

**The Pacific Northwest Laboratory Medicine Sentinel Monitoring Network  
Final Report of the Findings of Questionnaire 6  
Laboratory Personnel Changes**

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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 (POLs). To date, six 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 personnel changes. The data gathered thus far have provided network participants, interest groups and regulators with solid information about current trends in laboratory medicine, based on actual practices and experiences in testing facilities. Informed decisions can then be made about the impact of regulatory activities and health care reform measures on the practice of laboratory medicine.

## **QUESTIONNAIRE 6**

Questionnaire 6 was mailed to 436 network laboratories in April 1997. The intent of this questionnaire was to identify changes in the numbers and backgrounds of testing personnel and laboratory support personnel over the past two years. In addition, we hoped to characterize the reasons for the changes and the impact that they have had in the practice of laboratory medicine. Data from this questionnaire were analyzed using Microsoft ACCESS™ and Raosoft SurveyFirst™. Tests of significance were performed using the Student's t-test, at 95% confidence limits ( $p=.05$ ).

## **FINDINGS**

Three hundred twenty-three laboratories returned a completed questionnaire in time for analysis, a 74% response rate. Demographic characteristics of the respondents are summarized in Table 1.

**Table 1 - Questionnaire 6 respondents (N=323 laboratories)**

Demographic characteristic	Percent of respondents
STATE	
Washington	47
Oregon	27
Idaho	18
Alaska	8
CENSUS BUREAU DESIGNATION	
Urban	61
Rural	39
LABORATORY TYPE	
Physician office laboratory (POL)	62
Hospital	26
Independent	12

**Changes in Testing Personnel**

Network participants were asked "In the past two years, has your total number of full time equivalents (FTEs) of testing personnel increased, decreased or remained the same?" For the purpose of answering this question, testing personnel were defined as individuals that perform laboratory testing or supervise the technical aspects of laboratory testing. These individuals may also perform support functions (i.e., phlebotomy, processing, clerical or billing functions). Participants were also asked for the actual numbers of FTEs in April 1995 and April 1997.

Of the 321 laboratories that provided one of the three choices, 57% indicated that their FTEs of testing personnel had remained the same, 24% had an increase and 19% a decrease. A significantly higher percentage of POLs showed no change in numbers of testing personnel compared with hospital and independent laboratories. As laboratories increased in size (based on annual test volumes), changes in numbers of testing personnel became more frequent. Table 2 summarizes the changes in the number of FTEs of testing personnel in these laboratories.

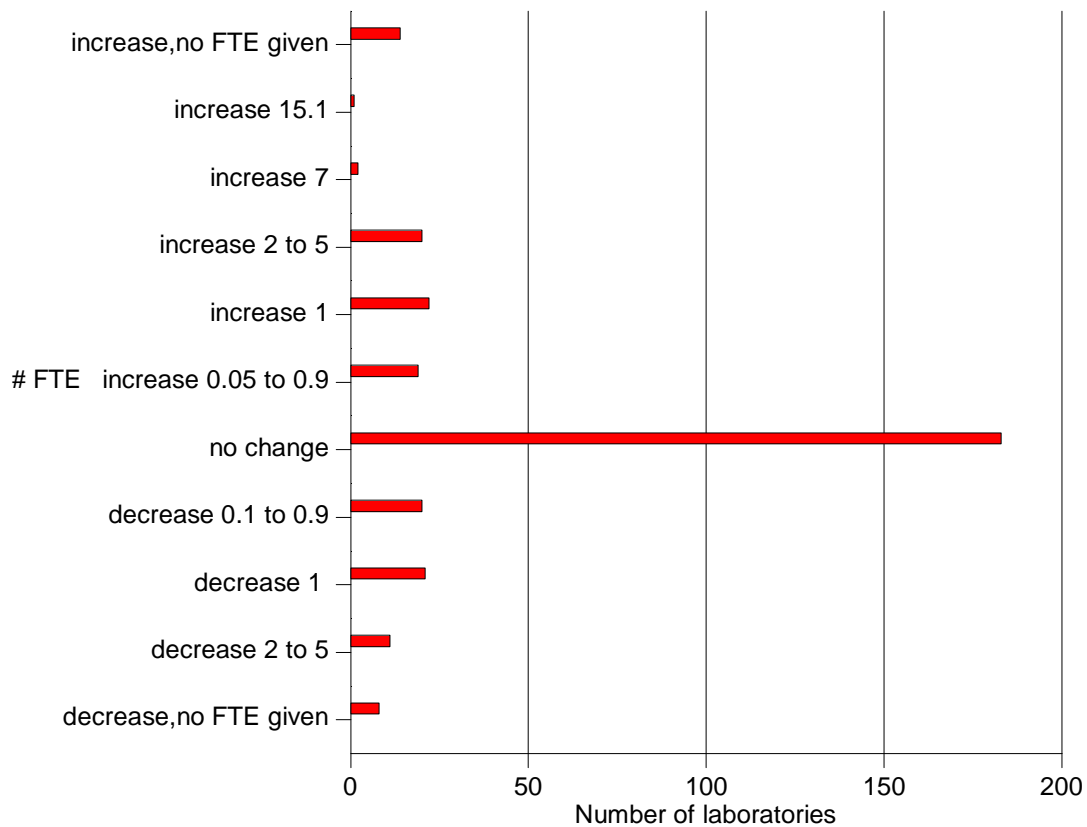
**Table 2 - Changes in the number of FTEs of testing personnel**

