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## Student Motivations in Medical Laboratory Science Job Selection

By Matthew M. Jones

A thesis

submitted in partial fulfillment

of the requirements for the degree of

Master of Science in the Department of Medical Laboratory Sciences

Idaho State University

Fall 2017

### **Committee Approval**

To the Graduate Faculty:

The members of the committee appointed to examine the thesis of Matthew M. Jones find it satisfactory and recommend that it be accepted.

Susan Galindo, Major Advisor

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## IRB-FY2017-245 - Initial: Letter of Approval (exempt)

1 message

baerralp@isu.edu <baerralp@isu.edu> To: jonemat7@isu.edu Tue, Apr 25, 2017 at 7:36 AM

April 25, 2017

Matthew Jones Medical Laboratory Science 1311 E. Central Drive Meridian, ID 83642

RE: regarding study number IRB-FY2017-245: What are MLS students most motivated by when searching for a job?

Dear Mr. Jones:

I agree that this study qualifies as exempt from review under the following guideline: Category 2. Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

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Notify the HSC of any adverse events. Serious, unexpected adverse events must be reported in writing within 10 business days.

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Sincerely,

Ralph Baergen, PhD, MPH, CIP Human Subjects Chair

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## List of Abbreviations

ISU – Idaho State University

MLS – Medical Laboratory Science/Scientist

#### Abstract

The purpose of this study is to determine the motivations behind job selection of the students in the Medical Laboratory Sciences program at Idaho State University. This is a replicate study of work previously done by researchers at the University of Utah in 2004 which examined job selection criteria of MLS students. Survey data of recently graduated students was gathered through convenience sampling and analyzed using SPSS to measure the importance of different job selection criteria to Medical Laboratory Science students. A significant difference was found between these factors leading to a selection of most favorable and least favorable clinical rotation sites attended by the students. Students appeared to value 'work environment' the most in potential employers, followed by 'pay.' As potential future employees in a high-demand career, it is increasingly important for potential employers to better recruit and fill the increasing need for highly skilled workers in the MLS field.

#### Introduction

Statement of the Problem/Statement of Purpose

The purpose of this research is to determine what factors Medical Laboratory Sciences (MLS) students at Idaho State University (ISU) value most when analyzing future employment opportunities in the profession. This is a replication of a study done by Stuart and Fenn at the University of Utah (Stuart & Fenn, 2004).

Research Questions/Goals

- a. What job selection criteria are most important to MLS students at Idaho State University when analyzing employment opportunities?
- b. Do the findings from Idaho State University coincide with the findings of Stuart and Fenn from the University of Utah?

#### Definitions

a. MLS: Medical Laboratory Science

#### Assumptions/Limitations/Delimitations

Surveys are an excellent tool used by researchers to gather data. However, surveys have inherent disadvantages, such as data errors due to question non-responses, certain answer options may be interpreted differently by subjects, and respondents may not recall information accurately, known as recall bias (Wyse, 2012). Students in this study were surveyed from the last 2 ISU MLS cohorts, requiring students from past cohorts to recall information from years prior. Despite this limitation, no significant difference was found in data provided by the most recent graduates, and past cohorts, so the data infers that recall bias is not actually a limitation of this particular study. Another limitation to this study was respondents submitting incomplete surveys, which resulted in these responses needing to be removed before analysis can be done. Furthermore, it is an assumption of this study that participants answered honestly and thoughtfully, as opposed randomly selecting answers, which can interfere with the validity of the data. And finally, survey instructions and questions may have been interpreted differently by different participants, such as in this survey, where no specific definitions were given for the listed job selection criteria. This means that, for example, students may have all interpreted 'organizational climate' very differently.

### Significance of the Study

With the increasing demand for Medical Laboratory Scientists, knowing what factors best influence job selection decisions of new professionals entering the field will help employers to tailor their environments to increase appeal and retain students as employees (Bureau of Labor Statistics, 2015). The state of Idaho itself presents a significant challenge to employers, due to it being a rural area, where all healthcare fields struggle more to find adequate staffing (Stempniak, 2016). There are a significant number of vacancies in the field nationwide, with the Bureau of Labor Statistics projecting that the "U.S. will need 81,000 additional MLS to replace retiring staff, and another 68,000 to fill newly created positions" (Institute of Medicine, 2009). Also, MLS academic programs across the country have closed, which results in less opportunity for the new workforce to get trained and enter the field (Enrado, 2009). The American Society for Clinical Pathology (a governing body of certified MLS professionals who represent 33,162 employees from a wide range of hospital types and sizes. They found that the western half of the United States had an MLS vacancy rate of 10.7% for MLS jobs (Garcia, Ali, Soles & Lewis,

2015). The Bureau of Labor Statistics estimates that there are 328,000 MLS jobs in the United States and the field is expected to grow by 16% from 2014 – 2024, which is considered much faster than average when compared to other occupations (2015). MLS are an integral part of the healthcare delivery team, so employers should be aware that MLS students consider different employment attributes, and not just salary, when considering employment at a particular facility.

#### **Review of Literature**

Primarily due to economic concerns and resource availability, there has been a history of medical laboratory science programs consolidating or closing around the United States (Enrado, 2009). As the increasing number of MLS academic programs decreases, there is a limitation on recruiting and advertising for this field. Demand for qualified healthcare professionals across all disciplines will increase as the world has an exponentially increasing elderly population (Morrow, 2014). There are already many vacancies present in the MLS field, and that number of vacancies is expected to grow, as is the projected need for new MLS workers. If we look at current vacancies, projected growth, and the closure of programs across the United States, it is evident that there is a decline in the workforce combined with an increased demand for MLS workers (Bureau of Labor Statistics, 2015). Due to the job demand for MLS compounded by the limited number of students trained annually, there is a fierce and growing competition for employers to obtain qualified employees. As such, it is imperative to identify factors that attract recent graduates to obtain employment.

In a world where an increasing number of people pursue higher education in order to find a job, it is wise to consider what motivates students to select future employers upon graduation. (Rampell, 2013). With an increasing demand for healthcare workers, both academic programs and businesses will need to identify students' job selection criteria (Aquino, 2012). There are many factors that potentially influence students, with some being solely motivated by monetary compensation, while others may primarily seek a positive work environment. For most individuals, the reality may be a blend of these criteria, but certain employer values or benefits may prove to be more enticing to recent MLS graduates than others. Identifying employment decision factors for recent MLS graduates is the motivation of this study. While expected income may intuitively be the most significant motivator for job selection, it is imperative to consider other indicators as well. A meta-analysis of studies regarding the correlation between salary and job satisfaction found the association to be very weak, with "less than 2% overlap between pay and job satisfaction levels" (Chamorro-Premuzic, 2013). Alternatively, this same study found positive work environments as a primary indicator for job seekers.

Income and work environment are two very distinct factors that students must consider when looking for a job, but the choice is not necessarily dichotomous. In order to properly attract future MLS employees, it is important to examine and identify any alternative factors that may also influence their job-making decision. With the increasing demand for Medical Laboratory Scientists nationwide, determining the perspective of students when looking for a job will be pivotal to fill the empty jobs (Bureau of Labor Statistics, 2015). A survey of the career motivations of dental nursing students found that 'features of the job' (availability of the job, reliability, flexibility, and financial security) and 'professional' (the opportunity for future career progress) factors were the strongest motivators (Sembawa, Wanyonyi & Gallagher, 2014). While this survey didn't cover MLS students specifically, it does show that there are a wide variety of factors that students consider when evaluating potential careers.

