

The Current State of Medical Laboratory Staffing With Certified Versus Noncertified Personnel

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Study Objectives

While studies have been conducted to track general staffing trends in the medical laboratory, no data exists regarding staffing at the laboratory department level. In 2008, ASCP initiated a survey to study this for the first time. This study represents an important first step in measuring how different departments may be affected by overall laboratory budget cuts, new technologies, and the implementation of management strategies, such as cross-training and part-time hours staffing. Examining staffing at the department level also offers more details about the oncoming wave of baby boomer retirements and whether there will be new entrants ready to replace them. Finally, the information generated in this study helps identify the state of laboratory staffing at the ground level and will help inform the development of programs and policies that address the needs of ASCP members.

Methods

As noted, ASCP conducted this survey to gather national level staffing data (current staff, staff replacements, vacancies, experience) for the various areas of practice that compose today's U.S. medical laboratory. The respondents indicated the department where they worked as the Core Lab, Hematology, Chemistry, Immunohematology, Molecular Biology/Flow Cytometry, Microbiology, Cytology, Histology, Phlebotomy, or Information Technology. Data was collected regarding staff working in the various departments and their certification status for Medical Technologists (MTs), Medical Laboratory Technicians (MLTs), Laboratory Assistants (LAs), Phlebotomists (PBTs), Histotechnicians (HTs), Histotechnologists (HTLs), Cytotechnologists (CTs), Pathologists' Assistants (PAs), and Specialists in Blood Banking (SBBs). The classification of certified versus noncertified staff was self-defined by the laboratories that responded to this survey.

The questionnaire was uniquely designed to support studies with this level of complexity (630 possible response items) and was formatted to reduce the time required for respondents to move through a large number of questions. Also, in order to improve the ease of distribution and receipt via e-mail, questionnaires were converted into a computer-fillable PDF format.

The following questions were asked about the staffing in each department:

1. What is the total number of staff members currently working in the laboratory area?
2. What is the total number of staff members replaced in the laboratory area over the past 12 months?
3. What is the total number of current vacancies in the lab area?
4. How many years have your staff members worked in the specified area of this laboratory?

Each recipient was self-identified as a laboratory manager and had a valid e-mail address on record. During the survey period, two additional questionnaires were sent via e-mail. Also, reminder calls were made to increase the number of completed surveys.

The survey was sent to 3,311 medical laboratories, representing all laboratory types. Participating laboratories were drawn from two sources: (1) ASCP member records and (2) the list of the most recent ASCP Wage and Vacancy Survey.¹ Respondents who indicated an interest in participating in a more in-depth staffing survey. This analysis is from the responses of 338 U.S. medical laboratories; a survey response rate of roughly 10% (0.1020). The response rate is sufficient to have 95% confidence in the findings ($\alpha=0.05$, $d=30$, power >0.95) at the national level.

Key Findings

Staffing

Staff members with the title of Medical Technologist (MT) or Medical Laboratory Technician (MLT) work in every area of the laboratory (Table 1). The highest mean number of certified MTs and MLTs are found in the Core Lab (MT, 4.75; MLT, 1.95), Microbiology (MT, 1.92; MLT, 0.29), Chemistry (MT, 1.52; MLT, 0.41), Hematology (MT, 1.22; MLT, 0.37), and Immunohematology (MT, 1.15; MLT, 0.20). Certified MTs are also more likely than noncertified staff to work in the Molecular Biology/Flow Cytometry (0.34) and Information Technology (0.20) departments. Fewer numbers of noncertified MTs and MLTs are reported to work in the following areas of the laboratory: Core Lab (MT, 0.31; MLT, 0.22), Microbiology (MT, 0.05; MLT, 0.07), Chemistry (MT, 0.12; MLT, 0.07), and Hematology (MT, 0.07; MLT, 0.08).

