Laboratory Managers’ Attitudes toward Clinical Laboratory Scientists Shortage

By Suzy Ghazarossian, D.H.Ed, MT(ASCP), SBB(ASCP)CM

Several factors have been associated with the shortage of qualified laboratory professionals. Therefore, to enhance laboratory managers’ involvement in increasing student interest in clinical laboratory science (CLS) careers, a research study was conducted in Southern California. This comprehensive study involved three phases. The first phase was the development and facilitation of a Shortage Awareness Course for laboratory managers that covered the significance of the shortage, the causes, and the possible solutions. These solutions focused on the manager’s role and involvement in the execution of the suggested solutions. The second phase utilized tools designed to evaluate the effectiveness of the course. The tools consisted of a series of questionnaires that recorded the perceptions and opinions of the participants towards the shortage and their role in addressing the shortage. The final phase was the development of standard operating procedures that outlined the steps implemented in the study.

Purpose
The purpose of this study was to determine through quantitative and qualitative means the impact a Clinical Laboratory Scientist (CLS) Shortage Awareness Course had on laboratory managers, so that participants can increase their efforts to attract more students to the profession. This study developed and validated a survey instrument that assessed pre-course and post-course shortage awareness attitudes. The survey instrument was developed to assess whether laboratory managers are aware of:

1) The current status of the critical personnel shortage
2) The effect the CLS shortage has on the public
3) The effect of the CLS shortage on the participant’s laboratory
4) The reasons for the CLS shortage
5) Their roles in addressing the shortage

This study consists of a research proposal and three phases designed to address the stated problem, evaluate the intervention, and maintain the changes made. The phases include:

1) A research proposal to resolve a work related issue, the CLS shortage.
2) A curriculum designed to support the Shortage Awareness Course.
3) Evaluation tools to measure the outcomes of the Shortage Awareness Course and ongoing effectiveness.
4) Standard operating procedures and policies that pertain to implementation of the Shortage Awareness Course, including limitations, conditions, restrictions, or constraints.
Proposal
Clinical laboratories have a critical personnel shortage. Several studies have identified various causes of this shortage. Additional studies have provided possible solutions to increase the number of students enrolling in clinical laboratory science programs.

This study focused on attitudes of laboratory managers toward the shortage. The decision to implement the recommended resolutions (increasing salaries, opening more training programs, and increasing public visibility) to help alleviate the shortage is based on the laboratory managers’ perception of the shortage.

Understanding the laboratory managers’ attitudes toward the shortage and their role in addressing it is equally important as ascertaining solutions for recruiting students. If laboratory managers do not perceive there is a shortage because their laboratory is functional with the number of employees they have, or believe there is nothing a manager can do, solutions will never be developed. This may lead to a worsening shortage which will ultimately have a severe negative impact on the public’s healthcare.

Problem Statement
Over a 12 to 18 month period, the researcher designed, created, and implemented a Clinical Laboratory Scientist Shortage Awareness Course to address survey-based attitudes of laboratory managers in Southern California.

Literature Review
The Bureau of Labor Statistics states the United States should expect 68,700 new clinical laboratory positions to be added between 2004 and 2014. In 2005, 64 percent of the number needed graduated from schools in the United States. The shortage has been particularly severe in California. According to Lindler in 1999 there were nearly 36,000 active clinical laboratory scientists in California. By 2001 there was a 28 percent decrease in active CLSs in California.

There are several factors that have led the laboratory to experience such a shortage. Beckering attributes the shortage to insufficient wages, job dissatisfaction, lack of training programs, and the lack of public awareness. Passiment discusses the findings of the Coordinating Council for the Clinical Laboratory Workforce (CCCLW). CCCLW was founded to improve recruitment into the medical laboratory profession. CCCLW suggests targeting the following areas to make a change in the supply of laboratorians: a) salaries, b) parity of wages with other healthcare professions, c) increase visibility of the profession, and d) increase recruitment and retention efforts. The president of the American Society for Clinical Pathology (ASCP) lists the following four reasons for the personnel shortage in the clinical laboratory:

1. Laboratory professionals are underpaid and under recognized, even at the institutions where they work. There is lack of compensation for the
amount of responsibility inherent to the work.

2. Patients are more isolated from direct contact with laboratory professionals, an unfortunate reality that does nothing to enhance their reputation as professionals.

3. Some healthcare administrators do not appreciate the specialized talent required to oversee clinical laboratory operations. They also do not value the special expertise and knowledge required to conduct laboratory testing.

