



ASCP Wage and Vacancy Survey of U.S. Medical Laboratories

Andrea Bennett, MPH, MT(ASCP),¹ Nancie Noie Thompson,²
Blair Holladay, PhD, SCT(ASCP),³ Alan Bugbee, PhD,³
Colette A. Steward, PhD⁴

*(¹American Society for Clinical Pathology, Washington, DC,
²ASCP, Chicago, IL, ³ASCP Board of Registry, Chicago, IL,
⁴The Colette Steward Group, Chicago, IL)*

DOI: 10.1309/LMZA19PWJY05FZGA

In 2008, the American Society for Clinical Pathology (ASCP) conducted its eleventh Wage and Vacancy Survey to provide recent wage data and determine the extent and distribution of shortages within the nation's clinical laboratory workforce. This confidential survey of hospital, reference, and physician office laboratory facilities has been administered every two years since 1988 and serves as the primary source of information for academic, governmental, and industry labor analysts in defining the state of the nation's clinical laboratory workforce. While continuity remains a central objective in order to monitor trends, the survey has evolved in response to the changes in the profession. New position categories and questions have been added to the 2008 survey to examine some of the factors that are affecting wage and vacancy rates.

Methodology

The survey was conducted by Morpace Research and Consulting (Farmington Hills, MI) under the supervision of Nancie Noie Thompson, ASCP Vice President of Membership and Communications, and The Colette Steward Group, an independent research firm. It was administered in two waves. The first wave ran from November 13, 2007, to January 31, 2008, resulting in 1,321 completed questionnaires for a response rate of 13%. To increase laboratory participation, the ASCP partnered with six other organizations in a second wave, fielded from August 14, 2008, to September 25, 2008, which yielded an additional 273 completed questionnaires. In total, 1,594 interviews were completed.

Sample Design

For the first wave of survey recipients, a representative sample of clinical laboratories by facility type was obtained from a list supplied by the Centers for Disease Control (CDC) database of all legally operating licensed clinical laboratories in the United States. Based on the response rates from the ASCP's 2003 *Wage and Vacancy Survey of Medical Laboratories (Lab Med.*

2005;36:149–157), 10,000 laboratories were selected by facility type and region from the 139,789 clinical laboratories contained in the CDC database. The questionnaire was mailed to the laboratory managers in hospitals, private clinics, reference laboratories, physician offices, and outpatient clinics. New for this survey was the option to respond online.

For the second wave of survey recipients, the ASCP partnered with the American Association for Clinical Chemistry (AACC), the American Association of Pathologists' Assistants, the American Society for Clinical Laboratory Science (ASCLS), The Joint Commission, the National Society for Histotechnology, and the Clinical Laboratory Management Association (CLMA). Respondents were invited to participate via Internet invitation or through a notification on each organization's Web site or newsletter. Questionnaires completed in Wave 2 were matched to Wave 1, and any duplicates were discarded.

This sample size was sufficient to provide an overall sampling margin of error of +2.4% at the 95% confidence level for total sample statistics. Statistical significance at the subgroup level varied and was generally lower than total sample statistics. Sub-sample sizes of 30 or less did not allow for statistically significant comparisons and therefore were not analyzed. Due to weighting and rounding, responses throughout the report may not add up to 100%. All wage and vacancy data collected was based on clinical laboratory personnel who received certification from a national organization including, but not limited to, the ASCP Board of Registry. See **Tables 1** through **5** for sample characteristics. "Population" refers to the universe of all legally operating licensed clinical laboratories in the United States, while the "unweighted sample" includes the laboratories that participated in the survey. It is important to note that although hospitals constitute 12% and physician office laboratories (POLs) 79% of the laboratory population, in this survey, hospitals were more heavily sampled because they employ many more positions and personnel than do POLs.

As in previous years, data pertains to wages and salary trends for 1) staff medical technologists (MT), 2) MT supervisors, 3) MT managers, 4) staff cytotechnologists (CT), 5) CT supervisors, 6) histotechnicians (HT), 7) histotechnologists (HLT), 8) HT supervisors, 9) staff medical laboratory technicians (MLT), 10) MLT supervisors, 11) staff phlebotomists (PBT), 12) PBT supervisors, 13) laboratory assistants (LA), and 14) LA supervisors. Four new position categories included in the survey were 1) pathologists' assistants (PA), 2) PA supervisors, 3) specialists in blood banking (SBB), and 4) SBB supervisors. Information about vacancies, hiring practices, and laboratory demographics was also collected.

Not all of the facilities surveyed included all of the aforementioned staff positions. **Figure 1** shows the distribution of survey respondents by type of board certification and level of responsibility.

Table 1 Laboratory Type (Population and Completed Unweighted Sample)

Type of Laboratory	Population	Unweighted Sample	Unweighted Sample Counts
Hospital	12%	70%	1,118
Private clinic/reference Lab	4%	14%	228
Physician office lab	79%	10%	166
Outpatient clinic	6%	5%	82
Total			1,594

Table 2 Laboratory Region (Population and Completed Unweighted Sample)

Region	Population	Unweighted Sample	Unweighted Sample Counts
Northeast	19%	11%	176
South Central Atlantic	28%	20%	325
East North Central	16%	15%	233
West North Central	5%	23%	367
West South Central	12%	15%	232
Far West	20%	16%	261
Total			1,594

Data Weighting Plan

Two weighting schemes were used to analyze the results—facility-based weights and person-based weights. This was done because the survey involved sampling organizations of unequal size. The facility-based scheme weighted respondents by laboratory type and geographic region according to the model provided by the CDC database. This model reflects the ratios of laboratory types by region. For example, in every region there are many more POLs than there are hospital-based laboratories. The ratio ranged from 4:1 to 8:1 across geographic regions. The facility-based weights adjust for these differences. Most of the survey questions have been weighted using the facility-based weights.

