

# **Environmental Scan of the Radiographer's Workplace: Phase 3**

Subgroups of Radiographers and  
Workplace Types

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## Background and Objectives

Founded in 1920, the American Society of Radiologic Technologists (ASRT) is the largest radiologic science organization in the world with a worldwide membership of more than 100,000. The mission of the ASRT is to provide members with educational opportunities, promote radiologic technology as a career and monitor state and federal legislation that affects the profession.

To understand the current workplace and use this information to better position and market the radiologic technologist profession to candidates, the ASRT commissioned Savitz Research Solutions to do a three-phase assessment of the radiologic technologist's workplace.

The objectives of the assessment were to: Gain a broad understanding of the workplace as perceived by radiologic technologists compared with administrators' perceptions of the workplace.

- Identify factors and attributes that drive job and career satisfaction.
- Gain an understanding of the general working conditions of radiologic technologists.
- Explore the details behind what is considered best and worst of class.
- Define the various types of workplaces as perceived by staff technologists, the various subgroups of technologists as defined by attributes they find important in the workplace and relate types of workplaces to subgroups of technologists.

This report details the results of the third phase of the research.

## Methodology

In the third phase, Savitz Research Solutions mailed a total of 7,996 surveys to a random sample of certified radiologic technologists (drawn from the registrant database of the American Registry of Radiologic Technologists, or ARRT) who listed staff technologist or senior staff technologist as their current job description.

Savitz conducted a four-to-one mailing to ensure a proper response. The mailing produced a 30% response rate by the requested return date of May 17, 2002. The segmentation section of this report describes the statistical analyses employed.

The mail questionnaire included the following areas of investigation:

- Active employment status.
- Attributes. Respondents rated overall satisfaction on six attributes, current facility importance on 27 attributes, preference for eight attributes and a current rating for 27 facility attributes.
- Current position. Questions asked for respondents' number of years in radiologic science, years in current position, average hours worked, shift worked and average commute time. Respondents were asked about their status as a generalist or specialist, time spent working in a trauma unit and performing paid on-call work. The survey gathered data on respondents' total number of past facilities and employers, education and certificates, and membership in ASRT and other organizations.
- Current facility. This section's questions addressed facility type, location, region, age of facility and radiology department staff size and tenure. The survey also sought to determine average amount of time spent with patients, number of patients treated per week, and amount of time spent on inpatient vs. outpatient care. Questions were asked concerning employment of noncredentialed personnel, internal and external training and career-specific training days per year.
- Demographics. The survey collected demographic data on respondent's age, gender, marital status, ethnicity, household size and number of children in household.

# Executive Summary

## Introduction

The third phase of the environmental scan combined information gathered in the first two phases and attempted to:

- Describe staff radiographers and their workplace environments using a larger sample than previous phases and a
- smaller, less redundant set of 27 workplace attributes selected from among first and second phase results. The survey analysis applied ratings of perceived importance to these workplace attributes. The third phase also added a set of items tapping broad career and workplace preferences.
- Define the various segments (types) into which a range of workplaces fell as perceived by technologists and the various clusters (subgroups) into which technologists fell.
- Determine the relationship between technologist subgroups and workplace types.

A total of 7,996 mail surveys were sent to a stratified random sample of technologists drawn from the registrant database of the ARRT. The sample included only technologists who were certified as radiographers and who considered themselves staff or senior staff technologists.

Thirty percent of the surveys were received by the May 17, 2002 requested return date.

## Radiologic Technologists in General (All Respondents)

### Satisfaction

- The vast majority of technologists said they were satisfied with their jobs, the quality of patient care provided at their institutions, their coworkers and facilities.
- Technologists were least satisfied with radiology administration. Only 60% of the respondents said they were either somewhat or very satisfied with administration.

### Location

- Most respondents worked in hospitals (60%) and one third worked in clinics or imaging centers.
- About one fourth defined their workplaces as rural and the remainder was evenly split between urban and suburban locations.
- Respondents commuted almost 23 minutes. One fourth of the technologists worked within 10 minutes of their homes.

### People

- About 90% of respondents listed staff technologist or senior staff technologist as their job on the survey, while 100% had listed those job descriptions on their ARRT certification-renewal forms.
- On average, respondents had worked in the profession for nearly 16 years.
- About 70% worked full time and 30% worked 35 hours per week or less.
- The vast majority worked straight day shifts.

- Technologists participating in the survey were evenly split between considering themselves specialists or generalists.
- About 30% of respondents worked in the trauma unit at least once per week.
- About one half held an associate degree and 11% a baccalaureate degree.
- On average, respondents spent about 20 minutes with each patient and saw an average of 80 patients per week.

### **What Did Respondents Consider Important?**

The 10 attributes technologists stated as important in selecting a facility were:

- Schedule that fits personal needs.
- Wages above industry average.
- Job security.
- Respect from physicians.
- Insurance benefits.
- Proper technologist education.
- Ability to provide accurate images.
- No on-call requirements.
- Opportunity to spend proper amount of time with patients.
- Adequate support staff.

The 10 attributes technologists stated were least important in selecting a facility were:

- The building's working order.
- Reimbursement of work expenses.
- Overall department layout.
- Internal training.
- Respect from nurses.
- Facility reputation.
- Receiving proper performance evaluations.
- Having control over career.
- Workplace safety.
- Location that meets personal needs.

Respondents gave several attributes high importance ratings, yet these attributes were found to have a statistically low to null impact on technologists' satisfaction (and vice versa) in the multivariate analyses. This was probably due to ceiling effects, as respondents who considered a given workplace characteristic important generally worked in facilities they rated highly on that characteristic. However, those attributes that an individual technologist considered important indeed impacted facility satisfaction more than those they considered unimportant. This is further explained in the Detailed Findings section.