4. Fewer students want a career in laboratory science. They prefer other allied health professions with equally altruistic missions, but with more visibility, higher salaries, and higher recognition factors.

Compared to other allied health professions such as nursing, CLSs are required to have more education and training, yet are offered lower salaries. Further, a career in laboratory medicine may not be appealing to students because CLSs are required to work in high stress environments for low salaries in clinical laboratories that operate 24 hours a day, seven days a week. This type of environment may cause students to seek training in other allied fields for more pay and at the same time, result in existing CLSs leaving the laboratory environment.

The literature reviewed suggests several solutions to the CLS shortage, including a) increasing wages, b) retaining CLSs by improving work environments, c) opening more training programs, and d) increasing visibility of the profession to the public. To carry out these solutions and make them happen is dependent on the support, participation, and active involvement of the laboratory managers.

**Methodology**

The participants were surveyed on their attitudes towards the shortage before and after attending the course. The pre-questionnaire mean was compared to the post-questionnaire mean to determine whether there was an increase in knowledge from the awareness course and the extent of that increase. The clinical laboratory scientist survey pre-questionnaire was in Likert scale format. Table 1 lists the data collected by the questionnaire. Due to the small sample size, caution must be taken when interpreting the data collected from these questionnaires. Overall, the demographic variables of the study groups had similar characteristics to the target population of the regional area of interest; thus, it is unlikely that these results are confounded by differences in any of those variables.

The clinical laboratory scientist survey post-questionnaire was also a Likert scale survey. Table 2 lists the data collected by the questionnaire.

A random sample of participants was interviewed for additional information using a semi-structured interview (see following sections). Two sets of open-ended questions were designed. A participant was asked a different set of questions if their laboratory is a CLS training site. Participants from laboratories that are not a training site were asked about:
- Their interest in becoming a CLS training site
- Obstacles preventing the facility from becoming a CLS training site
- Whether the Shortage Awareness Course provided useful information that will help the participant overcome some of the obstacles
- Whether the Shortage Awareness Course provided useful information to address the CLS shortage through means other than becoming a CLS training site.

Those participants whose laboratory is a training site were asked:
- What led the facility to become a CLS training site
- To explain obstacles they had to overcome to become a CLS training site
- Whether the Shortage Awareness Course provided useful information to address the CLS shortage through means other than becoming a CLS training site.

Sample
Managers from various Southern California hospitals and free-standing clinical laboratories were solicited for participation. Participants were contacted via electronic mail (e-mail). Participants were told that the objective of this study was to gather data regarding laboratory staffing and were asked to attend a course regarding the shortage. As an incentive to participate, two continuing education units (CEUs) and a $10 voucher to an upcoming CLMA Greater Los Angeles Chapter education event were offered for those who completed the course. (CLMA Greater Los Angeles Chapter sponsored the study by providing the CEUs and $10 vouchers).

Data Collection
Participants received the clinical laboratory scientist survey pre-questionnaire as a Microsoft Word file via e-mail from the researcher. This questionnaire was completed and returned to the researcher prior to attending the course offered as part of this research. Once the researcher received the clinical laboratory scientist survey pre-questionnaire, the participants received electronic copies of:
1) Microsoft PowerPoint Shortage Awareness Course presentation with audio
2) Microsoft Word file of the course supplemental guide
3) Microsoft Word file of the clinical laboratory scientist survey post-questionnaire
4) Microsoft Word file of the Shortage Awareness Course evaluation.

Data Analysis
The participants were asked to complete the same Likert survey after completing the Shortage Awareness Course. The results of the pre and post comparisons are listed in Table 3.

The impact of the course was demonstrated by a paired t-test comparing the means of the pre- and post-surveys. The p-value for a paired t-test equaled 0.0097, which indicates there was a significant difference between the overall pre- and post-test survey scores. This demonstrates, taken as a whole, exposing laboratory
managers to a course designed to teach them about the origins of the CLS shortage and possible modes of action to increase CLSs did have a significant effect.

The null hypothesis in this study was that laboratory managers would have no improved awareness and/or commitment to implementing strategies to address the CLS shortage as a result of this course. The null hypothesis was not supported; therefore, the course had a noteworthy outcome in improving awareness and in generating interest in implementing strategies to increase student appeal in careers in the laboratory.

**Open-ended Question Result**

Of the 29 participants, 11 were randomly selected to complete an open-ended questionnaire. Seven participants (64 percent) completed an open-ended questionnaire. Four of the seven interviewees (57 percent) completed an open-ended questionnaire designed for a training site; the remaining three (43 percent) completed the non-training site questionnaire.