Clinical rotations have become a staple of accredited MLS academic programs throughout the nation. They are used not only to practice and refine skills learned in the academic environment, but clinical rotations also give students real-life clinical experiences. Depending on the program, students may be required to travel and visit multiple sites, while others may stay at the same clinical site throughout their rotations. A goal of any institution is for their students to learn while on rotation and have a positive experience overall. The clinical

sites may vary widely in operational procedures, the specific instrumentation that is used, and work volume. In addition to this, clinical sites vary with respect to work environment, organizational climate, and even how active the involvement of the student might be. However, to ensure that all students have a similar exposure to key fundamental laboratory tests and processes, a standard check list or task list is used as required by accreditation standards. The completion of this task list is required in order for the student to pass their clinical rotation.

Clinical rotations are a mutually beneficial arrangement for both students and employers. It's an opportunity for an employer to examine potential employees without having to spend time and money on recruiting or hiring. The student benefits from the opportunity to learn on the job and to test out the skills and knowledge that they have acquired over the course of their didactic training. For many students, this is their first clinical MLS job exposure, allowing them to experience the expectations of workers in the profession. The hands-on experience that they gain during their rotations is paramount to their success.

Unfortunately, very little research has been done on the topic of what job selection criteria appears to be important to MLS students. A previous study was conducted by Joann P. Fenn and J. Michele Stuart, both faculty of the MLS program at the University of Utah. As professors in the field, both authors have a vested interest in the success of their program and the profession. It's important to keep in mind when viewing a study like this, that factor significance could vary from program to program due to an amalgamation of reasons, including location and program requirements.

What factors make for a good clinical rotation experience, and just how widely do these experiences differ? While the field of MLS is not currently a well-recognized one, the profession may be in the spotlight soon due to the nation suffering from a shortage of personnel

(Stuart & Fenn, 2004, p. 100). MLS is a highly technical field that requires a high amount of practice and skill, so it is not a quick process to train new employees. These workers have an incredibly important job, even if the field is not widely recognized. They successfully identify the presence, absence, progression and extent of diseases, and provide doctors with the data they need to make accurate diagnoses and improve patient care. In fact, 70% of medical decisions are based off of laboratory findings (Quest Diagnostics, 2014). This fact makes the following research vitally important, but despite this importance, the authors found "no previous studies have been published on the pre-professional socialization of MLS students as a strategy to increase the likelihood of employment" (Stuart & Fenn, 2004, p. 100). The authors hypothesized that "if one assumes that high quality clinical experiences create an interest for future employment in students, then a high quality clinical experience should result in student employment" (Stuart & Fenn, 2004, p. 100).

The Stuart and Fenn study consisted of two phases. Phase one involved structured interviews that were designed to determine the "attractiveness of clinical rotation sites to senior MLS students at a single university-based MLS program" (Stuart & Fenn, 2004, p. 101). The information gathered in this phase allowed the researchers to craft a survey in phase 2 that would provide descriptive, differential data about "quality" clinical rotation sites. The sample size for this study was n=21 and they had a 100% completion rate amongst the 2002 and 2003 academic year of University of Utah's MLS program.

According to Stuart and Fenn's study, students' most favorable rotation sites had a common and overall positive theme. Rather, only a few factors of job selection criteria were demonstrated to be more important than the rest (Stuart & Fenn, 2004). Influencing factors included 'organizational climate' (defined as "positive professional interaction, trust is extended

to individuals, employees are satisfied with their career environment"), 'work environment' (defined as "good reputation, hospital environment, stat lab environment, proper scheduling"), and followed closely by 'student participation' (defined as "participate in hands-on activities and direct application of skills for problem solving and critical thinking") and 'employee benefits' (defined as "adequate wages, health and educational benefits") (Stuart & Fenn, 2004, p. 102). Despite the small sample size, these conclusions identify potential factors MLS science students value most when looking for a job.

There have been no further studies beyond Stuart and Fenn's work to determine what influences MLS students most when looking for a job. Stuart and Fenn's study was the first of its kind in the field of MLS which means that while it provides important data, it doesn't necessarily provide strong evidence for the field as a whole. Additionally, sample size for this study was only n = 21, which makes it a very small study in terms of statistical significance. This research has the potential to be of great value to the field, and therefore should be replicated to see if its findings still hold true across other MLS programs. The purpose of my study is to determine if this data is replicated for other MLS academic programs, and to identify what might assist MLS employers in the state of Idaho. The more data that can be developed will only serve to strengthen the field of MLS.

#### Methodology

#### Participants/Sampling & Selection

Non-probability convenient sampling was used for this study.

Participants were students from the Idaho State University MLS program. Students who completed their clinical rotations in 2016 were contacted in May of 2017 vie e-mail by the MLS Program Director at Idaho State University and were provided with a link to anonymously take the survey via Qualtrics. The survey was then sent out to students who completed their clinical rotations in 2017 in July of 2017 via e-mail by the Clinical coordinator of Idaho State University's MLS program. Respondents were provided with a link to anonymously take the survey on Qualtrics. Responses were collected from Qualtrics in September of 2017 to give all respondents plenty of time to complete the survey.

E-mails were sent out to a total of 37 former students from the 2016 academic year, and a total number of 15 participated, resulting in a response rate for the 2016 year of 40.5%. Invitations were sent out to a total of 44 students from the 2017 academic year, and a total of 43 participated, resulting in a response rate for the 2017 year of 97.7%. This gives a total of 81 invitations and 58 participants, therefore an overall response rate of 71.6%.

There was a total of 62 participants for the study, however 4 sets of data were incomplete, resulting in a total sample size of n = 58 after the incomplete data sets were excluded. The participants consisted of 18 men and 40 women. 43 participants completed their clinical rotations during the summer of 2017 and 15 participants completed their clinical rotations during the summer of 2017 and 15 participants completed their clinical rotations during gender, age range, highest degree achieved, and future education plans.

Instrumentation

The survey was conducted online using Qualtrics, a web-based survey tool that is commonly used for this type of sampling (Qualtrics, n.d.). There were three main sections of the survey. The first section included questions about demographics (refer to Table 1 for data from the first section), including gender, age range, highest degree achieved, future education plans, year that clinical rotations were completed, and whether the student participated in rotations at more than one site or not. Both gender and age provided the option for the participant to decline to disclose.

The second section of the survey included questions about the students experience at their most favorable and least favorable clinical rotation site (refer to Table 2 for data from the second section). Students were asked to rate statements on 6-point Likert-scale of 0 = Non-Applicable or Don't Know, 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly Agree. Items marked Non-Applicable were removed from the analysis. Higher scores would suggest that the clinical site tends to be more positive and sought after.

