

**The Pacific Northwest Laboratory Medicine Sentinel Monitoring Network
Final Report of the Findings of Questionnaire 13
Laboratory Testing Personnel Shortages**

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BACKGROUND

The Pacific Northwest Laboratory Medicine Sentinel Monitoring Network was created in January 1995 to gather ongoing information about practices in hospital, independent and physician office laboratories. To date, 13 questionnaires have been released to the network, exploring issues related to: testing quality; access to testing services; laboratory-related problems and errors; personnel training and changes; proficiency testing participation; and point of care and waived test systems.

[Final reports of the findings of each questionnaire and references to published journal articles can be found on the Centers for Disease Control and Prevention (CDC) website:
<http://www.phppo.cdc.gov/dls/mlp/pnlmsmn.asp>]

Personnel shortages

The Clinical Laboratory Improvement Advisory Committee (CLIAC) provides scientific and technical advice and guidance to the Secretary of Health and Human Services regarding the standards under which clinical laboratories are regulated. The committee members represent medical technology, public health, clinical practice, manufacturers and consumers. At the CLIAC meeting held in September 1999, the primary topic of discussion was laboratory workforce shortages. This was believed to be an increasing problem throughout the country and an area of concern related to laboratory quality. During the presentations from a variety of professional organizations and academic institutions, and the subsequent discussion, CLIAC members were asked to consider the following questions:

- Is there a shortage?
- How is the workforce changing?
- How are the demands and delivery of services changing?
- Is the workforce changing to meet the demands?
- Are there quality implications?

[A summary of the CLIAC meeting, held September 22 and 23, 1999, can be found on the CDC website at: <http://www.phppo.cdc.gov/dls/cliac/cliac0999.asp>]

In response to these concerns, we developed a questionnaire to address the first two questions posed by CLIAC, by exploring: vacancy rates; length of time to hire replacements; reasons for difficulties in recruiting and hiring; and changes in testing personnel backgrounds between 1999 and 2000.

METHODS

Questionnaire 13 was mailed to 385 laboratories in February 2000. Two hundred seventy-three laboratories returned a completed questionnaire in time for analysis, a 71% response rate. Demographic characteristics of the respondents are summarized in Table 1.

Table 1 - Demographic characteristics of respondents (N=273)

Demographic characteristic	Percent of laboratories	
	Hospital (n=84) & Independent (n=30)	Physician office* (n=159)
STATE		
Washington	49	52
Oregon	22	21
Idaho	20	18
Alaska	9	8
CENSUS BUREAU DESIGNATION		
Urban	38	65
Rural	62	35
ACCREDITATION STATUS		
Yes	51	15
No	49	85
ANNUAL TEST VOLUME		
< 2000	2	31
2000 to 10000	12	36
10001 to 25000	12	13
25001 to 50000	16	5
50001 to 75000	5	5
75001 to 100000	7	4
>100000	46	6
* Includes: physician office laboratories (POLs), clinics, community health centers, rural health centers, health departments/districts, student health centers and health maintenance organizations (HMOs).		

Because the staffing and use of testing personnel in hospital and independent laboratories are quite different from that found in POLs, we developed two versions of this questionnaire. In hospital and independent laboratories, most testing personnel perform only laboratory testing. In POLs and clinics, the testing personnel are more commonly multi skilled personnel (i.e., nurses, medical assistants, radiologic technologists/technicians), who perform laboratory testing in addition to patient care. If all individuals in a facility performed a combination of patient care and laboratory testing, we believed it would be difficult to ascertain shortages of laboratory personnel versus shortages of nurses, medical assistants, radiologic technologists or technicians, etc. who performed some degree of laboratory testing as part of their overall patient care duties.

Therefore, we asked the “POL” group (which includes all testing sites other than hospitals and independent laboratories) to separate the total number of individuals, performing any laboratory testing, into two categories. One category included testing personnel whose primary responsibility was patient care, with some laboratory testing. The second category included individuals, whose primary or only responsibility was laboratory testing. If they identified personnel, whose primary or only responsibility was laboratory testing, they were instructed to complete the questions about testing personnel vacancies.

We asked all hospital and independent laboratories, and the POLs with personnel dedicated to laboratory testing, if they had any vacant positions in the past 12 months.

