

Physician Satisfaction With Clinical Laboratory Services

A College of American Pathologists Q-Probes Study of 81 Institutions

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• **Context.**—Assessment of customer satisfaction is a vital component of the laboratory quality improvement program.

Objective.—To survey the level of physician satisfaction with hospital clinical laboratory services.

Design.—Participating institutions provided demographic information and survey results of physician satisfaction, with specific features of clinical laboratory services individually rated on a scale of 5 (excellent) to 1 (poor).

Results.—Eighty-one institutions submitted 2425 surveys. The median overall satisfaction score was 4.2 (10th percentile, 3.6; 90th percentile, 4.6). Of the 16 surveyed areas receiving the highest percentage of excellent/good ratings (combined scores of 4 and 5), quality of results was highest along with test menu adequacy, staff courtesy, and overall satisfaction. Of the 4 categories receiving the lowest percentage values of excellent/good ratings, 3 were related to turnaround time for inpatient “STAT” (tests performed immediately), outpatient STAT, and esoteric

tests. The fourth was a new category presented in this survey: ease of electronic order entry. Here, 11.4% (241 of 2121) of physicians assigned below-average (2) or poor (1) scores. The 5 categories deemed most important to physicians included quality of results, turnaround times for inpatient STAT, routine, and outpatient STAT tests, and clinical report format. Overall satisfaction as measured by physician willingness to recommend their laboratory to another physician remains high at 94.5% (2160 of 2286 respondents).

Conclusions.—There is a continued trend of high physician satisfaction and loyalty with clinical laboratory services. Physician dissatisfaction with ease of electronic order entry represents a new challenge. Test turnaround times are persistent areas of dissatisfaction, representing areas for improvement.

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As physicians are the primary customers of the clinical laboratory, it is important for laboratories to assess physician satisfaction with services that are being provided. Both the College of American Pathologists (CAPs) Laboratory Accreditation Program and The Joint Commission recognize the importance of customer satisfaction as part of their respective accreditation programs. The CAP Laboratory Accreditation Program requires institutions to measure customer satisfaction (ie, physicians, clients or patients) with laboratory services at least once during each 2-year inspection cycle (GEN.20335).¹ The Joint Commission requires laboratories to identify opportunities for improvement by collecting data from “internal sources such as staff,” in addition to monitoring communication processes

such as “efficient transfer of information, completeness of test requisition, timeliness of reporting results, and accuracy of reports.”² Surveying end-users for their satisfaction with laboratory services provides meaningful reinforcement on areas of strength and opportunities to identify areas of weakness in need of quality improvement. Assessing physician satisfaction with laboratory services is an important component of a laboratory quality improvement program.

CAP Q-Probes is a laboratory quality improvement program designed to assist laboratories in assessing their own quality through benchmarking. Data resulting from Q-Probes studies have also been used to produce numerous publications that define benchmarks for use across many aspects of pathology and laboratory medicine.³ A standardized survey tool for assessing customer satisfaction with clinical laboratory services is part of the Q-Probes program, with previous studies examining physician satisfaction performed in 1999,⁴ 2002,⁵ and 2007.⁶ The 2007 study reported an overall physician satisfaction score for clinical laboratory services of 4.1 (on a scale of 1 [poor] to 5 [excellent]). The 2002 and 1999 studies reported overall physician satisfaction scores of 4.0.

The practice of laboratory medicine continues to change. New reimbursement models and new or expanded electronic health records and laboratory information systems are being developed, and the breadth of available laboratory

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tests continues to grow.^{7,8} Repeated assessment of key elements of clinical laboratory quality is imperative for comparison of results over time and evaluation of the relative success of interventions. Carefully selected additions to the surveyed elements may be considered given changes in the practice of laboratory medicine. Any additional elements should reflect aspects of service that are pertinent to customers and provide relevant and timely feedback on evolving practice areas.