Change in # FTEs	Percent of laboratories				
	POLs N=200	Hospital N=83	Independent N=38	Urban N=196	Rural N=125
same	67	37	47	61	50
increase	19	36	26	21	29
decrease	14	27	26	17	21

	Annual test volumes			
	< 10,000	10,000 to 25,000	25,000 to 100,000	>100,000
same	75	57	40	34
increase	15	25	33	36
decrease	10	18	27	30

Two hundred fifty-six laboratories (79%) provided actual numbers of FTES for both 1995 and 1997. The mean number of FTEs of testing personnel in 1995 was 6.93 (median 3.0) with a range of 0 to 131.4. In 1997, the mean was 7.13 FTEs (median 3.0) with a range of 0 to 146.5. The mean number of FTEs of testing personnel changed between 1995 and 1997, as follows: 3.45 to 3.53 for POLs; 11.6 to 11.9 for hospital laboratories; and 12.9 to 13.5 for independent laboratories. None of these differences between the mean number of FTEs in 1995 and 1997 are statistically significant. Figure 1 and Table 3 summarize the changes in numbers of FTEs of testing personnel between April 1995 and April 1997.

Figure 1 - Changes in the number of FTEs of testing personnel between 4/95 and 4/97



**Table 3 - Changes in FTEs of testing personnel in POLs, hospital and independent laboratories**

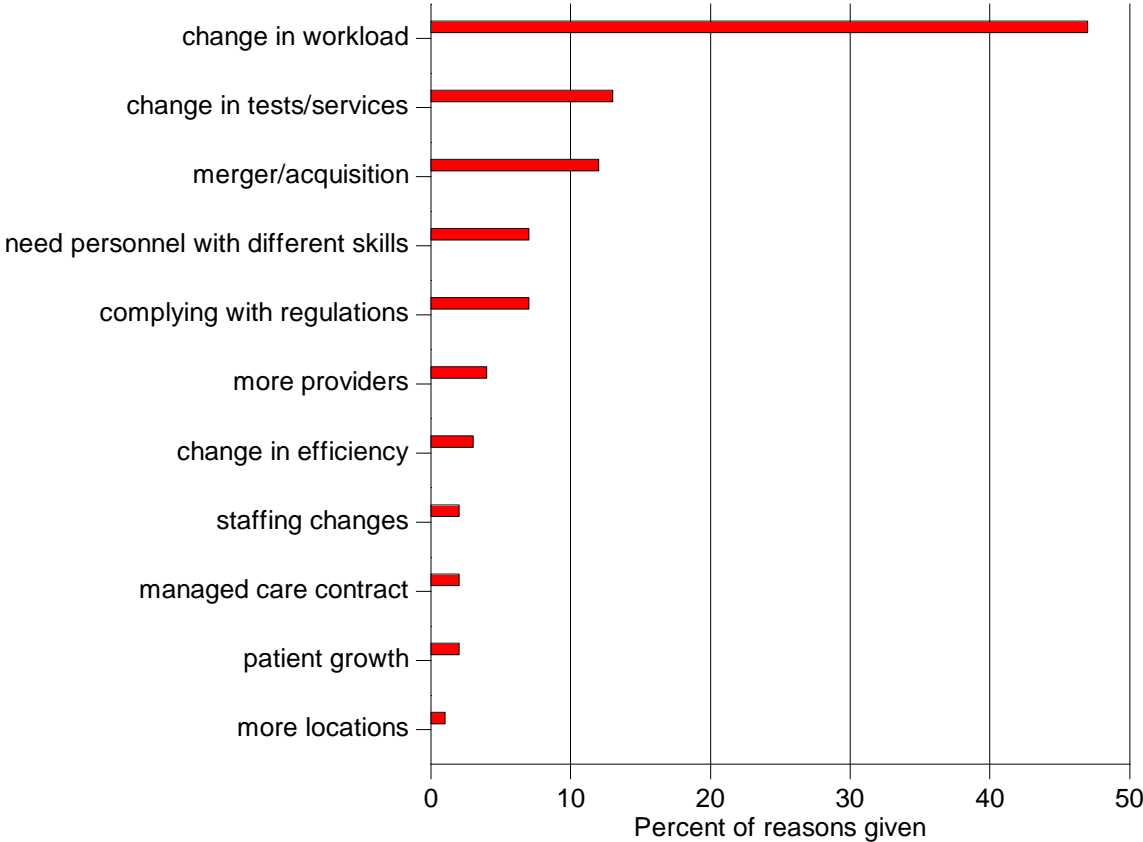
	All Labs	Labs with increase in FTEs	Labs with decrease in FTEs		
<b>POL</b>					
range	range				
Average # FTE 4/95	3.45	4.99	0 to 27	5.13	1.5 to 37.5
Average # FTE 4/97	3.53	6.25	0.2 to 28	4.08	0 to 35.5
Average change in # FTE between 4/95 and 4/97	0.08	1.26	0.05 to 7	1.05	0.2 to 3
Average percent change	2	25	3 to 200	21	3 to 100
Median percent change	0	27		25	
<b>HOSPITAL</b>					
Average # FTE 4/95	11.6	14.1	1 to 59	14.68	2.7 to 79
Average # FTE 4/97	11.9	15.7	2.75 to 66	13.73	2.0 to 76
Average change in # FTE between 4/95 and 4/97	0.3	1.6	0.2 to 7	0.95	0.2 to 3
Average percent change	3	11	2 to 175	6	1 to 33
Median percent change	5	13		9	
<b>INDEPENDENT</b>					
Average # FTE in 4/95	12.9	21.38	3 to 131.4	19.21	1.5 to 75
Average # FTE in 4/97	13.5	24.88	4.25 to 146.5	17.46	1 to 70
Average change in # FTE between 4/95 and 4/97	0.6	3.5	0.67 to 15.1	1.75	0.2 to 5
Average percent change	5	16	9 to 67	9	2 to 50
Median percent change	6	17		18	