All four (100 percent) of the respondents with a training program stated they were once a stand-alone training site. They were forced to close their CLS program at some point but all decided to reinstate their programs. Three of the four reopened their program affiliating with a local university. Only one re-opened as a stand-alone training site.

Measuring the return on the investment associated with reinstating a training program has been a challenge. The overall consensus in measuring return on investment is the ability to hire the students that have graduated from their respective training programs. Two sites received support from administration whereas the other two sites did not.

Support from staff was not an easy task for laboratory managers and education coordinators. The sites stated the following in regards to support from staff:

“The staff left behind to do the work had to be continually reminded that being a training site was the vision of the future and it was not going away.”

“The staff was excited to be a training site, but didn't receive additional staffing to get the program running, so they were disappointed.”

“As always, training the students is a time consuming endeavor, however the bench CLSs seem to rise to the challenge, as do the specialists, who bear the brunt of their training and must work it in between projects, deadlines, CAP surveys, etc.”

“Staff support has been difficult. In the past, staff did very little didactic lecturing, probably some mycology and serology. All other lectures were given by the four pathologists. Now, CLSs are doing half of the lectures. We've got a lot of old CLSs, worked here >25 yrs, and they want to do as little as possible. Two CLS in the Micro Dept developed eight chemistry lectures. Now, with position cuts, they are unhappy and refuse to give lectures.”
Finally, the open-ended question asked the participants about their role as laboratory managers in addressing the shortage. Two of the four felt they were in a position to make a difference. The other two noted, “the scope of the shortage is greater than one’s individual efforts” and “I am not sure if I am in a position to make a difference other than providing and expanding education program.”

The second interview group (without a training program) was given a different set of open-ended questions. Two of the three (67 percent) said they were interested in becoming a training site. All three were training sites in the past. The following reasons were cited when asked what is preventing these institutions from establishing a training program:

“Our lab currently does not perform testing in required training areas for either general license or specialist.”

“Due to shortage and few changes in administrative director's responsibility, one section (microbiology) is not able to commit at this time.”

“Primarily time and resources in completing the application and preparing materials for certification as a training site.”

This group was also asked to discuss their perception of their role as laboratory managers in addressing the shortage. All three responded with a sense of responsibility in educating the public about the profession.

**Limitations**

The limitations of this research study are as follows:

1) Participants who already have a training program may have felt compelled to state they believe the shortage is a serious enough problem to justify their program.

2) The computer literacy of participants may have resulted in a decreased return rate. A couple of participants required assistance from the researcher to launch the PowerPoint presentation. Prospective participants who may have had a similar experience may have opted not to participate instead of contacting the researcher for assistance.

3) The limited sample size did decrease the robustness of the statistical analysis. The sample size may have been due to the significant shortage in the laboratory field and competing priorities making it extremely challenging to obtain participation. Because this study was an education intervention, the sample size was limited. The data from this study may be used to design larger confirmatory studies.

4) A purposeful sample in one geographic area was used; this may not be representative of managers in other areas of the country.
Discussion
The general findings from the implementation of the three phases in this study provide strong support for the necessity of a CLS Shortage Awareness Course. The findings are based on a comparative analysis of the surveys of laboratory managers. The analysis shows that the curriculum was beneficial in educating managers on the critical CLS staffing issue.

Laboratory managers seem to be aware and are impacted by the shortage, as they are experiencing challenges in filling CLS positions. However, laboratory managers seem to attribute the shortage to a lack of training programs, lack of visibility, and insufficient wages.

The open-ended questionnaire and interviews confirmed all interviewees worked at an institution that was once a stand-alone CLS training site. The fact that they had all closed their programs at one time or another was in agreement with Chapman's10 observation of the significant amount of closures in training programs between 1975 and 2003. As more and more laboratory managers and administrators realize the significance of the shortage, CLS training programs have started emerging again11. However, since the programs are reopening at a time when the shortage is at a critical level, managers are faced with the dilemma of not having the appropriate personnel to perform the routine work and train students at the same time. This presents a paradox. Due to the lack of qualified personnel, laboratories are understaffed and need more CLSs in the profession. Yet, to train CLSs additional staffing requires maintaining the routine operations of the laboratory while also teaching students.