The Core Lab is staffed by a broader array of positions, namely MTs, MLTs, LAs, and PBTs—suggesting that these staff routinely define the Core Lab team. Among certified staff, there is a mean number of MTs (4.75), MLTs (1.95), LAs (0.32), and PBTs (0.35). Noncertified MTs and MLTs are less likely to work in the Core Lab; however, a greater mean number of noncertified LAs (0.61) and PBTs (0.37) are likely to staff the Core Lab.

It is important to note that there is one area—Cytotechnology—where the number of noncertified MLTs exceeds that of certified MLTs (mean number of 0.06 versus 0.01). This is in keeping with the findings of another recent study—Cytotechnology Work Force Report (in press). In all other areas, the number of certified employees exceeds the number of noncertified employees.

When examining certain specialized departments such as Cytology, Histology, Immunohematology, and Phlebotomy, a higher mean number of CTs, HTLs, HTs, PAs and SBBs are seen. A mean of 0.83 certified and 0.30 noncertified CTs work in the Cytology department. In the Histology department, a mean number of 0.58 certified and 0.30 noncertified HTs are employed. There is a mean number of 0.38 certified HTLs in the Histology department. This mean number of HTL staff falls to 0.09 when only noncertified HTLs are counted. Specialists in Blood Banking are most likely to work in the Immunohematology department—0.23 certified and 0.01 noncertified SBBs. The Phlebotomy department has a mean number of 2.48 certified and 3.02 noncertified PBTs.

Table 1 Laboratory Staff Positions by Department

Departments	MT				MLT				LA			
	Certified		Noncertified		Certified		Noncertified		Certified		Noncertified	
	Mean	Max	Mean	Max	Mean	Max	Mean	Max	Mean	Max	Mean	Max
Core Lab	4.75	57	.31	45	1.95	22	.22	9	.32	20	.61	26
Hematology	1.22	25	.07	8	.37	9	.08	5	.02	2	.10	7
Chemistry	1.52	37	.12	20	.41	11	.07	7	.02	2	.18	16
Immunohematology	1.15	20	.09	26	.20	9	.02	2	.01	2	.05	8
Molecular Biology	.34	31	.02	2	.03	3	.06	15	—	1	.02	5
Microbiology	1.92	40	.05	2	.29	11	.07	4	.03	3	.14	9
Cytology	.02	2	—	—	.01	1	.06	12	.02	2	.28	39
Histology	.15	25	.01	2	.03	2	.03	3	.03	3	.16	6
Phlebotomy	.20	30	.07	15	.10	11	.02	3	.12	15	.38	31
IT	.20	5	—	—	.03	2	—	1	—	1	.03	3

Departments	PBT				HT				HTL			
	Certified		Noncertified		Certified		Noncertified		Certified		Noncertified	
	Mean	Max	Mean	Max	Mean	Max	Mean	Max	Mean	Max	Mean	Max
Core Lab	.35	12	.37	16	.01	1	—	—	.01	3	—	—
Hematology	.02	4	.09	13	—	—	—	—	—	—	—	—
Chemistry	—	—	—	1	—	—	—	—	—	—	—	—
Immunohematology	—	—	.01	2	—	—	.01	3	—	—	—	0
Molecular Biology	—	—	—	—	—	—	—	—	.01	1	—	—
Microbiology	—	—	—	—	—	—	—	—	—	—	—	—
Cytology	—	—	.01	2	—	—	—	1	.01	1	—	—
Histology	—	—	—	1	.58	15	.30	25	.38	13	.09	8
Phlebotomy	2.48	59	3.02	57	.02	5	.01	3	—	—	—	1
IT	.02	8	—	—	—	—	—	—	—	—	—	—