### **How Did Facilities Perform?**

The 10 facility attributes receiving highest performance ratings were:

- Ability to provide accurate images.
- Facility follows occupational and radiation safety guidelines.
- Workplace safety.
- Schedule that fits personal needs.
- Job security.
- Proper technologist education.
- The building's working order.
- Coworkers who act professionally.
- Overtime pay.
- Facility reputation.

The 10 facility attributes receiving lowest performance ratings were:

- Wages above industry average.
- Respect from nurses.
- Overall department layout.
- Internal training.
- Adequate support staff.
- Radiology department communications.
- No on-call requirements.
- State-of-the-art imaging equipment.
- Location that meets personal needs.
- Retirement benefits.

### **Identifying Subgroups of Technologists**

A multivariate cluster analysis was conducted to sort respondents into groups that shared similar attribute ratings. Respondents were clustered into six groups providing similar combinations of job and workplace characteristic importance ratings (Q4).

**Paying Dues (19%).** Technologists in this segment most likely worked in an older hospital and in the trauma unit. They've worked for the fewest number of employers. Paying Dues technologists tended to place greater importance on professional procedures and care and less importance on personal gain and comfort. Although not especially young, they tended to be newer to the profession and to report no children in the household.

**Career Focused (18%).** This subgroup's respondents reported working hard and expected the compensation and environment to match their efforts. Career attributes such as wages and benefits were important. Career Focused respondents tended to work in larger, urban hospitals with correspondingly large radiology departments, an important factor because these technologists placed high value on a facility's capabilities. These types of facilities are few, so the subgroup's technologists appeared more flexible with their schedules and commutes. A need for patient care efficiency reflected in high productivity among these respondents.

**Balancing Family/Job (14%).** Respondents in this more “average” subgroup were more likely to work as generalists in suburban nonhospital facilities. Not new to the profession, they placed strong emphasis on their facilities. Balancing Family/Job technologists were more likely than those in many segments to be married, female and have children. They tended to place a higher priority on family values and personal lifestyle than their jobs.

**Seeking Stability (14%).** Respondents’ adversity to change and conflict primarily characterized this somewhat average segment. Radiographers viewed their jobs not simply as second incomes, but as their careers. Benefits were important to these technologists. They seemed to want to do their jobs and not “make waves.”

**Satisfied Overall (18%).** Technologists in this subgroup were most satisfied with all aspects of their jobs. Radiographers wanted to do their jobs well and seemed to have the time to spend with patients. They did not appear to rely on their jobs for long-term financial needs. Satisfied Overall respondents considered accuracy and professionalism important, but they had paid their “dues” and expected to be treated as such. They most likely worked in clinics.

**Least Satisfied (17%).** Respondents in this subgroup were the least satisfied of all technologist clusters, tending to place more emphasis on personal comfort and well-being than on job functions. Although average in demographics, their common characteristic appeared to be a concern about personal benefits and pay over facility and job attributes.

### **Differences Among Technologist Subgroups**

- The six technologist subgroups differed in attributes they considered important, in their broad professional practice and workplace characteristic preferences and in their demographic characteristics.
- Differences among subgroups in overall satisfaction, while statistically significant, were not large, varying only from a mean (across all six satisfaction measures) of 2.88 to 3.14 on a four-point scale.
- A number of statistically significant differences occurred across subgroups when rating facility characteristics, most notably, Paying Dues and Career Focused subgroups’ lower ratings of their facilities’ on-call policies. However, these differences generally remained small, and rankings normally resulted in similar facility strengths and weaknesses across subgroups.
- A technologist’s ratings of the importance of the 27 core attributes generated scores on five “importance dimensions.” Assigning respondents to subgroups based on their score profiles on these five dimensions correctly classified 93% of survey respondents. Employing an alternative classification and regression trees (CART) flowchart (see the segment analysis portion of the Detailed Findings section) would result in a 59% correct classification.

### **Identifying Types of Facilities**

Researchers conducted a cluster analysis to sort facilities into groups according to technologist perceptions. This resulted in seven types of facilities with similar ratings related to perceived performance and characteristics (Q6).



**Type 1: Ideal Facility (15%).** Workplaces in this type consistently scored highest on all satisfaction and facility attributes. Smaller clinics and imaging centers mostly made up this segment. Of special interest were the variety of credentials held by the radiology staff in these facilities and the fact that it was the least likely segment to employ noncredentialed radiology personnel.

**Type 2: Good Overall, On Call Required (16%).** Typically, a large hospital that respondents reported as a satisfying place to work represented this segment. On-call work was required, pulling the overall satisfaction rating below that of the Ideal Facility, and working in the trauma unit was prevalent. This facility type consistently performed well on all attributes. It was the least likely of the predominantly hospital segments (types 2, 4, and 6) to employ noncredentialed radiology personnel.

**Type 3: Very Good, Except for Equipment (12%).** The small facility prevalent in this type was more likely located in a rural or suburban setting than an urban area. Respondents tended to classify themselves as specialists and many as chief technologists. This type of facility treated the least number of patients, and although technologists spent the least amount of time with patients, they were more likely than those in many segments to feel their facilities allowed them to spend the proper amount of time with patients. Overall, Type 3 facilities received very good ratings from respondents.

**Type 4: OK Overall (22%).** Hospitals typically made up this workplace type, which rated average in many aspects. Although most technologists were generally satisfied with many parts of their jobs, they tended to be less satisfied with some specifics of their radiology departments, such as the administration and general radiology environment.

