Laboratory Staff Turnover

A College of American Pathologists Q-Probes Study of 23 Clinical Laboratories

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• ***Context.***—**Knowledge of laboratory staff turnover rates are important to laboratory medical directors and hospital administrators who are responsible for ensuring adequate staffing of their clinical laboratories. The current turnover rates for laboratory employees are unknown.**

Objective.—**To determine the 3-year average employee turnover rates for clinical laboratory staff and to survey the types of institutional human resource practices that may be associated with lower turnover rates.**

Design.—**We collected data from participating laboratories spanning a 3-year period of 2015–2017, which included the number of full-time equivalent (FTE) staff members that their laboratories employed in several personnel and departmental categories, and the number of laboratory staff FTEs who vacated each of those categories that institutions intended to refill. We calculated the 3-year average turnover rates for all laboratory employees, for several personnel categories, and for major laboratory departmental categories, and assessed the potential associations between 3-year average all laboratory staff turnover rates with institutional human resource practices.**

Results.—**A total of 23 (20 US and 3 international) participating institutions were included in the analysis. Among the 21 participants providing adequate turnover data, the median of the 3-year average turnover rate for all laboratory staff was 16.2%. Among personnel categories, ancillary staff had the lowest median (11.1% among 21 institutions) and phlebotomist staff had the highest median (24.9% among 20 institutions) of the 3-year average turnover rates. Among laboratory departments, microbiology had the lowest median (7.8% among 18 institutions) and anatomic pathology had the highest median (14.3% among 14 institutions) of the 3-year average turnover rates. Laboratories that developed and communicated clear career paths to their employees and that funded external laboratory continuing education activities had significantly lower 3-year average turnover rates than laboratories that did not implement these strategies.**

Conclusions.—**Laboratory staff turnover rates among institutions varied widely. Two human resource practices were associated with lower laboratory staff turnover rates.**

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Knowledge of national laboratory turnover rates (the rate at which workers vacate positions that their employers intend on refilling) is important to both laboratory medical directors whom laboratory licensing and accrediting agencies hold responsible for ensuring that clinical laboratories are staffed adequately[1,2] and to hospital administrators whom hospital boards of trustees hold responsible for ensuring that their institutions are staffed adequately. In addition to potentially undermining patient safety and operational efficiency, employee turnover in health care is expensive. In one study performed in an academic medical center, the annual cost of turnover represented 3.4% to 5.8% of the center's annual operating budget.[3]

A national survey of hospitals reported that in 2017, the average turnover rate for all hospital employees was 18.2%.[4] A study of vacancy rates (the percentages of vacant positions for which businesses are actively recruiting) published in 2018 reported that vacancy rates for the employees of various laboratory departments ranged from 4.70% to 10.98%.[5] The current turnover rates for laboratory employees are unknown.

Since 1989, the College of American Pathologists (CAP) Q-Probes studies have determined normative ranges of performance in anatomic pathology and laboratory medicine.[6,7] Participants in these studies, representing the entire spectrum of practice settings worldwide, have been able to compare their performances to those of their peers, and to share among their peers laboratory practices associated with superior performance.

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In this Q-Probes study, we determined turnover rates for clinical laboratory staff and surveyed the types of institutional human resource (HR) practices that may be associated with lower rates of turnover.

MATERIALS AND METHODS

In early 2018, we distributed Laboratory Staff Turnover Q-Probes Study materials to laboratories enrolled in the College of American Pathologists Q-Probes Program. We asked participants to submit laboratory staff full-time equivalent (FTE) data for study years 2015, 2016, and 2017. Institutions provided the number of FTEs who were employed for each of several personnel categories and laboratory departments at the beginning of years 2015, 2016, 2017, and 2018.

Personnel categories included all laboratory staff, supervisors and/or managers, technical staff, phlebotomist staff, and ancillary staff. The supervisor and/or manager category comprised nonpathologist laboratory staff in management positions including nonpathologist laboratory directors, laboratory managers and assistant managers, chief technologists, supervisors, and lead technologists. The technical staff category included individuals whose primary job was to perform testing of patient samples, regardless of certification designation. The phlebotomist staff category included individuals whose primary job was collection of patient samples and processes related to specimen collection. Lastly, the ancillary staff category included individuals who performed clerical or administrative assistant jobs that did not involve phlebotomy, laboratory testing and analysis, or laboratory management.

