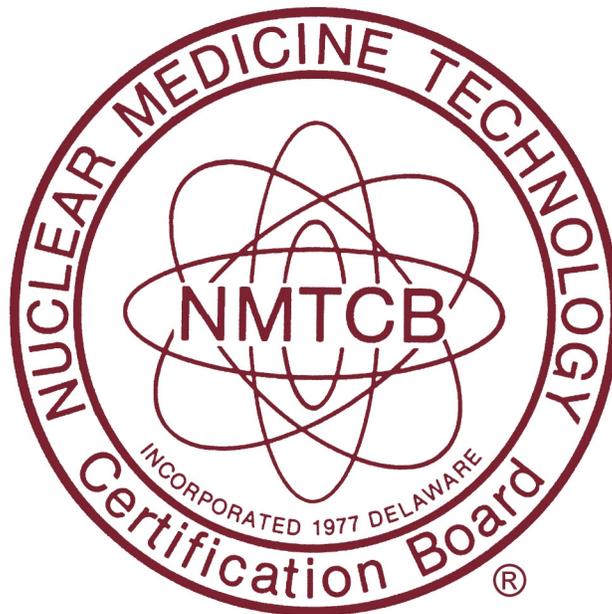


**THE NUCLEAR MEDICINE TECHNOLOGY  
CERTIFICATION BOARD, INC.**

# **N M T C B**

**ANNUAL  
EXAMINATION  
REPORT  
2017**



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# Table of Contents

|  |           |
|--|-----------|
| <b>Statistics-At-A-Glance.....</b>       | <b>2</b>  |
| <b>Introduction .....</b>                | <b>3</b>  |
| <b>Computer Adaptive Testing .....</b>   | <b>4</b>  |
| <b>Scaled Score Information.....</b>     | <b>5</b>  |
| <b>Overall Examinee Performance.....</b> | <b>6</b>  |
| <b>Group Performance.....</b>            | <b>7</b>  |
| All Examinees.....                       | 7         |
| Repeat Examinees.....                    | 8         |
| Alternate Eligibility Examinees.....     | 9         |
| First-Time Examinees.....                | 10        |
| <b>Summary .....</b>                     | <b>11</b> |

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## NMTCB 2017 Statistics

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### All Examinees

|                    |     |        |
|--------------------|-----|--------|
| Total Number:      | 659 |        |
| Total Number Pass: | 529 | 80.27% |
| Total Number Fail: | 130 | 19.73% |

### Summary Statistics:

|                    |       |
|--------------------|-------|
| Range of Scores    | 55-96 |
| Mean Score         | 78.67 |
| Standard Deviation | 6.39  |
| Median Score       | 78    |

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### First-Timers (Nuclear Medicine Program Graduates)

|                    |     |        |
|--------------------|-----|--------|
| Total Number:      | 588 |        |
| Total Number Pass: | 502 | 85.37% |
| Total Number Fail: | 84  | 14.63% |

### Summary Statistics:

|                    |         |
|--------------------|---------|
| Range of Scores    | 55 - 96 |
| Mean Score         | 79.40   |
| Standard Deviation | 6.11    |
| Median Score       | 79      |

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### Repeaters

|                    |    |        |
|--------------------|----|--------|
| Total Number:      | 67 |        |
| Total Number Pass: | 26 | 38.80% |
| Total Number Fail: | 41 | 61.20% |

### Summary Statistics:

|                    |       |
|--------------------|-------|
| Range of Scores    | 60-89 |
| Mean Score         | 72.57 |
| Standard Deviation | 5.44  |
| Median Score       | 73    |

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### Alternate Eligibility Examinees

|                    |   |     |
|--------------------|---|-----|
| Total Number:      | 4 |     |
| Total Number Pass: | 1 | 25% |
| Total Number Fail: | 3 | 75% |

### Summary Statistics:

|                    |       |
|--------------------|-------|
| Range of Scores    | 67-83 |
| Mean Score         | 74.25 |
| Standard Deviation | 6.60  |
| Median Score       | 73.5  |

# NMTCB Annual Examination Overview 2017



## **Introduction**

This summary report is intended to provide detailed information about the 2017 certification examination. The primary purpose of this report is to serve the needs of program directors and administrators. It contains a description of computer adaptive test (CAT) for classification, and provides detailed information about scaled scores and examination performance. The performance section includes a summary of examination data sorted by different groups of examinees as well as visual aids for the year 2017.

