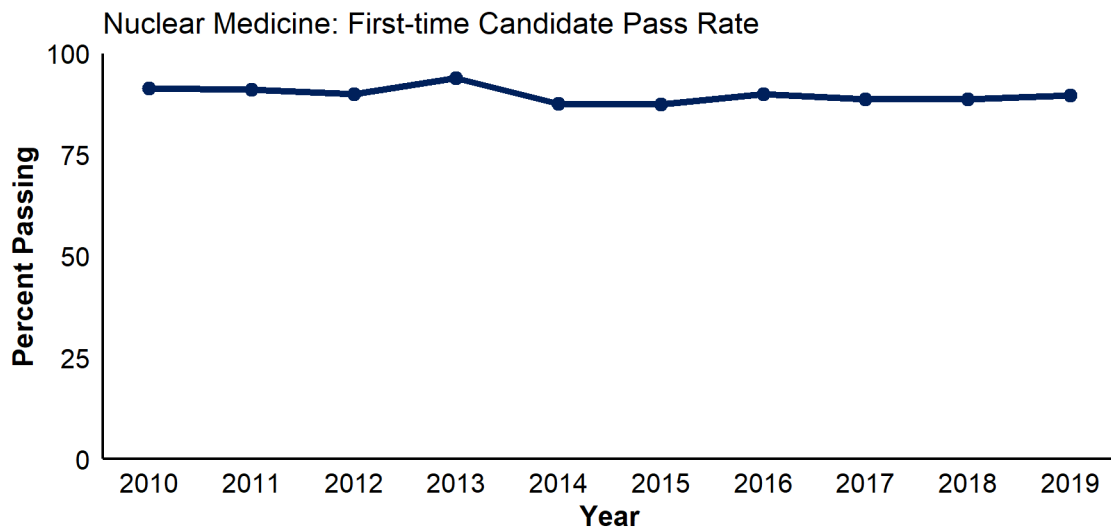
Content Categories and First-time Candidate Scores

Content Categories	# Items	Mean Score
Patient Care: Patient Interactions and Management	20	8.3
Safety: Radiation Physics, Radiobiology, and Regulations	22	8.1
Image Production: Instrumentation	38	8.1
Procedures: Radionuclides and Radiopharmaceuticals	24	8.4
Procedures: Cardiac	24	8.5
Procedures: Endocrine and Oncology	28	8.4
Procedures: Gastrointestinal and Genitourinary	20	8.3
Procedures: Other	24	8.5
Total	200	83.2

Pass Rate: 89.6%

Nuclear Medicine: First-time Candidate Pass Rate

Nuclear Medicine: Candidate Volume

Nuclear Medicine
Number of First-time Candidates, Mean Scaled Score, and Percentage Passing*

Map of the United States showing, per state, the number of first-time candidates, mean scaled score, and percentage passing:

- WA: 0, NA, NA
- OR: 16, 88.7, 100.0%
- CA: 21, 87.7, 100.0%
- NV: 0, NA, NA
- ID: 0, NA, NA
- UT: 11, 81.5, 81.8%
- AZ: 11, 85.7, 90.9%
- MT: 0, NA, NA
- WY: 0, NA, NA
- CO: 0, NA, NA
- NM: 7, 86.1, 100.0%
- ND: 0, NA, NA
- SD: 1, NA, NA
- NE: 0, NA, NA
- KS: 1, NA, NA
- OK: 6, 84.7, 100.0%
- TX: 42, 84.7, 95.2%
- MN: 1, NA, NA
- IA: 6, 87.8, 100.0%
- MO: 3, 89.7, 100.0%
- AR: 7, 90.9, 100.0%
- LA: 6, 79.7, 83.3%
- WI: 0, NA, NA
- IL: 14, 80.8, 78.6%
- MS: 2, NA, NA
- MI: 11, 79.5, 81.8%
- IN: 0, NA, NA
- KY: 0, NA, NA
- TN: 22, 84.5, 95.5%
- AL: 1, NA, NA
- GA: 7, 75.9, 57.1%
- OH: 12, 78.7, 75.0%
- WV: 5, 75.2, 80.0%
- VA: 0, NA, NA
- NC: 27, 79.5, 74.1%
- SC: 8, 87.0, 100.0%
- FL: 40, 84.1, 90.0%
- PA: 33, 80.1, 84.8%
- NY: 28, 81.6, 92.9%
- VT: 1, NA, NA
- NH: 0, NA, NA
- ME: 0, NA, NA
- MA: 20, 82.8, 90.0%
- RI: 4, 84.8, 100.0%
- CT: 1, NA, NA
- NJ: 11, 82.3, 90.9%
- DE: 0, NA, NA
- MD: 0, NA, NA
- DC: 0, NA, NA
- VA (coastal marker): 8, 84.4, 100.0%
- AK: 0, NA, NA
- HI: 0, NA, NA

