Clinical Laboratory Personnel Workforce Survey in Montana

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ABSTRACT

INTRODUCTION: The medical laboratory professional workforce shortage in the United States has been documented through several national survey reports that also describe the use of temporary staffing to fill vacancies. The primary study objectives were to determine the extent of the workforce shortage in Montana and describe the usage of temporary staffing to fill vacancies.

STUDY OBJECTIVES: The study objectives were as follows: (1) identify Montana Clinical Laboratory Improvement Amendments laboratories by geographical area classification, (2) identify usage of temporary medical laboratory professionals based on laboratory type, (3) determine wage differences between full-time/part-time permanent employees versus temporary medical laboratory professionals, (4) determine the usage rates of temporary medical laboratory professionals, (5) identify the cause(s) for usage of temporary staffing, and (6) determine the length of time to fill vacancies.

METHOD: An electronic survey composed of multiple-choice, dichotomous, short-answer, and open-ended questions was developed to collect qualitative and quantitative data and was distributed via email.

RESULTS: The survey was sent to 83 facilities, with a 54% ($n = 45$) response rate. Of respondents, 49% ($n = 22$) reported employing temporary staffing, and 51% ($n = 23$) do not employ temporary staffing. The reasons for hiring temporary staffing included being unable to fill the position (62%), medical leave (13%), vacation (10%), and other reasons, such as deployment, maternity leave, being short-staffed, and administrative projects (15%). Of the 22 facilities employing temporary staffing, 45% ($n = 10$) have a temporary staffing budget line item.

CONCLUSION: The survey results indicated there is a medical laboratory professional shortage in Montana, and compared with the national rate, the usage of temporary staffing is higher, and vacancies take longer to fill by up to 2 years. The usage of temporary staffing is more than twice as high compared with national survey rates. The state-specific data obtained from this study provided vital information to the Montana clinical laboratory community and could serve as an impetus to work collaboratively to explore solutions to the shortage based on state-specific needs. The survey design can also serve as an example for other states to conduct similar studies to gather state-specific information versus national survey aggregate data.

ABBREVIATIONS: ASCLS - American Society of Clinical Laboratory Science, ASCP - American Society for Clinical Pathology, CLIA - Clinical Laboratory Improvement Amendments, IRB - internal review board, MLO - medical laboratory observer, MLS - medical laboratory scientist, MLT - medical laboratory technician.

INDEX TERMS: medical laboratory personnel, laboratory personnel, laboratory professional workforce shortage, temporary staffing, workforce shortage.

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INTRODUCTION

There is published evidence of the shortage of medical laboratory professionals in the United States.[1-5] The American Society for Clinical Pathology (ASCP) 2014 and 2016–2017 vacancy surveys and the 2017 Medical Laboratory Observer (MLO) salary survey confirmed that the shortage continues to be significant.[3-5] The 2016 Bureau of Labor and Statistics Occupational Outlook Handbook for Medical and Clinical Laboratory Technologist and Technicians stated there will be a 16% increase in job growth for medical laboratory professionals from 2014–2024.[6] This is more than double the average growth rate reported for all occupations (7%).[6] The survey also reported on estimated retirement, with 16.9% of the total core laboratory employees retiring by 2019 and 20.72% in the next 5 years.[4,5] This equates to more than 35% of the workforce retiring with the potential of an increased number of vacant positions.

The projected vacancies provide job opportunities for medical laboratory professionals entering the profession. The American Society for Clinical Laboratory Science (ASCLS) 2016 Clinical Laboratory Personnel Shortage Report stated that the projected shortage rate would

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require 12 000 new medical laboratory professionals annually.[7] However, educational institutions are graduating less than 5000 students per year, leaving 7000 vacant positions each year.[7] The 2014 ASCP Vacancy Survey reported duties for vacant positions were assigned to temporary staffing 8.4% of the time, and the 2016–2017 ASCP vacancy survey noted an increase to 14.98%.[4,5] The rate for filling open positions varied from 3 to 6 months for general staffing for both 2014 and 2016–2017 ASCP vacancy surveys, suggesting that temporary staffing may be used for up to 6 months.[4,5]

A 2017 study on the effect of burnout in the clinical laboratory reported that turnover was due to emotional exhaustion and professional efficacy.[8] The combination of laboratory professional shortages and staff burnout could be affecting the number of open positions, the use of temporary staffing, and the rate of filling vacancies with permanent employees in any type of facility.[7-10]

The 2014 ASCP vacancy survey stated that the Western region of the United States, which includes Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming, has the overall highest vacancy rates.[4] Montana is among the states in the Western region; however, the ASCP survey does not provide state-specific data. Montana is the fourth largest state in terms of area, with few large urban regions, and a population of 1.06 million.[11] There are several medical facility categories in Montana, including large urban medical centers, urban cluster hospitals, reference laboratories, a public health laboratory, and multiple rural critical access facilities with small but essential laboratories providing patient care. As of 2015, 72 laboratories employed medical technologists/medical laboratory scientists (MLSs)/clinical laboratory scientists, of which 44 were small laboratories with three or fewer employed medical laboratory professionals.[10] Some laboratories do not offer a full range of tests, particularly more complex tests that challenge and engage laboratory professionals to utilize their skills, knowledge, and experience that may be contributing to their desire to seek positions at other facilities.[1,2]

The literature and national surveys support the workforce shortage, the difficulty in filling vacancies with full-time employees, and the use of temporary/traveler professionals to fill vacancies; however, state-specific data are not provided. A state-specific survey would provide meaningful data that can contribute to a comprehensive understanding of workforce shortage and options to fill vacancies within a specific state.