### Reasons for Changes in Testing Personnel

Using a list of possible reasons, laboratories were asked to check any that were responsible for their change in total number of FTEs of testing personnel. When individual reasons are grouped according to categories of interest, changes in workload (change in workload and types of tests or services; additional providers, locations and hours of operation; and patient growth) and business-

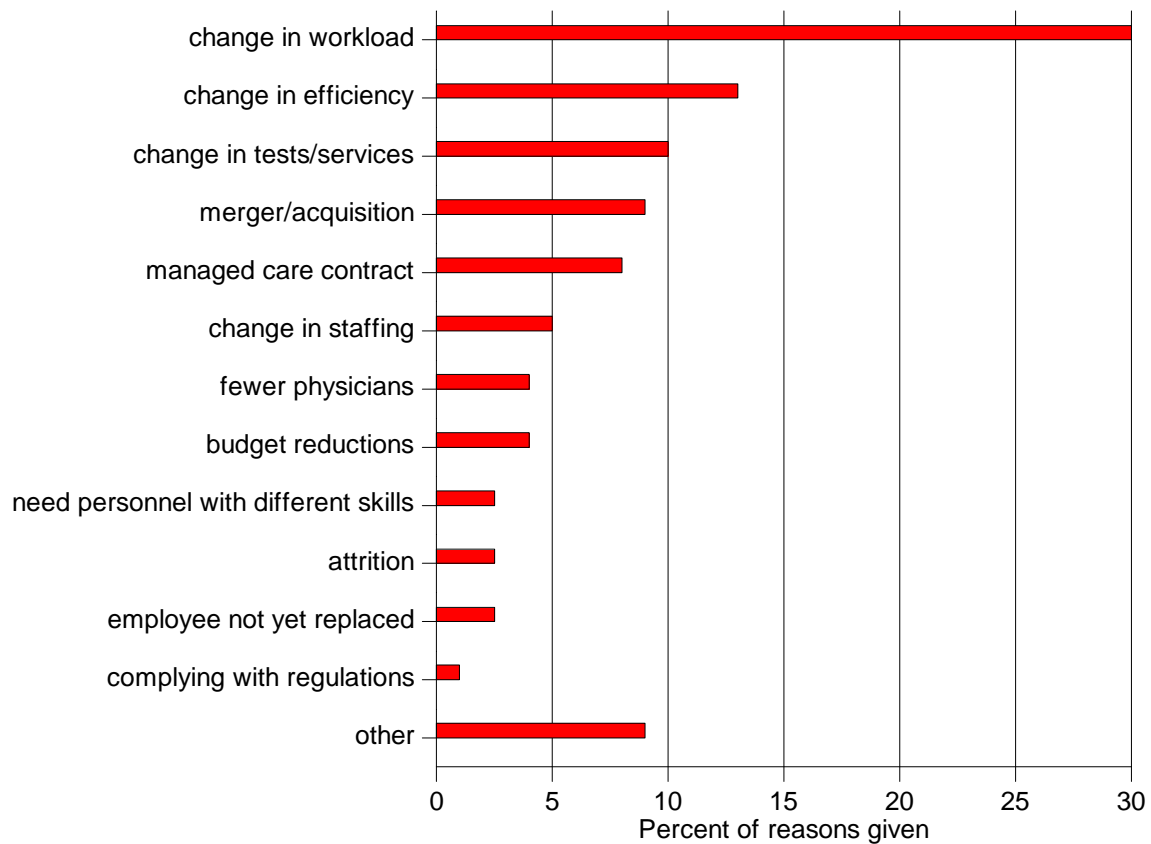
related issues (due to a merger, acquisition, consolidation or managed care contract agreement) accounted for 81% of the reasons for an increase in testing personnel.

