Impact of Time Lapse on ASCP Board of Certification Medical Laboratory Scientist (MLS) and Medical Laboratory Technician (MLT) Examination Scores

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ABSTRACT

Background: Research in several professional fields has demonstrated that delays (time lapse) in taking certification examinations may result in poorer performance by examinees. Thirteen states and/or territories require licensure for laboratory personnel. A core component of licensure is passing a certification exam. Also, many facilities in states that do not require licensure require certification for employment or preferentially hire certified individuals.

Objective: To analyze examinee performance on the American Society for Clinical Pathology (ASCP) Board of Certification (BOC) Medical Laboratory Scientist (MLS) and Medical Laboratory Technician (MLT) certification examinations to determine whether delays in taking the examination from the time of program completion are associated with poorer performance.

Methods: We obtained examination data from April 2013 through December 2014 to look for changes in mean (SD) exam scaled scores and overall pass/fail rates. First-time examinees (MLS: n = 6037; MLT, n = 3920) were divided into 3-month categories based on the interval of time between date of program completion and taking the certification exam.

Results: We observed significant decreases in mean (SD) scaled scores and pass rates after the first quarter in MLS and MLT examinations for applicants who delayed taking their examination until the second, third, and fourth quarter after completing their training programs.

Conclusions: Those who take the ASCP BOC MLS and MLT examinations are encouraged to do so shortly after completion of their educational-training programs. Delays in taking an exam are generally not beneficial to the examinee and result in poorer performance on the exam.

ABBREVIATIONS: ASCP - American Society for Clinical Pathology, BOC - Board of Certification, CMP - Credential Maintenance Program, ANSI - American National Standards Institute, MLS - Medical Laboratory Scientist, MLT - Medical Laboratory Technician, NAACLS - National Accrediting Agency for Clinical Laboratory Sciences, ANOVA - analysis of variance, NCSBN - National Council of State Boards of Nursing, NCLEX - National Council Licensure Examination, CPA - Certified Public Accountant, MRCP(UK) - Membership of the Royal Colleges of Physicians of the United Kingdom

INDEX TERMS: Medical Laboratory Scientist, Medical Laboratory Technician, examination, certification.

Clin Lab Sci 2015;28(3):145

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INTRODUCTION

The length of *time lapse* (ie, delay) between finishing an educational training program and completion of a professional certification and/or board examination may impact examinee performance. Previous studies[1-6] have demonstrated a negative effect on certification-exam outcomes (associated with delays in taking the exam) in several professional fields, including accounting, emergency medicine, internal medicine, nursing, and surgery.

This is particularly important to note when students have the option of scheduling computerized and/or remote secure testing, which allow them to select exam dates and potentially delay taking an exam for any number of personal and/or professional reasons. To our knowledge, no time-lapse studies have been published regarding exams in clinical laboratory science.

The American Society for Clinical Pathology (ASCP) Board of Certification (BOC) is an independent certification agency for medical-laboratory professionals that has certified more than 500,000 examinees total.[7] ASCP BOC certification examinations, which are part of the Credential Maintenance Program (CMP), are accredited by the American National Standards Institute (ANSI).[8] The two largest ASCP BOC certification categories are Medical Laboratory Scientist (MLS) and Medical Laboratory Technician (MLT). The objective of the present study was, therefore, to determine whether the length of the time lapse between completion of an MLS or MLT educational program and taking the corresponding ASCP BOC exam might impact examinee performance.

METHODS

We extracted examination-performance data from the ASCP BOC exam database. The inclusion criteria were are follows: MLS and MLT first-time examinees who had graduated from training programs accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS) and who took their exams between April 12, 2013, and December 30, 2014. Repeat examinees were excluded from analysis. The program completion date was self-reported by individuals during application for the certification exam; it was then verified electronically by Program Directors during status review for exam eligibility. In the extracted dataset, examinees were divided into 3-month quarters based on the interval of time between their date of program completion and the calendar date when they took their certification exam: quarter 1 (1-3 months after program completion), quarter 2 (4-6 months after program completion), quarter 3 (7-9 months after program completion), and quarter 4 (10-12 months after program completion). Data are presented as mean (SD) unless otherwise indicated. Statistical analysis was performed using SPSS software, version 20 (SPSS Inc, Chicago, IL) using analysis of variance (ANOVA) and/or χ^2 testing, as appropriate. Results were graphed in SigmaPlot 11 (Systat Software Inc, San Jose, CA).