Of this group, we determined their current vacancy rate by the number of current laboratory personnel vacant positions - in terms of full time equivalents (FTEs) - divided by their total number of FTEs of laboratory personnel when they consider themselves fully staffed. While we were primarily interested in current vacancy rates, we also asked how many positions were vacant in the past six months.

For any site with a vacant laboratory personnel position in the past six months, we asked for details about the background of the individual who vacated each position, the reason they left, whether the replacement had the same background, the length of time to hire a replacement, the typical time to replace that type of position, and (if applicable) the reason it took longer than usual to fill the position.

FINDINGS

Testing personnel vacancies

Hospital and independent laboratories

Of the 114 laboratories that completed this questionnaire, 70 (61%) had a vacant position in the past 12 months. Thirty-seven laboratories (32%) had a current vacancy (17% of independent laboratories and 38% of hospital laboratories). Current vacancy rates ranged from 0 to 33.3%, with a mean of 3.6% (Table 2).

POLs

Of the 159 POLs that completed this questionnaire, 111 (70%) had personnel dedicated to laboratory testing. Thirty-nine POLs (35%) had a vacant position in the past 12 months. The number with a current vacancy was 9 (8%). Current vacancy rates ranged from 0 to 100%, with a mean of 3.4% (Table 2)

Table 2 - Vacant positions in the past 12 months, current vacancy rates

	Number of labs		Percent with vacant position in past 12 months		Current vacancy rate (%)	
					Mean (Range)	
Hospital	84		74		4.5 (0 to 33.3)	
Independent	30		27		1.0 (0 to 11.8)	
POL	111		35		3.4 (0 to 100)	
	Hospital & Independent	POL	Hospital & Independent	POL	Hospital & Independent	POL
Washington	56	59	64	37	3.1 (0 to 25)	0.8 (0 to 27.2)
Oregon	25	26	60	35	3.3 (0 to 20)	7.4 (0 to 100)
Idaho	23	17	61	29	6.7 (0 to 33.3)	2.2 (0 to 37.7)
Alaska	10	9	50	33	0	11.1 (0 to 100)
Urban	43	74	63	31	2.5 (0 to 20)	2.3 (0 to 100)
Rural	71	37	61	43	4.3 (0 to 33.3)	5.6 (0 to 100)

Vacant positions in the past 6 months

Hospital and independent laboratories

Fifty-four laboratories (47%) had a vacant position in the past 6 months (56% of hospital laboratories and 23% of independent laboratories) and 154 positions were described (Table 3). Eight percent were supervisory positions.

Sixteen laboratories (10%) stated they hired or intended to hire someone with a different background to fill the vacant position. The majority of these laboratories (67%) hired someone with a higher level of formal laboratory training than that of the person who vacated the position [eg., a medical technologist (MT) instead of a medical laboratory technician (MLT); an MT instead of a person with a bachelor's degree but not an MT; an MT or MLT instead of someone with on the job training].

POLs

Twenty-nine POLs (26%) had a vacant position in the past 6 months and 50 positions were described (Table 3).

Twelve POLs (24%) stated they hired or intended to hire someone with a different background to fill the vacant position. The majority of these laboratories (64%) hired someone with a higher level of formal laboratory training than that of the person who vacated the position (eg., an MT instead of an MLT; an MT or MLT instead of a medical assistant or on the job trained individual).

Table 3 - Vacant positions in the past 6 months

Testing personnel background	Vacant testing personnel positions			
	Hospital and Independent n=154 positions		POL n=50 positions	
	Number	Percent	Number	Percent
Medical technologist (MT)	103	67	18	36
Medical laboratory technician (MLT)	13	8	8	16
Cytotechnologist	5	3	0	0
Histotechnologist	8	5	0	0
Bachelor degree, but not an MT	11	7	2	4
Associate degree but not an MLT	0	0	1	2
On the job trained in laboratory procedures	11	7	8	16
Medical assistant	0	0	11	22
Licensed practical nurse	0	0	1	2
Clinical laboratory technician	2	1	0	0
Laboratory assistant	1	1	0	0
X-ray technician/laboratory tech	0	0	1	2

Why did they leave?

Hospital and independent laboratories

The most common reason given for the 154 vacant testing personnel positions was that the individuals took new laboratory positions elsewhere (41%). Fourteen percent left the field of laboratory testing and 11% retired (Figure 1).