**Figure 2 - Reasons for increase in testing personnel (N=78 laboratories)**



Sixty-six percent of the reasons given for a decrease in testing personnel were due to workload changes (change in workload and types of tests or services; fewer physicians) or business-related decisions (due to a merger, acquisition, consolidation, managed care contract agreement, budget reduction, corporate mandate or decreased revenue).

**Figure 3 - Reasons for decrease in testing personnel (N = 60 Laboratories)**



There were no significant differences in the reasons given for changes in testing personnel between POL, hospital and independent laboratories or between urban and rural laboratories.

### **Changes in Laboratory Support Personnel**

In this question, participants were asked "In the past two years, has your total number of FTEs of



laboratory support personnel increased, decreased or remained the same?" Laboratory support personnel were defined as individuals that do not perform or supervise any laboratory testing (including waived tests). These individuals include: phlebotomists, staff that perform specimen collection, specimen processing, equipment maintenance, clerical or billing functions, but not laboratory testing. Participants were also asked for the actual numbers of FTEs of support personnel in April 1995 and April 1997.

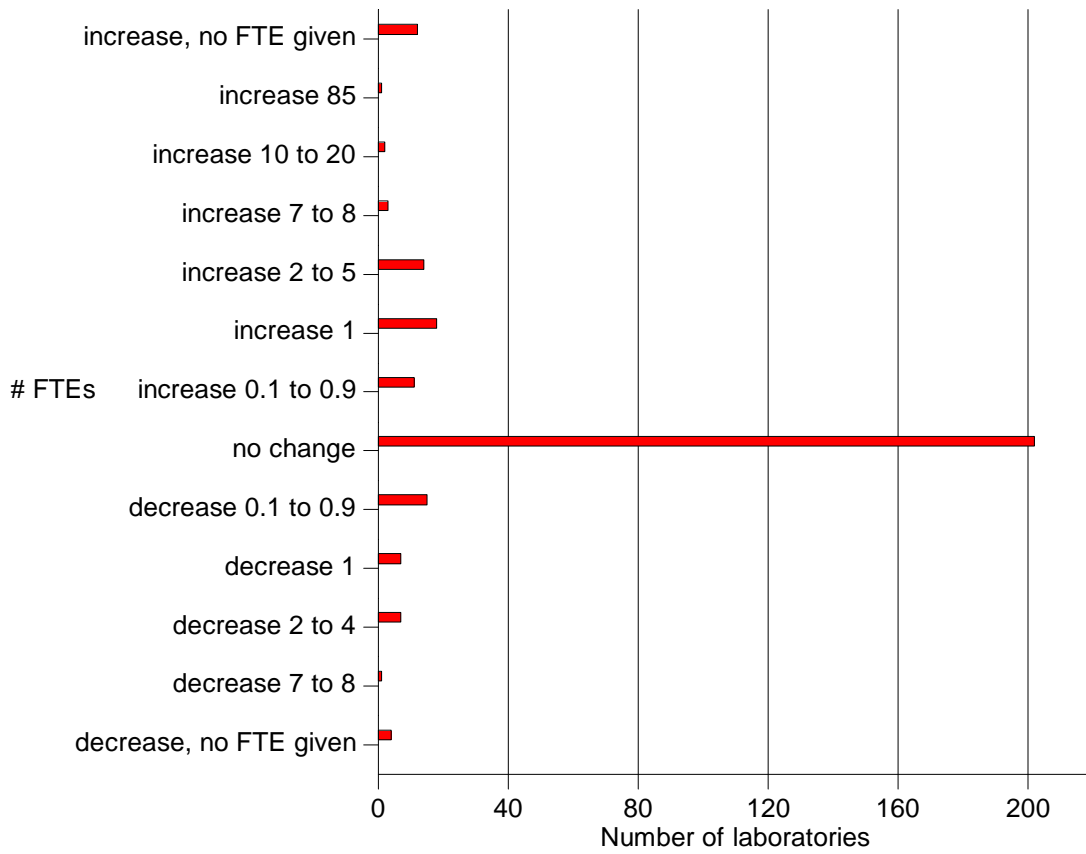
Of the 297 laboratories that provided one of the three choices, 68% said that the number of FTEs had remained the same, 21% had an increase and 11% a decrease. As seen with testing personnel, a significantly higher percentage of POLs demonstrated no change in the numbers of support personnel compared with hospital and independent laboratories. Table 4 summarizes the changes in the numbers of FTEs of support personnel in various types of laboratories.