*Results are based on educational program location and are not reported when fewer than three candidates from a state took the examination.
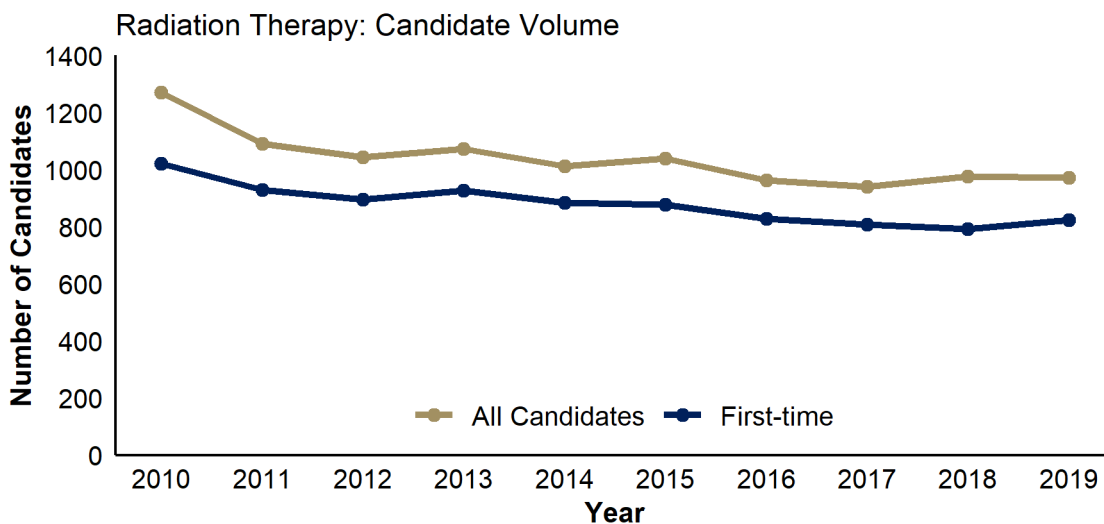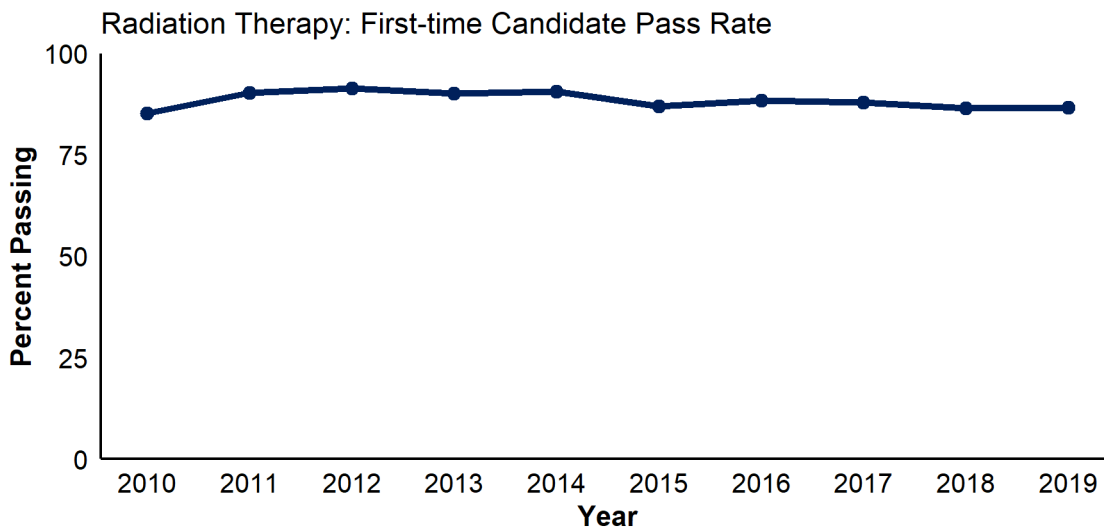
Exam Performance for Radiation Therapy