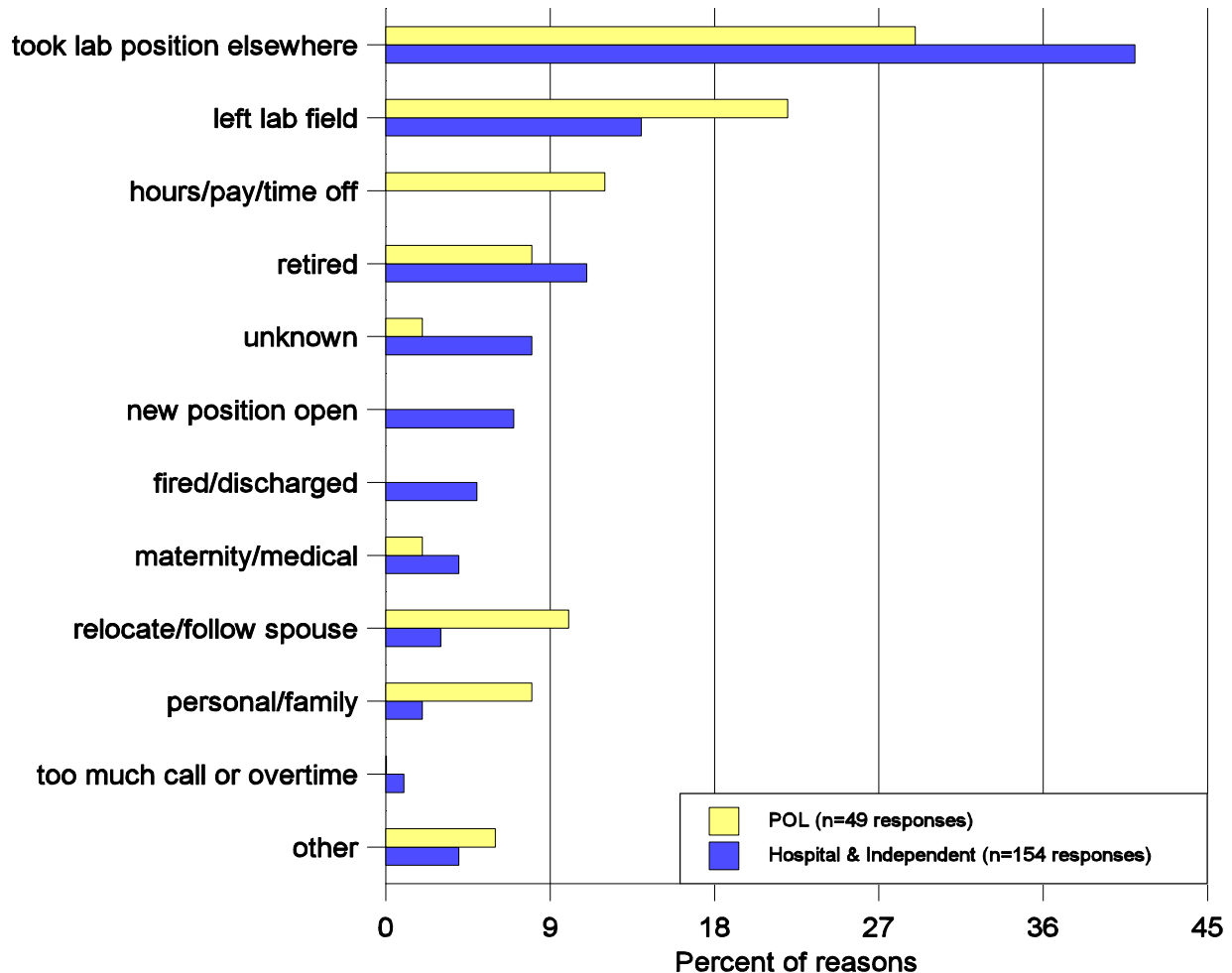
POLs

The most common reason given was that the individuals took new laboratory positions elsewhere

(29%). Twenty-two percent left the field of laboratory testing and 12% wanted better hours, pay or time off.

Figure 1 - Reasons for leaving position

Length of time to hire open positions



Hospital and independent laboratories

For the 154 vacant positions in hospital and independent laboratories in the past 6 months, the length of time it took to hire someone to fill the vacant position was described for 120 positions. It took an average of 3.4 months to fill these positions, with a range of 1 week to 18 months. Sixty-five percent of the positions were hired in 3 months or less and 8% took greater than 6 months. Figure 2 shows a frequency distribution of the number of months to hire.