**Type 5: Very Good, Including Equipment (14%).** This type of facility tended to rate average in many aspects. Most technologists were generally satisfied with their jobs, and they expressed satisfaction with some specifics of their radiology departments, such as the administration and general radiology environment. Type 5 facilities stood out primarily because of their high ratings for possessing state-of-the-art imaging equipment.

**Type 6: Only Fair Overall (11%).** This segment characterized the worst of all facilities. These workplaces tended to employ more noncredentialed radiology department personnel than other facility types. While staff spent the most days in training, they were not likely to receive it from a structured internal or external training class. This type received the lowest rating (though still above the midpoint of the scale overall) of all segments on almost every attribute, particularly those involving communication, support and respect. These hospitals were located in urban, suburban and rural communities.

**Type 7: Good Overall, On Call Not Required (10%).** This was the smallest segment, with average ratings for location and number of patients treated per week. Facilities were located in all geographic settings and consisted of hospitals, clinics and imaging centers. Type 7 facilities consistently rated lower on all satisfaction and attribute scores than any of the other segments except Only Fair Overall (Type 6). These workplaces were more likely than most to employ noncredentialed radiology personnel and treated the highest number of radiology patients.

## **Differences Among Facility Types**

The seven facility types differed in the mean ratings they received from the radiologic technologists who worked in them, as well as in a number of demographic characteristics, such as rural/suburban/urban location and number of patients treated per week.

Facility types 2, 4 and 6 were primarily hospitals (85% to 90%), while less than one half (47%) of facility types 5 and 7 were hospitals. Only about one fourth (27%) of facility types 1 and 3 were segmented as hospitals.

Ratings on the 27 core attributes that were used to group the facilities differed primarily along three dimensions:

- Overall rating (averaged across all 27 items) of the facility's characteristics by the technologists who worked there.
- On-call requirements for technologists (on-call duty was more likely in hospitals).
- Imaging equipment perceived – or not perceived – as state-of-the-art.

Researchers segmented a facility into one of these seven types based on where its rating fell in the three dimensions, providing a 73% correct classification of the sample facilities. The alternative, but much more complex, CART flowchart would yield a 66% correct classification.

## **Relationships Among Technologist Characteristics, Facility Characteristics and Workplace Satisfaction**

Although statistically significant, differences among the six technologist subgroups in workplace types they found particularly satisfying were not large. This could have resulted from relatively successful “assortative mating” of radiologic technologists to workplaces. In this case, a strong violation of independence between the two membership variables would be expected, with technologists from each subgroup working primarily in the type of facility they found particularly satisfying, while those in other subgroups did not. However, this was not the case. The modal facility – or the one that the highest percentage of respondents worked in – for five of six subgroups was the OK Overall facility type. Only one technologist subgroup offered an exception to the OK Overall modal selection. Satisfied Overall respondents worked mostly in an Ideal Facility.

Lack of a strong match between technologist subgroups and facility types did not eliminate the possibility that the match between some characteristic or set of characteristics of technologists and workplace attributes was important. Nor did it preclude the possibility that different subgroups of technologists gravitated toward workplace environments that uniquely suited them. Indeed, a Panglossian analysis (see the section, *Is the Radiographer's Workplace Panglossian?*) showed a substantial and statistically significant tendency for technologists who expressed a preference for a rural vs. urban location, for a hospital vs. nonhospital worksite, for working the same shift full-time vs. the swing/rotating shift, for being a technologist vs. an administrator, for working in a trauma unit vs. avoiding such duty, and for inpatient vs. outpatient work, were more likely than those with the opposite preference to work in their preferred type of job.

This match – or the lack of such a match – had a substantial, statistically significant impact on overall satisfaction in the expected direction. Overall satisfaction decreased as the difference

between preferred and actual situation increased. However, the match accounted for a substantially smaller proportion of the individual differences in satisfaction than did the ratings of the facility on the 27 core attributes.

Using a mixture of common and unique predictors produced overall satisfaction ratings for the various technologist subgroups. “Communications within radiology department” was a statistically significant predictor of satisfaction for all subgroups except Balancing Family/Job respondents. “Coworkers act professionally” and “your input is welcome” contributed significantly to the satisfaction for four of the six subgroups. Partly because of these common predictors, very little predictive ability was lost if the attributes were not tailored to the particular subgroup. The average of the eight attributes or the simple average rating on all 27 core attributes worked nearly as well to predict overall satisfaction.

Nevertheless, the data summarized attributes most highly predictive of overall satisfaction for the six subgroups:

- Technologists in the Paying Dues subgroup reported greatest overall satisfaction when communication within the radiology department was good, their coworkers acted professionally, their input was welcome, they were provided with the means to produce accurate images and they could spend the proper amount of time with their patients.
- Career Focused respondents’ overall satisfaction was significantly influenced by good communication within the department, coworkers who acted professionally and the ability to spend the proper amount of time with their patients. However, limiting attention to just those three predictors was less effective than averaging the ratings of all eight combined-groups predictors or simply using the average rating of all 27 attributes.
- Balancing Family/Job technologists’ satisfaction was increased significantly by good insurance benefits and by working in a facility that was not well-known. In other words, a technologist was more impressed with a facility’s insurance benefits than with its reputation. In addition, job security, control over their careers and conveniently located workplaces made marginally significant contributions to predicting satisfaction for this subgroup.
- Overall satisfaction of Seeking Stability technologists depended significantly on having good intradepartmental communication, being able to spend the proper amount of time with their patients and feeling that technologist input was welcome.
- Satisfied Overall respondents’ satisfaction was predicted significantly by intradepartmental communications, proper performance evaluations, having control over their careers, coworkers who acted professionally, receiving proper performance evaluations and feeling that their input was welcome.
- Above average pay, overall department layout, control over their careers, intradepartmental communications, coworkers who acted professionally, confidence that occupational safety guidelines were followed and feeling that technologists’ input was welcome proved to be statistically significant predictors of overall satisfaction for the Least Satisfied subgroup.