## **Computer Adaptive Test (CAT) for Classification.**

In July 1996, the NMTCB began offering a computer adaptive test (CAT) for classification in association with ACT, Inc. The CAT for classification exam is specifically designed to render a pass/fail decision. With a CAT for classification exam, the items themselves are ranked on the score scale according to their ability to classify accurately and quickly. Each item in the item pool is calibrated using pre-test information associated with its difficulty (the proportion of examinees answering an item correctly) and its ability to discriminate between individuals who should pass the exam and those who should fail. An item that has a difficulty index at or near the passing score and has good discrimination will contribute more to the decision-making process than items that are overly difficult or too easy or has little ability to discriminate between those examinees who should pass and those who should fail.

Routinely with a "classification" CAT, an individual whose performance is significantly above or below the passing score will require fewer questions for the algorithm to be able to accurately classify the examinee. Individuals whose performance is borderline will have to answer more scored questions in order to ensure an accurate classification. This process will not be obvious to the examinee because there will be a certain number of unscored pretest questions that will be administered in order to obtain statistics for their possible use in the future. Each examinee answers a total of 90 items regardless of how many items were actually used to make the pass/fail decision. The classification algorithm used in CAT takes into account the differences in exam difficulty. Each CAT administered is equated so the pass/fail standard is appropriate for the particular set of items administered to the candidate.

In 2017, CAT items are selected from each of five content domains of nuclear medicine technology in the following approximate proportions: **I.** Radiation Physics & Detection (7%), **II.** Radiation Safety & Regulations (13%), **III.** Pharmaceutical & Radiopharmaceutical Agents (45%), **IV.** Instrument Operations & Quality Control (15%) and **V.** Clinical Procedures (40%).

Due to the fundamental nature of CAT for classification (which is designed to provide a high degree of confidence in the final pass/fail decision), it cannot provide the same types of normative analysis typically provided with the fixed linear paper and pencil exams. With fixed linear exams, all examinees sit for the same exact exam and so comparative information such as percentile ranks can be obtained. Because the primary purpose of the CAT exam is to classify candidates as pass or fail (rather than distinguishing one examinee from another), CAT for classification selects items that are optimal for minimizing errors in classification, the critical consideration for occupation certification programs.

### **Scaled Score Information:**

As noted above, the main objective of the NMTCB CAT is to obtain a pass/fail decision with a high degree of accuracy and precision. However it was recognized that there may be occasions when there might be a need to know whether an examinee's performance is close to the passing score or some distance from it. Consequently, scaled scores generated and reported along with the pass/fail decision.

The scaled score is a transformation of the IRT ability score that is calculated by the CAT

algorithm based on the examinee's responses to the items presented during the examination to a linear score that ranges from 0 - 100. The minimum scaled passing score is set at 75. It is very important to note that these scaled score values are NOT percent correct or percentile rank scores.

In order to address any possible confusion between scaled, percent correct and percentile rank scores, the NMTCB will begin reporting examinee scores using a scale ranging from 200 – 500, where **375** has been set as the minimum passing score on January 1, 2018.

### **Content Outline Updates:**

NMTCB conducted a Job Task Analysis survey in April 2017. Survey results indicated the need for a slight update to the content domain classifications and their relative percentages. Beginning in August 2017, the entry level examination content areas were updated to the following percentages:

Domain I: Radiation Physics & Detection – 7%

Domain II: Radiation Safety & Regulations – 13%

Domain III: Pharmaceutical & Radiopharmaceutical Agents – 25%

Domain IV: Instrument Operations & Quality Control – 15%

Domain V: Clinical Procedures – 40%

In order to expedite the collection of statistics needed to effectively calibrate any items written to address any new content, the entry level examination was offered for a limited time as a linear examination beginning in August 2017. Both the adaptive delivery and linear exam delivery outcomes were reported using a scaled passing score of 75. Both the linear and adaptive examination scores are included as a part of this report.

Beginning January 1, 2018, the adaptive examination algorithm will select items from the operation pool using the approximate domain percentages as listed above.