STUDY OBJECTIVES

The objective of this study was to gather state-specific data from clinical laboratories in Montana regarding the medical laboratory professional workforce shortage and the use of temporary (traveler or contract) personnel versus hiring permanent medical laboratory professionals. The study was approved by the Rutgers University Internal Review Board Approval (IRB) September 2017.

The study was constructed to answer five areas of concern or contributing factors related to staff shortages in Montana medical laboratories:

1. What is the status of the shortage of medical laboratory professionals?
2. What is the status of the use of temporary (traveler or contract) medical laboratory science professionals to fill vacancies?
3. What is the difference in wages for permanent medical laboratory professionals versus temporary (traveler or contract) professionals?
4. Is there a facility type that uses temporary staffing more than others?
5. What facilities have the most difficulty filling vacancies?

Objectives

Our objectives were to

1. Identify geographical area classification of the laboratories in Montana.
2. Identify the facility type with the most usage of temporary medical laboratory professionals.
3. Determine wage rate differences between full-time/part-time permanent employees versus temporary medical laboratory professionals.
4. Determine the usage rates of temporary medical laboratory professionals within the state of Montana.
5. Identify the cause(s) for the usage of temporary staffing.
6. Determine the amount of time it takes to fill open permanent positions.

METHODS

A survey was developed to collect qualitative and quantitative data using multiple-choice, dichotomous, short-answer, and open-ended questions. The survey was composed of 25 multiple-choice questions, of which eight also included an option to add a short answer or explanation (Table 1). Basic demographic information and facility type questions were created based on categories listed in the 2010 Census Urban and Rural Classification and Urban Area Criteria.[12] Wage-range questions were created based on the median pay rates stated in the 2017 Bureau of Labor and Statistics for Medical and Clinical Laboratory Technologists and Technicians.[6] Questions to determine facility staffing information were constructed to understand current staffing needs, particularly number of open positions, usage of temporary staffing, duration of vacant positions, budgetary needs for staffing, reasons for vacant positions, and respondent's opinions for improving the odds of hiring permanent staff.

Table 1. Survey questions and answer options.

Question	Answer Options
1. What is your job title/responsibility?	a. Laboratory Manager b. Laboratory Director c. Lead Technologist d. Other_____
2. Select the facility/setting/location of your laboratory	a. Hospital b. Community Clinic c. Rural Healthcare Clinics d. Blood Bank – United Blood Centers, Red Cross e. Federally Qualified Health Center f. Independent Laboratory g. Public Health Laboratory h. Tissue Bank Repository i. Other_____
3. If your laboratory is located within a hospital, select what type	a. Acute care hospital b. Critical access hospital c. Other_____ d. Not applicable
4. What is the population demographic in which your facility is located?	a. Urban area – greater than 50,000 people b. Urban cluster – less than 50,000 but greater than 2500 people c. Rural area – Less than 2500 people
5. How many permanent **full-time** Medical Technologists (MTs)/Clinical Laboratory Scientists (CLSs)/Medical Laboratory Scientists (MLSs) are currently employed in your laboratory?	a. 1–5 b. 6–10 c. 11–20 d. 21–30 e. 31–40 f. 41–50 g. More than 50
6. How many permanent **full-time** Medical Laboratory Technicians (MLTs)/Clinical Laboratory Technicians (CLTs) are currently employed in your laboratory?	a. 0 b. 1–5 c. 6–10 d. 11–20 e. 21–30 f. 31–40 g. 41–50 h. More than 50
7. How many permanent **part-time** Medical Technologists (MTs)/Clinical Laboratory Scientists (CLSs)/Medical Laboratory Scientists (MLSs) are currently employed in your laboratory?	a. 1–5 b. 6–10 c. 11–20 d. 21–30 e. 31–40 f. 41–50 g. More than 50
8. How many permanent **part-time** Medical Laboratory Technicians (MLTs)/Clinical Laboratory Technicians (CLTs) are currently employed in your laboratory?	a. 0 b. 1–5 c. 6–10 d. 11–20 e. 21–30 f. 31–40 g. 41–50 h. More than 50
9. Has there been a vacancy for a Medical Technologist (MT)/Clinical Laboratory Scientist (CLS)/Medical Laboratory Scientist(MLS) within the last 2 years?	a. Yes b. No
10. Has there been a vacancy for a Medical Laboratory Technician (MLT)/Clinical Laboratory Technician (CLT) within the last2 years?	a. Yes b. No

Table 1. (*Continued*).