Table 3a Laboratory Type by Region (Population and Survey Participants)

Laboratory Type	Population	Northeast	South Central Atlantic	East North Central	West North Central	West South Central	Far West
Hospital	12%	2%	3%	2%	1%	2%	3%
Private clinic/reference lab	4%	1%	1%	0%	0%	1%	1%
Physician office lab	79%	15%	23%	13%	3%	9%	15%
Outpatient clinic	6%	1%	1%	1%	1%	1%	2%

Table 3b Laboratory Type by Region—Completed Survey Sample (Unweighted)

Laboratory Type	Total Sample	Northeast	South Central Atlantic	East North Central	West North Central	West South Central	Far West
Hospital	70%	8%	13%	11%	16%	11%	11%
Private clinic/reference lab	14%	1%	3%	2%	3%	1%	3%
Physician office lab	10%	1%	3%	2%	2%	2%	1%
Community/outpatient clinic	5%	1%	1%	0%	1%	1%	1%

Note: The decision was made to oversample hospitals and undersample physician office labs due to the relative number of laboratory positions in each, and their relative importance in establishing wage rates in the industry.

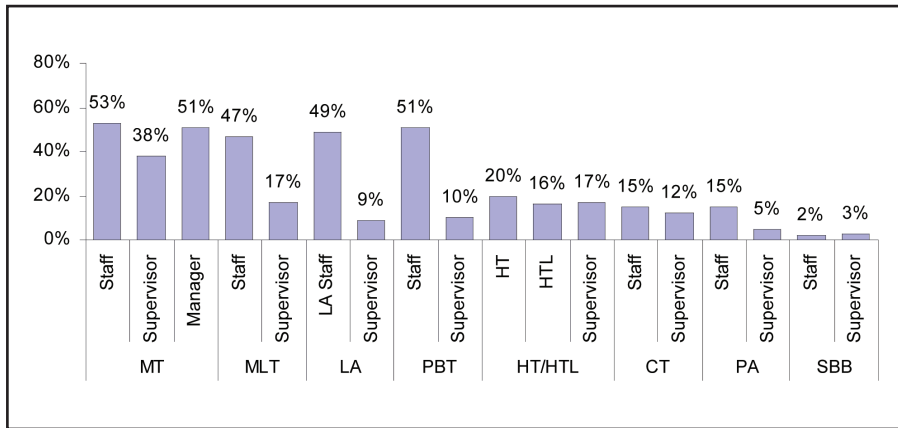
Some survey questions, however, do not have a facility focus. In particular, questions regarding average wage rates need to be projected to the population of laboratory workers, not facilities. In the survey, it was not unusual to see slightly higher wages being paid by hospitals for some positions. Hospital-based laboratories also tended to have larger staffs than other types of laboratories surveyed. Reports of average wage rates that do not take into account these disparities will tend to be negatively biased if viewed from the perspective of the population of all laboratory personnel receiving wages. Therefore, some survey questions—particularly those focused on wage rates (eg, Q2. *Enter the current lowest, highest, and average rate for each position, and Q3a. Is there a rate differential for the evening, night or weekend shifts?*)—have been weighted using a person-based weight. This weight is essentially the facility-based weight, weighted by the average number of laboratory employees by laboratory type. Estimates for the number of employees by laboratory type were regionally based and obtained from the survey data.

Table 4 Demographic Subgroups—Completed Survey Sample (Unweighted)

Demographic Group	Unweighted Sample Counts	Demographic Group	Unweighted Sample Counts
Total Sample	1,594		
Laboratory Type		Region	
Hospital	1,118	Northeast	176
Private clinic/reference lab	228	South Central Atlantic	325
Physician office lab	166	East North Central	233
Outpatient clinic	82	West North Central	367
		West South Central	232
Hospital Bed Size		Far West	261
Less than 100	517		
100–299	347	Testing Volume	
300–499	121	100k or less	648
500+	102	100k to 1 million	708
		Over 1 million	196
Testing Type (<i>Wave 1 data only</i>)			
Non-waived	815		
Waived	158		

Table 5 State by Region – Completed Survey Sample (Unweighted)

South Central Atlantic	325	Far West	261	West North Central	367	West South Central	232
Alabama	28	Alaska	9	Iowa	58	Arkansas	32
Delaware	3	Arizona	21	Kansas	71	Louisiana	36
District Of Columbia	2	California	92	Minnesota	95	Oklahoma	29
Florida	58	Colorado	15	Missouri	70	Texas	135
Georgia	34	Hawaii	2	Nebraska	33		
Kentucky	24	Idaho	7	North Dakota	17	Northeast	176
Maryland	13	Montana	11	South Dakota	23	Connecticut	4
Mississippi	23	Nevada	8			Maine	8
North Carolina	39	New Mexico	13	East North Central	233	Massachusetts	29
South Carolina	23	Oregon	25	Illinois	61	New Hampshire	8
Tennessee	38	Utah	11	Indiana	31	New Jersey	16
Virginia	29	Washington	39	Michigan	41	New York	55
West Virginia	11	Wyoming	8	Ohio	59	Pennsylvania	53
				Wisconsin	41	Rhode Island	1
						Vermont	2



lowest for LA and PBT staff level positions. Pay rates by position were comparable between hospitals and private clinic/reference laboratories for higher level HTs and all CT positions. These laboratory types paid similarly higher rates than physician offices for all MT positions. MLT, LA, and PBT staff level wages did not appear to be affected by laboratory type.