MATERIALS AND METHODS

During the third quarter of 2014, subscribers in the voluntary CAP Q-Probes program collected data for this study. All participating laboratories completed a general questionnaire outlining laboratory characteristics, demographic data, and scope of service. These data were necessary to standardize benchmarking and allow comparison of the satisfaction survey results between laboratories.

All participating laboratories received a standardized satisfaction survey along with instructions for administering the survey to physician end-users of the laboratory. The survey specifically excluded participation by physicians-in-training (fellows, residents, interns). Two options for survey distribution were provided: (1) paper-based (hard copy), which could also be scanned and emailed/faxed to customers, and (2) electronic, using a Cloud-based survey tool by Qualtrics Labs (Provo, Utah). Laboratories could use either or both methods of survey distribution.

For the paper-based survey, laboratories distributed up to 300 copies to their physician customers by using a distribution method of their choosing. Participating physician customers submitted their completed surveys back to their respective laboratories. Laboratory staff either manually entered data from the surveys onto Q-Probe data input forms, which were then faxed or mailed to the CAP data center, or directly entered survey data into e-LAB Solutions through the CAP Web site. Laboratory staff were able to review any handwritten comments on the hard copy responses. Paper-based responses were limited to 50 physician questionnaires per participating laboratory.

For the online-based survey, laboratories obtained a unique URL from the Q-Probe support staff. This Web link was subsequently distributed by the laboratory to physician customers by email. There was no limit to the number of surveys that could be distributed via this method. The CAP collected all data submitted via the Qualtrics tool without application of a 50-respondent limit. The use of the electronic survey did not require manual transcription or data entry by laboratory staff.

Satisfaction scores were collected for 16 laboratory service areas along with an overall satisfaction score. A 5-point rating scale was used for responses ranging from excellent (5 points) to poor (1 point). Survey descriptors associated with scores of 4, 3, and 2 were good, average, and below average, respectively. Physician customers were asked to choose 1 of the 16 laboratory services areas that they deemed "most important." Finally, physician respondents were asked whether or not they would recommend their laboratory to another physician. Paper-based surveys presented this recommendation question in the form of a yes/no choice. Online surveys presented this recommendation question as a 0 to 10 scale, with 0 representing "not at all likely" to recommend the laboratory to other physicians, and 10 as "extremely likely" to recommend the laboratory to other physicians. Different survey formats were combined by assigning scores 0 to 4 as "no" and 5 to 10 as "yes" to the recommendation question. Differences between paper and electronic surveys existed for this laboratory recommendation question only.

Participating laboratory subscribers received individualized performance reports with results and percentile rankings for internal use and benchmarking comparison, in combination with a thorough general data analysis and appraisal of the study results.

Data were analyzed by the biostatistics department of the CAP. A 2-phase approach was used to analyze the physician satisfaction scores. Individual associations between the satisfaction scores with the demographic and practice variables were analyzed by using Kruskal-Wallis tests for discrete-valued independent variables and regression analysis for the continuous independent variables. Variables with significant associations ($P < .10$) were then included in a forward selection multivariate regression model. A *t* test was used to compare the performance between the 2007 and 2014 study results. A level of .05 was used for statistical significance. All statistical analyses were performed by using SAS version 9.3 (SAS Institute, Cary, North Carolina).

RESULTS

Institutional Characteristics

Eighty-one institutions participated in this study of physician satisfaction with clinical laboratory services, submitting a total of 2425 surveys. Sixty-seven participants (82.7%) were from the United States and 14 (17.3%) were located overseas, including Saudi Arabia (6, 7.4%), United Arab Emirates (5, 6.2%), Qatar (2, 2.5%), and Brazil (1, 1.2%). Demographic information provided by the institutions indicated that 36 of 75 (48.0%) were teaching hospitals and 28 of 78 (35.9%) had a pathology residency training program. Of 78 responding laboratories, 68 (87.2%) had been inspected by the CAP during the preceding 2 years, while 8 (10.3%) were inspected by the Joint Commission. Institutional demographics characteristics are presented in Table 1 and other characteristics of participating institutions are presented in Table 2.