Question	Answer Options
11. How do you solicit or advertise for open positions?	a. Professional agency b. Online websites c. Posting to professional websites d. Placement agency e. Other_____
12. What was the cause of the vacancy? Select all that apply.	a. Retirement b. Moved out of geographical area c. Resigned for higher paying position d. Health reasons e. Promotion within facility or organization f. Not applicable – No vacancies in last two years. g. Other_____
13. How many permanent full-time positions do you currently have vacant?	a. None b. 1 to 2 c. 3 to 5 d. Greater than 5
14. How many permanent part-time positions do you currently have vacant?	a. None b. 1 to 2 c. 3 to 5 d. Greater than 5
15. How long have the vacant positions been open?	a. 3 months or less b. 6 months or less c. 1 year or less d. Greater than 1 year e. Greater than 2 years f. Not applicable
16. How many medical laboratory professionals have applied for the open position(s)?	a. 0 b. 1 to 2 c. 3 to 5 d. 6 to 9 e. Greater than 10 f. Not applicable
17. Do you employ temporary (traveler or contract) medical laboratory professionals?	a. Yes b. No
18. For what reasons do you hire temporary (traveler or contract) medical laboratory professionals?	a. Position Vacancy – Unable to fill b. Medical Leave c. Vacation/Time off d. Other_____ e. Do not hire temporary (traveler/contract) medical laboratory professionals
19. At your facility what is the average hourly wage for permanent full-time or part-time Medical Technologists (MTs)/Clinical Laboratory Scientists (CLSs)/ Medical Laboratory Scientists(MLSs)?	a. $23.00 to $25.00 b. $26.00 to $28.00 c. $29.00 to $31.00 d. Greater than $31.00
20. At your facility what is the average hourly wage for permanent full-time or part-time Medical Laboratory Technicians (MLTs)/ClinicalLaboratory Technicians (CLTs)?	a. $15.00 to $17.00 b. $18.00 to $20.00 c. $21.00 to $24.00 d. Greater than $24.00
21. What is the average hourly wage for a temporary (traveler or contract) Medical Technologist (MT)/Clinical Laboratory Scientist (CLS)/Medical Laboratory Scientist(MLS) that your facility has paid?	a. $28.00 to $30.00 b. $31.00 to $35.00 c. $36.00 to $40.00 d. Greater than $40.00 e. Not applicable

Table 1. (*Continued*).

Question	Answer Options
22. What is the average hourly wage for a temporary (traveler or contract) Medical Laboratory Technician (MLT)/Clinical Laboratory Technician (CLT) that your facility has paid?	a. $17.00 to $19.00 b. $20.00 to $24.00 c. $25.00 to $29.00 d. Greater than $29.00 e. Not applicable
23. Is there a line item in the laboratory budget for temporary (traveler or contract) staffing?	a. Yes b. No
24. What do you feel are reasons that could improve filling vacant positions for permanent laboratory professionals? Check all that apply.	a. Higher base salary b. Higher on call compensation c. Improved benefits d. Career ladder within institution e. Acknowledgement from peers and the medical profession. f. More graduates to fill job shortage g. Other_____
25. Do you prefer to hire temporary (traveler or contract) personnel vs permanent?	a. Yes b. No
If yes, why?	Free open-ended text box to answer.

The survey was distributed to Clinical Laboratory Improvement Amendments (CLIA) certificate laboratories in Montana. This laboratory list was obtained from the United States Centers for Disease Control and Prevention (CDC) website at https://wwwn.cdc.gov/clia/Resources/LabSearch.aspx. There are 898 CLIA certificates in Montana. Laboratories that were excluded from the study were those holding multiple certificates with the same address, physician offices that collected samples but did not perform testing, school student health services, hospice, and ancillary test sites. The final sample was 83 laboratories. The Montana Public Health Laboratory provided email addresses for the identified laboratories. Missing email information was obtained by calling facilities and requesting the laboratory manager/director/administrator name and email.

The survey was developed using Research Electronic Data Capture (REDCap), a survey tool provided by Rutgers University with a function to send the electronic survey via email. Email addresses were entered in REDCap. The process included an introduction email sent 5 days prior to sending the survey. This email informed the participants of the purpose of the survey, when and how it would be sent via email, of the due date, and to validate the email addresses for delivery confirmation. Three introductory emails bounced back, and the addresses were corrected by calling the facility to verify the contact information. The survey period was October 11, 2017, to October 27, 2017. Reminder emails were automatically sent every 3 days to those who had not participated. On the final day, a "Last Chance" email was sent allowing 2 more days to complete the survey.

RESULTS

Eighty-three laboratories were surveyed, with a 54% ($n = 45$) response rate. Email survey response rates can range from 25% to 30%, with an increased to up to 70% when follow-up emails or multimode reinforcement are used.[13] For this study, multiple email participation reminders were sent, which may have contributed to the higher response rate. Surveys were completed by laboratory managers (64%, $n = 29$), laboratory directors (15%, $n = 7$), lead technologists (13%, $n = 6$), and others (title not listed on the survey) (6%, $n = 3$). Responses were from demographic areas categorized by population size: urban (>50 000), urban cluster (<50 000 and >2500), and rural (<2500).[12] The response rates based on facility type and demographic location are depicted in Figure 1. Response rates for each area include urban $n = 8$, urban cluster $n = 20$, and rural areas $n = 17$.