**Table 4 - Changes in number of FTEs of laboratory support personnel**

Change in # FTEs	Percent of laboratories				
	POL N=179	Hospital N=80	Independent N=38	Urban N=181	Rural N=116
same	79	53	47	68	68
increase	13	31	32	19	22
decrease	7	16	21	13	9

Two hundred seventeen laboratories (73%) provided actual numbers of FTEs of support personnel for 1995 and 1997. The mean number of FTEs in 1995 was 5.01 (median 2.0) with a range of 0 to 169.5. In 1997, the mean number of FTEs was 5.79 (median 2.0) and the range was 0 to 254.7. The mean number of FTEs of support personnel changed between 1995 and 1997, as follows: 2.3 to 2.5 for POLs; 5.6 to 6.3 for hospital laboratories; and 13.9 to 17.3 for independent laboratories. None of these differences in means of FTEs between 1995 and 1997 are statistically significant. Figure 4 and Table 5 summarize the changes in numbers of FTEs of laboratory support personnel in the past two years.

**Figure 4 - Changes in the number of FTEs of laboratory support personnel between 4/95 and 4/97**



**Table 5 - Changes in FTEs of laboratory support personnel in POL, hospital and independent laboratories**

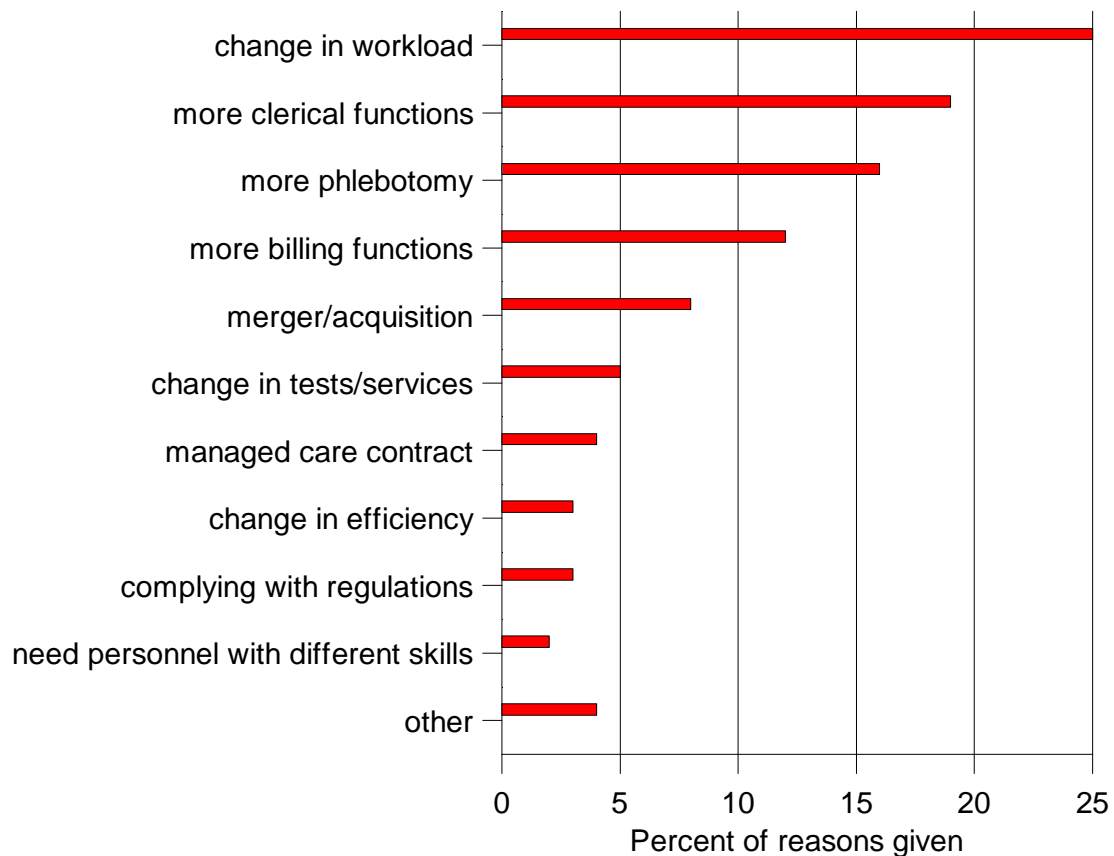
	All labs	Labs with increase in FTEs	Labs with decrease in FTEs		
<b>POL</b>	range				
Average # FTEs in 4/95	2.3	4.05	0 to 8	4.71	1 to 23
Average # FTEs in 4/97	2.5	5.92	1 to 13	3.3	0.25 to 20
Average change in # FTEs between 4/95 and 4/97	0.2	1.87	0.62 to 5	1.41	0.4 to 4
Average percent change	9	46	14 to 166	30	13 to 75
Median percent change	0	39		37	
<b>HOSPITAL</b>					
Average # FTEs in 4/95	5.6	10.8	0 to 45	7.56	2 to 23.5
Average # FTEs in 4/97	6.3	13.33	0.25 to 51	6.59	1 to 22.5
Average change in # FTEs between 4/95 and 4/97	0.7	2.53	0.25 to 8.2	0.97	0.2 to 3
Average percent change	13	23	4 to 257	13	3 to 50
Median percent change	8	28		17	
<b>INDEPENDENT</b>					
Average # FTEs in 4/95	13.9	37.49	0 to 169.46	4.08	0.75 to 12.9
Average # FTEs in 4/97	17.3	51.2	0.5 to 254.71	2.43	0 to 8
Average change in # FTEs between 4/95 and 4/97	3.4	13.71	0.4 to 85.25	1.65	0.2 to 7.7
Average percent change	24	37	2 to 200	40	5 to 100
Median percent change	4	50		63	