Departments	CT				PA				SBB			
	Certified		Noncertified		Certified		Noncertified		Certified		Noncertified	
	Mean	Max	Mean	Max	Mean	Max	Mean	Max	Mean	Max	Mean	Max
Core Lab	—	1	—	—	.01	3	.02	2	.02	3	—	1
Hematology	—	—	—	—	.01	2	—	—	.02	6	—	—
Chemistry	—	—	—	—	—	—	—	—	—	—	—	—
Immunohematology	—	—	—	—	—	—	—	—	.23	9	.01	2
Molecular Biology	.10	34	.10	33	—	—	—	—	—	—	—	—
Microbiology	—	—	—	—	—	—	—	—	—	—	—	—
Cytology	.83	41	.03	7	.03	5	.01	1	—	—	—	—
Histology	.03	5	—	—	.10	4	.04	2	—	—	—	1
Phlebotomy	—	—	—	—	—	—	—	—	.04	13	.04	12
IT	—	—	.01	2	—	—	—	—	—	1	—	—

—, denotes values less than 0.01; minimums in all cases are zero; numbers in bold indicate key statistics.

As the mean is affected by outliers in the data, it is also important to consider the maximum number of staff that were reported to work in each area of the laboratory. (See **Table 1** for a complete list of the mean number of positions and maximum number of positions in each area of the laboratory). In two areas—Cytology and Molecular Biology—the maximums for the number of noncertified MLTs exceeds that of the certified MLTs. This may mean that there are more noncertified employees in these

Abbreviations Used in This Report

Staff Titles/Positions

MT	Medical Technologist	HTL	Histotechnologist
MLT	Medical Laboratory Technician	CT	Cytotechnologist
LA	Laboratory Assistant	PA	Pathologists' Assistant
PBT	Phlebotomist	SBB	Specialist in Blood Banking
HT	Histotechnician		

Laboratory Areas (Departments)

Hem	Hematology	Histo	Histology
Chem	Chemistry	Immunochem	Immunohematology
Core Lab	Core Laboratory	Mol Bio	Molecular Biology/Flow Cytometry
Micro	Microbiology	IT	Information Technology
Cyto	Cytology	PBT	Phlebotomy

Table 2 Replaced Laboratory Staff Positions by Department

Departments	MT				MLT				LA			
	Certified		Noncertified		Certified		Noncertified		Certified		Noncertified	
	Mean	Max	Mean	Max	Mean	Max	Mean	Max	Mean	Max	Mean	Max
Core Lab	.53	6	.07	8	.32	8	.02	2	.09	4	.17	9
Hematology	.16	6	.04	11	.08	5	.01	1	.01	1	.02	2
Chemistry	.18	7	.01	3	.04	3	.01	1	—	—	.03	4
Immunohematology	.14	6	—	—	.01	1	—	—	—	—	.02	4
Molecular Biology	.06	10	.01	2	—	—	—	—	—	1	—	—
Microbiology	.17	10	—	—	.01	1	—	1	—	—	.02	2
Cytology	.01	1	—	—	—	1	—	—	—	1	.06	11
Histology	.02	5	—	—	.01	1	—	—	—	—	.02	2
Phlebotomy	.03	4	—	1	.01	2	.01	1	.10	8	.09	7
IT	.01	2	.01	2	—	—	—	—	—	—	—	1

Departments	PBT				HT				HTL			
	Certified		Noncertified		Certified		Noncertified		Certified		Noncertified	
	Mean	Max	Mean	Max	Mean	Max	Mean	Max	Mean	Max	Mean	Max
Core Lab	.11	10	.16	30	.01	2	—	—	—	1	—	—
Hematology	.01	2	.01	2	—	1	—	—	—	—	—	—
Chemistry	.01	5	—	—	—	—	—	—	—	—	—	—
Immunohematology	—	—	—	1	—	—	—	—	—	1	—	—
Molecular Biology	.01	2	—	—	—	—	—	—	—	1	—	—
Microbiology	—	—	—	—	—	—	—	—	—	—	—	—
Cytology	—	1	—	1	—	1	—	1	—	1	—	—
Histology	—	1	—	—	.11	3	.04	2	.03	3	.01	3
Phlebotomy	.56	20	.87	20	.01	2	—	—	—	—	—	—
IT	—	—	—	1	—	—	—	—	—	—	—	—