Overall Satisfaction

Of the 81 responding institutions, 4 submitted less than 5 surveys and were excluded from the laboratory-specific analyses. Responding physicians provided an overall satisfaction rating as well as satisfaction ratings for 16 defined laboratory service areas. The overall satisfaction ratings provided by the physicians were used as the quality indicator for the laboratory. Satisfaction scores were calculated as a mean of the ratings. The median overall satisfaction score for participants ($n = 77$) was 4.2 (10th percentile, 3.6; 90th percentile, 4.6) and the median percentage of excellent/good ratings for overall satisfaction was 85.7 (10th percentile 63.3; 90th percentile, 100.0) as shown in Table 3. Table 4 demonstrates the survey responses for each of the 16 survey categories. The overall satisfaction rating for each laboratory was analyzed in comparison with demographic variables, demonstrating a higher median overall satisfaction score for laboratories in hospitals with fewer than 300 beds (4.4 versus 4.0, $P = .001$). There was also a slightly higher median overall satisfaction score for laboratories that monitor send-out tests as part of their quality improvement program (4.3 versus 4.0, $P = .02$).

Satisfaction by Service Area

In addition to their overall satisfaction, physicians were asked to rate their satisfaction with 16 laboratory service characteristics on a 5-point scale with 5 representing an excellent rating and 1 representing a poor rating. Fifteen of the 16 categories were repeated from the 2007 version of this Q-Probes study with ease of electronic order entry added to the current questionnaire. Table 4 demonstrates the mean and distribution of survey responses for overall satisfaction and the other 16 survey categories, while the

Table 1. Institution Demographics

Demographics	No.	Percentage
Occupied bed size		
0–150	30	41.7
151–300	15	20.8
301–450	14	19.4
451–600	6	8.3
>600	7	9.7
Teaching hospital		
Yes	36	48.0
No	39	52.0
Laboratory trains pathology residents		
Yes	28	35.9
No	50	64.1
Institution location		
City	38	49.4
Suburban	13	16.9
Rural	23	29.9
Federal installation	2	2.6
Other	1	1.3
Government affiliation		
Nongovernmental	57	74.0
Governmental, nonfederal	12	15.6
Governmental, federal	8	10.4
College of American Pathologists inspection within the past 2 years		
Yes	68	87.2
No	10	12.8
The Joint Commission inspection within the past 2 years		
Yes	8	10.3
No	70	89.7
Institution type		
Voluntary, nonprofit hospital	40	51.9
Nongovernmental, university hospital	8	10.4
Other, governmental, nonfederal	4	5.2
Other, nongovernmental	4	5.2
State acute hospital	4	5.2
Veterans hospital	4	5.2
Proprietary hospital	3	3.9
County hospital	2	2.6
Department of Defense	2	2.6
Governmental, nonfederal university hospital	2	2.6
Other, governmental, federal	2	2.6
Group practice	1	1.3
Private, independent laboratory	1	1.3

Figure demonstrates a bar plot of survey results per service area. All categories demonstrated median satisfaction scores of 4.0 or higher except for the new topic “ease of electronic order entry” (median 3.9) and “esoteric test turnaround time (TAT)” (median 3.7). Of physician respondents, 241 of 2121 (11.4%) indicated a below-average (2) or poor (1) score for ease of electronic order entry, and 260 of 2189 (11.9%) of respondents indicated a below-average (2) or poor (1) score for esoteric test TAT. When grouping the 4 laboratory services areas receiving the highest number of below-average or poor ratings, 3 were related to inpatient STAT test (tests performed immediately) TAT, outpatient STAT test TAT, and esoteric test TAT. The fourth category in this group was ease of electronic order entry.