Vacancy

In the past 2 years, 89% ($n = 40$) reported vacancies, and 11% ($n = 5$) had no vacancies. Of the 40 survey respondents that reported vacancies, 68% ($n = 27$) had openings for both MLS and medical laboratory technician (MLT), 27% ($n = 11$) reported only MLS positions, and 5% ($n = 2$) reported only MLT positions. There were 23 respondents with full-time vacancies: 70% ($n = 16$) indicated one to two open positions and 30% ($n = 7$) had three to five open positions. There were 11 respondents with part-time vacancies: 91% ($n = 10$) reporting one to two openings and 9% ($n = 1$) with three to five openings. For vacancy duration, a total of 26 responses were received: 27%

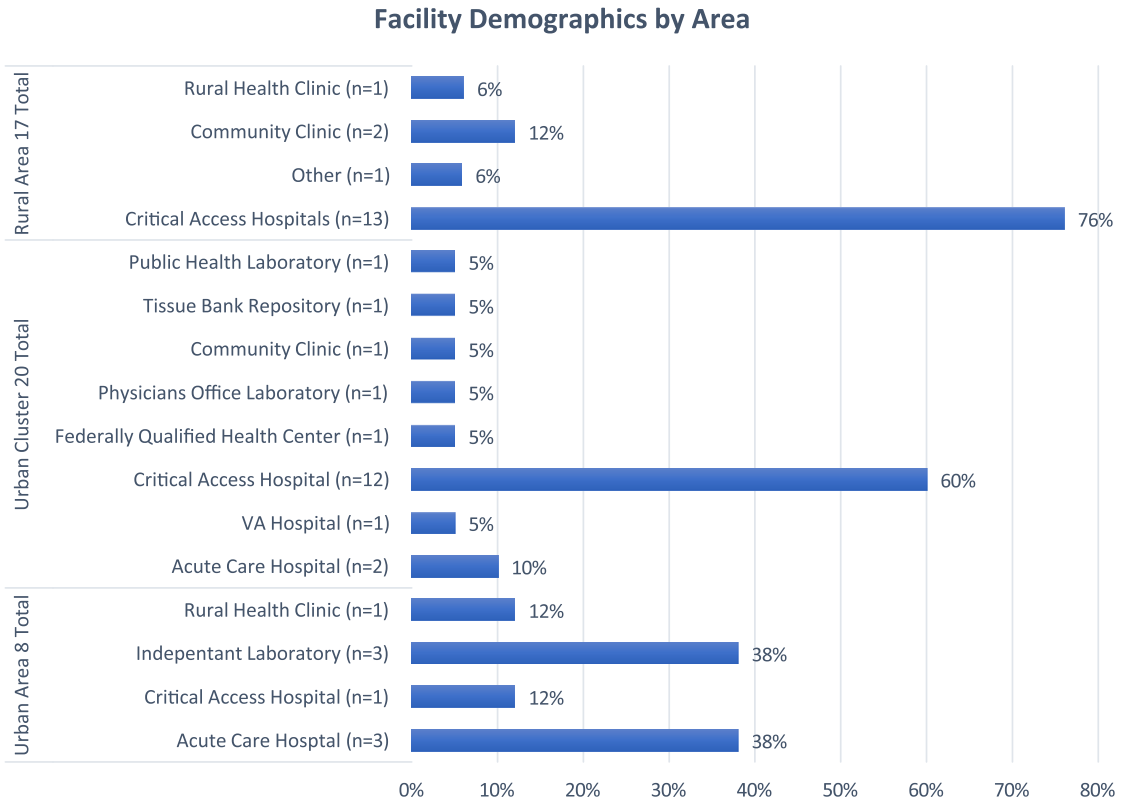

Figure 1. **Responses by facility type and demographics.**

($n = 7$) had openings for 1 year or less, 27% ($n = 7$) had openings for greater than 1 year, 23% ($n = 6$) had openings for 6 months or less, 15% ($n = 4$) had openings greater than 2 years, and 8% ($n = 2$) had openings for 3 months or less. Laboratories in all the demographic areas reported difficulty filling open positions, with the Critical Access Hospitals and Rural Healthcare Clinics having positions open for more than 2 years.

Of the 45 respondents, there were 28 responses to the question related to the number of applicants for open positions, with 25% ($n = 7$) reporting no applicants, 64% ($n = 18$) having one to two applicants, and 11% ($n = 3$) indicating three to five applicants. The major cause of vacancies was retirements ($n = 22$), which was followed by geographical location ($n = 20$), higher paying job ($n = 8$), health reasons ($n = 8$), promotion ($n = 8$), and openings for other reasons ($n = 8$), including termination, schedule, additional positions opened, and remote location. When asked what would increase the ability to fill vacancies, the majority indicated more graduates ($n = 37$), which was followed by higher base pay ($n = 30$), recognition ($n = 18$), career ladder ($n = 17$), improved benefits ($n = 11$), higher on-call compensation ($n = 9$), and other ($n = 5$), which included housing, location, and utilization of other qualified staffing, such as registered nurses, nurse practitioners, physicians assistants, and physicians.