The third section of the survey included questions regarding desirability of specific factors in an employer (refer to Table 3) and questions about MLS as a career (refer to Table 4). The factors in employment were 'Organizational Climate', 'Active Student Participation', 'Work Environment', 'Employee Benefits' and 'Pay.' They were ranked on a 6-point Likert-scale of 0 = Non-Applicable or Don't Know, 1 = Not Important, 2 = Somewhat Important, 3 = Neutral, 4 =Very Important and 5 = Extremely Important. Items marked Non-Applicable were removed from the analysis. The questions regarding MLS were about the value of the career, whether the student would choose to pursue it again given a choice, and if they would pursue employment at the most favorable or least favorable clinical rotation sites if they had the option. These

statements were rated on a 6-point Likert-scale of 0 = Non-Applicable or Don't Know, 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly Agree. Items marked Non-Applicable were removed from the analysis.

## Design/Analysis

Data was migrated from Qualtrics to SPSS in order to perform analysis. Frequency tables were created for the first and third sections of the survey data. Paired-samples t-tests were performed comparing responses to statements regarding most favorable and least favorable clinical site. For a total of 21 statements, a total of 21 t-tests were run. Table 2 displays the relevant data for the t-tests, and notes whether the data is significant to p < 0.05 or p < 0.01.

#### Results

The survey received a total of 62 responses with an overall response rate of 71.6%, although 4 cases had to be discarded due to incomplete data, leaving a total n = 58. No significant difference was found in results between clinical rotation years at p < 0.05, therefore both years' results are displayed and reported together. No significant difference was found in results between participants over age 30 and participants aged 30 or less at p < 0.05. No significant difference was found in results between male and female participants at p < 0.05 either.

Appendix A details the demographics of respondents. Table A1 contains the full breakdown of demographic data of respondents. Figure A1 contains a visual representation of the same data. There were 18 male participants and 40 female participants. Of interest, almost 26% of participants were over the age of 30, indicating that roughly a quarter of the students in the ISU MLS program are not traditional college students. Upon completion of the program, 53 of the participants earned a Bachelors of Science degree as their highest academic degree, and 5 earned a Masters of Science degree as their highest academic degree. 50.5% of participants did have plans for some kind of future education beyond the MLS program completed, which leads to a question of whether some students might use a MLS degree as a stepping stone to a higher degree or a different career. Almost three-quarters (74.1%) of respondents completed their clinical rotations in the summer of 2017. 51.7% (30 participants) participated at more than one clinical site.

Appendix B contains the full breakdown of data for clinical sites. Table B1 contains the full breakdown of the comparisons between factors indicating most favorable and least favorable clinical sites. Figure B1 contains a visual representation of the same data. The factors that were

statistically considered the most favorably during the clinical rotations were "I received hands on experience" in both most favorable and least favorable clinical experiences (4.53 and 3.93 respectively), so all students did feel that they fulfilled the main purpose of clinical rotations. The second highest average mean for most favorable clinical site was "Laboratory personnel were friendly" (4.50) and "Cooperation among laboratory staff is common" (3.77) for least favorable clinical site. Of note, no means, even in the least favorable experience were classified as 'Disagree' or 'Strongly Disagree', they were all 'Neutral' (3) or higher. Of all of the statements comparing most favorable and least favorable clinical site, all but two were considered statistically significant at p < 0.05. The two statements that were not found to have significant difference between most and least favorable clinical site were "I was able to use critical thinking skills learned in the ISU MLS program" and "Employee benefits are reasonable." All other statements were found to be significant to p < 0.05, and nine of the total statements were found to be significant to p < 0.01. It is also important to note that there was no significant difference found between the experience of students at their most favorable site and the experience of students who only went to one site on any of the statements at p < 0.05.

Table B2 has the data for most favorable site segregated out, showing responses from all years while Table B3 shows response from students in the 2016 class and Table B4 shows responses from students in the 2017 class.

Table B5 has the data for students who only attended one clinical rotation site segregated out, showing responses from all years while Table B6 shows responses from students in the 2016 class and Table B7 shows responses from students in the 2017 class.

Table B8 has the data for least favorable site segregated out, showing responses from all years while Table B9 shows responses from students in the 2016 class and Table B10 shows responses from students in the 2017 class.

Appendix C contains the full breakdown of data for job selection criteria. Table C1 contains the full breakdown of importance ratings of job selection criteria. Figure C1 shows the breakdown of responses for job choice criteria and Figure C2 shows the mean breakdown for job choice criteria. 'Work Environment' was found to be the most important, with 50% of respondents rating it 'Extremely Important' and 41.1% of respondents rating it 'Very Important.' 'Work Environment' was also the only criteria that was not ranked 'Not Important' by any participants, further reinforcing the idea that it is the most highly regarded criteria by participants. This was followed by 'Pay', with 33.9% of participants rating it 'Extremely Important.'

Appendix D contains the full breakdown of data for views on MLS as a career. Table D1 contains the full breakdown of questions regarding views about MLS as a career path. Figure D1 is a visual representation of the same data. The view of whether medical lab science is a recognized field was middle ground, with 32.8% of participants choosing 'Disagree,' 20.7% of participants selecting 'Neutral' and 34.5% of participants choosing 'Agree.' More participants chose 'Strongly Disagree' (6.9%) than 'Strongly Agree' (5.2%). All participants agreed that what they do in the MLS field is important, with over half (56.9%) of participants selecting 'Strongly Agree.' A total of 4 participants would not repeat their decision to pursue MLS as a career, and 7 participants felt neutral about it. Almost all participants (91%) would take a position at their most favorable clinical site. Of the participants that attended more than one clinical site, only 12 of them would accept a position at their least favorable clinical site.

Participants were also invited to include any additional comments that they felt pertinent to the study, the results of which can be found in Table E1 in Appendix E.

The full survey that went out to participants can be found in Appendix F.

#### Discussion

#### **Discussion of Research Findings**

People of all age ranges are pursuing MLS as a career path, with only 65.4% of participants reporting being below age 31. It's very possible that for some students, this may be a second career. This is important to consider because different age groups can have different values when it comes to job selection criteria. As we age, our priorities can change and we may find that what previously motivated us has changed as well. The distribution of male and female participants closely matches Stuart and Fenn's (2004) study. 50.5% of respondents did indicate a desire to pursue further education after completion of their MLS degree, which indicates that MLS may not be the final point in their career.

The data from this study identifies a vast range of possible clinical experiences, some positive and some negative. 56 of the 58 statements were found to have statistically significant difference between the most favorable and least favorable clinical sites. The effect that a good or bad clinical rotation experience may have on a student can be drastic, considering the fact that 4 participants would not repeat their decision to pursue MLS as a career, and 7 participants felt neutral about it. It cannot be inferred from this study whether or not bad clinical rotation experiences are the reason that some participants dislike the field, but it's certainly a possibility. If students are expected to feel good about their decision, not just in the present, but in the long term as well, clinical rotation and job sites need to ensure they are respecting, caring for and challenging both students and workers. Only 12 students would even consider accepting a position at their least favorable clinical site, even if it were an option. If students wouldn't consider taking jobs even if they were available and offered, that does not bode well for filling the vacancies that these facilities will be left with.