The highest median satisfaction scores were for staff courtesy and quality of results, both demonstrating median

satisfaction scores of 4.4. The percentages of excellent or good ratings for each repeated laboratory service category were not statistically different from those of the 2007 survey.

Laboratory Recommendation

Respondents to the physician satisfaction survey were asked to indicate whether they would recommend their clinical laboratory to another physician. In this study 94.5% (2160 of 2286) of physicians indicated they would recommend their laboratory to another physician. Table 5 shows the distribution of the physician recommendation rate. There was a significant association between the percentage of favorable physician recommendations a laboratory received and the overall physician satisfaction score ($P < .001$).

DISCUSSION

This Q-Probes study assessed physician satisfaction with 16 clinical laboratory-associated services and overall physician satisfaction with the clinical laboratory. This study was previously conducted in 2007 and assessed satisfaction with 15 of the 16 laboratory service categories addressed in the current survey. No statistically significant differences were found between the mean scores for repeated categories or for the overall physician satisfaction for these 2 studies.

The current study continues to demonstrate a high level of overall physician satisfaction with laboratory services. In this study, the median rate for overall percentage of excellent or good responses was 85.7% with a 10th to 90th percentile range of 63.3% to 100%. Physicians’ willingness to recommend their laboratory to another physician was very high at 2160 of 2286 (94.5%) and compares favorably to the 93.5% of physicians who made this recommendation in 2007.

Quality of results remained the most important laboratory service category as identified by 892 of 2195 respondents (40.6%) compared to 31.7% of respondents in 2007. After quality of results, the next most important laboratory service categories based upon physician responses included inpatient STAT test TAT (236 of 2195, 10.8%), routine test TAT (222 of 2195, 10.1%), followed by outpatient STAT test TAT (120 of 2195, 5.5%), which highlights the need for clinical laboratories to remain aware of the importance physicians place on these services. While quality of results remains the most important element for most physicians, physicians choosing other categories likely believe that the laboratory is producing quality results and these other categories raise to the top of their concerns. Noted is a slight upward trend in the importance of clinical report format from 2007 (2.4% of respondents selected) to 2014 (111 of 2095, 5.1% of respondents selected as most important). This issue may be related to transitions in electronic health record systems occurring during the intervening 7 years.

Overall physician satisfaction with laboratory services was very high with a mean satisfaction score of 4.2 (based on a 5-point scale). The highest mean scores were for quality of results at 4.4, followed by staff courtesy and test menu adequacy with scores of 4.3. The lowest mean scores of the 16 categories were esoteric test TAT at 3.7 and ease of electronic order entry at 3.8.

Electronic order entry was a new category added for the current study, which garnered relative dissatisfaction by providers, being listed as below average or poor by 241 of

Table 2. Personnel-Related Characteristics of Participating Institutions

General Questionnaire Query	Yes		No	
	No.	Percentage	No.	Percentage
Do you have full-time employees in your laboratory dedicated to customer support (ie, they spend most of their time in contact with customers)?	28	42.4	38	57.6
Do you have a formal customer satisfaction training program for all employees?	35	54.7	29	45.3
Do you have personnel (under laboratory management) who perform laboratory phlebotomy service for:				
Inpatients	51	77.3	15	22.7
Outpatients	64	97.0	2	3.0
Emergency department patients	32	50.0	32	50.0
Physician office/offsite drawing station	35	54.7	29	45.3
Do you have personnel (under laboratory management) dedicated to laboratory phlebotomy services?	64	97.0	2	3.0
Are the offsite couriers:				
Under laboratory management and employed by the laboratory?	15	26.8	41	73.2
Under laboratory management but not employed by the laboratory (private courier service, taking direction from laboratory managers)?	10	18.5	44	81.5
General institutional courier service, employed by your institution?	32	59.3	22	40.7
Private courier service, not under laboratory management?	30	56.6	23	43.4
Do you provide your own engagement training in customer service (as opposed to using outside consultants)?	25	38.5	40	61.5
In your opinion, has the engagement training had an effect on laboratory service?	20	80.0	5	20.0
As part of your performance improvement program, do you routinely monitor:				
Turnaround times	63	98.4	1	1.6
Corrected reports	55	88.7	7	11.3
Critical value notification	60	96.8	2	3.2
Lost specimens	48	78.7	13	21.3
Pending lists	45	73.8	16	26.2
Customer complaints	60	95.2	3	4.8
Telephone response time	16	26.7	44	73.3
Send-out testing	48	76.2	15	23.8
Rejected specimens	57	90.5	6	9.5
Mislabelled specimens	60	95.2	3	4.8
Do you participate in an ongoing patient satisfaction program (either inpatient or outpatient)?	58	87.9	8	12.1
Does your institution have an interdisciplinary workgroup to address problems?	54	81.8	12	18.2
Have you surveyed your physician customers within the last 2 years regarding laboratory services?	34	51.5	32	48.5