RESULTS

MLS Certification Examination

Summary data for MLS examinee performance are shown in Table 1. Of the 6037 examinees who took the ASCP BOC MLS certification examination for the first time during the 20-month period analyzed, 80.2% took the exam during the first quarter after completion of their training program. A smaller number of individuals took the exam in the second quarter (14.0%), third quarter (3.5%), or fourth quarter (2.2%).

The decrease in mean (SD) scaled exam scores was most notable between the first quarter (529 [98]) and second quarter (459 [95]), as shown in Figure 1A. The decrease in scores across quarters was statistically significant (ANOVA; P <.01). The observed decrease in examinee mean (SD) performance across quarters prompted further analysis of pass/fail results to determine whether a delay in taking the exam might affect the overall outcome. As shown in Table 1 and Figure 1B, the exam failure rate was only 8.9% in the first quarter but increased to 26.4% by the second quarter, 30.4% by the third quarter, and 31.9% by the fourth quarter. χ^2 analysis confirmed that there is a significant increase in failure rate as the time lapse increased across quarters (P <.01).

Table 1. Descriptive Data of Medical Laboratory Scientist (MLS) Examination Scores and Quarterly Pass/Fail Outcomes[a]

Quarter After Program Completion	No.(%) Examinees	Scaled Score (mean [SD])	Pass/Fail, No. (%)	
			Pass	Fail
1	4,843 (80.2%)	529 (98)	4,413 (91.1%)	430 (8.9%)
2	845 (14.0%)	459 (95)	622 (73.6%)	223 (26.4%)
3	214 (3.4%)	444 (102)	149 (69.6%)	65 (30.4%)
4	135 (2.2%)	440 (88)	92 (68.1%)	43 (31.9%)
Total	6037	514 (102)	5276 (87.4%)	761 (12.6%)

[a]Percentages may not total 100 because of rounding.

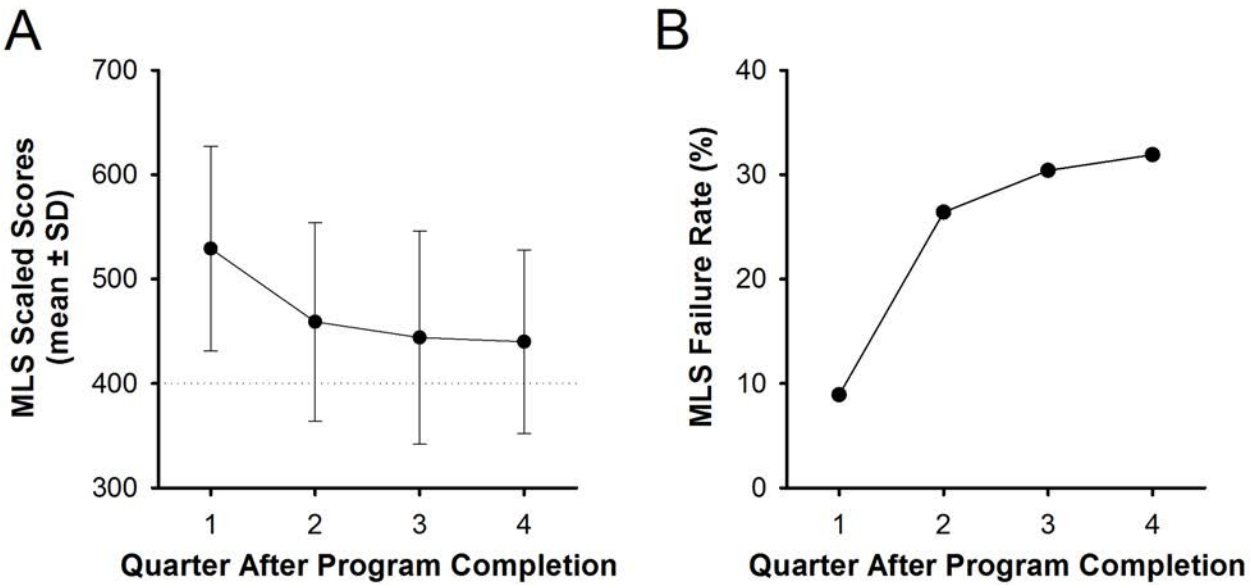

Figure 1. Medical Laboratory Scientist (MLS) Examination Scores and Failure Rate. A. Mean (SD) scaled scores plotted by quarter in which the American Society for Clinical Pathology (ASCP) Board of Certification (BOC) Medical Laboratory Scientist (MLS) examination was taken after completion of the examinee educational program. The dotted line indicates a passing-score threshold of 400. B. Failure rate on the American Society for Clinical Pathology (ASCP) Board of Certification (BOC) Medical Laboratory Scientist (MLS) examination by quarter.