'Work Environment' was considered the most important criteria when searching for a job. This shows that students have a vested interest in how they want their work life to be. In contrast to Stuart and Fenn's findings that 'Employee Benefits' was only rated important by 29% of respondents, 'Pay' and 'Employee Benefits' were second to work environment as the most important criteria in our findings (2004). This could certainly be due to how drastically the economic landscape has changed between 2004 and 2017. Following the economic recession of 2008, despite the overall economy showing relatively good recovery, it hasn't fully recovered, and many people remain nervous or concerned about the state of the economy (Casselman, 2016). This could certainly make 'Pay' a more important factor when considering employment options. 'Employee Benefits' was regarded more highly too, and this also makes sense given the current economic climate versus that of 2004. More and more companies are opting for high-deductible medical plans, and insurance prices are only going up. For many, their only option for affordable insurance may be through an employer, and it becomes especially important for those with families.

In summary, most of Stuart and Fenn's findings were reinforced by this replicate study. The data seems to match up quite closely, and should not be ignored as we look towards the future of MLS employment

#### Future Research Possibilities/Questions for Future Inquiry

More replication studies could be valuable, to make sure that these findings are repeatedly demonstrated across different programs in different areas. Currently, all of the research regarding MLS job criteria has been performed in the western United States, further research could expand to the east coast as well. Larger sample sizes would also be beneficial to increase statistical significance of the survey result.

Further research on what challenges clinical rotation/job sites might face in providing a positive experience could be beneficial as well. Are there challenges that are unique to MLS, or are they the challenges that all employers seem to face as they attempt to balance employee happiness and health with maintaining profitability?

Broader research on the job selection criteria across fields could be also be helpful. Do the same values trend across all fields? Specific research on ways to draw students in and get them excited about career fields, whether it is broad or specific to MLS, could be important as well. The more students that MLS can draw in, the better.

More specific research on the effects of lack of funding for MLS programs would be a good thing to expand upon as well. Two of the additional comments provided by participants referenced the difficulty of students having to travel to different sites and spend 40 hours per week at their rotations, thereby limiting the possibilities for part time work. This aspect alone may limit the number of prospective students just from a logistical perspective, and perhaps increased funding for MLS programs could aid to fix this.

#### Implications

There does appear to be a vast difference in students' perceptions of the quality of clinical rotation sites, and consequently job sites available. It is important for these different workplaces to examine what factors are important to potential job seekers in order to keep adequately staffed, and to be prepared to fill new positions created by the growing demand for medical laboratory scientists. If MLS employers don't find a way to be appealing and rewarding to graduating students, then the field could continue to face decline, even as the demand for highly

skilled workers grows. Considering the vital work that medical lab scientists do behind the scenes in healthcare delivery, this could have negative consequences for patient care.

#### References

Aquino, C. (2012). *Increasing Demand for Healthcare Workers*. Retrieved from http://www.healthcareadministration.com/increasing-demand-for-healthcare-workers/

Bureau of Labor Statistics. (December 17, 2015). *Medical and Clinical Laboratory Technologists and Technicians*. Retrieved from https://www.bls.gov/ooh/healthcare/medical-and-clinical-laboratory-technologists-and-technicians.htm

- Casselman, B. (January 29, 2016). Americans Are Still Really Worried About The Economy. *FiveThirtyEight*. Retrieved from https://fivethirtyeight.com/features/americans-are-still-really-worried-about-the-economy/
- Chamorro-Premuzic, T. (April 10, 2013). Does Money Really Affect Motivation? A Review of the Research. *Harvard Business Review*. Retrieved from https://hbr.org/2013/04/doesmoney-really-affect-motiv
- Enrado, P. (May 13, 2009). *Closure of clinical lab sciences programs threatens healthcare industry*. Retrieved from http://www.healthcarefinancenews.com/news/closure-clinical-lab-sciences-programs-threatens-healthcare-industry
- Garcia, E., Ali, A. M., Soles, R. M., & Lewis, D. G. (2015). The American Society for Clinical Pathology's 2014 Vacancy Survey of Medical Laboratories in the United States. *American Journal of Clinical Pathology*, 144, 432-443.

Institute of Medicine (US) National Cancer Policy Forum. (2009). Supply and Demand in the Health Care Workforce. Retrieved from https://www.ncbi.nlm.nih.gov/books/NBK215247/

- Morrow, I. (May 13, 2014). What an Aging Population Means for Careers in Healthcare. Retrieved from https://www.aimseducation.edu/blog/rising-aging-populations-meancareers-healthcare/
- Qualtrics. (n.d.). Retrieved October 16, 2017 from https://www.qualtrics.com/
- Quest Diagnostics. (2014). Professional Laboratory Services. Retrieved from http://www.questdiagnostics.com/dms/Documents/PLS/35841-FIN-WP-Hospital\_Lab\_Management-WP4289.pdf
- Rampell, C. (June 12, 2013). Data Reveal a Rise in College Degrees Among Americans. *The New York Times*. Retrieved from http://www.nytimes.com/2013/06/13/education/a-sharp-rise-in-americans-with-college-degrees.html?mcubz=0
- Sembawa, S., Wanyonyi, K.L. & Gallagher, J.E. (September 26, 2014). Career motivation, expectations and influences of trainee dental nurses. *BDJ Team*. Retrieved from https://www.nature.com/articles/bdjteam201499
- Stempniak, M. (January 20, 2016). Rural Hospitals Forced to Get Creative with Recruitment; Essential Traits of Pop Health RN Leaders. *Hospital & Health Networks*. Retrieved from http://www.hhnmag.com/articles/6874-rural-hospitals-forced-to-get-creative-withrecruitment-essential-traits-of-pop-health-rn-leaders

- Stuart, J. M. & Fenn, J. P. (2004). Assessment of Medical Technology Students' Perceptions of Clinical Site Rotations and Job Choice Criteria. *Clinical Leadership & Management Review*, 100-106.
- Wyse, S.E. (November 16, 2012). Advantages and Disadvantages of Surveys. *SnapSurveys*. Retrieved from https://www.snapsurveys.com/blog/advantages-disadvantages-surveys/

## **Appendix A: Respondent Demographics**

Table A1. Respondent Demographics

	Demographic	characteristics	of partici	pants (	n = 58)
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Characteristic	2016	2017	n	%
Age at time of survey (years)				
Prefer not to disclose	3	2	5	8.6
20-25	6	10	16	27.6
26-30	3	19	22	37.9
31-35	2	7	9	15.5
36-40	0	2	2	3.4
41-45	0	1	1	1.7
>45	1	2	3	5.2
Gender				
Male	3	15	18	31
Female	12	28	40	69
Highest degree achieved				
Bachelors	15	38	53	91.4
Masters	0	5	5	8.6
Clinical Rotation Year				
2017			43	74.1
2016			15	25.9
Future Education Plans				
Masters	3	11	14	24.1
Doctorate	0	4	4	6.9
Master's equivalent	2	0	2	3.4
Doctoral equivalent	1	1	2	3.4
None	6	22	28	48.3
Other	3	5	8	13.8
More than one clinical site?				
Yes	8	22	30	51.7
No	7	21	28	48.3

Figure A1. Respondent Demographics



## **Appendix B: Clinical Sites**

Table B1. Differences in Most and Least Favorable Sites Pair samples T test: differences in most favorable and least favorable clinical rotation experience statements (n = 30)