Temporary Staffing

For the question related to temporary staffing, 49% ($n = 22$) indicated they employ temporary staffing, and 51% ($n = 23$) do not use temporary staffing. The reasons for hiring temporary staffing included being unable to fill position (62%, $n = 24$), medical leave (13%, $n = 5$), vacation (10%, $n = 4$), and other reasons, such as deployment, maternity leave, being short-staffed, and administrative projects (15%, $n = 6$). Figure 2 depicts the respondents who utilize temporary staffing by facility type. Of the 22 facilities that employ temporary staffing, 45% ($n = 10$) have a line item in the budget for temporary staffing, and these facilities include Acute Care Hospital, VA Hospital, Federally Qualified Health Center, and Critical Access Hospitals.

Wages

Temporary staffing wages for MLSs ranged from $28 to more than $40 per hour, and temporary staffing wages for MLTs ranged from $20 to more than $31 per hour. Figure 3 compares temporary wages with permanent staff wages. Temporary staff wages exceed those of permanent staff wages. Comparing MLS and MLT wages by facility and pay rate indicated that the Acute Care Hospitals and Critical Access Hospitals paid within the entire wage range. However, most of these facilities fall in the upper tier of the

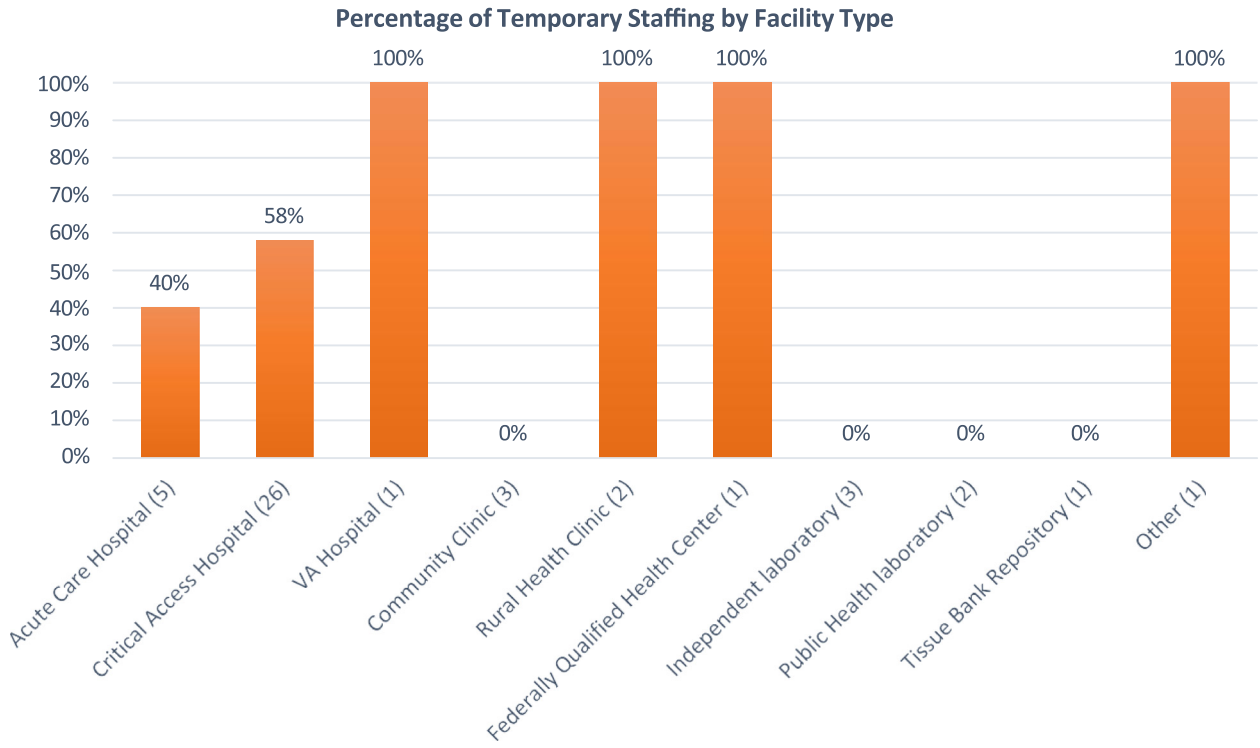

Figure 2. Percentage of temporary staffing by facility type.