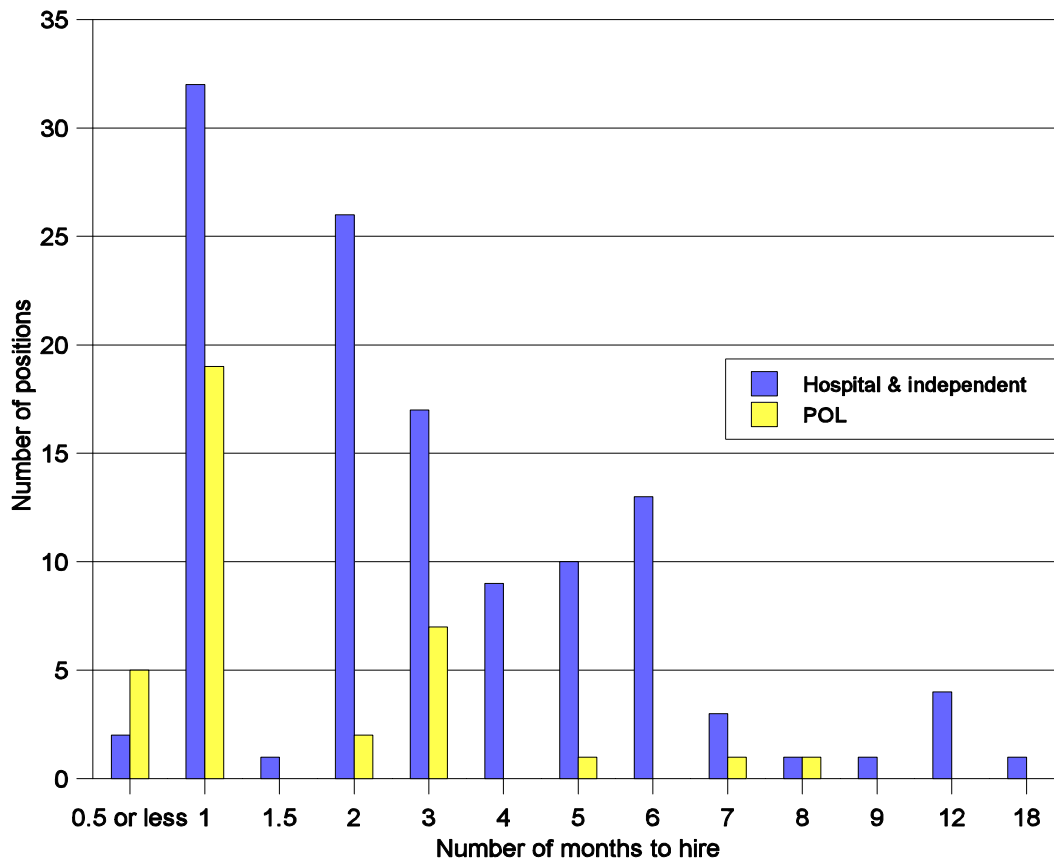
Thirty-one of the vacant positions were still open at the time of this questionnaire. The average time that these positions were open ranged from 2 weeks to 22 months, with a mean of 4 months.

POLs

For the 50 vacant positions in POLs in the past 6 months, the length of time it took to hire someone to fill the vacant position was described for 36 positions. It took an average of 1.8 months to fill these positions, with a range of 0 to 8 months. Ninety-two percent of the positions were hired in 3 months or less and six percent took greater than 6 months (Figure 2)

Eleven positions were still open at the time of this questionnaire. The average time that these positions were open ranged from 2 weeks to 6 months, with a mean of 4 months.

Figure 2 - Number of months to hire for vacant positions



Typical length of time to fill vacant positions

Hospital and independent laboratories

In the past, an average of 2.6 months was the typical or expected time to fill open positions, with a range of 2 weeks to 12 months. Eighty-two percent of the respondents said that it took 3 months or less to fill positions. Four percent took longer than 6 months. Table 6 shows the typical length of time it took to fill vacant positions for various testing personnel backgrounds. Figure 3 shows a frequency distribution of the number of months that respondents said were typical delays to fill open testing personnel positions.