Median lowest, average, and highest wage data for each of the 18 full-time equivalent (FTE) positions, based on type of certification held by individuals filling these positions and their level of responsibility, within all of the laboratories that responded to our survey is presented in **Figure 2**.

Pay rates by position were comparable between hospitals and private clinic/reference laboratories for higher

Figure 1 Distribution of survey respondents by type of Board certification and level of responsibility.

Q1. Check all of the positions that exist in your organization.

Findings

Using survey data from laboratories selected from the CDC database resulted in a modification to the weighting scheme. While an important objective of this survey was to show trends in current wage and vacancy rates, it was more important that the data from the survey be reliable and reflect the current status of wage and vacancy rates within the population of survey respondents. The use of the CDC database and the approach used to weight the data in the current report of annual wage and vacancy data prevents comparison of this data with wage and vacancy data published previously in *LABMEDICINE* for the years prior to 2008. Therefore, moving forward, wage and vacancy data from 2008 will serve as the benchmark year for comparison against future reports of annual wage and vacancy survey data. Wage and vacancy trends prior to this survey can be reviewed in previously published reports in *LABMEDICINE*.

Wages

Nationally, laboratories paid the highest wages for staff level PAs and upper-level MTs, CTs, and SBBs. Wages were

level HTs and all CT positions. Both of these types of laboratories were found to pay at a similarly higher rate than physician offices for all MT positions. Comparable wages were paid to MLT, LA, and PBT staff employees, regardless of laboratory type.

Nationally, clinical laboratories paid the highest wages for staff level PAs and upper level MT, CT, and SBB positions. Staff level LA and PBT positions were generally paid the lowest wages. (**Figure 3**.)

Nationally, shift differentials were more common for the evening shift (37%) than for other shifts (28% night and 29% weekend). Hospital-based laboratories were notably more likely to pay shift differentials than other laboratory types, as were laboratories in the West North Central region, larger hospitals, and high-volume testing laboratories, compared with other types of laboratories. Nationally, the median increase in wage rates for the evening, night, and weekend shifts was \$1.91/hr, \$2.56/hr, and \$2.31/hr, respectively. Few laboratories (10%) offered bonuses for evening, night, or weekend work. (**Figure 4**.)

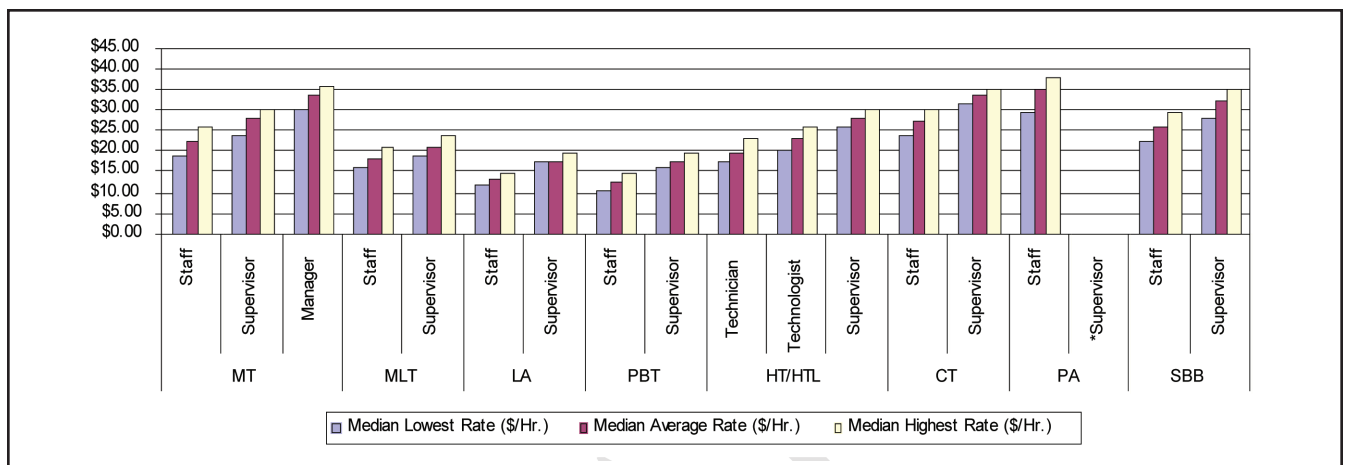


Figure 2 Median lowest, average, and highest wages paid to full-time employee (FTE) laboratory staff by type of certification and level of responsibility.

*Small sample sizes (30 or less), insufficient to analyze.

Q2. Please enter the current lowest rate (\$/hr), highest rate (\$/hr), and average rate (\$/hr) for each FTE certified position based on your current staff.