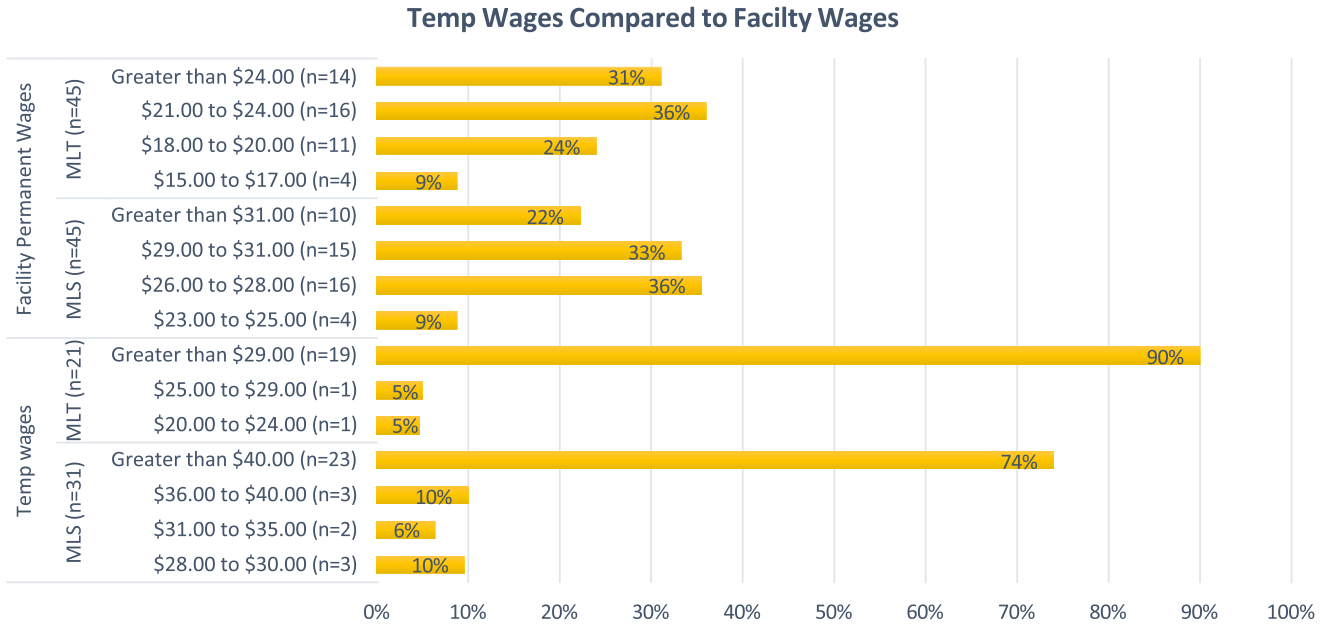

Figure 3. Temporary wages compared with facility permanent wages.

wage range. Figure 4 illustrates MLS wages by facility type, and Figure 5 illustrates MLT wages by facility type.

DISCUSSION

The Montana survey results revealed a shortage of laboratory professionals equivalent to or greater than what was reported in national surveys. Of the respondents to the survey, 51% ($n = 23$) reported full-time position vacancies, and 24% ($n = 11$) had part-time vacancies, with a total of 60% ($n = 27$) open positions, whereas the national ASCP vacancy surveys noted that the vacancy rate for core laboratory was 12.1% (2014 survey) and 7.54% (2016–2017 survey).[4,5]

The Montana survey had 49% ($n = 22$) facilities indicate that retirement was one of the reasons for vacancies.