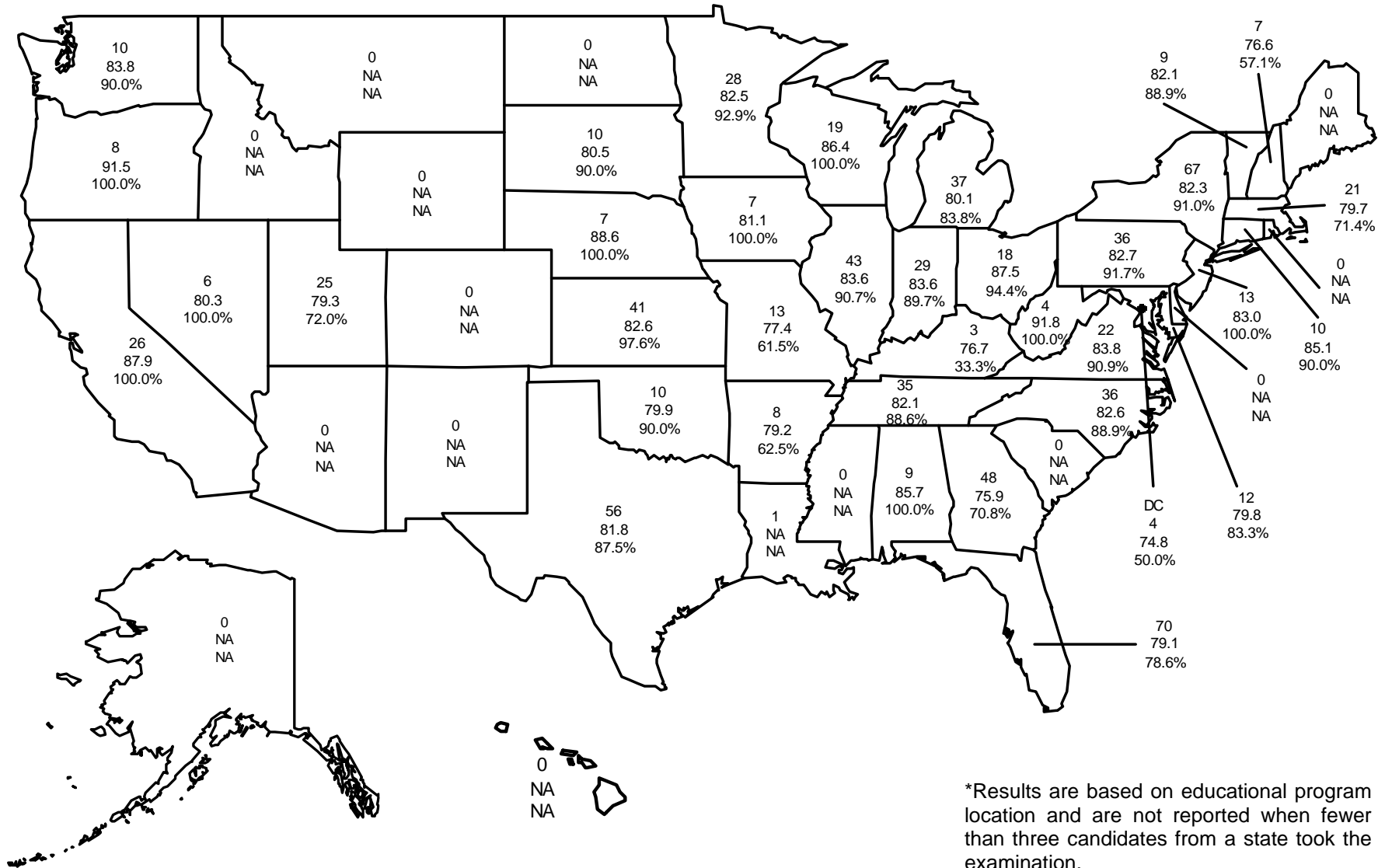### Content Categories and First-time Candidate Scores