## Overall Examinee Performance:

Please refer to Table 1 for a general overview of the examination. This table presents the number of examinees who took the test, their average scaled score, and the pass rate for twenty-two years beginning 1996 up until to 2017.

**Table 1.** 1996 - 2017 NMTCB CAT Examinees

|      | Number of Examinees | Mean Scaled Score | Overall Pass Rate | Pass Rate for NMT Program Graduates |
|------|---------------------|-------------------|-------------------|-------------------------------------|
| 1996 | 671                 | 78.9              | 88.1%             | 94.4%                               |
| 1997 | 757                 | 78.8              | 85.6%             | 92.4%                               |
| 1998 | 664                 | 78.4              | 83.8%             | 92.9%                               |
| 1999 | 696                 | 78.3              | 83.9%             | 93.0%                               |
| 2000 | 792                 | 78.2              | 81.0%             | 90.4%                               |
| 2001 | 879                 | 77.9              | 81.9%             | 90.1%                               |
| 2002 | 1072                | 78.02             | 78.6%             | 88.4%                               |
| 2003 | 1327                | 77.99             | 79.9%             | 87.1%                               |
| 2004 | 1459                | 78.35             | 82.6%             | 91.6%                               |
| 2005 | 1652                | 78.74             | 84.1%             | 90.0%                               |
| 2006 | 1590                | 79.05             | 87.9%             | 93.7%                               |
| 2007 | 1694                | 79.19             | 86.7%             | 91.7%                               |
| 2008 | 1712                | 79.30             | 86.3%             | 91.7%                               |
| 2009 | 1466                | 80.00             | 89.9%             | 94.3%                               |
| 2010 | 1298                | 79.33             | 88.2%             | 92.4%                               |
| 2011 | 1184                | 78.47             | 91.4%             | 94.9%                               |
| 2012 | 1038                | 78.25             | 88.2%             | 91.3%                               |
| 2013 | 958                 | 78.26             | 88.2%             | 90.8%                               |
| 2014 | 816                 | 78.19             | 87.6%             | 89.6%                               |
| 2015 | 808                 | 77.92             | 86.8%             | 90.9%                               |
| 2016 | 819                 | 77.00             | 83.15%            | 88.9%                               |
| 2017 | 659                 | 78.67             | 80.27%            | 85.37%                              |

From Table 1, it can be seen that the number of examinees taking the test ranged from low candidate volumes of 664 in 1998 and 659 in 2017, to a high candidate volume of 1,712 in 2008. Since 1996, the average scaled scores of examinees have been steadily constant around 78.

**Table 2.** 2017 Overall Examinee Performance

|                       | Total Number | Total Number Pass | Pass Percentage for Each Group | Total Number Fail | Fail Percentage for Each Group |
|-----------------------|--------------|-------------------|--------------------------------|-------------------|--------------------------------|
| Program Graduates     | 588          | 502               | 85.37%                         | 84                | 14.63%                         |
| Repeat Examinees      | 67           | 26                | 38.80%                         | 41                | 61.20%                         |
| Alternate Eligibility | 4            | 1                 | 25%                            | 3                 | 75%                            |
| <b>All Examinees</b>  | <b>659</b>   | <b>529</b>        | <b>80.27%</b>                  | <b>130</b>        | <b>19.73%</b>                  |

## Group Performance 2017

### All Examinees:

A total of 529 out of 659 examinees (80.27 percent), who attempted, passed the NMTCB certification examination in 2017 (Table 4).