### Reasons for Changes in Laboratory Support Personnel

Using a list of possible reasons, laboratories were asked to check any that were responsible for their change in total number of FTEs of support personnel. Thirty-one percent of the reasons given for an increase in support personnel related to workload changes (change in workload and tests or services; new locations; growth). Forty-seven percent of the reasons were due to

increased needs for clerical and billing functions (31%) and phlebotomy (16%). Business-related decisions (due to a merger, acquisition, consolidation, managed care contract agreement or an administrative cutback) accounted for 12% of the reasons given.

**Figure 5 - Reasons for increase in support personnel (N=61 laboratories)**



When individual reasons for a decrease in support personnel were combined, 31% related to workload changes (change in workload and types of tests or services; fewer physicians), 13% related to changes in clerical and billing functions and 12% to changes in phlebotomy activities. Business-related issues (due to merger, acquisition, consolidation or managed care contract;

corporate/management decision) accounted for 15% of the reasons for support personnel decreases.

**Figure 6 - Reasons for decrease in laboratory support personnel (N=34 laboratories)**



When evaluating the changes in the patterns of both testing personnel and support personnel, the majority of testing sites (49%) had no changes in the number of either of these two types of personnel. In 12% of laboratories, both types increased and in 8%, both types decreased. The frequency with which laboratories demonstrated an increase in one type with a decrease in the other type (suggesting a shift to different backgrounds) was very low: 3% had a decrease in testing personnel and an increase in support personnel; 1% had an increase in testing personnel and a decrease in support personnel. Table 6 shows these changes for both personnel types for

POLs, hospital and independent laboratories.

**Table 6 - Changes in testing personnel and support personnel**

Pattern of personnel change	Percent of laboratories		
	POL	Hospital	Independent
Both testing and support personnel remained the same	61	30	34
Both testing and support personnel increased	6	21	18
Both testing and support personnel decreased	5	13	13
Decrease in testing personnel & increase in support personnel	1	5	8
Increase in testing personnel & decrease in support personnel	2	1	0

Eighty-nine laboratories provided actual numbers of FTEs for both testing and support personnel and for 1995 and 1997. Sixty-three percent of laboratories had a decrease in the ratio of testing personnel to support personnel; 31% showed an increase and 6% were the same. The mean ratio of testing personnel to support personnel decreased very slightly between 1995 and 1997, from 2.25 to 2.08. Table 7 demonstrates the changes in ratios of testing personnel to support personnel for POLs, hospital and independent laboratories.