Departments	CT				PA				SBB			
	Certified		Noncertified		Certified		Noncertified		Certified		Noncertified	
	Mean	Max	Mean	Max	Mean	Max	Mean	Max	Mean	Max	Mean	Max
Core Lab	—	—	—	—	—	—	—	—	—	1	—	—
Hematology	—	—	—	—	—	—	—	—	—	—	—	—
Chemistry	—	—	—	—	—	—	—	—	—	—	—	—
Immunohematology	—	—	—	—	—	—	—	—	.01	2	—	—
Molecular Biology	.02	6	.03	10	—	—	—	—	—	—	—	—
Microbiology	—	—	—	—	—	—	—	—	—	—	—	—
Cytology	.06	4	.01	2	—	1	—	—	—	—	—	—
Histology	—	1	—	—	.03	2	.01	2	—	—	—	—
Phlebotomy	—	—	—	—	—	—	—	—	—	—	—	1
IT	—	—	—	—	—	—	—	—	—	—	—	—

—, denotes values less than 0.01; minimums in all cases are zero; numbers in bold indicate key statistics.

areas than certified ones. The highest staff counts within each position title are in **Table 1**. These are the position titles that are most likely to be found in each area of the laboratory. Note that the minimum number of staff is zero for each department.

Replacements and Vacancies

For purposes of this survey, staff replacement is defined as a position in a laboratory area that was filled in the last 12 months and staff vacancy is defined as an open position in the laboratory area at the time of the survey. The mean number of staff replacements (**Table 2**) and vacancies (**Table 3**) is highest in the Core Lab, particularly for certified laboratory staff. The highest vacancies in the Core Lab are for MTs (0.42). This number is matched by the mean number of certified MT (0.53) staff replacements.

Noncertified MT replacements were 0.07. This pattern is also true for Core Lab MLTs. The mean number of replacements for certified MLTs is 0.32 and mean number of replacements for noncertified MLTs is 0.02. The mean number of replacements, however, is higher for noncertified LAs (0.17) and PBTs (0.16) than for certified LAs (0.09) and PBTs (0.11).

The second highest vacancy rates were in Phlebotomy (certified PBTs, 0.16; noncertified PBTs, 0.15), Chemistry (certified MTs, 0.11), and Hematology (certified MTs, 0.09). Mean numbers of staff replacements for PBTs (certified PBTs, 0.56; noncertified PBTs, 0.87) in the Phlebotomy department were the highest of any staff position.

Table 2 shows the highest staff replacement counts within position title for each area of the laboratory. These are the replacements

Table 3_Vacant Laboratory Staff Positions by Department

Departments	MT				MLT				LA			
	Certified		Noncertified		Certified		Noncertified		Certified		Noncertified	
	Mean	Max	Mean	Max	Mean	Max	Mean	Max	Mean	Max	Mean	Max
Core Lab	.42	12	.03	5	.17	4	—	—	.04	2	.03	3
Hematology	.09	2	—	1	.02	1	—	1	—	—	—	—
Chemistry	.11	8	—	—	.02	1	—	1	—	—	.01	4
Immunohematology	.06	4	—	—	.01	1	—	—	—	—	.01	2
Molecular Biology	.03	3	—	—	—	—	—	—	—	—	.01	3
Microbiology	.09	4	.01	1	.01	1	—	—	—	—	—	—
Cytology	—	1	.01	2	—	—	—	—	—	—	.01	4
Histology	.01	1	—	—	—	—	—	—	—	—	.01	2
Phlebotomy	—	1	—	—	—	1	—	—	.03	4	—	1
IT	—	1	—	—	—	—	—	—	—	—	—	—