**Table 4.** All 2017 Examinees

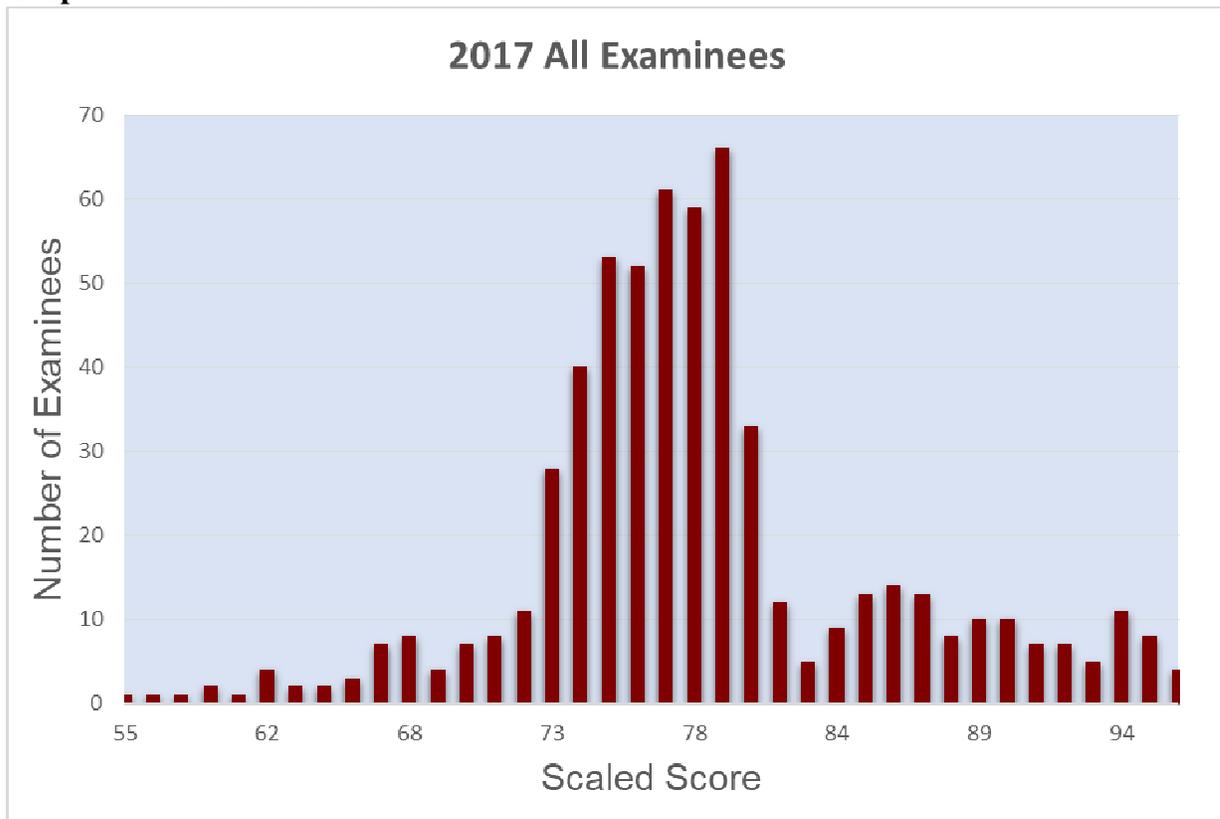
|                    |     |        |
|--------------------|-----|--------|
| Total Number:      | 659 |        |
| Total Number Pass: | 529 | 80.27% |
| Total Number Fail: | 130 | 19.73% |

**Performance breakdown**

|                      |          |
|----------------------|----------|
| Range of Scores:     | 55 to 96 |
| Mean Score:          | 78.67    |
| Standard Deviation:  | 6.39     |
| Median scaled Score: | 78       |