## **Conclusions and Recommendations**

The majority of respondents reported they were at least somewhat satisfied with their jobs and workplaces.

The first and second phases of the environmental scan identified a core set of 27 attributes of the radiologic technologist's workplace. The core attributes can be used to:

- Account for substantial proportions of the individual differences among radiographers in workplace satisfaction.
- Identify (via the patterns of their ratings of the importance of the core attributes) six interesting and likely familiar subgroups of radiographers.
- Identify seven types of facilities via mean rating across all 27 attributes together with ratings on the single attributes of on-call policy and state-of-the-art equipment.

Although the initial expectation that each technologist subgroup would find a particular type of facility more satisfying was not met, certain significant differences in workplace attributes most strongly predicted subgroup members' satisfaction with their workplaces.

The alternative possibility that the members of a given technologist subgroup sort themselves into satisfying and unique types of workplace environments also didn't appear to be true. However, technologists and their workplace environments showed substantial, statistically significant tendencies to match up with respect to broad dimensions of preference, such as rural vs. urban location and inpatient vs. outpatient work. Moreover, failure of a workplace to match the technologist's broad preferences negatively impacted workplace satisfaction to a large degree.

Researchers found it was more important to consider a number of the 27 core attributes when predicting technologists' satisfaction with their workplaces than to tailor particular attributes to a respondent's subgroup. Likewise, focusing on those attributes that had the absolutely highest regression weights in the prediction equations was no more helpful. The simple average of a facility's rating predicted satisfaction better than any single facility characteristic and was nearly as good or even better than the subset of attributes with the highest regression weights.

Focusing on those attributes that a particular individual rated as most important produced a small, statistically significant gain in predictive ability. However, focusing on attributes important to a particular technologist subgroup created no gain.

An imperfect match occurred between the attributes most important to a particular technologist subgroup and the attributes most predictive of the subgroup's workplace satisfaction. This was probably due primarily to high average performance of most facilities on many of the attributes respondents considered important. The attributes with high importance ratings therefore bear careful examination – especially by managers of facilities that are deficient with respect to those attributes – even if they are not highly correlated with satisfaction.

## Detailed Findings: Total Respondents

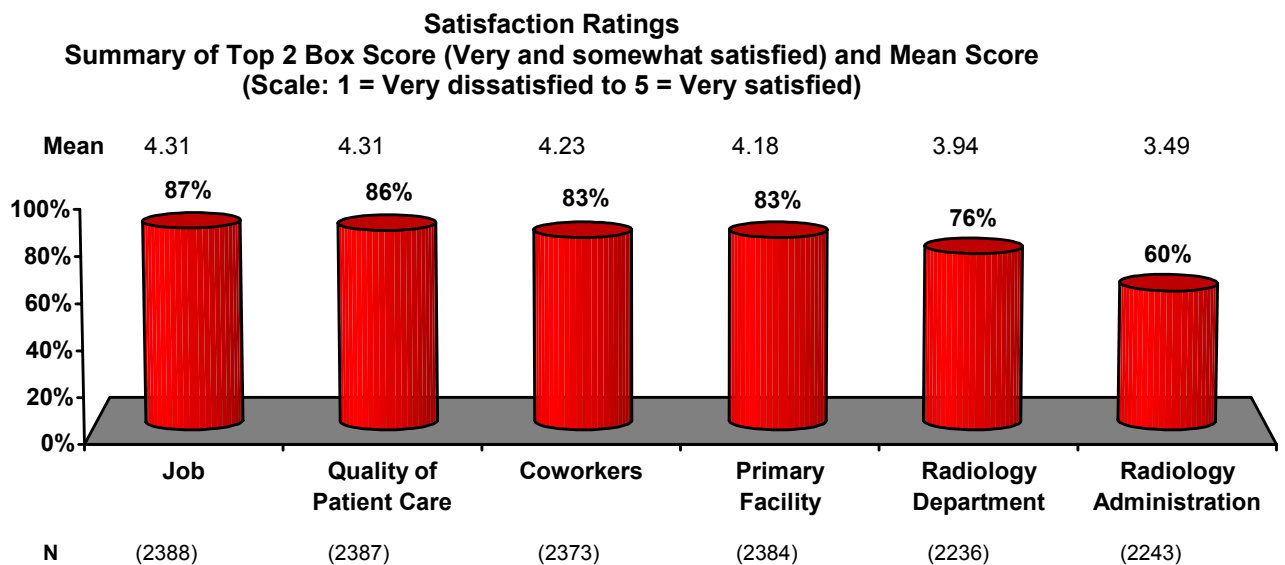
### Satisfaction

Question 3 asked respondents to rate attributes of their jobs and facilities for overall satisfaction in the following six key areas:

- Primary work facility.
- Radiology department.
- The job.
- Coworkers.
- Radiology administration.
- Quality of patient care.

Respondents were asked to rate the attributes based on the following scale: 1 = Very dissatisfied, 2 = Somewhat dissatisfied, 3 = Neither satisfied nor dissatisfied, 4 = Somewhat satisfied, 5 = Very satisfied.

Respondents were most satisfied with their job and “quality of patient care.” These respondents were least satisfied with “radiology administration.” None of these attributes received a mean score below a neutral rating.