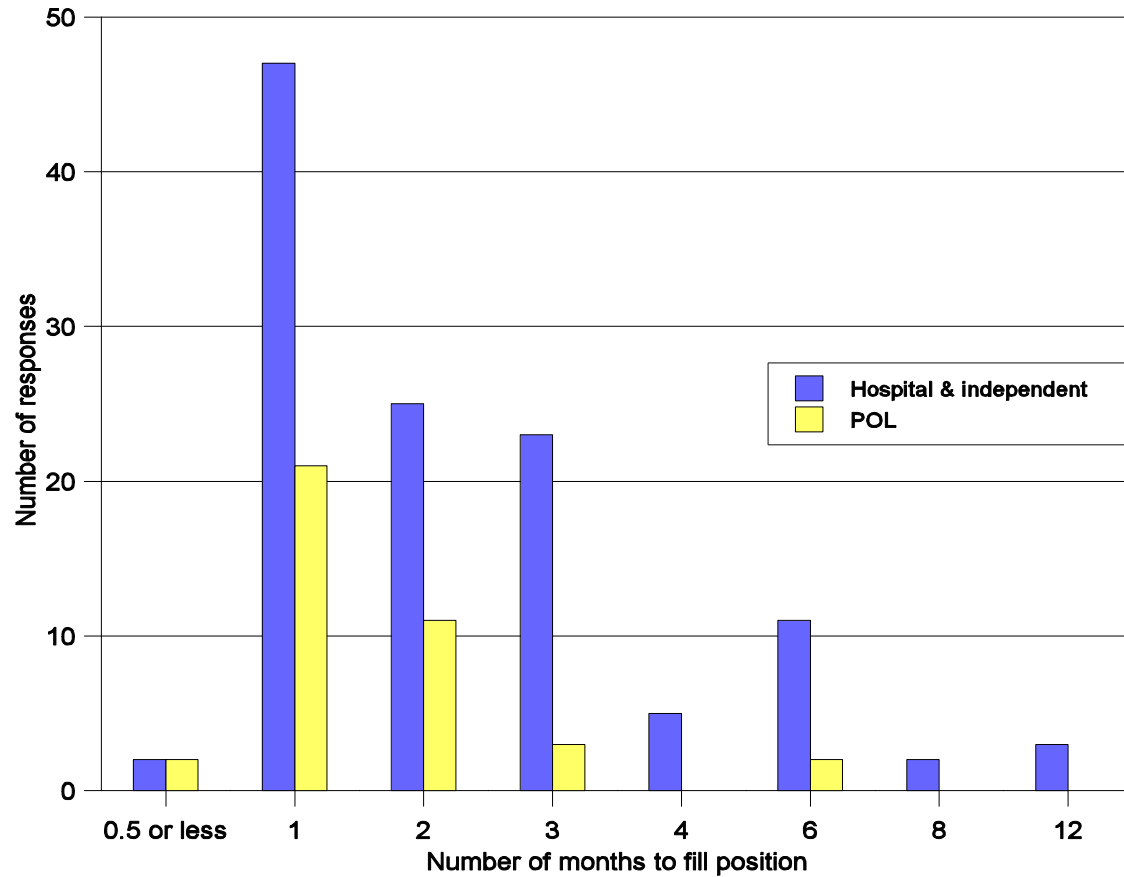
Table 6 - Typical length of time to fill vacant positions - Hospital and independent laboratories

	Average number of months	Range of months
Testing personnel background		
Medical technologist (MT)	2.8	1 to 12
Medical laboratory technician	2.5	.5 to 12
Cytotechnologist	2.6	1 to 8
Histotechnologist	4.3	3 to 6
Bachelor degree, not an MT	1.0	1 to 1
On the job trained in laboratory procedures	1.6	1 to 4

POLs

In the past, an average of 1.7 months was the typical or expected time to fill open positions, with a range of 0 to 6 months. Ninety-five percent of the respondents said that it took 3 months or less to fill positions. Five percent took 4 to 6 months (Figure 3)

Figure 3 - Typical number of months to fill positions



Why did it take longer to fill vacant positions?

Hospital and independent laboratories

Sixty-one percent of the vacant positions took longer than the laboratory's stated typical length of time to fill the position. The most frequently given reason was because there were no applicants or very few applicants (46% of all reasons) (Table 7).

POLs

Thirty-nine percent of the vacant positions took longer than the laboratory's stated typical length of time to fill the position. The most frequently given reason was because there were no applicants or very few applicants (25% of all reasons given) (Table 7).