2121 respondents (11.4%). This is important because computerized provider order entry (CPOE) for laboratory orders is a stage 2 criterion for Meaningful Use of electronic health records (EHRs).⁹ Meaningful Use criteria developed by the federal government are used to incentivize stepwise adoption of EHR technology, with the ultimate goal of improving health care outcomes. Therefore, utilization of CPOE has quickly spread through medical centers in the United States. Computerized provider order entry is a powerful tool. Studies indicate that CPOE can decrease errors of transcription that can occur when written physician orders are entered by clerks.¹⁰ If presented in conjunction with clinical decision support tools such as drug contraindication data, CPOE also presents a unique opportunity to alter physician behavior in real-time.^{11,12} In an era of increasing focus on cost effectiveness, a previous study¹³ demonstrated a modest decrease in test ordering in the inpatient setting at the Johns Hopkins Hospital when fee data for laboratory

testing was displayed at the time of order entry. Our data provide feedback from physicians who use CPOE for laboratory orders and demonstrate room for improvement in physician satisfaction with this tool. Clinical laboratories should work to optimize the CPOE experience for physicians to improve their satisfaction. High-quality communication to physicians regarding CPOE and involving physicians in optimization strategies may improve physician acceptance and satisfaction.¹⁴ Additional optimization of this powerful tool can include linked access to an electronic laboratory manual for sample collection instructions, linked access to decision support tools, and/or linked access to assay TAT and price information. As many hospitals have purchased EHR systems and are moving through Meaningful Use stages of implementation, now is the appropriate time for action and optimization of the CPOE process.

The only other category to have more below-average or poor responses than ease of electronic order entry was