Base: Respondents Answering (n=varied)

Q3. Using the scale below, please give your overall satisfaction with the following ...

## Facility Characteristic Importance

Question 4 asked respondents the following:

We would like you to tell us which attributes and workplace characteristics you, yourself feel are the most important to you in terms of judging a facility as a place to work. Please identify the five most important attributes in the first column. Then, please identify the next five most important attributes in the second column, the next five most important attributes in the third column and finally the next five most important attributes in the fourth column.

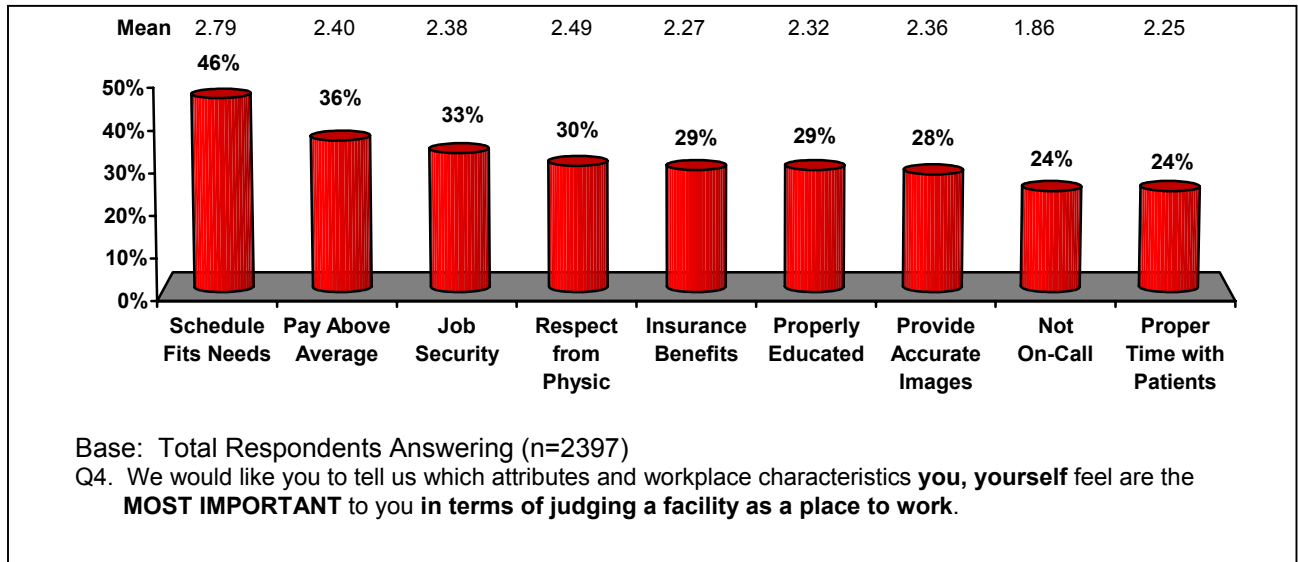
The facility characteristics (presented on a rotational basis) that respondents were asked to rank for importance were\*:

A. Pay is above industry average for your geographic area	J. Respect from physicians	S. Not required to be on-call
B. Follows occupational safety guidelines in terms of radiation and disease exposure	K. Respect from nurses	T. Job security (no worry about being laid off)
C. Primary facility you work at is a safe place (i.e., safe neighborhood, building security)	L. Ability to provide accurate images	U. People you work with act professionally
D. State-of-the-art imaging equipment	M. Have control over your career	V. Facility is well-known
E. Overall layout of the radiology department	N. Internal/onsite training	W. Being properly educated in the job you do
F. Insurance benefits	O. Location meets personal needs such as convenient location, daycare/ senior care, etc.	X. Receive proper performance evaluation
G. Retirement benefits	P. Working order of building (i.e., elevators, etc.)	Y. Have adequate support staff
H. Schedule fits your personal needs	Q. Communications within radiology department	Z. Your input is welcome
I. Can spend proper amount of time with patients	R. Reimbursement for work-related expenses	AA. Receive proper compensation for extra hours

\* Letter (A, B, etc.) designates core attributes (questions 4 and 6) in tables, graphs only. A letter assignment does not rank the attributes.

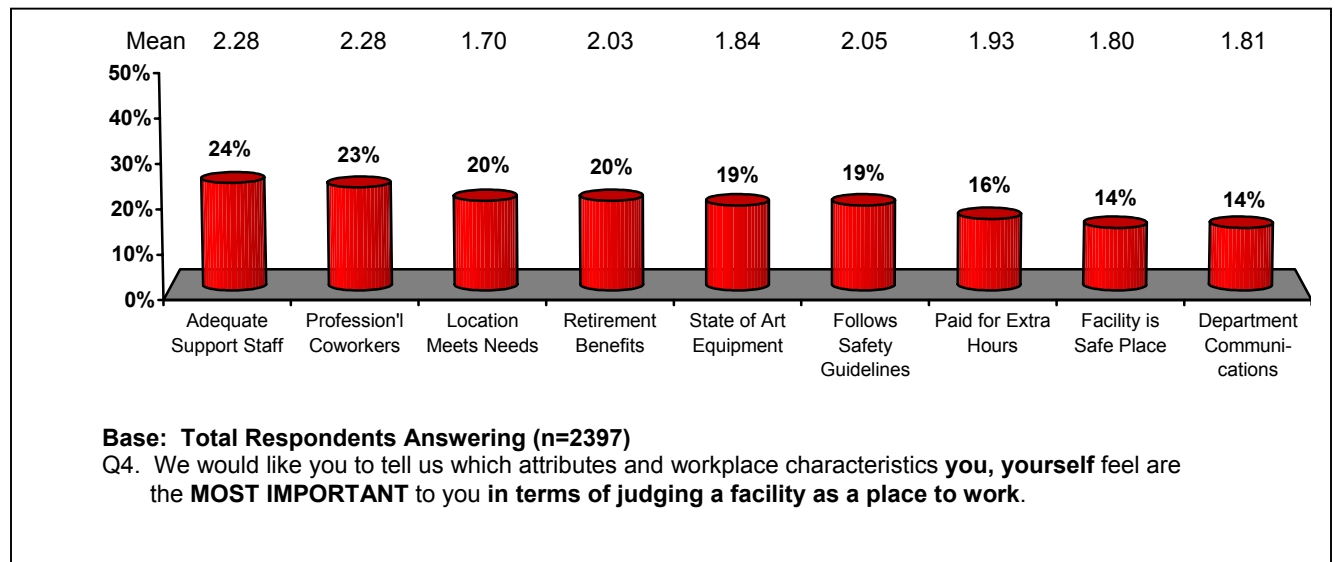
“Schedule fits needs” received the greatest number of “most important attribute” rankings. Almost one half of the respondents (46%) ranked it as the most important attribute. The four attributes that received the highest importance mean scores and most-important-attribute rankings were all specific to the individual technologist: schedule, pay, job security and respect received.