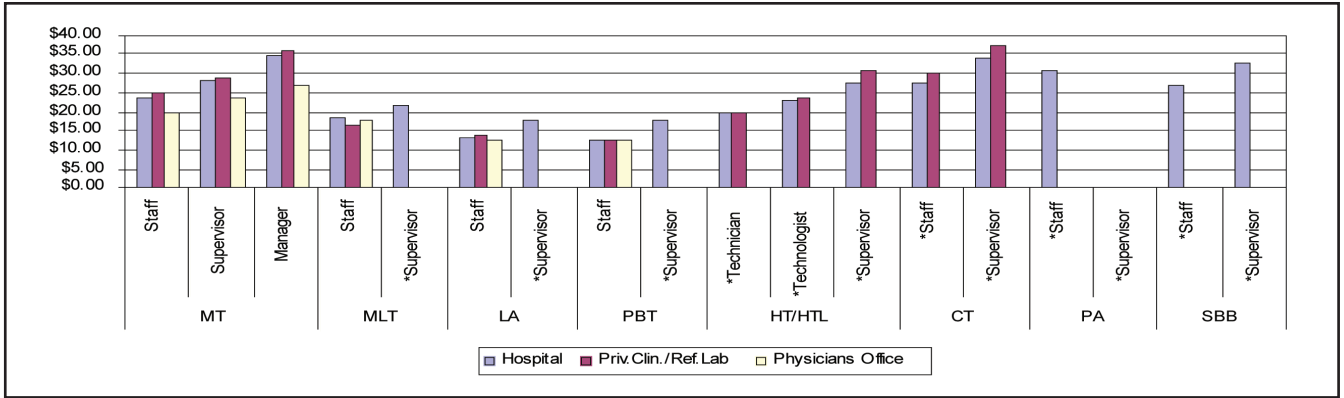


Figure 3 Median average wages paid to full-time employee (FTE) laboratory staff by type of certification, level of responsibility, and laboratory type.

*Small sample sizes (30 or less), insufficient to analyze.

Q2. Please enter the current lowest rate (\$/hr), highest rate (\$/hr), and average rate (\$/hr) for each FTE certified position based on your current staff.

Summary of Wage Data by Level of Certification, Type and Location of Laboratory, Type of Testing, and Level of Responsibility

Medical Technologists (MT)

The national median average wage for full-time certified MT staff level employees was \$23.00 per hour or \$47,840 annually. Hospitals, private clinic/reference laboratories, and outpatient clinics paid comparatively higher median average wages than physician offices. Large hospitals (>500 beds) were likely to pay higher wages than small hospitals (<100 beds). MT staff in the Far West region were paid significantly higher wages compared with other regions.

MT supervisors earned a median average wage of \$28.00 per hour or \$58,240 per year. MT supervisors received notably higher pay in hospitals and private clinic/reference laboratories than in physician offices. Large hospitals paid considerably higher wages than small hospitals, and the highest paying region was the Far West.

MT managers earned a median average wage of \$34.00 per hour or \$70,720 annually. Hourly wages of MT managers were likely to be up to 30% higher in hospitals and private clinics/reference laboratories than in physician offices, and as with the other MT positions, large hospitals paid considerably higher than small hospitals. MT managers also earned 20% to 35% higher wages in medium- and high-test-volume laboratories than they did in low-volume laboratories.

Medical Laboratory Technicians (MLT)

For MLT staff level employees, the average median hourly wage was \$18.48 per hour or \$38,438 per year. Pay rates were similar within laboratory type, hospital size, test volume, and type of testing (ie, waived versus non-waived) performed. The Northeast region paid higher than the South Central Atlantic and the West South Central regions.

MLT supervisors earned a median average wage of \$21.80 per hour or \$45,344 yearly. Sample sizes by laboratory type, hospital size, region, test type and volume prevented significance testing for wage rate differences based on these variables.

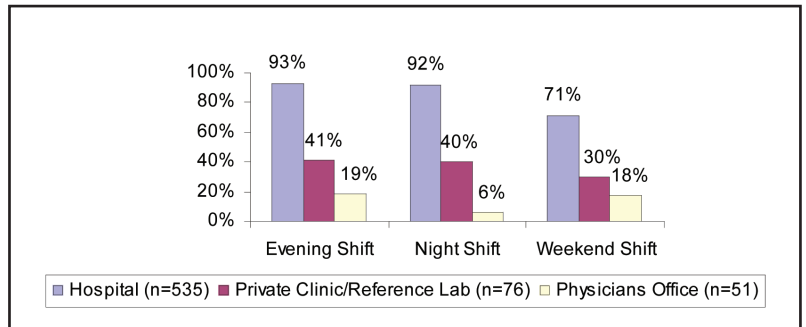


Figure 4 Percent of laboratories paying a higher shift differential from the day shift.

Q3. Is your evening, night, and weekend shift hourly rate higher, lower, or the same as the day shift?

Cytotechnologists (CT)

Staff level CTs were paid a median average rate of \$27.90 per hour or \$58,032 per year. CT supervisors earned a median average rate of \$34.16 per hour or \$71,053 annually. Small sample size (n ≤ 30) prevented significance testing for wage differences between physician offices and outpatient clinics, hospital size, region, and testing type. Wages for both CTs and CT supervisors were similar within laboratory type and testing volume.

Histotechnicians (HT)/Histotechnologists (HTL)

HTs were paid an average median wage of \$20.24 per hour or \$42,099 annually. HTLs were paid a median average wage of \$23.46 per hour or \$48,797 annually. Further wage rate analysis by significance testing is not available for either of these levels of certification due to the small sample sizes (n ≤ 30) for laboratory type, hospital size, region, and test type. HT supervisors earned a median average wage off \$28.00 per hour or \$58,240 per year. HT supervisors earned higher hourly rates in private clinics and reference laboratories than they did in hospitals. Likewise, HT supervisors were paid at higher rates in the Far West region than in other regions.