Laboratory departments included chemistry/hematology/immunology, microbiology, transfusion medicine/blood bank, and anatomic pathology. The chemistry/hematology/immunology section included staff who performed all routine and special testing in chemistry, hematology, coagulation, urinalysis, serology, and immunology. The microbiology section comprised staff who performed tests that included 1 or more of the following functions: aerobic and anaerobic cultures, antimicrobial susceptibility testing, mycobacterial culture, mycology cultures, parasitology, and virology testing. The transfusion medicine/blood bank department comprised staff who performed 1 or more of the following functions: blood type/ABO, type and screens, cross-matches, atypical antibody identification, or holding and dispensing of blood products. Lastly, the anatomic pathology section included staff who performed 1 or more of the following functions: gynecologic cytopathology, nongynecologic cytopathology, surgical pathology, histochemistry, immunohistochemistry, or autopsy pathology.

We represented the number of FTEs employed for the 3 study years by computing the average of the number of FTEs employed on January 1 of each year with the number of FTEs employed at the beginning of the subsequent year. We collected data on the number of FTEs who vacated their positions during the study years by whether they left voluntarily, involuntarily, or retired. We instructed participants not to count vacated positions that their laboratories did not intend to refill.

We calculated yearly turnover rates by using the formula:

$$\text{Yearly Turnover Rate (\%)} = \left[\frac{\text{Total Number of FTEs Who Vacated Their Position During Year}}{\left(\begin{array}{c}\text{Number of FTEs at the Beginning of the Year}\\ +\text{Number of FTEs at Beginning of the Subsequent Year}\end{array}\right)\Big/2}\right] \times 100$$

For each laboratory, we averaged the yearly turnover rates for 2015, 2016, and 2017 and calculated these 3-year average turnover rates by overall laboratory, personnel category, and laboratory department. We provided participants with comparative 10th, 50th, and 90th percentiles of turnover rates among all participating institutions submitting adequate data.

Table 1. Demographic Summary of Participating Institutions

Institutional Demographic Categories	No. (%)
Occupied bed size (n = 18)	
0–150	5 (27.8)
151–300	4 (22.2)
301–450	3 (16.7)
451–600	5 (27.8)
>600	1 (5.6)
Teaching hospital (n = 21)	
Yes	11 (52.4)
No	10 (47.6)
Laboratory trains pathology residents (n = 22)	
Yes	11 (50.0)
No	11 (50.0)
Institution location (n = 21)	
City	15 (71.4)
Suburban	5 (23.8)
Rural	1 (4.8)
Government affiliation (n = 22)	
Nongovernmental	16 (72.7)
Governmental, nonfederal	5 (22.7)
Governmental, federal	1 (4.5)
CAP inspection within the past 2 years (n = 22)	
Yes	20 (90.9)
No	2 (9.1)
The Joint Commission inspection within the past 2 years (n = 22)	
Yes	4 (18.2)
No	18 (81.8)
Institution type (n = 22)	
Voluntary, nonprofit hospital	11 (50.0)
Other, governmental, nonfederal	3 (13.6)
Nongovernmental, university hospital	2 (9.1)
Private, independent laboratory	1 (4.5)
Children's hospital	1 (4.5)
System/integrated delivery network	1 (4.5)
County hospital	1 (4.5)
Governmental, nonfederal university hospital	1 (4.5)
Indian Health Service	1 (4.5)