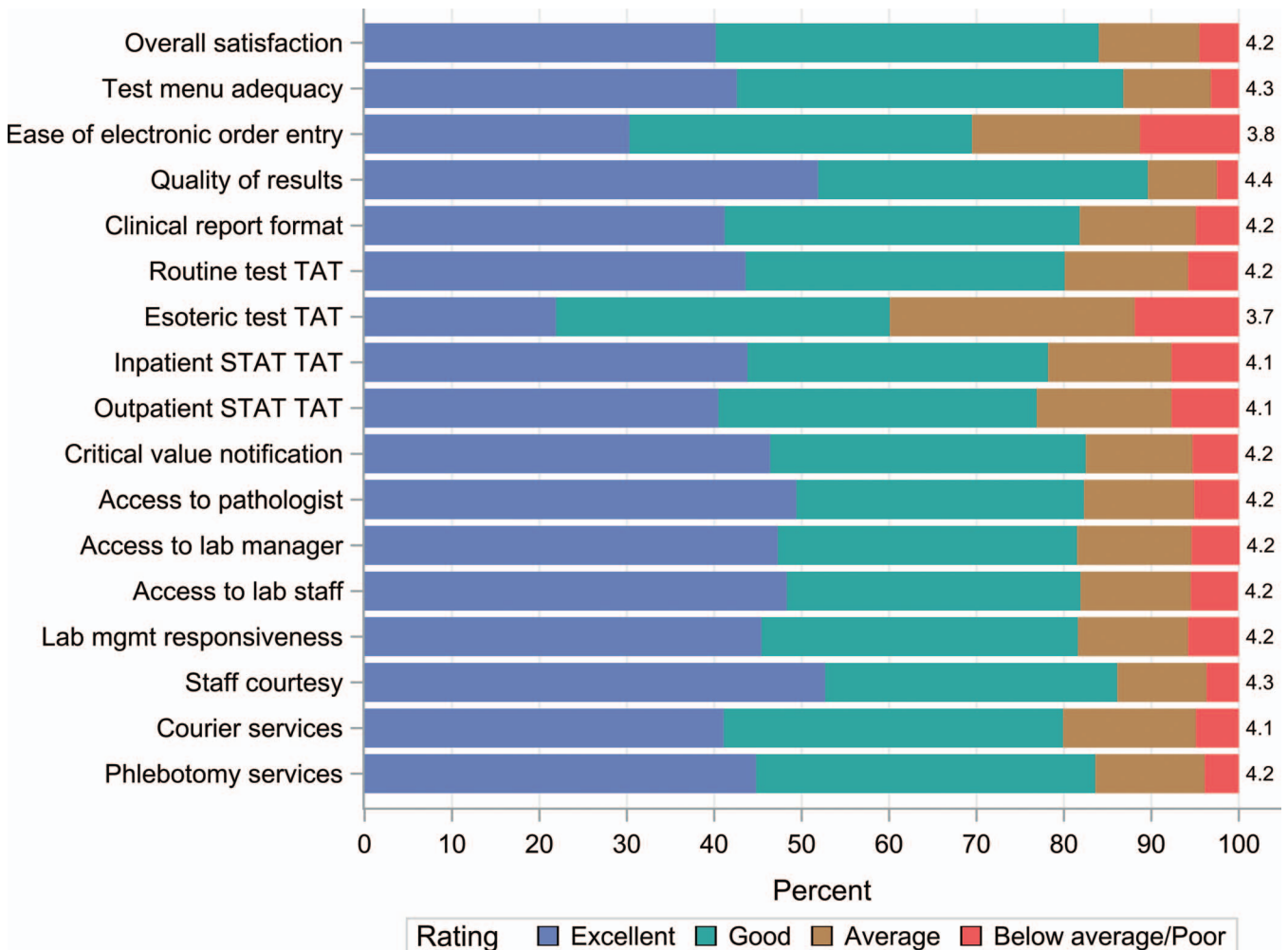
Table 3. Distribution of Mean Overall Satisfaction Scores and Distribution of Percentages of Scores Showing Excellent/Good Ratings

	n	Satisfaction Score (5-Point Scale)					Percentage of Excellent/Good Ratings				
		10th	25th	Median	75th	90th	10th	25th	Median	75th	90th
Overall satisfaction	77	3.6	4.0	4.2	4.5	4.6	63.3	78.1	85.7	93.4	100.0

Table 4. Physician Satisfaction With Clinical Laboratory Services Results for All Service Categories