**Facility Characteristic Importance**  
**Summary of Most Important Attribute and Mean Score**  
 (Scale: 0 = Not Among Top 20 Attributes to 4 = Among Top 5 Attributes)

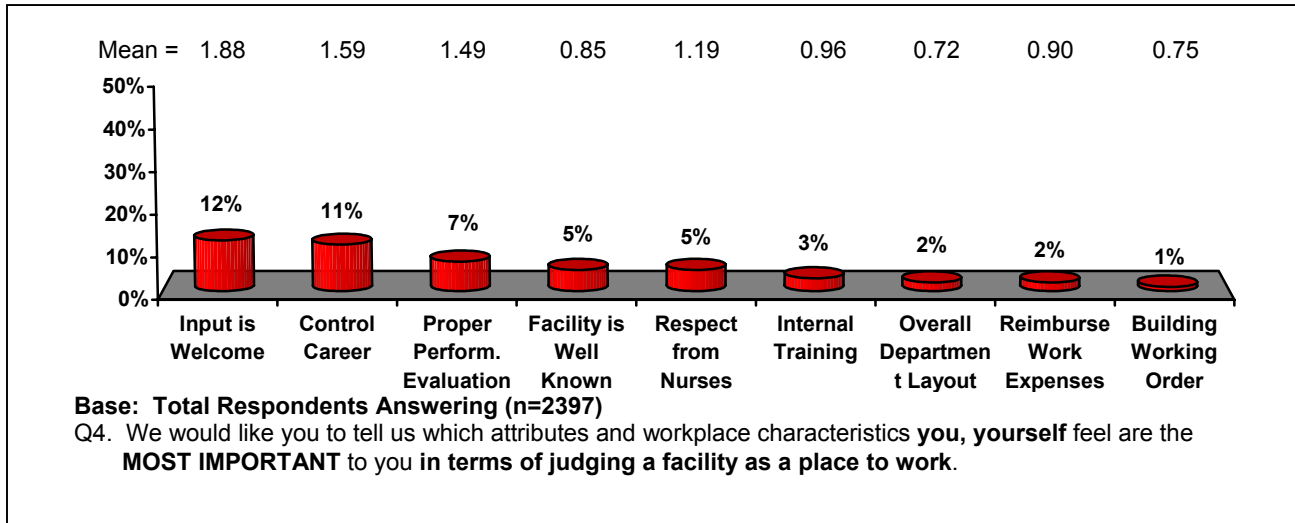


When comparing each attribute's percentage of most-important-attribute rankings with the attribute's mean score, or overall importance, three attributes' measurements changed considerably. "Respect from physicians" ranked fourth as the most important attribute among the 27 attributes, while its mean score was the second highest. "Not on call" was the eighth most important attribute while its mean score was 15th highest. Also, "location meets needs" demonstrated a noticeable difference, ranked as the 12th most important attribute but only the 19th highest mean score.

**Facility Characteristic Importance**  
**Summary of Most Important Attribute and Mean Score**  
 (Scale: "0" = "Not Among Top 20 Attributes" to "4" = "Among Top 5 Attributes")



**Facility Characteristic Importance**  
**Summary of Most Important Attribute and Mean Score**  
 (Scale: “0” = “Not Among Top 20 Attributes” to “4” = “Among Top 5 Attributes”)



Only 1% of the technologists surveyed gave “building working order” a most-important-attribute rating. Two of the three lowest attributes, “overall department layout” and “building working order,” were facility specific. Technologists’ support staff, equipment and facility characteristics tended to fall in the middle/bottom of the attributes in terms of stated importance.



### How Important Was Importance?

Clustering technologists into six subgroups was based primarily on respondents' importance ratings on Question 4, making it necessary to consider whether importance mattered in the rankings. A number of indications illustrated that importance mattered, but that the relationship between the importance of an attribute and the impact of a facility's position on that attribute was far from straightforward.

Overall satisfaction, based on Question 3 and the average of the technologist's satisfaction rating on each of its six items, was predicted most effectively (+.501) by averaging the five workplace attributes the respondent considered most important. The next most important five were determined (+.476) by the average of the five attributes the technologist placed in the second grouping, and so on, to a correlation of only +.365 with the average rating of the facility on the seven attributes considered by that technologist to be least important.