Content Categories	# Items	Mean Score
Patient Care: Patient Interactions	25	8.3
Patient Care: Patient and Medical Record Management	22	8.3
Safety: Radiation Physics, Equipment, and Quality Assurance	20	8.0
Safety: Radiation Protection	29	8.0
Procedures: Treatment Sites and Tumors	26	8.2
Procedures: Treatment Volume Localization	18	8.4
Procedures: Prescription and Dose Calculation	24	8.1
Procedures: Treatments	<u>36</u>	<u>8.2</u>
Total	200	81.9

Pass Rate: 86.6%

Radiation Therapy: First-time Candidate Pass Rate

Radiation Therapy: Candidate Volume

Radiation Therapy
Number of First-time Candidates, Mean Scaled Score, and Percentage Passing*

*Results are based on educational program location and are not reported when fewer than three candidates from a state took the examination.
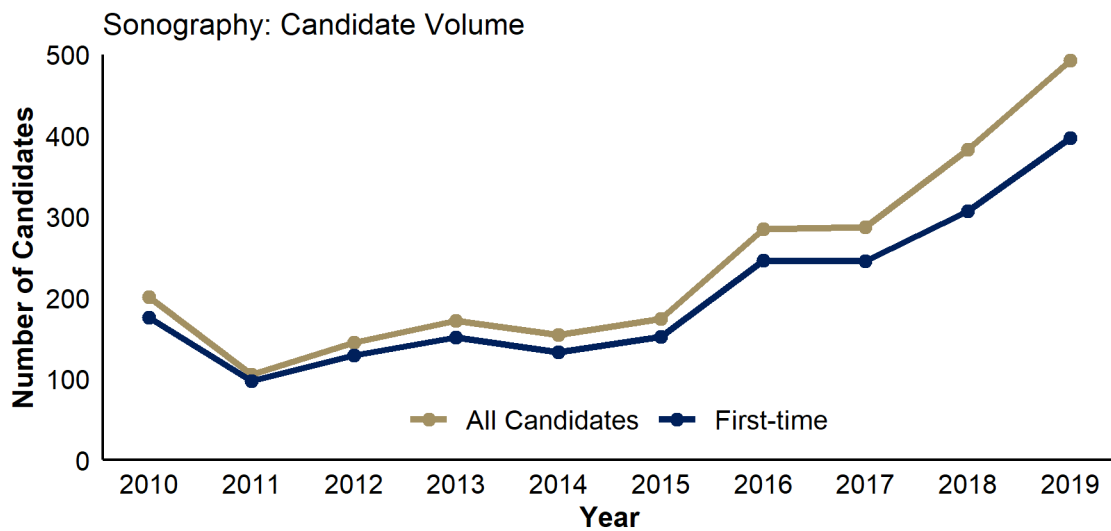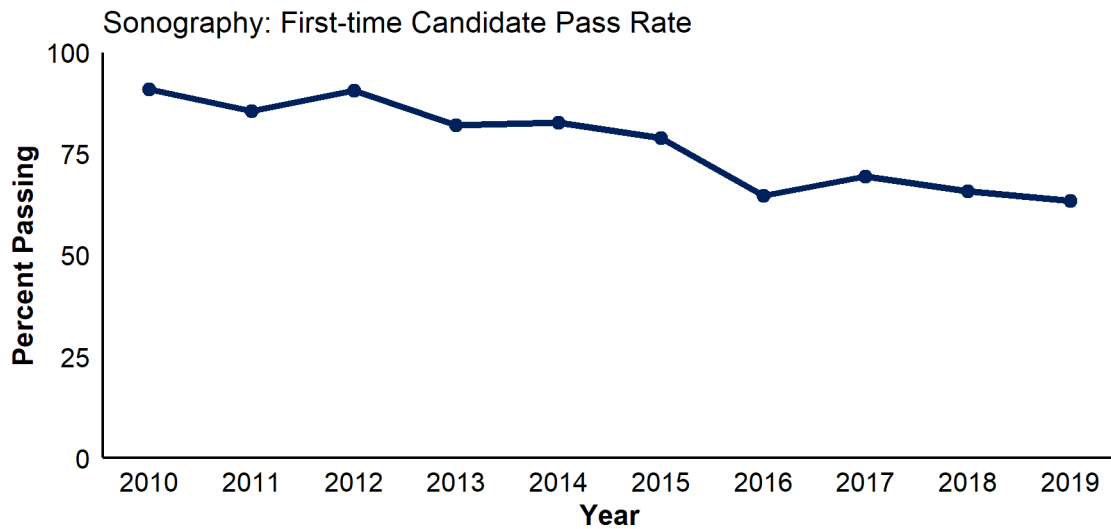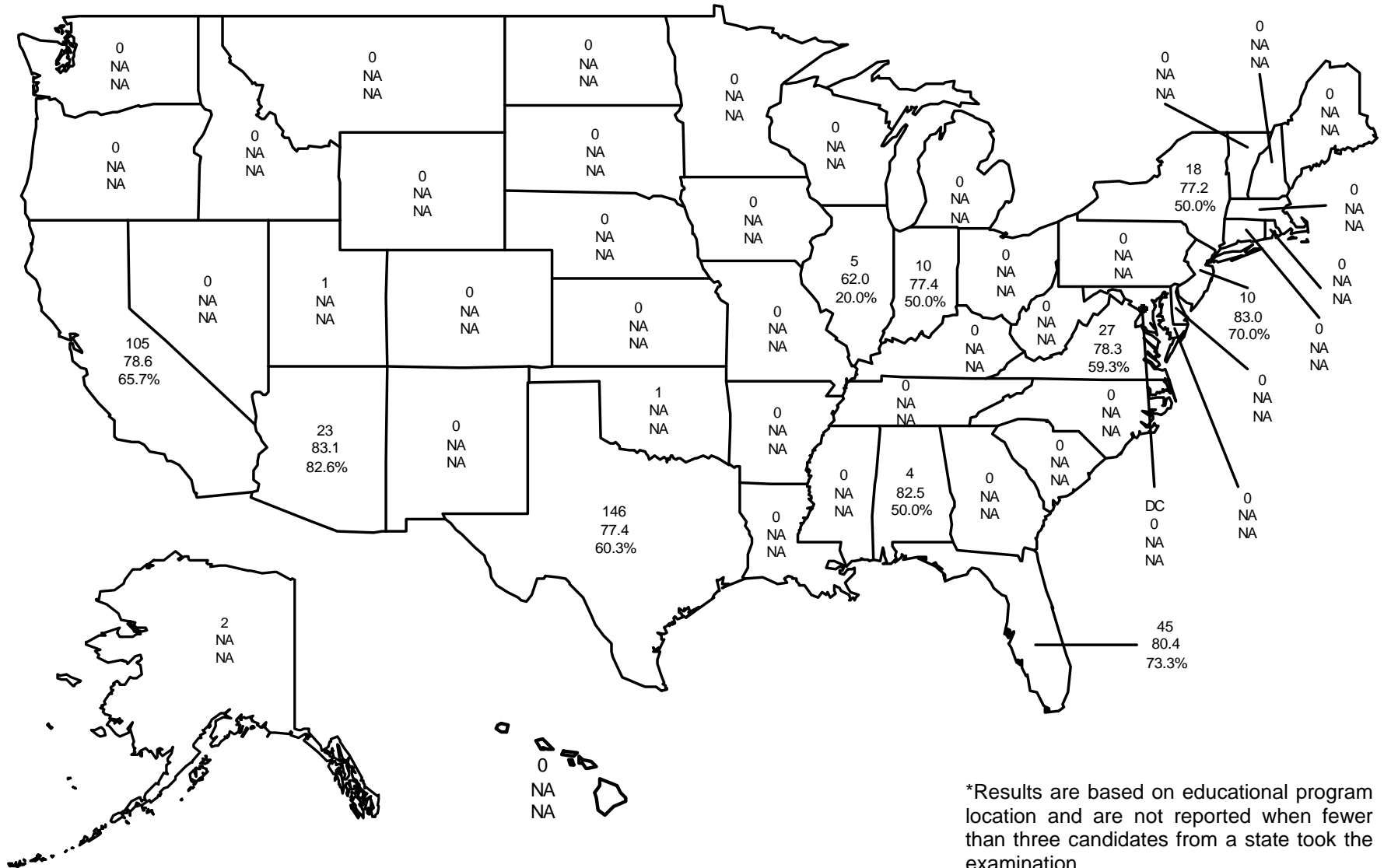
Exam Performance for Sonography