**Table 7 - Changes in the ratio of testing personnel to support personnel**

	POL	Hospital	Independent
Mean ratio in 1995 (median)	1.55 (1.17)	3.26 (2.39)	1.76 (1.06)
Mean ratio in 1997 (median)	1.55 (1.17)	2.75 (2.17)	1.91 (1.00)
Percent of laboratories with decrease in ratio	62	65	61
Percent of laboratories with increase in ratio	24	35	39
Percent of laboratories with no change in ratio	14	0	0

None of the changes in mean ratios of testing personnel to support personnel from 1995 to 1997 were statistically significant for all laboratories or for each of the laboratory types shown in Table 7.

### **Impact of the Decrease in Personnel**

Laboratories were asked "What impact has the decrease in testing personnel or laboratory support personnel had on laboratory testing in your facility?" Using a list of 13 issues related to

laboratory testing, participants were asked to indicate the impact by choosing one of the following: no change, better, worse or don't know.

For each of these issues, the highest percent of respondents felt there had been no change due to their decrease in personnel. Test accuracy, patient outcome and testing accessibility ranked highest among the issues where no changes were recognized. Testing costs, testing efficiency and personnel competency ranked highest among the issues judged to be better and test result turnaround time, patient convenience and specimen problems/errors ranked highest among the issues judged to be worse due to personnel decreases. Table 8 summarizes all the responses about the impact of decreases in personnel on laboratory testing.

**Table 8 - Impact on laboratory testing due to decreases in personnel**

Laboratory testing issues	Impact on laboratory testing (Percent of laboratories)			Other responses (Number of laboratories)	
	No change	Better	Worse	Don't know	Did not answer
Test result turnaround time	58	13	29	2	5
Test accuracy	89	8	3	1	5
Testing efficiency	59	29	12	0	5
Testing accessibility	77	7	16	2	7
Personnel competency	62	27	11	2	5
Testing menu	69	16	15	2	6
Patient satisfaction	70	11	19	10	6
Patient convenience	62	13	25	3	6
Testing costs	48	40	11	2	6
Specimen problem/errors	64	13	23	2	6
Testing problems/errors	70	16	14	1	6
Reporting problems/errors	63	19	17	2	5
Patient outcome	80	12	8	12	7

### **Coping with Decreases in Personnel**

In this question, participants were asked "What have you done to cope with the decrease in testing personnel or laboratory support personnel?" Using a list of 15 choices, laboratories were asked to indicate any of the coping mechanisms that they have used. Sixty-seven laboratories had a decrease in testing personnel or support personnel or both and chose a total of 246 responses to this question. The most frequent mechanisms for coping with personnel decreases have been:

cross-training employees (16% of all responses); developing more efficient ways to do things (16%); obtaining new instrumentation (11%) and changing work shifts (10%). Table 9 shows the coping mechanisms grouped according to categories of interest.

**Table 9 - Mechanisms for coping with decreases in personnel**

	Percent of responses
<b>Employee training</b> (cross-training, retraining)	22
<b>Obtained new equipment</b> (new computer, lab information system, instrumentation)	18
<b>Change in structure of laboratory operations</b> (structure of lab or sections of lab, work shifts)	17
<b>Developed more efficient ways of doing things</b>	16
<b>Changes in test choices</b> (encouraged better ordering/utilization, changed test order choices, changed STAT test order protocol)	13
<b>Shifted tests out</b> (to point of care areas, to other labs)	9
<b>Merged with another entity</b> (another lab or health care network or integrated system)	<1

No significant differences were found between POL, hospital and independent laboratories with respect to the types of coping mechanisms used. Rural laboratories obtained new equipment at a higher frequency (24%) than urban laboratories (14%). Urban laboratories changed the structure of laboratory operations more frequently (21%) than did rural laboratories (12%).

### **Changes in the Backgrounds of Testing Personnel**

Using a list of 18 personnel backgrounds, laboratories were asked to record the number of individuals that performed laboratory testing in April 1995 and April 1997. The intent of this question was to identify general changes in the backgrounds of individual testing personnel over the past two years.

Of the 301 laboratories that responded to this question as intended, 113 (37%) demonstrated a change in the mix of backgrounds of personnel that performed laboratory testing between 1995 and 1997. If any background type changed from none to at least one or from at least one to none



between 1995 and 1997, this was counted as a laboratory with a change in the testing personnel background mix.

Changes in individual personnel backgrounds performing laboratory testing between 1995 and 1997 have been minimal. The personnel backgrounds that showed the most changes (based on the number of laboratories with a background change between 1995 and 1997) were: On the job trained personnel; medical laboratory technicians (MLT); medical technologists (MT); medical assistants and licensed practical nurses.