**Correlation Between Q3 Overall and average of satisfaction with sets of attributes**

Most important 5	Next most important 5	3rd most important 5	4th most important 5	Least important 5
.501	.476	.459	.422	.365

Similarly, the predictability gained (as measured by the increase in the squared multiple correlation) when the five second-most important items were averaged, then the average of the 5 third-most important attributes were calculated, and so on was, while statistically significant, relatively modest. The prediction rating went from .251 with just the five most important attributes considered to .294, .318, .329, and .334 as successively fewer important attributes were added.

Prediction of Q3 Overall from Facility Rating on Most Important 5, 10, ... 27 Attributes									
Model	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	Std. Error of the Estimate	Change Statistics				
					R <sup>2</sup> Change	F Change	df1	df2	Sig. F Change
1	.501	.251	.250	.71002	.251	706.108	1	2112	.000
2	.542	.294	.293	.68928	.043	130.001	1	2111	.000
3	.564	.318	.317	.67757	.024	74.554	1	2110	.000
4	.573	.329	.328	.67240	.011	33.626	1	2109	.000
5	.578	.334	.332	.67020	.005	14.866	1	2108	.000

a. Predictors: (Constant), Ave5most  
 b. Predictors: (Constant), Ave5most, Ave2nd5  
 c. Predictors: (Constant), Ave5most, Ave2nd5, Ave3rd5  
 d. Predictors: (Constant), Ave5most, Ave2nd5, Ave3rd5, Ave4th5  
 e. Predictors: (Constant), Ave5most, Ave2nd5, Ave3rd5, Ave4th5, Ave5th5

Three of the six satisfaction measures were better predicted by taking an importance-weighted average of each respondent's facility ratings (i.e., multiplying each facility rating by four, three, two, one or zero, based on the attribute's placement as first, second, third, fourth or last in the importance grouping; summing the resulting products, then dividing by the sum of the importance weights) than by simply using the simple, unweighted average of the facility's

ratings on all 27 attributes (Q6 Overall). However, importance weighting made no difference – to three decimal places – for a fourth measure and in predicting Q3 Overall. Importance weighting actually lowered the correlation with the remaining two satisfaction measures.

**Correlation of Average of 27 Facility Attributes with Six Overall Satisfaction Measures**

	Q3a Your Primary facility	Q3b The radiology dept	Q3c Your Job	Q3d Your co- workers	Q3e Your radiology administr'n	Q3f Quality of patient care	Q3Halo = Average of six ratings
<b>Unweighted average</b>	0.478	0.519	0.379	0.301	0.530	0.430	0.568
<b>Importance- weighted average</b>	0.484	0.522	0.396	0.301	0.514	0.422	0.568

On the other hand, although the facility attributes most predictive of overall satisfaction (Q3 Overall) differed among the six technologist subgroups, the set of most predictive attributes was generally quite different from the set of most important attributes. No attribute had both a mean importance rating and a z-score regression coefficient with an absolute value among the top five for the regression equation based on all respondents. For individual technologist subgroups, the overlap between the two top five lists ranged from 0 (Career Focused and Least Satisfied) to 3 (Paying Dues).

Subgroup	Paying Dues	Career Focused	Balancing Famil/Job	Seeking Stabilitv	Satisfied Overall	Least Satisfied	All
5 with highest mean importance rating (Q4)	Q4L (3.13) Q4I (2.94) Q4W (2.90) Q4U (2.89) Q4Y(2.77)	Q4A (3.09) Q4W (3.08) Q4F (3.03) Q4G (2.83) Q4Y (2.77)	Q4O (3.16) Q4H (2.88) Q4T (2.87) Q4Y (2.63) Q4U (2.60)	Q4F (3.14) Q4H (3.13) Q4C (2.78) Q4B (2.77) Q4G (2.77)	Q4H (3.52) Q4J (3.17) Q4L (3.17) Q4I (2.98) Q4U (2.84)	Q4F (3.21) Q4A (3.16) Q4G (2.87) Q4J (2.85) Q4S (2.60)	Q4H (2.79) Q4J (2.49) Q4A (2.40) Q4T (2.38) Q4L (2.36)
5 with largest z-score regression coeffs (Q6)	Q6Z (.164**) Q6I (.143**) Q6Q(.129*) Q6U (.122*)	Q6U (.151**) Q6Q (.135*) Q6i (.106*) Q6J (.093) Q6L (-.090)	Q6F (.144*) Q6O (.117) Q6M (.116) Q6T (.111) Q6V (-.108*)	Q6Z (.195**) Q6Q (.148*) Q6i (.137*) Q6Y (.113) Q6F (-.118)	Q4Q (.240***) Q4U (.225***) Q4X (.127**) Q4M (.115*) Q4Z (.112*)	Q6B (.179***) Q6U (.159**) Q6Q (.155**) Q6Z (.119*)	Q4Q (.151***) Q4U (.145***) Q4Z (.119***) Q4I (.098***) Q4B (.065***)

\*, \*\*, \*\*\*  $P < .05, .01, .001$  for  $H_0$  that population coefficient = zero.

Could this mean that technologists responded inconsistently to the Phase 3 questionnaire because they were uncertain how to determine satisfaction in their workplaces? Or could it mean that radiology department administrators can simply ignore the importance ratings given various attributes by respondents? Not necessarily. Technologists in general, or respondents in a given subgroup, may consider a work schedule that fits their personal needs very important. If almost all agreed that this was true, then this attribute contributed very little to higher satisfaction among

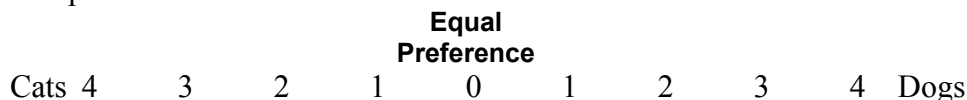
some facilities than others, since almost no facilities were deficient in this respect. This phenomenon is known among data analysts as the “restriction of range” problem. However, the manager who ignores the fit of department work schedule to individual staff technologists’ needs is apt to discover the importance of this attribute.