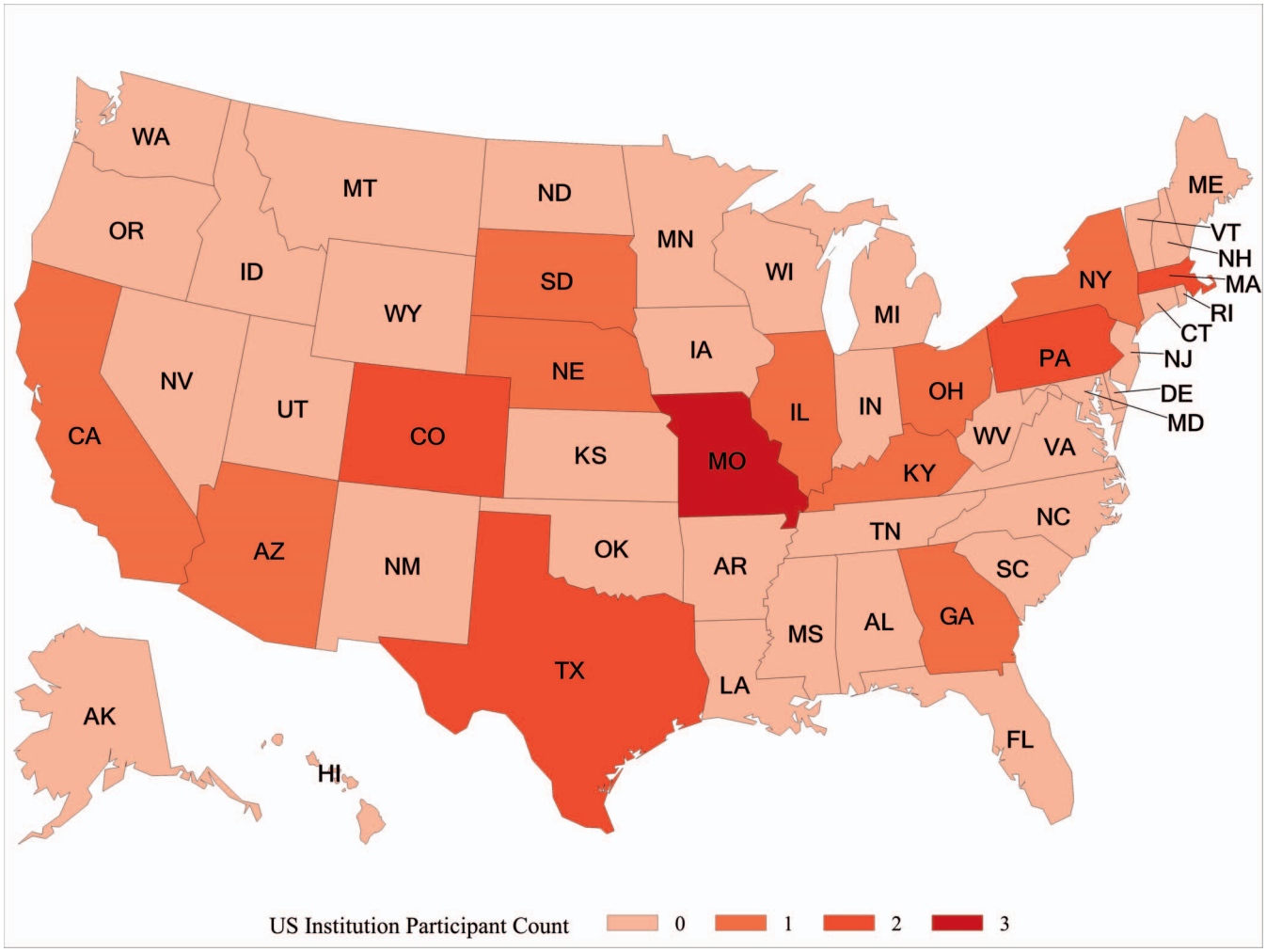
Abbreviation: CAP, College of American Pathologists.

Participants submitted their institutional demographic information (Table 1). We evaluated the potential associations between these demographic measures on all laboratory staff 3-year average turnover rates.

We evaluated the potential associations of several institutional and laboratory practices on laboratory staff turnover rates by having participants complete a detailed questionnaire (Table 2). For some questions, we offered participants the option of entering "unknown" if they were unaware of their facility's practices.

Finally, we asked participants to choose from a prespecified list or enter a short comment on the study questionnaire describing the strategy their facilities used that they believed to be most effective in retaining laboratory staff.

In analyzing potential associations of institutional and laboratory practices on laboratory staff turnover rates we included only those institutions that provided sufficient all laboratory staff 3-year average turnover rates. In analyzing participants' descriptions of the strategy their facilities used to retain laboratory staff that they believed to be the most effective we included all institutions regardless of whether they provided sufficient all laboratory staff 3-year average turnover rates.



United States institution participant location by state (N = 20).

The all laboratory staff 3-year average turnover rate data were normally distributed among the 21 institutions that provided sufficient data and a 2-phase analysis approach was implemented. First, individual associations between the 3-year average turnover rate with demographic and practice characteristic variables were performed by using *t* tests to test for differences in means for 2-level discrete independent variables and analysis of variance to test for differences in means for 3-level discrete independent variables. Variables with significant associations were then included in a forward selection multiple linear regression model. A level of .05 was used for statistical significance. All analyses were performed with SAS 9.3 (SAS Institute, Cary, North Carolina).