		Most Favorable		Least Favorable		
Statement		Mean	SD	Mean	SD	t( <b>30</b> )
1.	Laboratory personnel appeared satisfied with their own work	4.20	1.031	3.60	1.070	2.523*
2.	Cooperation among laboratory staff is common	4.37	.809	3.77	.935	4.039**
3.	Laboratory personnel treated students with respect	4.43	.898	3.63	1.098	4.252**
4.	Laboratory personnel were respectful of student knowledge	4.23	1.040	3.57	1.194	3.340*
5.	Positive feedback was given for good performance	4.23	1.165	3.57	1.278	3.959**
6.	Laboratory personnel showed appreciation of students' knowledge and skills	4.17	.913	3.60	1.037	3.319*
7.	Adequate time was spent with laboratory employees	4.27	.828	3.37	1.299	4.506**
8.	The laboratory personnel acted as a team	4.13	.973	3.63	1.098	2.408*
9.	Laboratory personnel were friendly	4.50	.630	3.67	.994	4.475**
10.	Laboratory personnel involved the student in the lab	4.33	.711	3.43	1.194	4.267**
11.	I was allowed to have independence in the laboratory	4.17	.874	3.20	1.400	3.846*
12.	I was able to use critical thinking skills learned in the ISU MLS program	4.10	.960	3.60	1.037	3.042
13.	Constructive criticism was given if I did something incorrectly	4.03	.890	3.40	1.003	4.535**
14.	Help was available if I didn't know something	4.47	.629	3.67	1.124	4.942**
15.	I received hands on experience	4.53	.507	3.93	1.015	3.674*
16.	I was given responsibilities	4.07	1.112	3.27	1.337	3.449*
17.	I was satisfied with my clinical rotation experience	4.10	1.213	3.17	1.147	4.877**
18.	I was challenged in my clinical rotation experience	4.13	.937	3.47	1.224	3.084*
19.	Employees socialized with students	4.10	1.125	3.47	1.306	3.357*
20.	Starting wages are reasonable $(n = 20)$	3.90	.788	3.30	1.129	2.179*
21.	Employee benefits are reasonable (n = 19)	4.05	.780	3.68	.885	1.933
Note. A	All statements were rated on a six point Lik	ert scale: 0	= non-app	icable or d	on't know,	1 =
strongly	y disagree, $2 = \text{disagree}$ , $3 = \text{neutral}$ , $4 = \text{ag}$	gree, $5 = str$	ongly agree	e.		
* <i>p</i> < 0	0.05.		-			
** <i>p</i> <	0.01.					



#### Figure B1. Most and Least Favorable Site Comparison

## Table B2. Most Favorable Sites (All)

Question	N/A or	Strongly	Disagree	Neutral	Agree	Strongly
	Don't Know	Disagree				Agree
Laboratory personnel appeared satisfied with their own work	1	0	0	3	13	13
Cooperation among laboratory staff is	0	0	2	0	13	15
common						
Laboratory personnel treated students with respect	0	0	2	2	7	19
Laboratory staff were respectful of student knowledge	0	1	2	1	11	15
Positive feedback was given for good	1	9	2	1	10	16
performance		-				
Laboratory personnel showed appreciation of students' knowledge	0	0	2	4	11	13
and skills	0	0				1.4
Adequate time was spent with	0	0	1	4	11	14
laboratory employees	0	1	1	2	10	10
The laboratory personnel acted as a	0	1	1	3	13	12
lealli Laboratory parsonnal wara friandly	0	0	0	2	11	17
Laboratory personnel involved the	0	0	0	2 1	11	17
student in the lab	0	0	1	1	15	15
I was allowed to have independence in	0	0	1	6	10	13
the laboratory	0	0	1	0	10	15
I was able to use critical thinking	0	0	3	3	12	12
skills learned in the ISU MLS	0	0	C .	C		
program						
Constructive criticism was given if I	0	0	3	2	16	9
did something incorrectly						
Help was available if I didn't know	0	0	0	2	12	16
something						
I received hands on experience	0	0	0	0	14	16
I was given responsibilities	0	2	0	0	5	10
I was satisfied with my clinical	0	2	2	2	9	15
rotation experience						
I was challenged in my clinical	0	0	3	2	13	12
rotation experience						
Employees socialized with students	1	0	1	4	11	13
Starting wages are reasonable	8	0	1	4	13	4
Employee benefits are reasonable	7	0	1	2	14	16

## Table B3. Most Favorable Sites (2016)

Question	N/A or	Strongly	Disagree	Neutral	Agree	Strongly
	Don't Know	Disagree	C		U	Agree
Laboratory personnel appeared	0	0	0	1	3	4
satisfied with their own work	-	-	-		-	
Cooperation among laboratory staff is	0	0	1	0	3	4
common						
Laboratory personnel treated students	0	0	1	1	1	5
with respect						
Laboratory staff were respectful of	0	0	2	0	4	2
student knowledge	_	_		_		
Positive feedback was given for good	0	0	1	0	2	5
performance	0	0	1	1	2	4
Laboratory personnel showed	0	0	1	1	2	4
appreciation of students' knowledge						
and skills	0	0	1	1	2	2
Adequate time was spent with	0	0	1	1	3	3
The laboratory personnal acted as a	0	0	1	1	4	2
the faboratory personner acted as a	0	0	1	1	4	2
L aboratory personnel were friendly	0	0	0	1	2	5
Laboratory personnel involved the	0	0	0	0	$\frac{2}{4}$	3
student in the lab	0	0	1	0	-	5
I was allowed to have independence in	0	0	0	1	3	4
the laboratory	Ū	0	0	1	5	
I was able to use critical thinking	0	0	2	0	2	4
skills learned in the ISU MLS	-	-		-		
program						
Constructive criticism was given if I	0	0	1	0	5	2
did something incorrectly						
Help was available if I didn't know	0	0	0	1	3	4
something						
I received hands on experience	0	0	0	0	3	5
I was given responsibilities	0	1	0	1	2	4
I was satisfied with my clinical	0	1	1	0	1	5
rotation experience						
I was challenged in my clinical	0	0	2	0	3	3
rotation experience					-	
Employees socialized with students	0	0	1	1	2	4
Starting wages are reasonable	0	0	0	2	4	2
Employee benefits are reasonable	1	0	1	0	3	3

Frequency table for 2016 most favorable clinical site questions.

## Table B4. Most Favorable Sites (2017)

Question	N/A or	Strongly	Disagree	Neutral	Agree	Strongly
	Don't Know	Disagree				Agree
Laboratory personnel appeared	1	0	0	2	10	9
satisfied with their own work	0	0	1	0	10	11
cooperation among laboratory staff is common	0	0	1	0	10	11
Laboratory personnel treated students	0	0	1	1	6	14
Laboratory staff were respectful of	0	1	0	1	7	4
student knowledge						
Positive feedback was given for good	1	0	1	1	8	11
performance	0	0		2	0	0
Laboratory personnel showed appreciation of students' knowledge and skills	0	0	1	3	9	9
Adequate time was spent with	0	0	0	3	8	11
laboratory employees						
The laboratory personnel acted as a	0	1	0	2	9	10
team						
Laboratory personnel were friendly	0	0	0	1	9	12
Laboratory personnel involved the	0	0	0	1	11	10
student in the lab						
I was allowed to have independence in	0	0	1	5	7	9
the laboratory						
I was able to use critical thinking	0	0	1	3	10	8
skills learned in the ISU MLS						
program	0	0	•	•		_
Constructive criticism was given if I	0	0	2	2	11	7
did something incorrectly	0	0	0	1	0	10
Help was available if I didn't know	0	0	0	I	9	12
something	0	0	0	0	1.1	1.1
I received hands on experience	0	0	0	0	11	11
I was given responsibilities	0	1	0	4	8	9
I was satisfied with my clinical	0	1	1	2	8	10
I was shallonged in my alinical	0	0	1	2	10	0
rotation experience	0	0	1	Z	10	9
Employees socialized with students	1	0	0	3	9	9
Starting wages are reasonable	8	0	1	2	9	2
Employee benefits are reasonable	6	0	0	$\frac{2}{2}$	) 11	$\frac{2}{3}$

Frequency table for 2017 most favorable clinical site questions.