Laboratory Assistants (LA)

Staff level LAs earned a median average wage of \$13.50 per hour and \$28,080 annually in 2008. By region, the Far West and Northeast regions paid notably higher than laboratories in the West South Central region. There was a negligible difference in wages across laboratory type, hospital size, testing volume, and type. For LA supervisors, the median average pay rate was \$17.69 per hour or \$36,795 annually. Small sample sizes

precluded significance testing for wage differences by laboratory type, hospital size, region, and test type and volume.

Phlebotomists (PBT)

Staff phlebotomists were paid a median average wage of \$13.00 per hour or \$27,040 per year. Higher pay rates were found in the Northeast region, but no difference in rates was found across laboratory type, hospital size, testing volume, or type of test performed. The average pay rate for phlebotomy supervisors was \$18.14 per hour or \$37,814 annually. Small sample size (n ≤ 30) precluded significance testing for wage differences by laboratory type, hospital size, region, and test type performed.

Pathologists' Assistants (PA)

Nationally, staff level PAs earned a median average wage of \$35.00 per hour or \$72,800 annually. This position paid the highest wage among all clinical laboratory positions analyzed. The overall sample size (n ≤ 30) for PA supervisors was too small for meaningful statistical analysis.

Specialists in Blood Banking (SBB)

The median average hourly rate for staff SBBs was \$26.24 per hour or \$54,579 annually. Supervisory SBBs earned a median average wage of \$32.72 per hour or \$68,058 annually. The small sample size for the number of SBBs in all subgroups (laboratory type, hospital size, region, testing volume, and testing type) prevented significance testing for wage differences by subgroup.

Summary of Vacancy Rate Data by Level of Certification and Responsibility and Type and Location of Laboratory

A primary objective of this research was to determine whether or not there is a shortage of certified laboratory personnel and to understand the distribution of personnel shortages. The vacancy rate was calculated as follows:

Each surveyed laboratory with a particular position (eg, staff level medical technologist) that responds to the “number

of certified current positions” and “number of certified vacant positions” is included in the certified vacancy rate computation. The number of budgeted positions is derived from adding the number of current positions plus the number of vacant positions. A vacancy rate is calculated for each laboratory by dividing the number of vacant positions by the number of budgeted positions for that laboratory. The vacancy rate shown in the report for a given position is the mean of the vacancy rates across all laboratories with that particular position.

Table 6 shows the current mean number of budgeted positions and vacancy rates by level of certification and responsibility.

Across the nation, vacancy rates were generally highest for non-managerial staff, most notably staff level MTs (10.4%). Vacancy rates were also high for staff level LAs (8.8%), HTs (8.0%), and HTLs (7.2%). The lowest vacancy rates occurred among CT supervisors (0.0%), MT supervisors (1.4%), and staff level PAs (2.4%).

By laboratory type, private clinic/reference laboratories reported higher vacancy rates than most other laboratories for staff level LAs, CTs, HTs, and HTLs. Vacancy rates for staff level MTs were highest in laboratories in physician offices and outpatient clinics. MLT staff level vacancy rates were higher in private clinic/reference laboratories and outpatient clinic laboratories than in laboratories in other types of facilities. Outpatient clinic laboratories also reported a higher vacancy rate for staff level PBTs than laboratories located in other types of facilities. For most staff level positions, larger hospitals reported higher vacancy rates than smaller hospitals.

By region, the Far West reported higher vacancy rates than other regions for many staff level positions. The rates for PBT supervisors were generally higher in the South Central Atlantic than elsewhere in the country. The vacancy rate for MT managers was highest in the Northeast and South Central Atlantic regions.

Low- and medium-volume laboratories had higher vacancy rates than high volume laboratories for MT staff and managers. High-volume laboratories had higher vacancy rates for most other staff level positions (ie, MLTs, LAs, PAs, and SBBs). The vacancy rate was notably higher for MT managers and staff level MLTs in laboratories performing non-waived testing, while laboratories

Table 6 Mean Number of Total Available Budgeted Positions and Mean Vacancy Rates By Level of Certification and Responsibility

Variable	MT Positions			MLT Positions		LA Positions		PBT Positions	
	MT Staff	MT Supervisor	MT Manager	MLT Staff	MLT Supervisor	LA Staff	LA Supervisor	PBT Staff	PBT Supervisor
(Sample size)	(1,093)	(747)	(951)	(886)	(187)	(422)	(67)	(716)	(196)
No. of budgeted positions (mean)	8.2	2.3	1.3	5.7	1.3	4.4	1.1	7.3	2.6
Vacancy rate	10.4%	1.4%	3.7%	6.4%	2.6%	8.8%	3.4%	5.9%	5.7
Variable	HT Positions			CT Positions		PA Positions		SBB Positions	
	HT	HTL	HT Supervisor	CT Staff	CT Supervisor	PA Staff	PA Supervisor	SBB Staff	SBB Supervisor
(Sample size)	(333)	(256)	(259)	(263)	(172)	(153)	(28)	(83)	(121)
No. of budgeted positions (mean)	3.0	3.4	1.1	2.9	1.2	1.6	*	4.4	1.3
Vacancy rate	8.0%	7.2%	4.1%	4.8%**	0.0%	2.4%	*	5.1%	3.2%

Q4. Enter the number of employees you have for each certified position, followed by the current number of vacancies in budgeted positions.

