

## **Texas Program Report Methodology**

### **Design of Analysis:**

**Sampling Frame:** All individuals who successfully completed a Texas approved EMS education program, submitted an acceptable application to the National Registry of Emergency Medical Technicians, and completed the National Registry of Emergency Medical Technicians written examination between the inclusive dates of January 1, 2005 and December 31, 2005.

**Inclusion Criteria:** All individuals who successfully completed a Texas approved EMS education program, submitted an acceptable application to the National Registry of Emergency Medical Technicians, and completed the initial attempt of the National Registry of Emergency Medical Technicians written examination between the inclusive dates of January 1, 2005 and December 31, 2005.

**Exclusion Criteria:** Individuals who successfully completed a Texas approved EMS education program, submitted an acceptable application to the National Registry of Emergency Medical Technicians, and completed their initial attempt of the National Registry of Emergency Medical Technicians written examination prior to January 1, 2005 or after December 31, 2005.

**Data Collection:** Each individual meeting the inclusion criteria was identified and grouped based his/her pass/fail status and the program code affixed to the National Registry of Emergency Medical Technician application completed at the time of initial examination. Secondary data collection was carried out on those individuals meeting the inclusion criteria and failing the initial attempt of the examination. Secondary data collection included identifying the pass/fail status the individuals attempting the examination on a second occasion during the inclusive dates of the study. Tertiary data collection was carried out on those individuals meeting the inclusion criteria and failing the initial and second attempt of the examination. Tertiary data collection included identifying the pass/fail status of individuals attempting the examination on a third occasion during the inclusive dates of the study.

### **Description of Outcome Measures:**

Data were analyzed by education program and the following outcome measures were reported:

#### **First Time Pass Rate:**

The percent of individuals achieving a passing score on the initial attempt of the examination. This percent is reflective of the observed first time pass rate and is not statistically influenced by future or previous attempts of the examination by any individual in the study.

#### **Second Time Pass Rate:**

The percent of individuals achieving a passing score on the second attempt of the examination. This percent is reflective of the observed second time pass rate and is not statistically influenced by previous attempts of the examination by any individual in the study.

#### **Third Time Pass Rate:**

The percent of individuals achieving a passing score on the third attempt of the examination. This percent is reflective of the observed third time pass rate and is not statistically influenced by previous attempts of the examination by any individual in the study.

**Registration Rate:**

The percent of individuals who gained registration during the study period regardless of number of examination attempts. Registration rate is reflective of the number of individuals who successfully completed a Texas approved EMS education program and gained National Registration during the study period regardless of the number of examination attempts.

**Consider the following example:**

*A sample EMS education program (TX-XXX) issued 100 course completion certificates during a calendar year. At the end of the calendar year 50 individuals passed the written examination on the first attempt, 16 passed on their second attempt and 4 passes on their third attempt, therefore  $(50 + 16 + 4) = 70$  individuals have successfully gained National Registration. The registration rate would be  $70/100 = 70\%$ . The Program Status report for the TX-XXX would appear as follows:*

Site	Attempt			Total	Pass %
	#	Pass	Fail		
TX-XXX	1	50	50	100	
	2	16	24	40	
	3	4	10	14	
<b>Registration Rate</b>					70.00%
<b>Cumulative Pass Rate</b>					
<b>Testing Attrition Rate</b>					

*An appropriate interpretation would be that 70 of 100 individuals who were deemed to be successful by the approved EMS education program gained National Registration. Conversely 30 of 100 individuals who were deemed to be unsuccessful by the approved EMS education program failed to gain National Registration. It would be **inappropriate** to interpret a fail rate from this outcome measure since the 30 individuals identified as failing to gain National Registration could include individuals failing the examination as well as individuals who did not attempt the examination on a second or third occasion following an initial failure. The Registration Rate is an indicator of the percent of individuals who achieve success with an education program and are available for state certification.*

**Cumulative Pass Rate:**

The cumulative percent of individuals achieving a passing score on the examination regardless of the number of attempts of the examination. The cumulative pass rate is reflective of the number individuals who successfully completed a Texas approved EMS education program, exhausted their examination attempts eligibility, and received a passing score on the written examination regardless of examination.

**Consider the following example:**

*A sample EMS education program (TX-XXX) issued 100 course completion certificates during a calendar year. At the end of the calendar year,  $(50+16+4) = 70$  individuals have successfully passed the written examination. Of the 50 people who failed the first attempt, only 40 attended a second attempt of the examination and of the 24 people who failed the second attempt, only 14 attended a third attempt. Therefore  $(50 - 40 = 10$  and  $24 - 10 = 14$ ), a total of 20 individuals chose not to complete their testing opportunities within the study period. The total number of people who exhausted their examination attempts is calculated by subtracting the number of individuals who did not complete the testing opportunities (20) from the total number of individuals who attempted the examination on the initial attempt (100). Therefore, there are  $(100 - 20) = 80$  individuals who completed their testing opportunities during the study period. This results in a cumulative pass rate of  $70/80 = 87.5\%$ . The Program Status report for the TX-XXX would appear as follows:*

Site	Attempt #	Pass	Fail	Total	Pass %
TX-XXX	1	50	50	100	
	2	16	24	40	
	3	4	10	14	