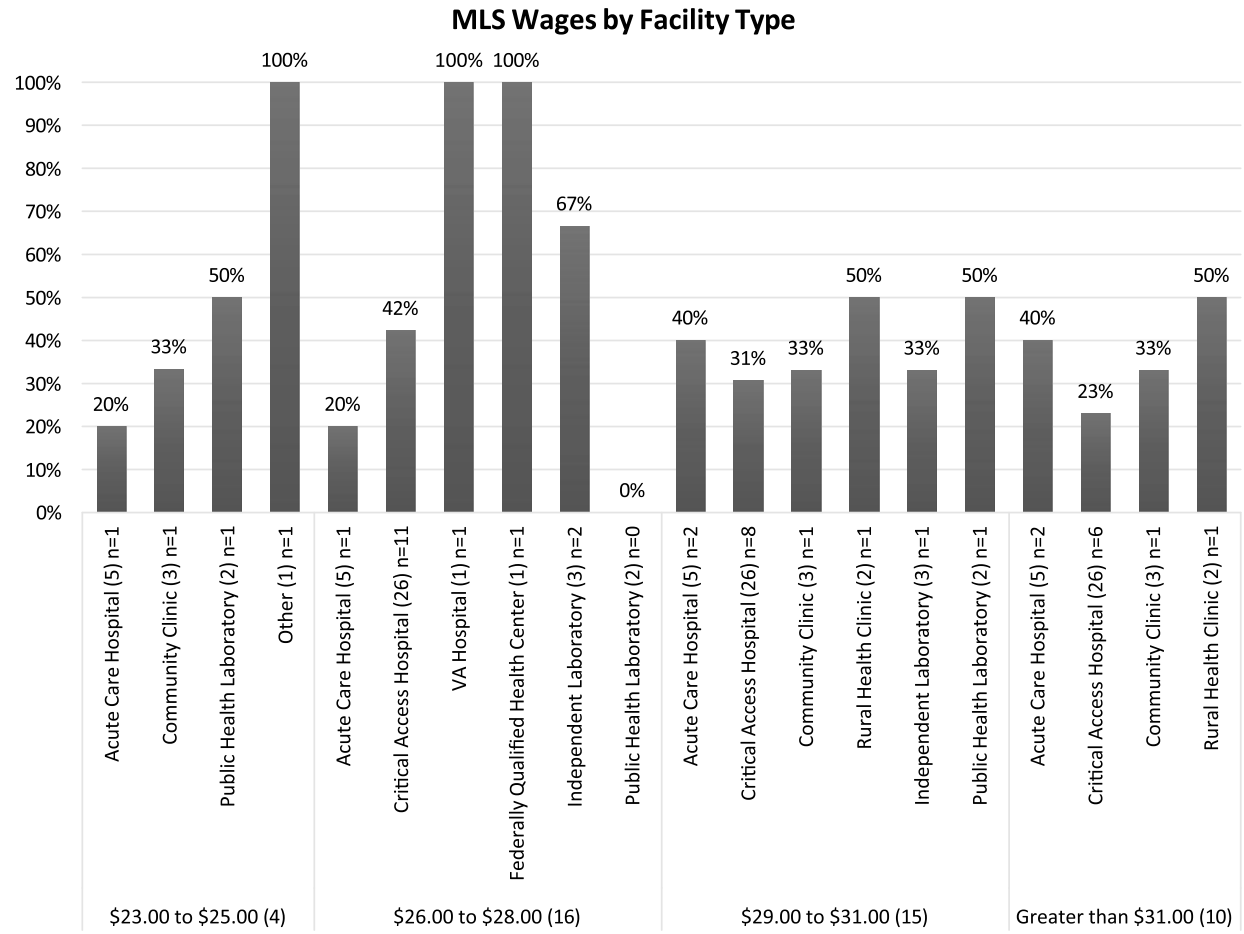

Figure 4. **MLS wages by facility type.**

This is approximately three times higher than the rate reported in the 2014 ASCP Vacancy Survey (16.9%) and more than two times higher than the projected rate reported in the 2016–2017 survey (20.72 %).[4,5] The Montana data revealed that 49% ($n = 22$) used temporary staffing with 45% ($n = 10$) having a line item in the budget. The fact that this is included in the annual budget suggests the severity of the issue being long standing, and laboratories must financially address this with budget allocation. The Montana statistics for temporary staffing (49%) are five times higher than the 2014 ASCP vacancy survey (8.4%) and approximately three times higher compared with the 2016–2017 ASCP vacancy survey results (14.98%).[4,5] The Montana Survey data suggest that the rate of temporary staffing may be higher due to few applicants for the permanent positions. Of respondents who had job openings, 25% ($n = 7$) reported zero applicants, 64% ($n = 18$) had one to two applicants, and 11% ($n = 3$) had three to five applicants. Of the facilities with vacant positions, 67% ($n = 18$) reported vacancies for 6 months or more, and 41% ($n = 11$) required more than 1 year to fill the position. Filling a position in Montana is higher than in the 2014 and 2016–2017 ASCP vacancy surveys, which reported 3–6 months to fill a vacant position.[4,5]

There were a total of 60% ($n = 27$) respondents that had either full-time, part-time, or both position vacancies, and 56% ($n = 15$) reported using temporary staffing while continuing to seek full-time employees. Of the 23 respondents with only full-time vacancies, 16 reported one to two open positions, and seven indicated three to five open positions. Of the 11 respondents with only part-time vacancies, 10 reported one to two open positions, and one stated three to five vacancies.

Twenty-eight responded to the question regarding the number of applicants for open positions, with seven reporting zero applicants, 18 had one to two applicants, and three reported three to five applicants. The survey data revealed 92 potential open positions with 51 potential applicants, which puts into perspective the insufficient pool of laboratory professionals applying.

The survey data provided information to determine whether there is a difference between the permanent MLS/MLT wages versus temporary/traveler MLS/MLT wages. Temporary staff wages range from one and a half to two times higher than permanent staff wages (Figure 3). Seventy-four percent of respondents selected greater than $40.00 per hour for temporary MLS staff wages, and 90% selected greater than $29.00 per hour