*Small sample sizes (30 or less), insufficient to analyze

**Calculation based data from hospitals and private clinic/reference labs

performing waived testing sites reported higher vacancy rates for staff level MTs and LAs.

Medical Technologists (MT)

The overall vacancy rate for staff level certified MTs was 10.4%, the highest across all the surveyed positions. The vacancy rate for MTs was highest among laboratories in the East North Central (11.8%) and Far West (13.1%) regions. Hospitals with 500+ beds had an MT vacancy rate of 11.6%. However, the vacancy rate for MT supervisors was among the lowest of all surveyed positions at 1.4%. For MT managers, the certified vacancy rate was 3.7%. Clinical laboratories in the Northeast and South Central Atlantic regions exhibited the highest vacancy rates for MT managers.

Medical Laboratory Technicians (MLT)

The MLT staff level position vacancy rate was 6.4%. Outpatient clinic and reference laboratories, laboratories in the West South Central region, and high-volume testing laboratories experienced the highest MLT vacancy rates. The national vacancy rate for MLT supervisors was 2.6%.

Laboratory Assistants (LA)

The vacancy rate for LAs was 8.8% and was one of the higher vacancy rates reported across all surveyed positions. Vacancy rates were high in private clinic/reference laboratories (15.4%), laboratories in the West South Central region (20.4%), high-volume testing laboratories (26.3%), and laboratories conducting only waived tests (23.4%). The vacancy rate for LA supervisors was 3.4%, but small sample sizes for most subgroups prevented significance testing for vacancy rate analysis between subgroups.

Phlebotomists (PBT)

The national vacancy rate for staff level PBTs was 5.9%. Rates were highest for laboratories in outpatient clinics (12.0%), hospitals with 100 to 299 beds (9.8%), and hospitals with 500 or more beds (17.0%). Rates were also higher for laboratories in the South Central Atlantic (9.5%) and in the Far West (9.1%) regions. For PBT supervisors, the vacancy rate was 5.7%. Although the subsample sizes for some demographic groups were too small for meaningful statistical analysis, a very high vacancy rate (25.6%) was reported in the South Central Atlantic region.

Histotechnicians (HT)/Histotechnologists (HTL)

The vacancy rate for HTs was 8.0%, among the highest vacancy rates reported across all of the surveyed positions. Laboratories in the Far West and laboratories that performed medium-volume testing reported very high vacancy rates, 21.0% and 33.8%, respectively. Private clinic/reference laboratories and hospitals with 500+ beds had vacancy rates of 12.2% and 12.1%, respectively. The vacancy rate for HT supervisors was 4.1%. Although subsample sizes for some demographic groups were too small for meaningful statistical analysis, vacancy rates for HT Supervisors were notably higher among hospitals with 500+ beds (8.5%) and laboratories in the East North Central region (24.7%). For HTLs, the vacancy rate was 7.2%. Laboratories in the Far West reported a vacancy rate of 9.5%.

Cytotechnologists (CT)

The overall national vacancy rate (hospitals and private clinic/reference laboratories) for staff level CTs was 4.8%. Vacancy rates appeared to be higher in private clinic/reference laboratories (7.3%) and large hospitals (6.9%). The vacancy rate

Key Terms

Certified employees. The questionnaire defined certified employees as those who received certification from a national organization, including, but not limited to, the ASCP.

Geographic regions. *Northeast:* Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. *South Central Atlantic:* Alabama, Delaware, District of Columbia, Florida, Georgia, Kentucky, Maryland, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia. *East North Central:* Illinois, Indiana, Michigan, Ohio, and Wisconsin. *West North Central:* Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota. *West South Central:* Arkansas, Louisiana, Oklahoma, and Texas. *Far West:* Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

Median wage. Wages were measured by the statistical median. The median was used to eliminate bias created by abnormally high or low survey response rates within a category that skew the mean for that category. The median wage is the 50th percentile when all pay rates for a given position are ordered from lowest to highest. The pay rates measured in this study were daytime wages and did not include differential or shift pay, bonuses, or benefits. Median wage was categorized as median lowest wage, median average wage, and median highest wage.

Test volume. High-volume laboratories were those that reported conducting greater than 1 million tests per year. Laboratories conducting 100,001 to 1 million tests were mid-volume. Those conducting 100,000 or fewer tests were categorized as low-volume.

Vacancy rate. Vacancy rates were adjusted to a de-aggregated mean rate. In previous years, the mean of the total number of vacancies for a given cell was divided by the mean of the budgeted positions at the aggregate level. In an effort to increase vacancy rate precision, a vacancy rate was calculated for each individual laboratory. At the de-aggregated level, a vacancy rate was calculated from the mean of each laboratory's vacancy rate for each cell. Therefore, trends of previous years may not necessarily be due to market conditions, but to adjustments in the vacancy rate calculations.

Waived testing versus non-waived testing. Laboratories were classified as either a "waived" testing facility or a "non-waived" testing facility as defined by the Clinical Laboratory Improvement Amendments (CLIA) of 1988 (Public Law 100-578). Tests waived from regulatory oversight were defined as simple laboratory examinations and procedures that are cleared by the U.S. Food and Drug Administration (FDA) for home use; employ methodologies that are so simple and accurate as to render the likelihood of erroneous results negligible; or pose no reasonable risk of harm to the patient if the test is performed incorrectly.

for CT supervisors was 0.0%. Subsample sizes for other demographic groups for both of these positions were too small ($n \leq 30$) for meaningful statistical analysis.