  

<b>Registration Rate</b>	
<b>Cumulative Pass Rate</b>	87.50%
<b>Testing Attrition Rate</b>	

*An appropriate interpretation would be that approximately 87 of 100 individuals who were deemed to be successful by the approved EMS education program and exhausted their examination attempt eligibility achieved a passing score on the National Registry written examination. Conversely about 13 of 100 individuals who were deemed to be successful by the approved EMS education program and exhausted their examination attempt eligibility failed to achieve a passing score on the National Registry written examination. The cumulative pass rate is an indicator of the composite effect of educational preparedness and individual motivation to be successful.*

**Testing Attrition Rate:**

The percent of attrition of individuals who were unsuccessful on the initial attempt of the examination and failed attempt the written examination a second or third time. The testing attrition rate is reflective of the number individuals who successfully completed a Texas approved EMS education program, failed their initial attempt of the examination and did sit for a second or third attempt of the examination.

**Consider the following example:**

*A sample EMS education program (TX-XXX) issued 100 course completion certificates during a calendar year. At the end of the calendar year, the total number of people who failed the initial attempt was 50 and the number of individuals that did not attempt the examination a second time during the calendar year  $50 - 40 = 10$ . The total number of individuals who failed the second attempt was 24 and the number of individuals who did not attempt the examination a third time during the calendar year is  $24 - 14 = 10$ . Therefore  $(10 + 10) = 20$  individuals did not complete their opportunities to test during the study period. This results in a testing attrition rate of  $20/100 = 20\%$ . The Program Status report for the TX-XXX would appear as follows:*

Site	Attempt #	Pass	Fail	Total	Pass %
TX-XXX	1	50	50	100	
	2	16	24	40	
	3	4	10	14	

**Registration Rate**  
**Cumulative Pass Rate**  
**Testing Attrition Rate 20.00%**

*It is important to understand that the testing attrition rate identified in the report above represents the upper bounds of testing attrition and therefore it would be **inappropriate** to interpret the testing attrition rate as an unbiased estimate and representation of the number of individuals who have decided to leave the field of EMS. The testing attrition rate only accounts for individuals who did not complete their eligible examination attempts between the inclusive dates of January 1, 2005 and December 31, 2005. Per NREMT policy, a portion of these individuals may be eligible to take an additional attempt of the examination within the following calendar year.*

**Special Note:**

The information contained in this report reflects the distribution of students into education program codes based on information provide to the NREMT by the candidates when completing the application. The program code TX-xxx is the default code for candidates who fail to complete the program code portion of the NREMT application. This report indicates that 14 – 16 % of initial candidates at each level failed to provide the NREMT with the appropriate program code reflecting the education program. While this does not affect the overall results for the state of Texas, it potentially underreports individual program status.

It should be noted that when using a sample of EMS individuals to draw conclusion about an entire EMS Education program, the sample size is critical to the stability of the estimates and subsequent conclusions drawn from those estimates. As a general rule, as sample size increases, the estimates of Passing Percents, Registration Rates, Cumulative Pass Rates and Attrition Rates become more stable and are not extremely influenced by the addition or subtraction of a few candidates. However, as sample size decreases the volatility of the estimates increase and which become extremely susceptible to the addition or subtraction of just a few individuals. As a general guideline, it should be noted that as initial testing volume approaches 30 individuals, the estimates become relatively stable. However, as the testing volume begins to decrease below 30 individuals the estimates become increasingly less stable making it difficult to draw inferences about program performance and may result in biased conclusions. To put this concept in perspective, compare two EMS programs with the following program status reports:

<b>January 1, 2005 – June 30, 2005</b>					
<b>Site</b>	<b>Attempt #</b>	<b>Pass</b>	<b>Fail</b>	<b>Total</b>	<b>Pass %</b>
TX-???	1	4	2	6	66.67%

<b>July 1, 2005 – December 31, 2005</b>					
<b>Site</b>	<b>Attempt #</b>	<b>Pass</b>	<b>Fail</b>	<b>Total</b>	<b>Pass %</b>
TX-???	1	5	1	6	83.33%

<b>January 1, 2005 – June 30, 2005</b>					
<b>Site</b>	<b>Attempt #</b>	<b>Pass</b>	<b>Fail</b>	<b>Total</b>	<b>Pass %</b>
TX-???	1	24	16	40	60.00%

<b>July 1, 2005 – December 31, 2005</b>					
<b>Site</b>	<b>Attempt #</b>	<b>Pass</b>	<b>Fail</b>	<b>Total</b>	<b>Pass %</b>
TX-???	1	25	15	40	62.50%

Notice a change of one candidate in the fail column to the pass column in each program report does not result in an equal increase in the pass percentage between programs. Moving one person from the fail column to the pass column in the program report TX-157 rises by 16.67% to a first time pass rate of 83.33% while an equal move of one candidate from the fail column to the pass column in the program report for TX-166 rises 2.5% to a first time pass rate of 62.5%. This same variability will occur with Registration Rate, Cumulative Pass Rate and Testing Attrition Rate. It is recommended that all program reports (whether positive or negative) with total candidates testing less than 30 be considered only as descriptive and comparative data and that any interpretation from an inferential perspective be conducted cautiously.