MLT Certification Examination

During the period of time analyzed, 3920 individuals took the ASCP BOC MLT certification examination for the first time. Compared with the distribution of MLS exam times, MLT examinees took their certification exam slightly later (57.6%, first quarter; 29.4%, second quarter; 8.2%, third quarter; 4.8%, fourth quarter). Summary data for MLT exam performance is presented in Table 2. The mean (SD) scaled exam scores were as follows: first quarter (546 [117]), second quarter (489 [124]), third quarter (454 [116]), and fourth quarter (471 [115]) (Figure 2A). The difference in mean (SD) scaled scores across quarters was, again, statistically significant (ANOVA; P <0.01). The overall MLT certification-exam failure rates were 11.5% (first quarter), 24.5% (second quarter), 30.8% (third quarter), and 27.8% (fourth quarter) (Figure 2B). χ^2 analysis confirmed that there was a significant increase in the failure rate as the time lapse increased (P <.01).

Table 2. Descriptive Data of Medical Laboratory Technician (MLT) Examination Scores and Quarterly Pass/Fail Outcomes

Quarter After Program Completion	No. (%)of Examinees	Scaled Score (mean [SD])	Pass/Fail, No. (%)	
			Pass	Fail
1	2,258 (57.6%)	546 (117)	1,999 (88.5%)	259 (11.5%)
2	1,154 (29.4%)	489 (124)	860 (74.5%)	294 (24.5%)
3	321 (8.2%)	454 (116)	222 (69.2%)	99 (30.8%)
4	187 (4.8%)	471 (115)	135 (72.2%)	52 (27.8%)
Total	3920	518 (123)	3216 (82.0%)	704 (18.0%)

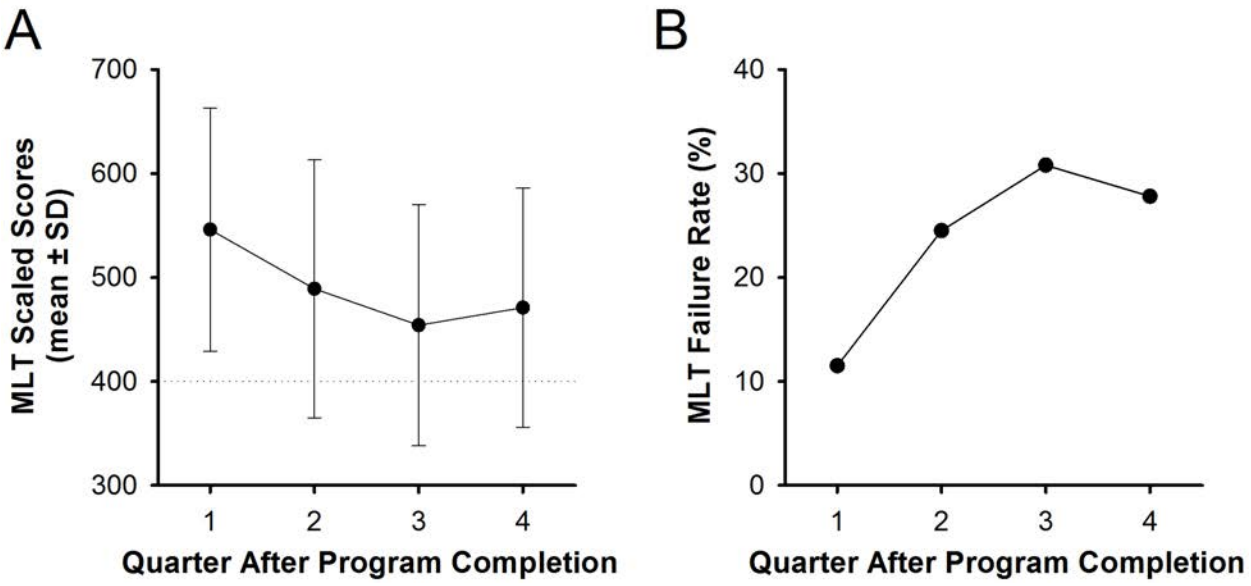

Figure 2. Medical Laboratory Technician (MLT) Examination Scores and Failure Rate. A. Mean (SD) scaled scores plotted by quarter in which the American Society for Clinical Pathology (ASCP) Board of Certification (BOC) Medical Laboratory Technician (MLT) examination was taken after completion of the examinee educational program. The dotted line indicates a passing-score threshold of 400. B. Failure rate on the American Society for Clinical Pathology (ASCP) Board of Certification (BOC) Medical Laboratory Technician (MLT) examination by quarter.