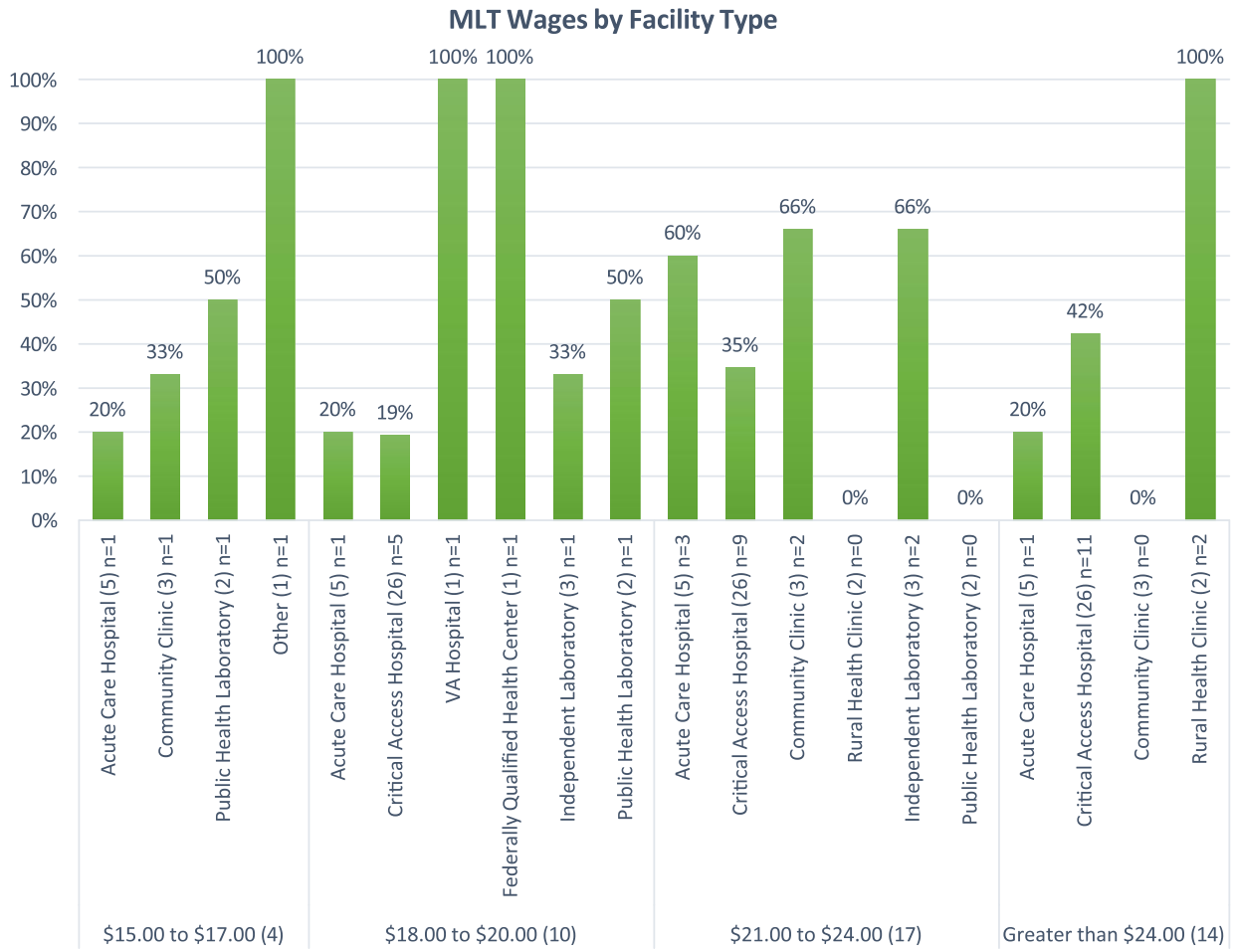

Figure 5. **MLT wages by facility type.**

for temporary MLT staff. Based on this data, it appears there was a limitation of the survey tool related to the temporary staffing wage range options. The survey wage range did not provide sufficient choices to determine the true cost of temporary staffing. The data indicate more than $40 for MLS and more than $29 for MLT. Additional wage ranges above these amounts would have provided a more accurate representation of the true cost for employing travelers/temporary staff. This variable requires further study.

CONCLUSION

The survey provided data to demonstrate the difference between the medical laboratory staffing shortage in Montana to that of national aggregate data. This study confirmed there is a medical laboratory professional shortage in Montana, the usage of temporary staffing is much higher than the national rate, vacancies take longer to fill than the average national rate, and wages for temporary staffing are one and half to two times higher than permanent staff wages. The state-specific data provide vital information to the Montana clinical laboratory community and can serve as an incentive to work collaboratively to explore solutions to the shortage.

Future directions include encouraging states to conduct surveys similar to the Montana survey to gather state-specific data, which would provide state-specific evidence of shortage and staffing issues. The medical laboratory profession should engage in more evidence-based studies that investigate outcomes of staff shortage related to quality laboratory diagnostic services, patient care, patient safety, and cost. Other related issues that can be studied include staff morale, safety, and the psychological impact/stress associated with turnaround of traveler/temporary staff.

Although measuring stress is difficult, studies need to be conducted on how the usage of temporary staffing affects employees and management, determining if added stress is causing staff to leave the laboratory for other positions.

Studies related to cost, such as measuring temporary versus permanent wages, onboarding cost, training of temporary staff, recruitment, and overtime if temporary staffing is not utilized, could provide insight into the advantages and disadvantages of using temporary

staffing. Collaborating with industry partners, such as the temporary staffing agencies and laboratories that use temporary staff to compare wage rates, cost related to temporary staffing, and benefits, and exploring what the greatest needs are in terms of demographics and laboratory specialty area(s) would provide valuable information.

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