Table 7 - Reasons it took longer to fill vacant positions

Reason	Percent of reasons (n=95)	Number of reasons (n=16)
	Hospital & independent	POL
No applicants, very few applicants	46	4
Increased competition in the area for this type of personnel	16	0
Difficult shift to fill (i.e., evening, night, weekend, etc.)	13	0
Applicants did not have the qualifications desired	11	1
Unable to pay the wage requested by applicants	6	2
Applicants did not have the qualifications required	4	3
Applicants were unsuitable for other reasons	2	1
Due to budget constraints	0	2
Because we are in a rural location	0	1
Other	2	2

Reasons for difficulties recruiting or hiring laboratory employees

All laboratories that had personnel vacancies in the past 12 months were asked to give their primary reasons for the difficulties in recruiting or hiring laboratory employees.

Hospital and independent laboratories

The most common reasons given were: Increasing competition for well-trained personnel (35% of all responses); Lower compensation compared with other careers (17%); and Applicants do not come with the necessary education, skills to perform the work (14%) (Table 8)

POLs

The most common reasons were: Applicants do not come with necessary education, skills to perform the work (30%); Increasing competition for well-trained personnel (28%); and Lower compensation compared with other careers (22%) (Table 8).

Table 8 - Reasons for difficulties recruiting or hiring

Reason	Percent of responses	
	Hospital & Independent (n=115)	POL (n=64)
Increasing competition for well-trained personnel	35	28
Lower compensation compared to other careers	17	22
Applicants do not come with necessary education, skills	14	30
Less desirable working conditions compared with other careers	9	3
People are not attracted to health care in general	8	0
We are located in a rural, remote, or isolated area	6	3
People are not attracted to laboratory work	5	8
We only have part time or temporary positions available	2	0
Other, includes: Biosafety concerns; Won't work after 6 PM; High cost of living; People are not going into the field; Wages are lower.	4	3

Steps taken to alleviate difficulties filling open positions

Hospital and independent laboratories

Among the laboratories that had a vacancy in the past 12 months, 69% indicated that they had taken measures to alleviate their difficulties in filling open testing personnel positions. The most frequent responses were: Have offered to pay relocation expenses (28% of the responses) and Have increased wages, benefits (24%). Table 9 shows all the responses given.

POLs

Among the POLs that had a vacancy in the past 12 months, 35% indicated that they had taken measures to alleviate their difficulties in filling open testing personnel positions. The most frequent responses were: Have increased wages, benefits (53%) and Have offered to pay for tuition or continuing education expenses (29%) (Table 9).

Table 9 - Steps taken to alleviate difficulties filling open positions

Steps taken	Percent of responses (n=102)	Number of responses (n=17)
	Hospital & Independent	POL
Offered to pay relocation expenses	28	0
Increased wages, benefits	24	9
Offered to pay expenses for applicants to interview	19	2
Offered hiring bonus	13	1
Offered to pay for tuition or continuing education expenses	12	5
Other, includes: Provide finder's fee to employees who bring in new employee; Revised work schedule; Guaranteed enough hours for employee to get benefits; Provide training for less qualified candidates; Act as extern site for medical laboratory technician students.	5	0

Recent experiences in recruiting or hiring laboratory testing personnel

All network laboratories were given the opportunity to provide any comments about their recent experiences in recruiting or hiring personnel.

Hospital and independent laboratories

Thirty-nine laboratories made 55 comments which are summarized into the following categories:

- & 27% Few qualified applicants
- & 20% Located in rural, remote, isolated area
- & 18% Applicants do not want: evenings, nights, part time, 24 hour/7day coverage, on-call coverage, management or supervisory positions
- & 9% Applicants want better wages, pay, bonuses
- & 5% Employees are getting older, retiring
- & 4% There is a problem also with support and phlebotomy positions

POLs

Forty-five laboratories made 56 comments which are summarized into the following categories:

- & 30% Applicants lack qualifications, experience, education, skills, training
- & 20% Responses where stability and availability of testing personnel were favorable:
 - “Found excellent candidates from medical assistant background”
 - Haven’t recruited in: 6 years, 7 years, >10 years, 17 years
 - “Impressed with recently trained medical technologists”
 - “Most employees are long term”
 - “In past 2 years - good candidates”
 - “No problem”
- & 14% Difficult to cover: part time, fill-in, on-call, temporary, weekend, evening, vacations
- & 14% Applicants want better wages, benefits, salary, pay scale
 - “Can’t pay what the hospital can”

Changes in testing personnel backgrounds in the past year

Hospital and independent laboratories

Between February 1999 and February 2000, there has been minimal change in the number of laboratories that employed testing personnel of each background type. There has also been minimal change in the numbers or percentages of individuals of each background type performing testing in these settings in the past year (Table 10).