**Graph 1.** All 2017 Examinees



**Repeat Examinees:**

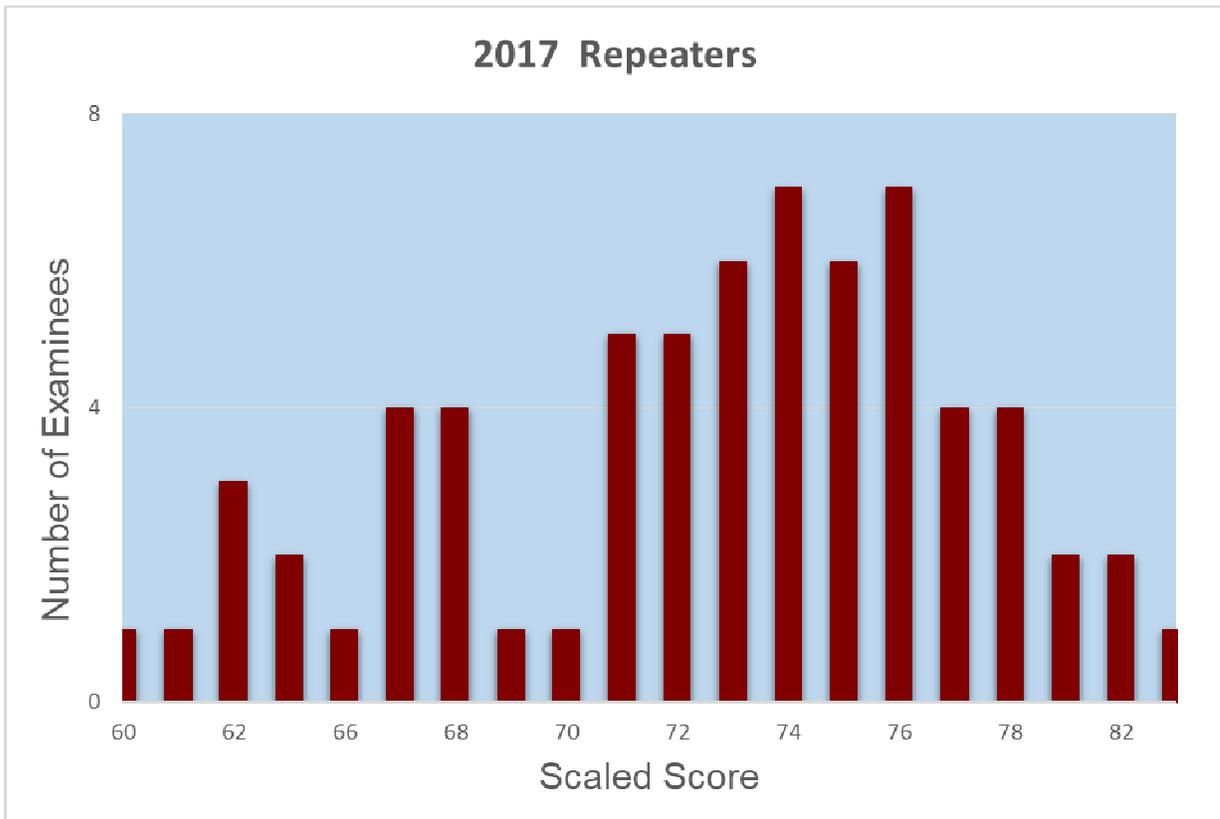
Sixty-seven (67) examinees were repeat examinees in 2017 (Table 5). A total of 26 out of 67 examinees (38.80 percent) passed the examination. A total of forty-one (41) examinees (61.20 percent) failed the examination. A frequency distribution of these repeat examinees scaled scores is also presented below (Graph 2).

|                    |    |        |
|--------------------|----|--------|
| Total Number:      | 67 |        |
| Total Number Pass: | 26 | 38.80% |
| Total Number Fail: | 41 | 61.20% |

**Performance breakdown**

|                      |          |
|----------------------|----------|
| Range of Scores:     | 60 to 89 |
| Mean Score:          | 72.57    |
| Standard Deviation:  | 5.44     |
| Median scaled Score: | 73       |

**Graph 2.** 2017 Repeat Examinees



**Alternate Eligibility:**

Four (4) examinees qualified to sit for the examination through the Alternate Eligibility Pathway in 2017 (Table 6).

A total of 1 out of 4 examinees (25 percent) passed the examination.

**Table 6:** 2017 Alternate Eligibility Examinees

| <b>Alternate Eligibility Examinees</b> |         |     |
|--|---------|-----|
| Total Number:                          | 4       |     |
| Total Number Pass:                     | 1       | 25% |
| Total Number Fail:                     | 3       | 75% |
| <b>Summary Statistics:</b>             |         |     |
| Range of Scores:                       | 67 - 83 |     |
| Mean Score:                            | 74.25   |     |
| Standard Deviation:                    | 6.60    |     |
| Median scaled Score:                   | 73.5    |     |