RESULTS

A total of 20 institutions located in the United States and 3 located abroad (Brazil, Jordan, Saudi Arabia) submitted either partial or complete laboratory staff turnover data for study years 2015, 2016, and 2017. We required participants to submit staff turnover data across all 3 study years, from which we computed the all laboratory staff 3-year average turnover rate, and 3-year average turnover rates for the various personnel categories and laboratory departments. The Figure summarizes the geographic locations of the 20 US participants that provided sufficient data.

Table 1 summarizes participants' demographic information. Among 22 institutions, 11 (50.0%) served voluntary

Table 2. Summary of Institutional and Laboratory Practices Comprising Participant Questionnaire

Use of routine surveys of laboratory worker satisfaction.
Number of grievance reports filed by employees.
Types of activities they use to foster respectful behavior among employees.
Types of managerial training they offer laboratory managerial personnel.
Degree of managers' responsiveness to laboratory worker issues.
Categories of hospital employees participating in hiring of laboratory supervisors.
Use of peer interviews in laboratory employee recruitment.
Use of posthiring follow-up interviews of new employees.
Presence of designed career paths in their facilities.
Opportunities for advancement in their laboratories.
Laboratory's overtime requirements.
Types of competitive and merit-based compensation adjustments.
Alignment of employee and institutional missions and goals.
Communication of employee performance standards.
Evaluation of employees' performance.
Presence and frequency of rounding and huddles.
Pathologists' involvement in laboratory educational activities.

Table 3. Percentile Distributions of 3-Year Average Laboratory Staff Turnover Rates by Personnel Category and Laboratory Departments

Staff and Department Categories	N	3-Year Average Turnover Rate, %		
		10th Pctl	Median	90th Pctl
All laboratory staff	21	12.2	16.2	20.5
Personnel categories				
Supervisors and/or managers	21	0.0	12.6	18.5
Technical staff	21	7.8	12.4	19.1
Phlebotomist staff	20	13.7	24.9	46.4
Ancillary staff	21	0.0	11.1	27.0
Laboratory departments				
Chemistry/Hematology/Immunology	19	7.6	13.1	20.0
Microbiology	18	0.0	7.8	18.3
Transfusion Medicine/Blood Bank	16	0.0	13.2	27.8
Anatomic Pathology	14	4.0	14.3	28.0

Abbreviation: Pctl, percentile.

nonprofit hospitals. Fifteen of 21 institutions (71.4%) were located in cities. Eleven of 21 laboratories (52.4%) served teaching institutions and 11 of 22 (50.0%) maintained pathology residency programs. Occupied bed size was equally distributed among those serving fewer and greater than 300 beds, with 9 of 18 institutions (50.0%) reporting 300 or fewer occupied beds.

Twenty-one participants submitted sufficient data to calculate all laboratory staff 3-year average turnover rates. Table 3 shows the percentile distributions of the 3-year average laboratory staff turnover rates for all laboratory staff, specific personnel categories, and laboratory departments that we studied. The median of the all laboratory staff 3-year average turnover rates among 21 institutions was 16.2%, ranging from 12.2% to 20.5% for the 10th and 90th percentiles, respectively.

Across personnel categories that we studied, ancillary staff had the lowest median of the 3-year average turnover rates (11.1% among 21 institutions, ranging from 0.0% to 27.0% for the 10th to 90th percentiles, respectively) and phlebotomist staff had the highest median of the 3-year average turnover rates (24.9% among 20 institutions, ranging from 13.7% to 46.4% for the 10th to 90th percentiles, respectively). Across laboratory departments that we studied, microbiology had the lowest median of the 3-year average turnover rate (7.8% among 18 institutions, ranging from 0.0% to 18.3% for the 10th and 90th percentile values, respectively) and anatomic pathology had the highest median of the 3-year average turnover rate (14.3% among 14 institutions, ranging from 4.0% to 28.0% for the 10th to 90th percentiles, respectively).

Of the laboratory practices about which we inquired, 2 were significantly associated with lower average 3-year all laboratory staff turnover rates (Table 4). Estimated from a statistical model, the all laboratory staff 3-year average turnover rates were 3.3% lower for institutions that develop and communicate clear career paths ($P = .001$), and 3.6% lower for institutions that provide funding for external laboratory continuing education activities ($P < .001$) as strategies for minimizing turnover, than for institutions that do not implement these strategies. Not included in Table 4 are those HR practices (see Table 2) that were not significantly associated with 3-year average all laboratory staff turnover. None of the demographic characteristics about which we inquired were associated with lower rates of staff turnover.