**Table 10 - Changes in testing personnel backgrounds 1999 and 2000
Hospital and independent laboratories (n=102)**

Personnel background	Number of laboratories with personnel type performing testing		Individuals performing testing			
			1999		2000	
	1999	2000	Number	Percent	Number	Percent
Medical technologist (MT)	96	97	921	55	924	53
Medical laboratory technician	56	56	149	9	158	9
Cytotechnologist	8	8	37	2	40	2
Histotechnologist	8	8	29	2	32	2
Histotechnician	2	2	3	<1	3	<1
Bachelor degree, not an MT	7	10	24	1	26	2
Master degree	4	5	5	<1	5	<1
Ph.D.	3	4	7	<1	8	<1
On the job training	25	26	83	5	95	5
Respiratory therapist	9	10	49	3	56	3
Registered nurse	23	24	244	15	256	15
Licensed practical nurse	14	14	59	4	78	5
Medical assistant	9	9	25	1	19	1
X-ray technologist, technician	4	5	10	<1	13	<1
Other	5	5	16	<1	16	<1
			3=1661		3=1729	

POLs

Between February 1999 and February 2000, there has been minimal change in the number of laboratories that employed testing personnel of each background type. Changes have also been minimal in the numbers or percentages of individuals of each personnel background type performing testing in these settings in the past year (Table 11).

Table 11 - Changes in testing personnel backgrounds 1999 and 2000 - POLs (n=159)

Personnel background	Number of laboratories with personnel type performing laboratory testing		Individuals performing testing			
			1999		2000	
	1999	2000	Number	Percent	Number	Percent
Medical technologist (MT)	82	82	160	16	161	15
Medical laboratory technician	42	47	70	7	81	8
Cytotechnologist	0	0	0	0	0	0
Histotechnologist	1	0	1	0.1	0	0
Histotechnician	0	0	0	0	0	0
Bachelor degree, not an MT	16	17	34	3	40	4
Master degree	9	13	23	2	27	3
Ph.D.	8	8	19	2	18	2
On the job training	29	34	64	6	77	7
Respiratory therapist	0	0	0	0	0	0
Registered nurse	71	71	237	24	232	22
Licensed practical nurse	42	44	71	7	72	7
Medical assistant	62	69	180	18	202	19
X-ray technologist, technician	18	19	39	4	44	4
Other	40	43	95	10	96	9
			3=993		3=1050	

DISCUSSION

Hospital laboratories had the highest percentage of vacant positions within the last 12 months, the last 6 months and at the time of completion of our questionnaire. Current vacancy rates were also the highest in hospitals.

In the past 6 months, medical technologists were the primary type of personnel who had vacated positions in hospital and independent laboratories. In POLs, open positions were spread out among medical technologists, medical assistants, medical laboratory technicians and on the job trained personnel.

Respondents indicated that they hired or intended to hire someone with a different background for relatively few of their vacant positions. Among these respondents, the majority wanted someone with a higher level of formal laboratory training.

Testing personnel primarily left their laboratory positions to take another laboratory position elsewhere, remaining in the pool of testing personnel at large. Twenty-five percent of the people who vacated positions in hospital and independent laboratories and 31% of those who vacated positions in POLs were lost from the testing personnel pool because they retired or left the field of laboratory medicine. Personnel appeared to be choosier about their hours, wages, time off and some left their positions for these reasons.

Sixty-one percent of hospital and independent laboratory positions took longer than expected to fill; 39% of POL positions took longer. Sixty-nine percent of hospital and independent laboratories took monetary or other types of actions to alleviate their difficulties recruiting and hiring testing personnel; 35% of POLs did so.

Overall comments indicate there is a general lack of applicants for laboratory positions and in some cases applicants are not coming with the necessary qualifications or skills. There appears to be increased competition for well-trained personnel and applicants are more selective about the conditions of their employment - they do not want undesirable shifts or management positions but do want higher compensation. There continues to be the usual problems in recruiting for rural, remote or isolated locations.