Content Categories and First-time Candidate Scores

Content Categories	# Items	Mean Score
Patient Care: Patient Interactions and Management	29	8.1
Image Production: Basic Principles of Ultrasound	50	7.4
Image Production: Image Formation	44	7.9
Image Production: Evaluation and Selection of Representative Images	21	8.1
Procedures: Abdomen	75	7.9
Procedures: OB/GYN	109	8.0
Procedures: Superficial Structures and Other Sonographic Procedures	<u>32</u>	<u>7.6</u>
Total	360	78.5

Pass Rate: 63.5%

Sonography: First-time Candidate Pass Rate

Sonography: Candidate Volume

Sonography
Number of First-time Candidates, Mean Scaled Score, and Percentage Passing*

Washington: 0 / NA / NA
Oregon: 0 / NA / NA
California: 105 / 78.6 / 65.7%
Nevada: 0 / NA / NA
Idaho: 0 / NA / NA
Montana: 0 / NA / NA
Wyoming: 1 / NA / NA
Utah: 23 / 83.1 / 82.6%
Arizona: 146 / 77.4 / 60.3%
North Dakota: 0 / NA / NA
South Dakota: 0 / NA / NA
Colorado: 0 / NA / NA
New Mexico: 0 / NA / NA
Nebraska: 0 / NA / NA
Kansas: 0 / NA / NA
Oklahoma: 1 / NA / NA
Texas: 146 / 77.4 / 60.3%
Minnesota: 0 / NA / NA
Iowa: 0 / NA / NA
Missouri: 0 / NA / NA
Arkansas: 0 / NA / NA
Louisiana: 0 / NA / NA
Wisconsin: 0 / NA / NA
Illinois: 5 / 62.0 / 20.0%
Indiana: 10 / 77.4 / 50.0%
Michigan: 0 / NA / NA
Kentucky: 0 / NA / NA
Tennessee: 0 / NA / NA
Mississippi: 0 / NA / NA
Alabama: 4 / 82.5 / 50.0%
Georgia: 0 / NA / NA
Ohio: 0 / NA / NA
West Virginia: 27 / 78.3 / 59.3%
Pennsylvania: 0 / NA / NA
Virginia: 0 / NA / NA
North Carolina: 0 / NA / NA
South Carolina: 0 / NA / NA
Florida: 45 / 80.4 / 73.3%
New York: 18 / 77.2 / 50.0%
Vermont: 0 / NA / NA
New Hampshire: 0 / NA / NA
Maine: 0 / NA / NA
Massachusetts: 0 / NA / NA
Rhode Island: 0 / NA / NA
Connecticut: 0 / NA / NA
New Jersey: 10 / 83.0 / 70.0%
Delaware: 0 / NA / NA
Maryland: 0 / NA / NA
DC: 0 / NA / NA
Alaska: 2 / NA / NA
Hawaii: 0 / NA / NA