The bigger challenge, as revealed by the interviews, is obtaining the staff’s support and improving job satisfaction. Part of implementing a training program should include educating the staff about the advantages and disadvantages of the training program, obtaining input from the laboratory staff, and working with the staff in designing favorable schedules and shifts. Beckering5 believes supervisors and managers need to work more closely with current staff to restructure their jobs to make them more appealing. Managers can also work on incentivizing teaching by offering bonuses, promotions, opportunities to attend educational seminars for free, or paying membership fees for instructors to belong to laboratory professional organizations.

Since the cost of a hospital training program is substantial, laboratory managers can seek to affiliate with university training programs to disseminate the cost. Universities are being observed closely because of the costs of running laboratory science programs, particularly the high expense of providing laboratory space10. By joining forces, both institutions can benefit and produce more CLSs for the public. The school can absorb the cost of faculty and providing didactic lectures. The hospitals can provide the laboratory training space and hands-on training. Given the student has to pay tuition for attending a university, the cost and training will be distributed among the university, hospital, and the student, lessening the burden on all participants.
Seemingly, staff support was more of a concern than support from administration, further emphasizing the importance of including the staff in the process and encouraging the importance of participating.

In addition to encouraging staff to support training programs, staff members can also be encouraged to join professional laboratory organizations and thereby contribute to the field beyond their specific laboratory. Eighty-two percent (9/11) of the managers interviewed did feel they are in a position to make a difference; the remaining 18 percent did not. Both belonged to the group with a current training program. One manager felt having a CLS training program was the extent of her obligation to the shortage while the other felt it is the responsibility of national organizations and their local affiliates to make an impact on recruitment. Passiment\(^8\) points out that each year ASCLS, ASCP, and other laboratory organizations collaborate with many allied health professions who seek to increase funding of Title VII to supply grants for allied health, nursing, and medical education. Managers do not need to stop with their institution’s administration to make a difference. Rather they can be involved with other laboratory professionals outside of their organization. Managers can also encourage and support the staff to participate. Laboratory managers themselves can go out into the community and promote the career or encourage their staff to do so. They can educate the public, students, counselors, and teachers, for example, by participating in school career days.

References


**Acknowledgments**

I would like to express the deepest appreciation to my committee chair, Dr. Colleen Halupa. She continually and convincingly conveyed a spirit of adventure in regard to research and scholarship, and an excitement in regard to teaching. Without her guidance and persistent help this dissertation would not have been possible. I would also like to thank my committee members, Dr. Paula D’Amore and Dr. Joy Fridley, for their encouraging words, thoughtful criticism, and time and attention during busy quarters.

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### Table 1: Data Collected by Clinical Laboratory Scientist Survey Pre-Questionnaire

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<thead>
<tr>
<th>Question</th>
<th>Pre-score</th>
<th>Post-score</th>
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<tbody>
<tr>
<td>Participant’s CLS license number</td>
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<tr>
<td>Participant’s laboratory status as a CLS training site</td>
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<td></td>
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<tr>
<td>Participant’s age</td>
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<td></td>
</tr>
<tr>
<td>Participant’s expected years to retirement</td>
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<td></td>
</tr>
<tr>
<td>Participant’s years of managerial experience</td>
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<tr>
<td>Number of CLS employees</td>
<td></td>
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<tr>
<td>Number of open CLS positions in the participant’s place of work</td>
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<tr>
<td>Perceptions of the existing shortage</td>
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<tr>
<td>Perception of their role/responsibility in addressing the shortage</td>
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### Table 2: Data Collected by Clinical Laboratory Scientist Survey Post-Questionnaire

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<thead>
<tr>
<th>Question</th>
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<td>Participant’s CLS license number</td>
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<tr>
<td>Perception of their role/responsibility in addressing the shortage</td>
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### Table 3: Average scores from Clinical Laboratory Scientist Survey Pre-Questionnaire and Clinical Laboratory Scientist Survey Post-Questionnaire

<table>
<thead>
<tr>
<th>Question #</th>
<th>Question</th>
<th>Mean Score to Survey Questions</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Pre-score</td>
</tr>
<tr>
<td>2</td>
<td>The CLS shortage can be attributed to job dissatisfaction</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>In my laboratory, filling CLS positions is not challenging</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>In my laboratory, testing errors are direct results of being short staffed</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>The number of students graduating is enough to meet the current demand for CLSs</td>
<td>2</td>
</tr>
</tbody>
</table>

1 = Strongly Disagree  2 = Disagree  3 = Agree  4 = Strongly Agree

Note: there was no change in mean score in excluded questions