Pathologists' Assistants (PA)

The overall vacancy rate for staff PAs was 2.4%, with hospital laboratories reporting a rate of 7.3%. The vacancy rates for supervisors across the other demographic groups were not available due to small subsample sizes. The rate for PA supervisors could not be calculated due to its extremely small sample size.

Specialists in Blood Banking (SBB)

The national vacancy rate for staff level SBBs was 5.1%; for SBB supervisors, it was 3.2%. The small sample sizes for both positions for private clinic/reference laboratories, physician offices, outpatient clinics, all categories of hospital bed-size, all regions, low-volume test laboratories, and waived-only test sites prevented significance testing for vacancy rate analysis between these subgroups.

Hiring Difficulties

Nearly one-half (43%) of clinical laboratories across the nation reported difficulties hiring personnel. Hiring qualified staff was considerably more challenging in hospital-based laboratories than in laboratories located in other types of facilities (65% versus 51% or less). Larger hospital-based laboratories (69%-77%), laboratories located in the Far West (53%), high-volume laboratories (81%), and non-waived testing laboratories (47%) were notably more likely than other types of laboratories to experience recruiting obstacles. (Table 7.)

Recruiting and hiring for the day shift was much more difficult than for other shifts. Of the laboratories surveyed, 69% reported challenges to day shift hiring as opposed to 39% or less for evenings, nights, and weekends. Most physician office laboratories (77%) and private clinic/reference laboratories (60%) were recruiting day shift personnel during the survey period. However, hospitals were much more hard-pressed for night (72%) and evening shift employees (66%) than for day shift staff (36%). For other demographic groups, day shift recruiting was most problematic in the Far West (89%) and the South Central Atlantic (83%) regions, in low-volume laboratories (85%), and in facilities in which only waived testing was performed (73%).

The majority of laboratories across the nation reported difficulty in hiring staff level MT positions (63%), most likely due to the larger number of MT positions per laboratory. Lower level positions were generally harder to fill than upper-level positions. Only a few laboratories reported problems recruiting supervisor level CTs (<1%) and PAs (<1%). Eight out of 10 hospitals (83%), laboratories in the Northeast (83%), and high-volume test sites (85%) reported difficulties in filling staff level MT positions. (Figure 5.)

Table 7 Percent of Laboratories Experiencing Difficulties in Hiring Certified Laboratory Personnel

Demographic Group	Sample Size	% Yes
Total Sample	(1,594)	43%
<i>Laboratory Type</i>		
Hospital	(1,118)	65%
Private clinic/reference lab	(228)	41%
Physicians office	(166)	40%
Outpatient clinic	(82)	51%
<i>Hospital Bed Size</i>		
Less than 100	(517)	58%
100–299	(347)	69%
300–499	(121)	72%
500+	(102)	77%
<i>Region</i>		
Northeast	(176)	42%
South Central Atlantic	(325)	42%
East North Central	(233)	36%
West North Central	(367)	39%
West South Central	(232)	46%
Far West	(261)	53%
<i>Testing Volume</i>		
100k or less (low)	(648)	33%
100k to 1 million (medium)	(708)	58%
Over 1 million (high)	(196)	81%
<i>Testing Type</i>		
Non-waived	(815)	46%
Waived	(158)	24%

Q7. Are you currently experiencing difficulties in recruiting or hiring medical laboratory personnel?

Nationally, the majority of laboratories refilled most positions within six months of posting an opening. HT supervisor, PA supervisor, and SBB positions took longer to fill. A notable exception was the Far West region in which relatively few of the laboratories were able to hire new personnel within six months (Table 8). The SBB supervisor was the toughest position to fill as 53% of laboratories across the country took more than one year to fill a vacancy for this position.

Turnover and Retirement

Two-thirds of laboratories across the country reported turnover for a given position was similar to one year ago. An increase in turnover was notably more prevalent in staff level positions than in managerial positions. However, over one-fifth of laboratories reported a rise in turnover for staff level PBT (27%), HT (22%), LA (21%), and HTL (21%) positions. Increased turnover appeared to be more prevalent among front-end (ie, staff-level) positions than back-end (ie, supervisory) positions.

By laboratory type, one quarter or more of laboratories reported an increase in turnover from last year for the following positions: MT staff level positions in hospital- (30%) and outpatient clinic-based (27%) laboratories; MLT staff level positions in outpatient clinic-based laboratories (27%); PBT staff level positions in hospital-based laboratories (38%), private clinic/reference laboratories (29%), and outpatient clinic laboratories (41%); and HTs in private clinic/reference laboratories (28%).

By hospital bed-size, one quarter or more of laboratories reported an increase in turnover from the previous year for the following positions: MT staff level positions in all hospital-based laboratories (26% to 41%) regardless of hospital bed size; MLT staff level positions in laboratories in 100 to 299 bed (26%) and 500+ bed (27%) hospitals; HT positions in laboratories in 300 to 499 bed (28%) and 500+ bed (32%) hospitals; HTL positions in laboratories in hospitals with 500+ beds (31%); and PBT staff level positions in all hospital sizes (32% to 39%).

More than half of the laboratories in the West South Central region reported an increase in PBT staff turnover (56%). PBT supervisor turnover was on the rise in the Far West (50% of laboratories reported an increase). Notably, more high test-volume laboratories (50%) than other test-volume laboratories reported an increase in turnover for LA staff level positions.