## Table B5. Single Site (All)

Frequency table for those who only went to one site.

	NT/A	<u>G</u> ( 1	D'		•	<u>G</u> ( 1
Question	N/A or Don't Know	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Laboratory personnel appeared satisfied with their own work	0	0	0	4	16	8
Cooperation among laboratory staff is	0	0	0	4	15	9
common		-	-			-
Laboratory personnel treated students	0	0	2	2	15	9
with respect						-
Laboratory staff were respectful of	1	0	0	6	11	10
student knowledge						
Positive feedback was given for good	0	0	0	4	15	9
performance						
Laboratory personnel showed	0	0	1	6	15	6
appreciation of students' knowledge						
and skills						
Adequate time was spent with	0	0	1	1	15	11
laboratory employees						
The laboratory personnel acted as a	0	0	0	4	15	9
team						
Laboratory personnel were friendly	0	0	1	3	17	7
Laboratory personnel involved the	0	0	0	1	10	10
student in the lab						
I was allowed to have independence in	0	0	3	6	14	5
the laboratory						
I was able to use critical thinking	0	0	0	3	15	10
skills learned in the ISU MLS						
program						
Constructive criticism was given if I	0	0	0	2	17	9
did something incorrectly						
Help was available if I didn't know	0	0	0	0	13	15
something						
I received hands on experience	0	0	0	1	9	18
I was given responsibilities	0	0	1	5	13	9
I was satisfied with my clinical	0	0	1	3	12	12
rotation experience						
I was challenged in my clinical	0	0	0	5	10	13
rotation experience						
Employees socialized with students	2	1	1	1	10	13
Starting wages are reasonable	7	0	1	5	10	5
Employee benefits are reasonable	9	0	1	2	6	4

## Table B6. Single Site (2016)

Frequency table for those who only went to one site in 2016.

Question	N/A or	Strongly	Disagraa	Noutral	Agroo	Strongly
Question	Don't Know	Disagree	Disagree	neutrai	Agree	Agree
Laboratory personnel appeared satisfied with their own work	0	0	0	0	5	2
Cooperation among laboratory staff is	0	0	0	1	5	1
common	°	-	-	-	-	_
Laboratory personnel treated students	0	0	1	1	2	3
with respect						
Laboratory staff were respectful of	0	0	0	2	2	3
student knowledge						
Positive feedback was given for good	0	0	0	1	3	3
performance						
Laboratory personnel showed	0	0	0	1	4	2
appreciation of students' knowledge						
and skills						
Adequate time was spent with	0	0	1	1	4	1
laboratory employees						
The laboratory personnel acted as a	0	0	0	0	5	2
team						
Laboratory personnel were friendly	0	0	0	1	5	1
Laboratory personnel involved the	0	0	0	1	5	1
student in the lab						
I was allowed to have independence in	0	0	1	3	2	1
the laboratory						
I was able to use critical thinking	0	0	0	2	3	2
skills learned in the ISU MLS						
program						
Constructive criticism was given if I	0	0	0	0	5	2
did something incorrectly						
Help was available if I didn't know	0	0	0	0	5	2
something						
I received hands on experience	0	0	0	1	3	3
I was given responsibilities	0	0	1	2	2	2
I was satisfied with my clinical	0	0	1	0	4	2
rotation experience						
I was challenged in my clinical	0	0	0	2	3	2
rotation experience						
Employees socialized with students	1	0	0	1	2	3
Starting wages are reasonable	1	0	1	2	2	1
Employee benefits are reasonable	1	0	0	1	3	2

## Table B7. Single Site (2017)

Frequency table for those who only went to one site in 2017.

Question	N/A or	Strongly	Disagraa	Noutrol	Agroo	Strongly
Question	Don't Know	Disagree	Disagree	neutrai	Agree	Agree
Laboratory personnel appeared satisfied with their own work	0	0	0	4	11	6
Cooperation among laboratory staff is	0	0	0	3	10	8
common	-	-	-	-	-	-
Laboratory personnel treated students	0	0	1	1	13	6
Villi lespeci Laboratory staff were respectful of	1	0	0	1	0	7
student knowledge	1	0	0	4	2	,
Positive feedback was given for good	0	0	0	3	12	6
nerformance	0	0	0	5	12	0
I aboratory personnel showed	0	0	1	5	11	Δ
appreciation of students' knowledge	0	0	1	5	11	т
and skills						
Adequate time was spent with	0	0	0	0	11	10
laboratory employees	0	0	0	Ū		10
The laboratory personnel acted as a	0	0	0	4	10	7
team	0	0	0	·	10	,
Laboratory personnel were friendly	0	0	1	2	12	6
Laboratory personnel involved the	0	0	0	1	10	10
student in the lab						
I was allowed to have independence in	0	0	2	3	12	4
the laboratory						
I was able to use critical thinking	0	0	0	1	12	8
skills learned in the ISU MLS						
program						
Constructive criticism was given if I	0	0	0	2	12	7
did something incorrectly						
Help was available if I didn't know	0	0	0	0	8	13
something						
I received hands on experience	0	0	0	0	6	15
I was given responsibilities	0	0	0	3	11	7
I was satisfied with my clinical	0	0	0	3	8	10
rotation experience						
I was challenged in my clinical	0	0	0	3	7	11
rotation experience						
Employees socialized with students	1	1	1	0	8	10
Starting wages are reasonable	6	0	0	3	8	4
Employee benefits are reasonable	8	0	1	2	6	4