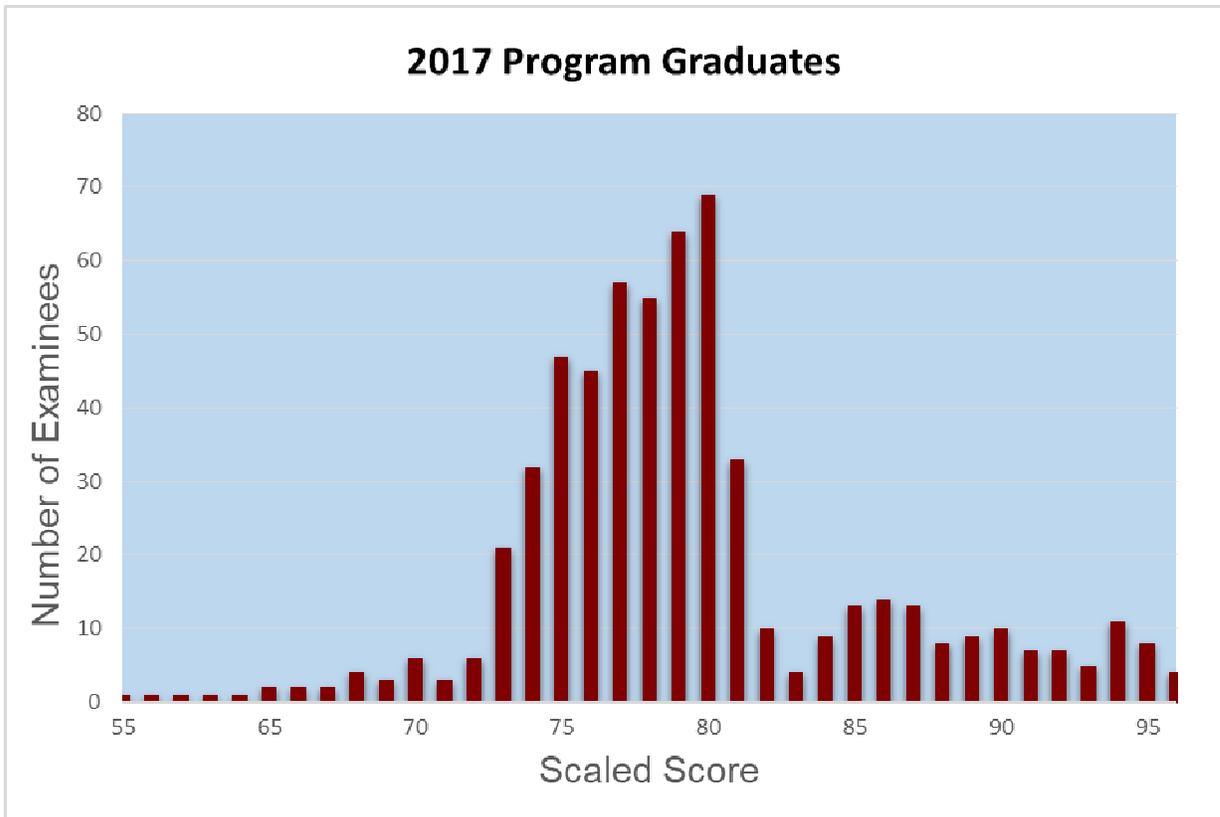
**NMT Program Graduates - First Time Examinees:**

A total of 588 out of 659 (89.23 percent) were graduates of nuclear medicine technology training programs who took the examination for the first time (Table 7). A total of 502 out of 588 first-time examinees (85.37 percent) passed the examination in 2017. Only 84 program graduate first-time examinees (14.63 percent) did not pass the examination in 2017. A frequency distribution of these first-time examinees is provided below (Graph 4).

**Table 7.** First Time Examinees

| <b>First-Timers (Nuclear Medicine Program Graduates)</b> |          |        |
|--|----------|--------|
| Total Number:  | 588      |        |
| Total Number Pass:                                       | 502      | 85.37% |
| Total Number Fail:                                       | 84       | 14.63% |
| <b>Summary Statistics:</b>                               |          |        |
| Range of Scores:   | 55 to 96 |        |
| Mean Score:  | 79.40    |        |
| Standard Deviation:                                      | 6.11     |        |
| Median scaled Score:                                     | 79       |        |

**Graph 4.** First Time Examinees (Nuclear Medicine Program Graduates)



Overall, the year 2017 was a successful year for both program directors and students of nuclear medicine technology programs. Of the 588 examinees who graduated from nuclear medicine technology training programs, 502 (85.4 percent) passed the examination in 2017.

As always, the NMTCB remains sensitive to the needs of the program directors and their students. The Board is committed to offering the premier certification program for nuclear medicine technologists. Please let us know if there is anything that should be included in future exam reports. We welcome your comments/suggestions.

**NMTCB**

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