The onset of retiring baby boomers from the ranks of all laboratory personnel poses yet another staffing challenge for the clinical laboratory field. According to laboratory managers, it is estimated that an average of 13% of the current laboratory staff is likely to retire within the next five years. Retirement projections are lowest in private clinic/reference laboratories (9%). By region, the East North Central (17%), West South Central (17%), and Far West regions (17%) may be hit the hardest by retiring baby boomers than elsewhere in the country, particularly the Northeast which projects a 6% retirement forecast.

Summary

Laboratory medicine is a rapidly evolving field. Advances in genomics and automated technology are redefining the workforce skills necessary to meet the demand of tomorrow's laboratory. In addition to these changes, the nation's clinical laboratories continue to be plagued by challenges to recruitment and retention of staff. Increased competition for qualified staff was reported as the chief hiring challenge for 63% of clinical laboratories. Other top issues affecting recruitment were lower

compensation for laboratory work compared with other fields (33%), applicants unwilling to relocate (28%), applicants not having the necessary skills or education to perform the work (26%), and less desirable working conditions compared with other careers (17%).

Demand for all laboratory professionals far outstrips supply. As laboratories struggle to fill positions, their challenges are compounded by a dwindling pipeline of new professionals. Unfamiliarity with the profession due to its lack of public visibility and limited opportunities for advancement are also contributing factors. In addition, the Clinical Laboratory Improvement Amendments of 1988 may have inadvertently played a part in today's laboratory personnel shortage by relaxing the educational requirements for those permitted to perform laboratory tests, allowing some laboratories managers to hire previously unqualified individuals at lower wages. This change in hiring criteria for laboratory personnel, coupled with a declining interest in laboratory medicine as a career over the past two decades, has led to the closure of numerous medical technologist training programs. Now, students who are interested in pursuing a career as a laboratory professional face limited opportunities to do so.

There are many dimensions to the current shortage of well-trained and qualified laboratory personnel and understanding the reasons for it will be essential to formulating an effective strategy to alleviate it. Like the nursing shortage, solving the medical laboratory personnel shortage will require a multifaceted

approach. Many of the issues believed to be contributing to the shortage of nurses are the same factors affecting the shortage of laboratory personnel. Implementing recruitment and retention strategies similar to those employed by the nursing industry might prove to be equally effective in battling the current shortage of laboratory personnel, which is projected to worsen in the next five years. Similar to a shortage of nurses, a shortage of qualified laboratory staff, trained to perform tests that make early disease detection possible or enable physicians to diagnose and treat medical symptoms, seriously compromises patient care and safety. A coordinated effort involving the various clinical laboratory organizations, government agencies, and industry partners will be needed to examine the situation and determine what the profession as a whole can do. In addition, the involvement of stakeholders outside the laboratory, including other clinicians, health care administrators, legislators, and the public, in the formulation of a long-term solution will be essential if the U.S. is to elude a public health crisis in the next five to 10 years. LM

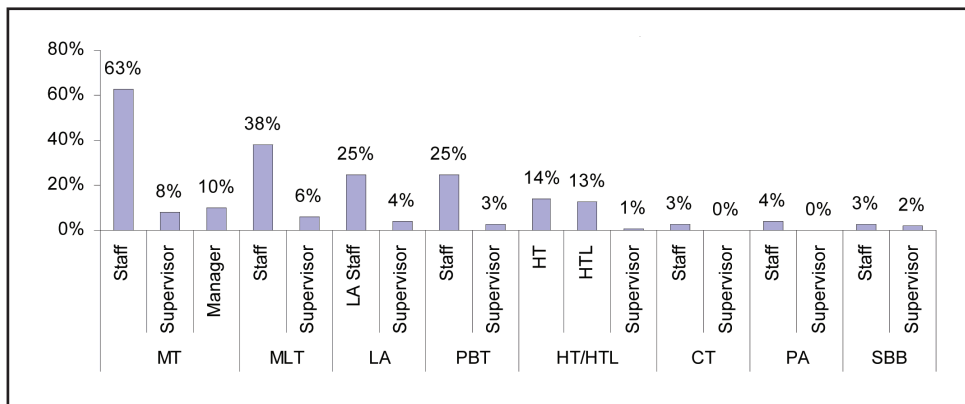


Figure 5_Percent of laboratories reporting difficulties in hiring by position.

Table 8_Time to Refill Various Positions Based on Type of Certification and Level of Responsibility

Position	Sample Size	Less than 3 Months	3 to 6 Months	6 Months to 1 Year	More than 1 Year
MT Staff	(1,172)	32%	31%	26%	11%
MT Supervisor	(514)	37%	26%	23%	14%
MT Manager	(512)	33%	25%	25%	18%
MLT Staff	(913)	37%	34%	18%	11%
MLT Supervisor	(165)	26%	38%	20%	17%
LA Staff	(597)	69%	24%	7%	0%
LA Supervisor	(110)	49%	19%	32%	1%
PBT Staff	(889)	73%	21%	6%	0%
PBT Supervisor	(185)	53%	26%	19%	2%
HT	(349)	33%	41%	17%	8%
HTL	(262)	31%	24%	35%	10%
HT Supervisor	(163)	20%	17%	41%	23%
CT Staff	(242)	49%	26%	22%	3%
CT Supervisor	(107)	51%	28%	9%	12%
PA Staff	(166)	50%	23%	26%	1%
PA Supervisor	(41)	10%	28%	57%	5%
SBB Staff	(100)	14%	26%	45%	15%
SBB Supervisor	(95)	12%	13%	22%	53%

Q11. On average, how long does it take to refill the following positions?