Departments	PBT				HT				HTL			
	Certified		Noncertified		Certified		Noncertified		Certified		Noncertified	
	Mean	Max	Mean	Max	Mean	Max	Mean	Max	Mean	Max	Mean	Max
Core Lab	.03	3	.03	6	.01	2	—	—	—	—	—	—
Hematology	—	1	—	1	—	1	—	—	—	—	—	—
Chemistry	—	—	—	—	—	—	—	—	—	—	—	—
Immunohematology	—	—	—	1	—	—	—	—	—	—	—	—
Molecular Biology	—	—	—	—	—	—	—	—	—	—	—	—
Microbiology	—	—	—	—	—	—	—	—	—	—	—	—
Cytology	—	—	—	—	—	—	—	—	—	—	—	—
Histology	—	—	—	—	.02	2	.01	1	.04	3	—	1
Phlebotomy	.16	14	.15	10	—	—	—	—	—	—	—	—
IT	—	—	—	—	—	—	—	—	—	—	—	—

Departments	CT				PA				SBB			
	Certified		Noncertified		Certified		Noncertified		Certified		Noncertified	
	Mean	Max	Mean	Max	Mean	Max	Mean	Max	Mean	Max	Mean	Max
Core Lab	—	—	—	—	—	—	—	—	—	—	—	—
Hematology	.01	2	—	—	—	—	—	—	—	—	—	—
Chemistry	—	—	—	—	—	—	—	—	—	1	—	—
Immunohematology	.01	2	—	—	—	—	—	—	.01	1	—	—
Molecular Biology	—	—	—	—	—	—	—	—	—	—	—	—
Microbiology	—	—	—	—	—	—	—	—	—	—	—	—
Cytology	.01	1	—	—	—	—	—	—	—	—	—	—
Histology	—	1	—	—	.01	1	—	—	—	—	—	—
Phlebotomy	—	—	—	—	—	—	—	—	—	—	—	—
IT	—	—	—	—	—	—	—	—	—	—	—	—

—, denotes values less than 0.01; minimums in all cases are zero; numbers in bold indicate key statistics.

by position title that are most likely to be found in each area of the laboratory. Note that the minimum number of staff is zero for each department. (See **Table 2** for a complete list of the mean number of replacements and maximum number of replacements in each area of the laboratory.)

The highest staff vacancy counts between certified and noncertified positions within each department of the medical laboratory are shown in **Table 3**. These are the vacancies by position title that are most likely to be found in each area of the laboratory. Note that the minimum number of staff is zero for each department. (See **Table 3** for a complete list of the mean number of vacancies and maximum number of vacancies in each area of the laboratory.)

Certified versus Noncertified Staff

In general, Laboratory Managers appear to choose certified rather than noncertified staff (**Table 1**). For example, in the Core Lab, while there are more certified staff members, there are comparable numbers of noncertified staff especially in the maximum mean number of staff reported. In terms of mean number of staff, there is near equality between certified and noncertified phlebotomists (certified PBTs, 0.35; noncertified PBTs, 0.37). The mean number of noncertified LAs is higher than certified LAs (0.61 versus 0.32). It also appears that fewer of the replaced Core Lab staff are noncertified (See **Table 2**), suggesting that these facilities are more successful in retaining noncertified staff. It appears, however, that laboratories definitely depend on noncertified staff, particularly for phlebotomy services (certified PBTs, 2.48; noncertified PBTs, 3.02; certified LAs, 0.12; noncertified LAs, 0.38). Comparable numbers of certified and noncertified staff are also seen in Histology (certified HTs, 0.58; noncertified HTs, 0.30). Noncertified LAs are well represented in the Core Lab and in Chemistry, Microbiology, Histology and Cytology.

With respect to vacancies and replacements, where comparisons by position are possible, certified and noncertified vacancies are generally at nearly the same number. Except for the Core Lab and Phlebotomy, where replacement staff LAs and PBTs were more likely to be noncertified, replacements are also similar across certified and noncertified staff.