## Table B8. Least Favorable Site (All)

Frequency table for least favorable clinical site questions.	
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Quantian	NI/A am	C4man alar	Diaganas	Nautual	A	Streen also
Question	N/A or Don't Know	Strongly Disagree	Disagree	Ineutrai	Agree	Strongly Agree
Laboratory personnel appeared satisfied with their own work	0	1	4	7	12	6
Cooperation among laboratory staff is	0	0	3	8	12	7
common	Ū.	ů –	C	Ū.		,
Laboratory personnel treated students	0	1	4	7	11	7
U aboratory staff wara respectful of	0	2	4	6	11	7
student knowledge	0	2	4	0	11	/
Positive feedback was given for good	1	1	3	8	0	8
Positive recuback was given for good	1	1	5	0	9	0
I aboratory personnel showed	0	1	2	12	8	7
appreciation of students' knowledge	0	1	2	12	0	,
and skills						
A dequate time was spent with	0	4	3	7	10	6
laboratory employees	0	4	5	1	10	0
The laboratory personnel acted as a	1	0	2	9	12	6
team	1	0	2	,	12	0
I aboratory personnel were friendly	0	1	1	12	9	7
Laboratory personnel involved the	0	2	5	12 7	10	6
student in the lab	0	2	5	1	10	0
I was allowed to have independence in	1	3	5	7	8	6
the laboratory	1	5	5	/	0	0
I was able to use critical thinking	0	1	3	9	11	6
skills learned in the ISU MI S	0	1	5	,	11	0
program						
Constructive criticism was given if I	0	0	7	8	11	4
did something incorrectly	0	0	7	0	11	т
Help was available if I didn't know	0	1	4	7	10	8
something	Ū	1		,	10	U
I received hands on experience	0	1	2	4	14	9
I was given responsibilities	Ő	4	5	6	9	6
I was satisfied with my clinical	0	3	5	9	10	3
rotation experience	Ū	5	5	/	10	5
I was challenged in my clinical	0	3	2	10	8	7
rotation experience	0	2	-	10	0	,
Employees socialized with students	1	2	2	9	9	7
Starting wages are reasonable	10	2	2	6	8	2
Employee benefits are reasonable	10	1	$\overline{2}$	5	9	3

## Table B9. Least Favorable Site (2016)

Question	N/A or	Strongly	Disagree	Neutral	Agree	Strongly
	Don't Know	Disagree			0	Agree
Laboratory personnel appeared	0	0	2	2	1	3
Cooperation among laboratory staff is	0	0	1	3	1	3
common	0	0	1	5	1	5
Laboratory personnel treated students with respect	0	1	0	2	3	2
Laboratory staff were respectful of student knowledge	0	1	1	1	2	3
Positive feedback was given for good	0	1	1	2	1	3
performance	0			•		•
Laboratory personnel showed appreciation of students' knowledge and skills	0	1	1	2	2	2
Adequate time was spent with	0	3	0	1	2	2
laboratory employees						
The laboratory personnel acted as a	0	0	1	2	3	2
team						
Laboratory personnel were friendly	0	1	0	2	2	3
Laboratory personnel involved the	0	2	1	1	2	2
Student III the lab	0	1	2	1	0	2
the laboratory	0	1	3	1	0	3
I was able to use critical thinking	0	1	2	1	2	2
skills learned in the ISU MLS	0	1	2	1	2	2
program						
Constructive criticism was given if I	0	0	2	3	1	2
did something incorrectly	0	0	-	2	1	2
Help was available if I didn't know	0	1	2	1	2	2
something	0	-	-	-	-	_
I received hands on experience	0	1	1	0	3	3
I was given responsibilities	0	2	2	1	0	3
I was satisfied with my clinical	0	1	3	0	2	2
rotation experience						
I was challenged in my clinical	0	1	2	3	0	2
rotation experience						
Employees socialized with students	0	2	2	0	1	3
Starting wages are reasonable	0	1	1	2	2	2
Employee benefits are reasonable	0	1	2	2	1	2

Frequency table for 2016 least favorable clinical site questions.

## Table B10. Least Favorable Site (2017)

Ouestion	N/A or	Strongly	Disagree	Neutral	Agree	Strongly
	Don't Know	Disagree	Disugree	i (out) ui	- igi ee	Agree
Laboratory personnel appeared satisfied with their own work	0	1	2	5	11	3
Cooperation among laboratory staff is	0	0	2	5	11	4
common	0	0	2	5	11	4
Laboratory personnel treated students	0	0	4	5	8	5
I aboratory staff were respectful of	0	1	3	5	9	4
student knowledge	0	1	5	5	/	т
Positive feedback was given for good	1	0	2	6	8	5
performance						
Laboratory personnel showed	0	0	1	10	6	5
appreciation of students' knowledge						
and skills						
Adequate time was spent with	0	1	3	6	8	4
laboratory employees				_		
The laboratory personnel acted as a	1	0	1	7	9	4
team	0	0	1	10	7	4
Laboratory personnel were friendly	0	0	1	10	/	4
Laboratory personnel involved the	0	0	4	6	8	4
student in the lab	1	2	2	6	0	2
the laboratory	1	Z	L	0	0	3
I was able to use critical thinking	0	0	1	8	9	4
skills learned in the ISU MLS	0	0	1	0		7
program						
Constructive criticism was given if I	0	0	5	5	10	2
did something incorrectly						
Help was available if I didn't know	0	0	2	6	8	6
something						
I received hands on experience	0	0	1	4	11	6
I was given responsibilities	0	2	3	5	9	3
I was satisfied with my clinical	0	2	2	9	8	1
rotation experience						
I was challenged in my clinical	0	2	0	7	8	5
rotation experience		0	0	0	0	
Employees socialized with students	1	0	0	9	8	4
Starting wages are reasonable	10	1	1	4	6	0
Employee benefits are reasonable	10	U	U	3	8	1

Frequency table for 2017 least favorable clinical site questions.

## Appendix C: Job Choice Criteria

Table C1. Job Choice Criteria

Responses to job choice criteria statements: "Rate the following on how important they are to you in a potential employer" (n = 58)

Statement	2016	2017	n	%
Organizational Climate $(n = 57)$			Me	an = 4.0
N/A or Don't Know	0	1		
Not Important	1	0	1	1.8
Somewhat Important	1	1	2	3.5
Neutral	2	4	6	10.5
Very Important	8	27	35	61.4
Extremely Important	3	10	13	22.8
Active Student Participation			Mea	n = 3.74
Not Important	1	1	2	3.4
Somewhat Important	3	2	5	8.6
Neutral	3	8	11	19.0
Very Important	5	23	28	48.3
Extremely Important	3	9	12	20.7
Work Environment			Mea	n = 4.38
Somewhat Important	2	0	2	3.4
Neutral	1	2	3	5.2
Very Important	6	18	24	41.4
Extremely Important	6	23	29	50.0
Employee Benefits			Mea	n = 4.05
Not Important	1	0	1	1.7
Somewhat Important	1	2	3	5.2
Neutral	1	5	6	10.3
Very Important	9	21	30	51.7
Extremely Important	3	15	18	31.0
Pay $(n = 56)$			Mea	n = 4.07
N/A or Don't Know	0	2		
Not Important	1	0	1	1.8
Somewhat Important	1	2	3	5.4
Neutral	3	3	6	10.7
Very Important	6	21	27	48.2
Extremely Important	4	15	19	33.9





Figure C2. Mean for Job Choice Criteria



## **Appendix D: MLS Career Questions**

Table D1. MLS Career Questions

Responses to employment and emilical site survey questions (II - 30)	Responses to emp	ployment and clinica	l site survey a	uestions $(n = 58)$
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Response	2016	2017	n	%
"Medical Laboratory Science is a				
recognized profession"				
Strongly Disagree	1	3	4	6.9
Disagree	7	12	19	32.8
Neutral	3	9	12	20.7
Agree	4	16	20	34.5
Strongly Agree	0	3	3	5.2
"What I do as a Medical Laboratory				
Scientist is important"				
Agree	6	19	25	43.1
Strongly Agree	9	24	33	56.9
"I would repeat my decision in				
choosing a career in Medical				
Laboratory Science"				
Strongly Disagree	1	1	2	3.4
Disagree	1	1	2	3.4
Neutral	0	7	7	12.1
Agree	2	17	19	32.8
Strongly Agree	11	17	28	48.3
"Would you take a position at your				
MOST favorable clinical rotation				
site?" (n = 57)				
N/A or Don't Know	0	1		
Strongly Disagree	1	0	1	1.8
Neutral	1	3	4	7.0
Agree	4	16	20	35.1
Strongly Agree	9	23	32	56.1
"Would you take a position at your				
LEAST favorable clinical rotation				
site? $(n = 30)$				
Strongly Disagree	2	4	5	16.7
Disagree	2	5	6	20.0
Neutral	3	6	7	12.1
Agree	0	11	8	26.7
Strongly Agree	2	3	4	13.3



Figure D1. MLS Career Questions

## **Appendix E: Additional Comments**

Table E1. Additional Comments

Additional comments from student participants.