*Results are based on educational program location and are not reported when fewer than three candidates from a state took the examination.
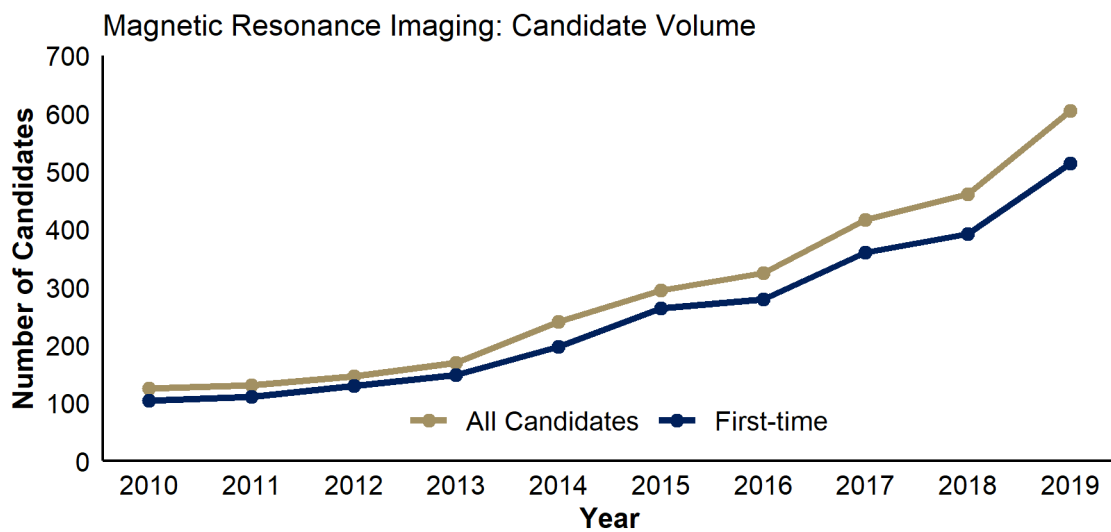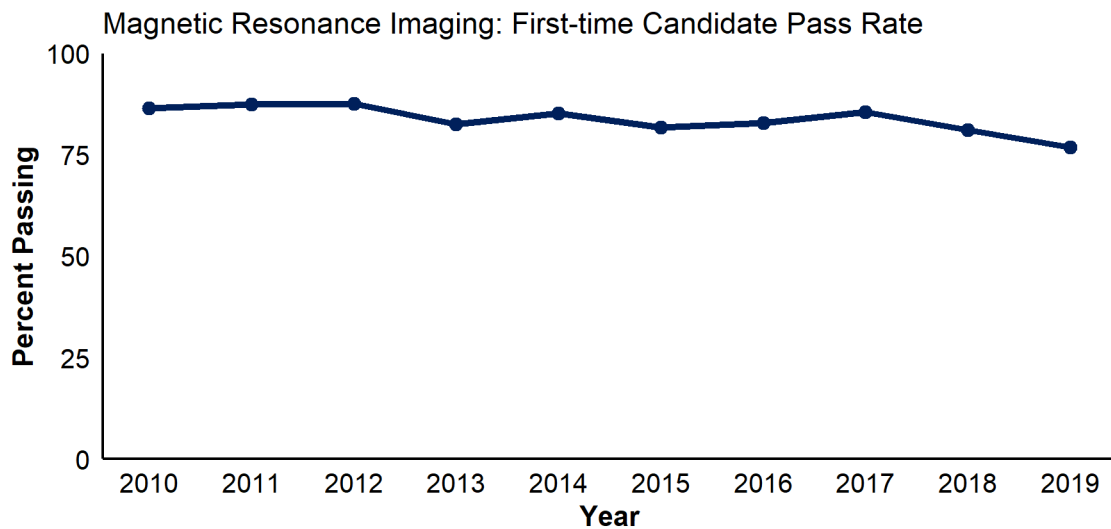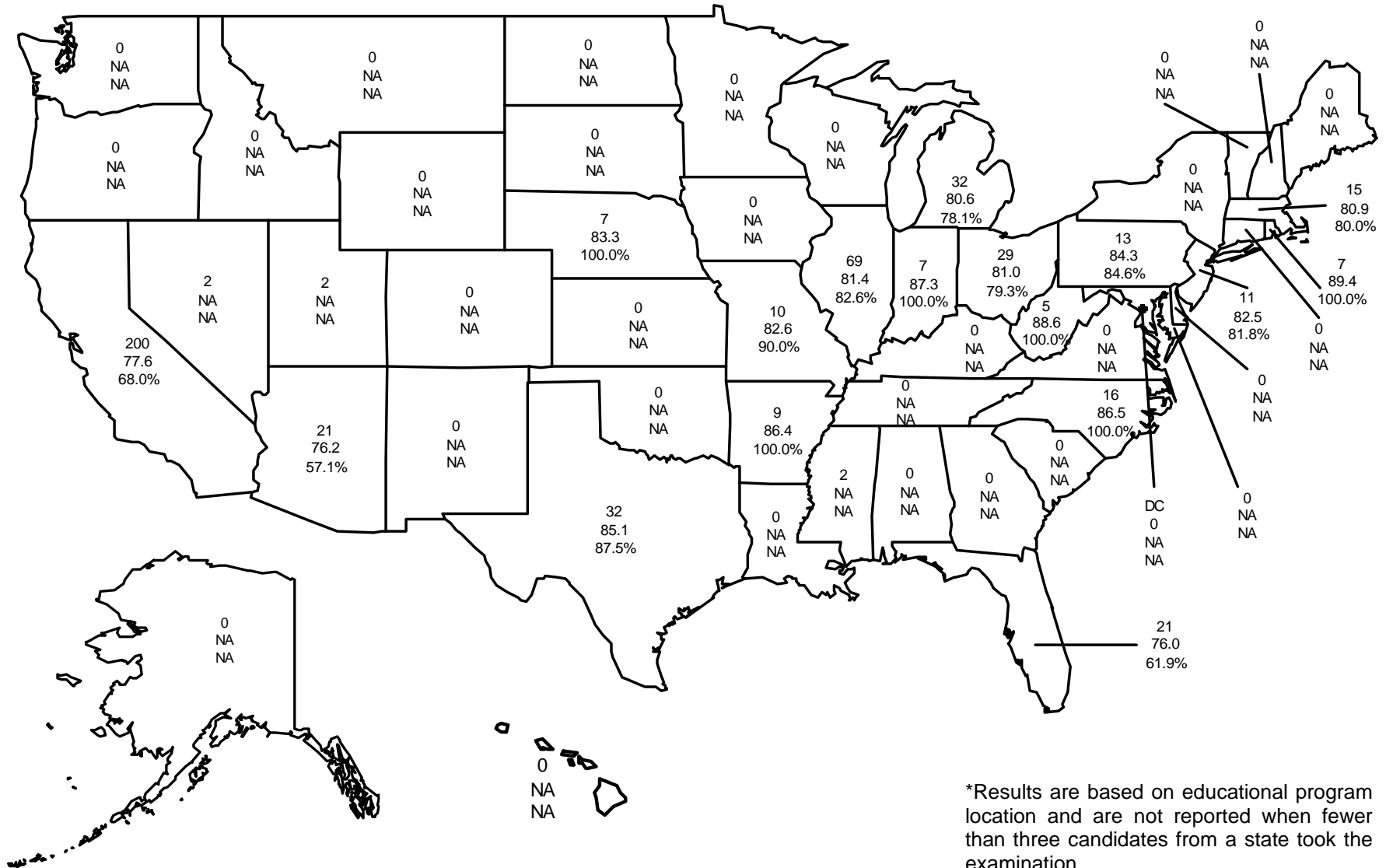
Exam Performance for Magnetic Resonance Imaging

Content Categories and First-time Candidate Scores

Content Categories	# Items	Mean Score
Patient Care: Patient Interactions and Management	17	7.7
Safety: MRI Screening and Safety	15	8.0
Image Production: Physical Principles of Image Formation	40	8.1
Image Production: Sequence Parameters and Options	38	8.2
Image Production: Data Acquisition and Processing	34	7.8
Procedures: Neuro	26	8.3
Procedures: Body	20	7.8
Procedures: Musculoskeletal	10	8.2
Total	200	80.3

Pass Rate: 76.8%

Magnetic Resonance Imaging: First-time Candidate Pass Rate

Magnetic Resonance Imaging: Candidate Volume

Magnetic Resonance Imaging
Number of First-time Candidates, Mean Scaled Score, and Percentage Passing*

*Results are based on educational program location and are not reported when fewer than three candidates from a state took the examination.