Years of Experience

Evidence of the oncoming wave of boomer generation retirements in the laboratory is shown in the survey findings (See **Table 4**). In the Core Lab, a mean number of 1.91 staff members are reported to have 17 to 21 years of experience with their current employer. A mean number of Chemistry (0.88), Hematology (0.54), Microbiology (0.69), Immunohematology (0.44), and Phlebotomy (0.45) staff also have 17 to 21 years of experience with their current employer.

However, evidence that laboratory managers have begun to bring in new staff, particularly over the last 6 years is also seen. The mean number of staff with 6 or fewer years of experience in the Core Lab is 4.04, more than double the mean number of staff with 17 to 21 years of experience. The variance between these recent hires and the staff with the greatest number years of experience is even wider in the Phlebotomy department.

There is more balance between the mean number of new staff and the most experienced staff in Hematology, Chemistry, Microbiology, and Immunohematology. Laboratory Managers, however, appear to have just begun to hire new staff for Cytology, Histology, and IT. Hiring patterns in Molecular Biology differ from the others, as the greatest mean number of staff has

Table 4_Years Worked in Laboratory Department (Mean Number of Staff)

	Years of Experience			
	≤6	7 to 11	12 to 16	17 to 21
Core Lab	4.04	1.61	1.06	1.91
Hematology	0.74	0.30	0.22	0.54
Chemistry	0.69	0.39	0.27	0.88
Immunohematology	0.69	0.22	0.20	0.44
Molecular Biology	0.25	0.09	0.31	0.09
Microbiology	0.65	0.30	0.31	0.69
Cytology	0.32	0.24	0.09	0.27
Histology	0.69	0.26	0.13	0.32
Phlebotomy	3.03	0.63	0.34	0.45
IT	0.04	0.05	0.03	0.09

12 to 16 years of experience, suggesting that retirements will rise slightly later in this area than in the other departments.

Discussion and Recommendations for Further Research

One of the most intriguing comparisons made possible in this survey is the selection by laboratory managers between certified and noncertified staff. There appears to be some careful decision making among laboratory managers when hiring and choosing between certified and noncertified individuals. For example, hiring of noncertified LAs appears to be a common practice, leading to the question of how these staff are utilized and whether they are performing tasks that MLTs or some other staff may have had responsibility for previously. While this analysis does not lead to the conclusion that retiring staff are being replaced by less trained or less experienced staff, additional research should be designed to further examine the hiring decisions by staff title and department, as well as test complexity, test volume, and system type to provide more conclusive answers.

Another set of valuable findings hint at how laboratories are preparing for the retirement of the baby boomer generation. As expected, the mean numbers of staff with the greatest number of years of experience were comparatively high. Managers, however, appear to be anticipating these staff losses by bringing on new job entrants in almost every position category and in almost every area of the laboratory.

Additional research on new entrants could yield information about their educational backgrounds and work experiences. This research would also be helpful to educators so that they could learn what motivated these people to choose laboratory medicine as their field and to laboratory managers who are looking for new strategies to hire and retain staff. It is interesting to note that a survey conducted in 2007 by a workgroup of the Coordinating Council on the Clinical Laboratory Workforce (CCCLW) found that sources that led survey respondents to first become interested in the field included the following, in descending order of importance:

- A relative or friend
- A college catalog or college visit
- A high school science teacher
- A tour of a medical laboratory
- Personal research
- Career fairs

Indeed, the survey respondents who were asked when they first became aware of the profession, more than 76% reported that they heard about the career option only after leaving high school.²

It would also be valuable to capture information as to whether and how the responsibilities of these new entrants have changed since the advent of automation, laboratory consolidation, and changes in laboratory regulation. Finally, additional research should be conducted to delve further into the impact of changes in the environment of the areas of the laboratory and changes in the responsibilities of each member of the laboratory team.

The objective of this study was to investigate the staff trends at the medical laboratory department level. The authors wish to thank each laboratory that participated in the survey. This kind of research is critical not only to document the experience of staff working in the medical laboratory, but also to support the development of programs and policies that effectively target the educational and employment needs of the laboratory. LM

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