Service Category	No. of Ratings	Mean Satisfaction Score	Ratings Breakdown, No. (%)				
			Excellent	Good	Average	Below Average	Poor
Overall satisfaction	2400	4.2	965 (40.2)	1050 (43.8)	277 (11.5)	74 (3.1)	34 (1.4)
Critical value notification	2335	4.2	1084 (46.4)	842 (36.1)	286 (12.2)	71 (3.0)	52 (2.2)
Access to pathologist	2030	4.2	1002 (49.4)	668 (32.9)	255 (12.6)	72 (3.5)	33 (1.6)
Access to laboratory manager	1938	4.2	916 (47.3)	663 (34.2)	254 (13.1)	65 (3.4)	40 (2.1)
Access to laboratory staff	2286	4.2	1105 (48.3)	768 (33.6)	288 (12.6)	88 (3.8)	37 (1.6)
Laboratory management responsiveness	2089	4.2	949 (45.4)	756 (36.2)	263 (12.6)	67 (3.2)	54 (2.6)
Staff courtesy	2329	4.3	1228 (52.7)	778 (33.4)	237 (10.2)	58 (2.5)	28 (1.2)
Courier services	1556	4.1	640 (41.1)	603 (38.8)	237 (15.2)	53 (3.4)	23 (1.5)
Phlebotomy services	1980	4.2	888 (44.8)	768 (38.8)	247 (12.5)	52 (2.6)	25 (1.3)
Test menu adequacy	2317	4.3	988 (42.6)	1023 (44.2)	232 (10.0)	48 (2.1)	26 (1.1)
Ease of electronic order entry	2121	3.8	642 (30.3)	831 (39.2)	407 (19.2)	161 (7.6)	80 (3.8)
Quality of results	2407	4.4	1249 (51.9)	908 (37.7)	191 (7.9)	42 (1.7)	17 (0.7)
Clinical report format	2393	4.2	986 (41.2)	971 (40.6)	319 (13.3)	79 (3.3)	38 (1.6)
Routine test TAT	2375	4.2	1036 (43.6)	868 (36.5)	336 (14.1)	99 (4.2)	36 (1.5)
Esoteric test TAT	2189	3.7	479 (21.9)	836 (38.2)	614 (28.0)	170 (7.8)	90 (4.1)
Inpatient STAT test TAT	1884	4.1	825 (43.8)	649 (34.4)	265 (14.1)	95 (5.0)	50 (2.7)
Outpatient STAT test TAT	1944	4.1	788 (40.5)	707 (36.4)	300 (15.4)	101 (5.2)	48 (2.5)

Abbreviations: STAT, tests performed immediately; TAT, turnaround time.



Bar plot showing distribution of ratings (excellent, good, average, below average/poor) for overall satisfaction and the other 16 survey categories. Abbreviations: STAT, tests performed immediately; TAT, turnaround time.

Table 5. Physician Recommendation of Laboratory

	n	Recommendation Rate, %				
		10th Pctl	25th Pctl	Median	75th Pctl	90th Pctl
Physician recommends laboratory to another physician	77	81.6	91.7	98.0	100.0	100.0

Abbreviation: Pctl, percentile.

esoteric test TAT at 260 of 2189 (11.9%). Both inpatient STAT test TAT and outpatient STAT test TAT had below-average or poor responses of 7.7% (145 of 1884 and 149 of 1944, respectively). This highlights the need for clinical laboratories to remain vigilant about TATs and affords laboratories opportunities for improvement and better education of providers to align expectations with realistic goals especially as related to esoteric testing.

Two statistically significant associations were discovered when comparing overall physician satisfaction with laboratory characteristics. Smaller hospitals had higher overall satisfaction scores than larger hospitals, and laboratories that routinely monitor send-out testing as part of their performance improvement program also had higher satisfaction scores.

Interestingly, no significant associations were found between overall physician satisfaction and laboratory practices of monitoring TAT, corrected reports, critical value notifications, lost specimens, pending lists, customer complaints, telephone response times, rejected specimens, or mislabeled specimens. Whether or not these categories are important to monitor, the lack of association with overall physician satisfaction may represent the lack of effectiveness in achieving improvement in these areas. Alignment of laboratory monitoring priorities with issues identified on physician satisfaction surveys and optimization of communication of improvement in areas of concern (such as esoteric and STAT test TAT) are strategies that could be implemented in response to these data.

Monitoring customer satisfaction remains a vital component of assessing laboratory performance. This Q-Probes study demonstrated that overall physician satisfaction remains high among most laboratories but also highlights

several areas where physicians continue to have concerns about laboratory performance.

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