In 1995 and in 1997, 73% of laboratories had at least one MT or MLT performing testing. Eight laboratories (3%) changed from having no MT or MLT in 1995, to having at least one of these in 1997. Eight laboratories (3%) showed the reverse pattern -having at least one MT or MLT in 1995 and none in 1997.

**Table 10 - Changes in testing personnel backgrounds**

Personnel background	Number of labs with personnel type performing laboratory testing		Number of labs with background change between 1995 & 1997		
	1995	1997	0 in 1995 > 0 in 1997	> 0 in 1995 0 in 1997	net change
Registered nurse	67	70	6	3	3
Licensed practical nurse	38	42	10	6	4
Medical assistant	59	65	12	6	6
On the job training	55	64	20	11	9
Nurse practitioner	22	23	3	2	1
Physician assistant	18	20	4	2	2
Medical doctor	56	55	0	1	1
Naturopathic physician	1	2	1	0	1
Medical technologist	190	187	7	10	3
Medical lab technician	97	98	16	15	1
Military lab training	15	13	4	6	2
Cytotechnologist	17	16	0	1	1
Bachelor's degree in science	48	51	4	1	3
Master's degree in science	13	12	4	5	1
Ph.D. in science	13	13	1	1	0
Respiratory therapist	6	7	1	0	1

X-ray technician	14	18	5	1	4
Other	18	18	4	4	0

## DISCUSSION

In October 1996, meetings were held with network participants in three locations in Washington state to gather input on topics of interest and concern in the practice of laboratory medicine. Many topics identified related to the perceived changes in numbers and skills of personnel and their impact on the quality of laboratory testing. Some participants felt there were more demands on testing personnel-not only to perform more testing, but to assume more non-testing tasks as well. Others cited high turnover rates and less time dedicated to personnel training and orientation. In addition, some felt changes in the skill mix of testing personnel had contributed to more testing errors and other negative effects in laboratory testing capabilities. To address these issues, Questionnaire 6 was developed to characterize the extent to which changes have occurred in both numbers and skill backgrounds of testing and laboratory support personnel.

We found that decreases in the numbers of FTEs have not been significant. Testing personnel remained the same in 57% of laboratories and support personnel remained the same in 68%. More laboratories had an increase in testing personnel (24%) than a decrease (19%) and more had an increase in support personnel (21%) than a decrease (11%).

We did not find that testing personnel were being replaced with support personnel. Only 3% of laboratories demonstrated a decrease in testing personnel with an increase in support personnel between 1995 and 1997. In addition, there was no significant shift in the ratio of testing personnel to support personnel during this time frame. Very few laboratories gave reasons for changes that would indicate a shift in duties between technical and support personnel: Three laboratories stated that support personnel had been trained to do laboratory testing; one laboratory decreased their number of phlebotomists that had performed testing; one laboratory reduced their support personnel by shifting phlebotomy to point of care areas; one reduced their support personnel by shifting clerical duties to their medical technologist; and one reduced their FTEs of technical personnel by hiring an individual to assume their phlebotomy duties.

The most common reasons for increases in testing personnel related to changes in workload and testing services and to mergers/acquisitions/consolidations. The most common reasons for increases in support personnel related to changes in workload, with increased activities in clerical functions, billing functions and phlebotomy. Testing personnel decreases were also due to workload and testing service changes and due to more efficient practices. Laboratories with decreases in support personnel indicated a need for personnel with different skills in addition to

workload changes and phlebotomy needs.

For each of the laboratory testing issues presented for their review, the highest percent of respondents felt there had been no impact despite their decrease in personnel. Laboratories coped with personnel decreases by training personnel, changing the structure of the laboratory and obtaining new equipment. Some laboratories had influenced better test ordering and utilization. Very few laboratories resorted to shifting their workload to other sites.

Changes in the mix of backgrounds of testing personnel have been minimal. There was no evidence of a significant shift to one background type over another.

### **CONCLUSIONS**

Through this questionnaire, we explored a variety of issues related to changes in laboratory personnel. With respect to the numbers of personnel, the majority of laboratories remained the same or recognized staffing increases. In addition, the variety of backgrounds of personnel performing laboratory testing did not reveal any significant shifts. For those laboratories that did experience a decrease in personnel, the major influences related to workload changes and marketplace issues and not to managed care contracts or regulatory issues. In a few cases, respondents noted increases in personnel with even higher increases in workload, resulting a net effect of "fewer" personnel for the tasks at hand. Laboratories used a variety of coping skills to lessen the impact of their loss of personnel or their demands to "do more with less."