In some instances, study participants indicated the response to questions regarding institutional HR practices as "unknown." Most commonly, 5 of 21 participants (23.8%) were unaware of the number of grievance reports that employees filed in the previous fiscal year. Fifteen of 22 participants (68.2%) indicated that laboratory medical directors routinely participate in hiring decisions of supervisory personnel (data not shown).

Table 5 lists questionnaire responses inquiring as to what strategies participants' facilities use to retain laboratory staff. Twenty of 22 participants (90.9%) reported conducting morale-boosting activities as a strategy used at their institution to minimize turnover. Offering annual bonuses was the least frequent strategy reported by participants that was used to retain laboratory staff (6 of 22, 27.3%),

Table 4. Practice Characteristics Significantly Associated With All Laboratory Staff 3-Year Average Turnover Rate

Practice Characteristics	N	All Laboratory Staff 3-Year Average Turnover Rate, %			*P* Value
		10th Pctl	Median	90th Pctl	
Strategy used for minimizing turnover: developing and communicating a clear career path					
Yes	9	10.8	14.7	20.5	.001
No	11	15.0	19.0	20.8	
Strategy used for minimizing turnover: funding for external laboratory continuing education activities					
Yes	12	12.2	14.9	18.2	<.001
No	8	15.4	19.9	21.0	

Abbreviation: Pctl, percentile.

Table 5. Responses to Questionnaire Entry: "What Strategies Does Your Facility Use to Retain Laboratory Staff?" (Multiple Responses Allowed) (N = 22)

Strategies Used to Retain Laboratory Staff	No.	Percentage
Conducting morale-boosting activities (eg, meals, treats, laboratory week celebration)	20	90.9
Offering college tuition reimbursement	17	77.3
Conducting laboratory huddles	17	77.3
Providing continuing education activities on site	16	72.7
Providing special recognition awards	15	68.2
Funding external laboratory continuing education activities	14	63.6
Developing and communicating clear career paths	9	40.9
Offering annual bonuses	6	27.3
Other: Offering competitive salaries and maintaining adequate staffing levels[a]	1	4.5
Other: Supporting work/life balance[a]	1	4.5
Other: *Not specified*[a]	1	4.5

[a] Indicates a formatted verbatim response provided in the "other, specify" category as a strategy used to retain laboratory staff.

excluding the responses reported verbatim specified as "other."

Table 6 lists the single strategy participants believed to be most effective in retaining laboratory staff. Ten of 20 participants (50.0%) believed that activities boosting morale provided the most effective strategy their facilities used to retain laboratory staff. Three of 20 participants (15.0%) believed that developing and communicating clear career paths was the single most effective strategy, and zero participants believed that funding for external laboratory continuing education activities was the single most effective strategy used to retain laboratory staff.

DISCUSSION

A total of 23 (20 US and 3 international) participating institutions were included in the study analysis. The median of the 3-year average all laboratory staff turnover rate for the 21 laboratories that provided sufficient turnover data for this study was 16.2%, ranging from 12.2% to 20.5% for the 10th and 90th percentiles, respectively. This median of the 3-year average turnover rate is lower than the 18.2% turnover rate for all health care workers, reported in a recent national survey.[4]

The range of turnover rates among personnel categories and laboratory departments varied greatly from the 10th to 90th percentiles (Table 3). Among personnel categories, the variability in turnover rates was greatest among phlebotomist staff, which ranged from 13.7% to 46.4% for the 10th and 90th percentiles, respectively, out of 20 institutions. Among laboratory departmental categories, the variability in turnover rates was greatest among transfusion medicine/blood bank staff, which ranged from 0.0% to 27.8% for the 10th and 90th percentiles, respectively, out of 16 institutions.

The highest median turnover rate within personnel categories was observed among phlebotomist staff. The median of the 3-year average turnover rate among 20 institutions was almost 25.0%; the 90th percentile of the observed 3-year average turnover rates was almost 50.0%. The high turnover rate for phlebotomists is consistent with the relatively high vacancy rate (8.11%) reported previously.[5] The highest median of the 3-year average turnover rate for departmental categories was observed within anatomic pathology departments. The median of the 3-year average turnover rate among 14 institutions for anatomic pathology departments was 14.3%; the 90th percentile of the 3-year average turnover rates observed was 28.0%. This finding is inconsistent with a recently reported study showing that nonphysician reported vacancies in anatomic pathology departments are the lowest (4.7%) in the laboratory industry.[5] This paradox may be an artifact of our small sample size and/or a reflection of the geographic distribution of this study's participants. It may also indicate a bias in the design of this Q-Probes study. For example, managers may be incentivized to purchase studies that investigate perceived problem areas in their laboratories, in this case high laboratory staff turnover rates, potentially skewing