"At the majority of the sites, the lab staff seemed to have a heavy workload and while they did their best to teach and show the information, it's difficult to have time to properly teach when there is a large workload to get through"

"Overall, it was a great experience that I would do again"

"The clinicals were neither long enough nor encompassing enough to all students during rotations. While I understand the limitations and the logistics of placing upwards of 50 students in rotations it SEVERELY impacts the quality of the rotations. I love the facilities I went to and they taught me to the fullest extent of the their [sic] capabilities, but they were limited in scope and my clinical experience in comparison to not only other state programs but other students is grossly inadequate. The clinicals need to be longer, provide more opportunities across different facilities (even at the risk of being shorter such as a week at the Red Cross), and don't place students based off of grades or interviews. We all made it in to the program and if we made it to rotations we clearly passed, but there are multiple extenuating factors to the degree at which some of us passed. There is an extreme bias based off of grades which is not only a grossly unfair metric by which one should be placed, but not at all representative of one's aptitude in the lab itself. If this program wants to bolster it's [sic] reputation and put out better quality MLS degree holders in to the work place the clinicals need to be heavily reevaluated. Three months borders on being irresponsible for training students in the real world when lives are at stake, and at the least it puts the onerous task of furthering a students training when they reach the job place. The latter impacts not only the employer, but the students as we are passed over because not every facility has the time to hand-hold past the first few weeks of training they would provide for someone with more experience in the field. Again, I very much enjoyed my time at the clinical sites and would jump at the opportunity to work at any of them, but the program dropped the ball with duration and diversity of training and I am very disappointed. Purely due to the clinical rotations I would recommend that anyone interested in becoming an MLS apply to other schools, because this is a gaping flaw and I personally feel cheated out of what could have been a wonderful learning experience."

"I liked the hands-on approach at Fort Hall the most, I think."

"some depts are better than others. some precepters [sic] where better than others. The office politics were the worst."

"At my least favorable clinical site only some employees [sic] socialized with me and gave me independence/responsibilities"

"The clinical rotation was a very good experience for me. The only problem was traveling all over Idaho without too much of transportation or stipends to make for the traveling. Overall the experience was awesome. Would do it again (if there's financial support)"

"I greatly enjoyed my rotations"

"I don't think it's fair to expect us to be there for 40 hours a week. I believe 30 hours a week would be sufficient. I feel we need more time to either work a little part l"

"The only reasons I did not enjoy one Laboratory site had to do with the work flow. It was a smaller hospital and very slow paced relative to the other rotation sites. The preceptors were great though and I appreciate their time and effort."

"Rotations were awful, just like the program."

"I had my job already lined up before i finished my rotation and at this point I'm working as a clinical microbiology coordinator. But getting my degree with ISU was very helpful and gratifying."

"All three sites where very helpful. Gaining experience from differents [sic] sites is the best for student future career"

"The second rothatuon [sic] i did was a great lab but was so small there wasnt enough to do to

challenge and further my skills" "30 applications later im still lookoking [sic] for work as an MLS. I can provide documentation [sic] to prove all 30."

## **Appendix F: Survey**

## **Respondent demographic:**

- 1. To which gender do you most identify?
  - a. Male
  - b. Female
  - c. Prefer not to disclose
- 2. What year were you born?
  - a. \_\_\_\_\_
  - b. Prefer not to disclose
- 3. Highest degree achieved (after completion of this program)
  - a. Bachelors
  - b. Masters
  - c. Doctoral
  - d. Other
- 4. When did you do your clinical rotations?
  - a. 2017
  - b. 2016
  - c. 2015
  - d. 2014
  - e. Other
- 5. Plans for future education
  - a. Masters
  - b. Doctorate

- c. Master's equivalent
- d. Doctoral equivalent
- e. None
- f. Other

Did you participate at more than one clinical site? \**If you only participated at one site, please leave the following question block regarding least favorable site blank* 

- a. Yes
- b. No

# Thinking back on your own clinical rotations, how much do you agree with the following statements?

The following questions were ranked on a 5-point Likert scale.

0 N/A - 1 Strongly Disagree - 2 Disagree - 3 Neutral - 4 Agree - 5 Strongly Agree

The following statements were used for both "Rate your **most favorable** clinical site" and for "Rate your **least favorable** clinical site"

- 1. Laboratory personnel appeared satisfied with their own work
- 2. Cooperation among laboratory staff is common
- 3. Laboratory personnel treated students with respect
- 4. Laboratory personnel were respectful of student knowledge
- 5. Positive feedback was given for good performance
- 6. Laboratory personnel showed appreciation of students' knowledge and skills
- 7. Adequate time was spent with laboratory employees
- 8. The laboratory personnel acted as a team

- 9. Laboratory personnel were friendly
- 10. Laboratory personnel involved the student in the lab
- 11. I was allowed to have independence in the laboratory
- 12. I was able to use critical thinking skills learned in the ISU MLS program
- 13. Constructive criticism was given if I did something incorrectly
- 14. Help was available if I didn't know something
- 15. I received hands on experience
- 16. I was given responsibilities
- 17. I was satisfied with my clinical rotation experience
- 18. I was challenge in my clinical rotation experience
- 19. Employees socialized with students
- 20. Starting wages are reasonable
- 21. Employee benefits are reasonable

#### Rate the following on how important they are to you in a potential employer

The following questions were ranked on a 5-point Likert scale.

0 N/A – 1 Strongly Disagree – 2 Disagree – 3 Neutral – 4 Agree – 5 Strongly Agree

- 1. Organizational climate
- 2. Active student participation
- 3. Work environment
- 4. Employee benefits
- 5. Pay

# Thinking about Medical Laboratory Science as a whole, rate the following statements on whether you agree with them or not

The following questions were ranked on a 5-point Likert scale.

0 N/A – 1 Strongly Disagree – 2 Disagree – 3 Neutral – 4 Agree – 5 Strongly Agree

- 1. Medical Laboratory Science is a recognized profession
- 2. What I do as a Medical Laboratory Scientist is important
- 3. I would repeat my decision in choosing a career in Medical Laboratory Science
- 4. Would you take a position at your MOST favorable clinical rotation site?
- 5. Would you take a position at your LEAST favorable clinical rotation site?

## Free response section

- 1. How long were your clinical rotations?
- 2. How many sites did you participate in for clinical rotations?
- 3. How many of those sites would you consider seeking employment at?
- 4. Any additional comments