There have been minimal shifts in the backgrounds and skill mix of testing personnel in the past year.

CONCLUSIONS

With this questionnaire, we hoped to answer two basic questions: Is there a shortage of testing personnel? and How is the workforce changing?

Among our network respondents in the Pacific Northwest, the vacancy rates and other indicators of a laboratory personnel shortage do not appear to be as severe as found in studies nationwide.

Although 27% of independent laboratories, 35% of POLs and 74% of hospital laboratories have had some type of vacancy during the past 12 months, the current vacancy rates have ranged from an average of 1% to 3.4% to 4.5% in these settings. These are much lower than were found in a study by the American Society for Clinical Pathologists (ASCP) Board of Registry (BOR), where vacancy rates in 1998 ranged from an average of 9.3% to 20% for MT, MLT, cytotechnologist (CT) and histotechnologist (HT) positions.¹

We did not see large numbers of testing personnel leaving the field but many comments expressed the lack of applicants and less qualified applicants, in addition to a trend for employees and applicants to be more demanding in their expectations for laboratory employment. In some cases, supervisory positions go unfilled for extended periods because employees do not see the additional responsibilities as a desirable condition of employment. These comments do indicate a decline in the ability to fill open positions and this is consistent with another ASCP-BOR study, in which program directors of training schools for MTs, MLTs, and CTs, revealed a decline in both the quantity and quality of their applicant pool.²

We saw very minimal changes in the education and training background types of personnel used for testing between 1999 and 2000 and minimal changes in the skill mix of testing personnel in our respondent laboratories. MTs and MLTs are not being replaced with personnel of different backgrounds. Very few laboratories were willing to hire personnel from different backgrounds. If anything, they desired personnel with higher levels of formal laboratory training.

In November 1999, the Washington State Clinical Laboratory Advisory Council Personnel Shortage Workgroup studied these issues in 85 laboratories in the state. Their findings were very similar to ours, showing that Washington State and the Pacific Northwest are not seeing the severity of shortages expressed in other parts of the country. This may be due to the good economy and job market currently found in the Pacific Northwest. Recruitment of laboratory personnel into the region is easier when spouses are likely to find good jobs as well. In addition, the region does not have many jobs in competitive industries, such as vendors of laboratory information systems or instrument manufacturers, that might pull existing personnel away from testing positions.

While the existing laboratory workforce is not yet leaving in high numbers for alternate careers, the future laboratory workforce is perhaps another story. Business careers and the computer science industries may be pulling students into college programs, where the same number of

years of college can offer considerably higher pay, stock options, expense accounts and more attractive working environments than are currently found in the clinical laboratory arena. Information recently gathered from laboratory training program directors in Washington State concurred with the ASCP-BOR study² that showed fewer individuals entering laboratory training programs, fewer training program slots, and fewer slots being filled to capacity. Taking these issues into account, it is not hard to recognize that the supply of formally trained testing personnel will become insufficient to satisfy the needs of the laboratory workplace at some point in the future.

Solutions to the seemingly inevitable shortage of laboratory personnel may include:

- Increased efforts to recruit students into training programs
- More training programs and more capacity for students in those programs
- Different training approaches to match the current laboratory workplace and technologies
- More competitive compensation to recruit new personnel into the field, draw them back from other fields, and to retain personnel within the field
- Train for different career paths within the field to expand into roles in personnel management, financial management, information systems and consulting
- More on-the-job training for individuals with science degrees, but lacking a formal laboratory training program

At the April 2000 CLIAC meeting, it was recommended that a task force be created to look more in depth at the personnel shortage issue. The topics of discussion at this meeting addressed many of the same issues that we found in our study: The existing workforce of formally-trained laboratorians is getting older, retiring or changing to different fields; there aren't enough new people entering the field; and those left are more demanding of compensation and employment conditions. Laboratory training programs and clinical internship sites are dwindling, due to the lack of applicants and/or financial capabilities.

One of the presenters at the CLIAC meeting suggested that since vacancy rates for laboratory personnel have not shown significant changes over the past decade, an evaluation of turnover rates may be a better indicator of the effects of personnel changes on testing quality. Are laboratories hiring and training new testing personnel more often? Are they hiring more individuals with less formal laboratory training? Does it take longer to adequately train these individuals? Are error rates increasing due to the lack of well-trained personnel? These and other questions still need to be asked to resolve this multifaceted problem.

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