Table 6. Responses to Questionnaire Entry: "In Your Opinion, What Is the One Most Effective Strategy Used at Your Facility To Retain Laboratory Staff?" (N = 20)

Strategies Used to Retain Laboratory Staff	No.	Percentage
Conducting morale-boosting activities (eg, meals, treats, laboratory week celebration)	10	50.0
Developing and communicating a clear career path	3	15.0
Offering annual bonuses	2	10.0
Providing continuing education activities on site	2	10.0
Offering college tuition reimbursement	1	5.0
Other: Offering competitive salaries and maintaining adequate staffing levels[a]	1	5.0
Other: Supporting work/life balance[a]	1	5.0
Providing special recognition awards	0	0.0
Funding external laboratory continuing education activities	0	0.0
Conducting laboratory huddles	0	0.0

[a] Indicates a formatted verbatim response provided in the "other, specify" category reported as the one most effective strategy used to retain laboratory staff.

performance statistics from those of free-of-charge surveys in which the laboratories of participating managers do not share those problem areas.

Three-year average laboratory staff turnover rates were significantly lower in institutions that reported developing and communicating clear career paths for their employees as a strategy to minimize turnover ($P = .001$) than in institutions not implementing this strategy (Table 4). However, of the 9 of 22 participating institutions using this strategy (40.9%), only 3 of 20 participants (15.0%) believed this to be the most effective strategy for retaining employees (Tables 5 and 6). Three-year average laboratory staff turnover rates were also significantly lower in institutions that reported providing funding for external laboratory continuing education activities ($P < .001$) than in institutions that do not implement this strategy (Table 4). Fourteen of 22 institutions (63.6%) provided such funding, but none of the participants believed this strategy to be the most effective strategy for retaining employees (Tables 5 and 6). We did not include in the Table 4 analysis descriptive summaries (see Tables 5 and 6) of institutions that were missing all laboratory staff 3-year average turnover data.

Other than the 2 actionable practices reported in Table 4, none of the laboratory practices that we tested, including those that focused on morale boosting, were associated with lower laboratory staff turnover rates. However, the number of laboratories participating in this study may have been insufficient to demonstrate significant differences. Regardless of whether or not any of the practices about which we chose to inquire were effective, or which participants indicated were effective, laboratories invested in reducing turnover rates might benefit from piloting 1 or more of them. Twenty institutions of 22 (90.9%) conduct morale-boosting activities as strategies for retaining laboratory employees (Table 5). Ten of 20 participants (50.0%) believed this practice to be the most effective strategy for retaining staff (Table 6).

In several instances, participants responded "unknown" to survey questions regarding laboratory and institutional HR practices (data not shown). This response may indicate that in some institutions, laboratory managers and medical directors responsible for staffing the laboratory may have very limited knowledge of their institutions' HR practices. If that is true, those individuals may find it helpful to familiarize themselves with their institutions' HR policies and the effects those policies might have on turnover rates, especially in laboratories for which turnover rates are high.

Fifteen of 22 participants (68.2%) reported that laboratory medical directors are routinely involved in hiring of laboratory supervisory personnel, meaning laboratory medical directors in 7 of 22 laboratories responding to this question (31.8%) may not participate in hiring laboratory supervisory personnel. When hiring supervisory personnel, laboratory managers might consider soliciting the input of their laboratory medical directors, since the statute of the Clinical Laboratory Improvement Amendments (1988) and standards of CAP accreditation hold medical directors responsible for the overall operation of laboratories, including ensuring adequate laboratory staffing.[1,2]

We caution laboratory and hospital managers who may be tempted to use these data as a means of gauging their abilities to retain employees and fill vacant positions relative to other institutions. There may be many reasons why employees leave their employers, not the least of which are personal motivations, hospital reorganizations, and variations in leadership, managerial skills and personality traits, to name a few, none of which this study was designed to detect. We did not investigate whether turnover rates and factors related to them may have been influenced by confounding institutional operational and regional economic circumstances about which we did not inquire. We suggest those institutions in which laboratory staff turnover is at the higher extreme of these normative rates examine their organizational culture and HR practices to detect, and if necessary correct, any deleterious effects on staff turnover those practices might have.

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