DISCUSSION

This report demonstrates that mean (SD) scaled scores on the ASCP BOC MLS and MLT examinations decreased the longer examinees waited after completion of their educational program before taking the test. The decrease in scores was, in fact, large enough to significantly increase the overall exam failure rates (Figure 1B, Figure 2B). Although most of the eligible examinees took their examination in the first quarter after program completion, with pass rates of 91.1% (MLS) and 88.5% (MLT), applicants who waited until the fourth quarter after program completion had pass rates of only 68.1% (MLS) and 72.2% (MLT).

The results of this report provide supportive evidence for encouraging candidates to take their certification examinations as soon as possible after program completion. Results could be used by program directors and examinees in developing strategies to optimize overall certification-exam performance and to facilitate the transition to successful careers in laboratory professions that require (or benefit from) professional certification.

Taking the MLS or MLT certification examination early does not guarantee a passing outcome. Those tests are competency based: to earn a passing score, each student must have acquired the knowledge and skills necessary for successful performance. However, there are potentially many reasons why time lapse may have a significant effect on exam outcome. Students may be more accustomed to taking tests immediately after completing a program. Also, it is possible that students have a more generalized fund of knowledge at that time because they have not specialized or devoted their mental energy to the specific tasks encountered in the workplace.

It is possible that individuals who delayed taking the certification examination and subsequently earned a failing score may have done so because they lack confidence in their ability to successfully earn a passing score. Some individuals may need more time to prepare for the exam and/or have test anxiety. These individuals could have introduced a self-selection bias to this study: they may still have earned a failing score if they had taken the exam immediately after program completion.

Requirements for the medical-laboratory professions differ from those in fields such as nursing in that there is not a uniform requirement across states that laboratory personnel must have certification and/or licensure to practice in the field. However, 13 states and territories require licensure for laboratory personnel,[9] which is usually based on passing a certification examination. ASCP has issued a policy statement in support of state licensure; this statement is available for download online.[10] In states where licensure is not required, the employer usually determines whether an applicant must have certification to be hired. Many employers preferentially hire those individuals with certification; certain institutions, in fact, will only hire certified individuals. Because of this lack of standardization, MLS and MLT graduates may be more inclined to delay taking a certification exam until they have a job and can afford to pay the certification application fee (or are applying for a job that requires certification).

Several previous studies have noted similar time-delay effects in performance on certification and/or board examinations. In 2006, the National Council of State Boards of Nursing (NCSBN) conducted a study to examine the relationship between passing the National Council Licensure Examination (NCLEX) and the amount of time elapsed between becoming eligible and actually taking the exam.[1] This study showed that the passing rates tended to decrease when there was an increased time delay. A subsequent study was carried out for the years 2006 through 2008 and found similar results—namely, that the candidates were less likely to pass the NCLEX as the time between eligibility and the exam increased.[6]

The negative effects of time delay have also been observed in other professional fields. One study demonstrated lower cumulative passing rates in candidates who took the American Board of Internal Medicine certification examination more than 1 year after completion of training.[5] Poorer performance was also observed on the American Board of Emergency Medicine qualifying exam when candidates waited 1 or 2 years after completing residency.[2] Marked increases in exam failure rates were also observed for candidates who delayed taking the American Board of Surgery qualifying exam for 1 or more years after residency training.[3] Poorer performance associated with delays in taking the Certified Public Accountant (CPA)

examination have also been described.[4]

It should be noted that time-lapse effects may not be generalizable for all types of examinations. For example, the Membership of the Royal Colleges of Physicians of the United Kingdom [MRCP(UK)] Part 2 Clinical Examination (also known as PACES) recommends delaying taking that particular (clinical-skills) exam until 36 months after graduation.[11] Experience in practice, rather than the training program, may serve as better preparation for that exam.

A limitation of this study is that the number of applicants who delayed taking the certification examinations through subsequent quarters (particularly the third and fourth quarters) is relatively small (Tables 1 and 2). This may have introduced slight variability at these time points. For example, although the MLT fourth-quarter exam mean (SD) scaled scores (Figure 2A) appear to slightly increase from the third to the fourth quarter, this apparent difference was not statistically significant (P = .68). MLT fourth-quarter mean (SD) scaled scores were still decreased significantly (P <.01) from the first quarter. Despite this limitation, statistically significant differences in exam performance across quarters were identifiable and are generally predictable. Future research could be conducted to evaluate pass/fail rates in repeat test takers and to identify which factors might influence an applicant's decision to delay taking their certification exam.

ACKNOWLEDGEMENTS

We thank ASCP BOC staff members Kristin Blake, Robin Lewis, Bernie Olson and Geraldine Piskorski for assistance throughout this project.

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