In short, managers are well advised to pay careful attention to the workplace attributes that received high importance ratings in this study, even if some did not display high individual correlations with overall satisfaction or did not contribute significantly to predicting overall satisfaction.

### Preferences Along Broad Dimensions of Workplace and Profession

Question 5 asked respondents the following:

Next, we would like to see your preference, if any, between selected attributes. An example: If you totally prefer dogs over cats then you would circle the 4 under “Dogs.” If you prefer dogs over cats but still like cats a little, then you would circle 3, 2 or 1 on the “Dogs” side of 0, depending on your preference. You would circle 0 if you have equal preference. If you preferred cats over dogs then you would circle 1, 2, 3 or 4 on the “Cats” side of 0 depending on amount of preference.

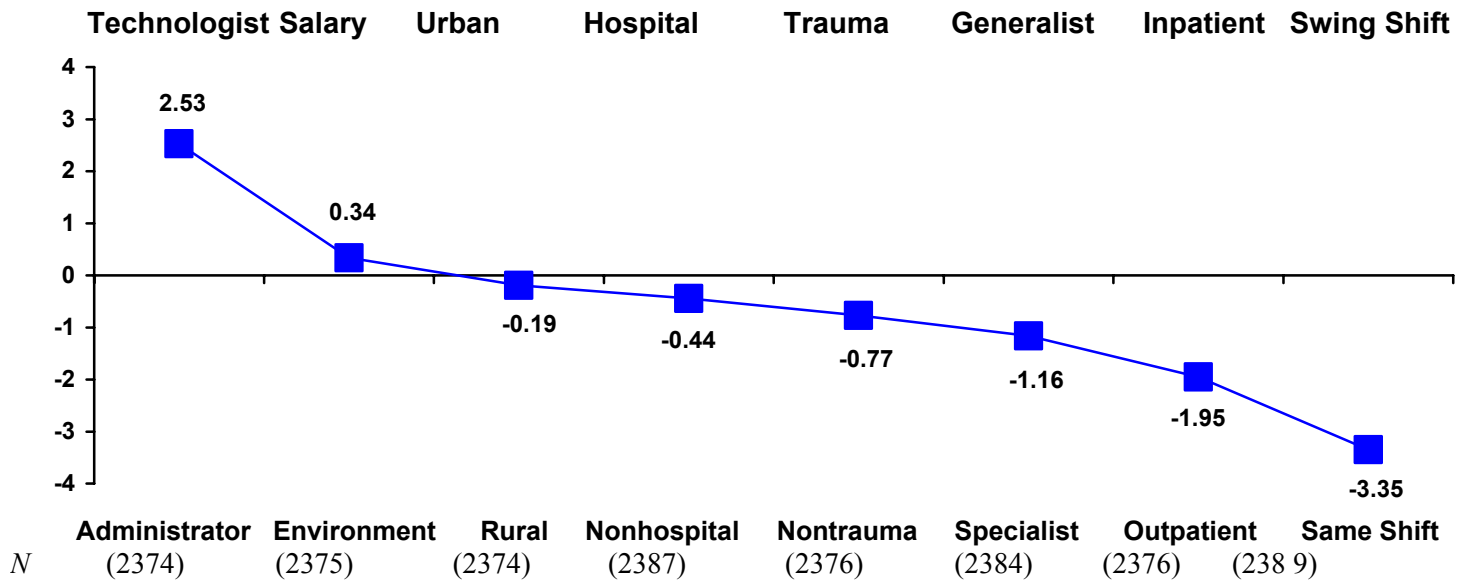


The eight attributes that respondents were asked to rate for preference were:

					<b>Equal Preference</b>						
Great Work Environment	4	3	2	1	0	1	2	3	4	Great Salary	
Rural	4	3	2	1	0	1	2	3	4	Urban	
Nonhospital	4	3	2	1	0	1	2	3	4	Hospital	
Administrator	4	3	2	1	0	1	2	3	4	Technologist	
Specialist	4	3	2	1	0	1	2	3	4	Generalist	
Nontrauma	4	3	2	1	0	1	2	3	4	Trauma	
Same Shift	4	3	2	1	0	1	2	3	4	Swing Shift	
Outpatient	4	3	2	1	0	1	2	3	4	Inpatient	

Of the eight preference scenarios given, the biggest preference toward one end of a dimension was when technologists were asked about shift preferences. Working the “same shift” was significantly preferred to working a “swing shift.” Respondents’ second highest preference was working as a technologist as opposed to working as an administrator. Respondents generally showed equal preference when asked if they would rather work in a rural or urban setting.

### Broad Preference Summary of Mean Score



Base: Respondents Answering (N = varied)

Q5. Next, we would like to see your preference, if any, between selected attributes.

### Current Facility Core Characteristic Ratings

Question 6 asked respondents the following:

Please tell us, how much you agree with the following statements using a 5-point scale where 1 = I completely disagree with this statement, 2 = I somewhat disagree with this statement, 3 = I neither agree nor disagree with this statement, 4 = I somewhat agree with this statement and 5 = I completely agree with this statement. Once again, we are speaking about your current job at the primary facility you work at.

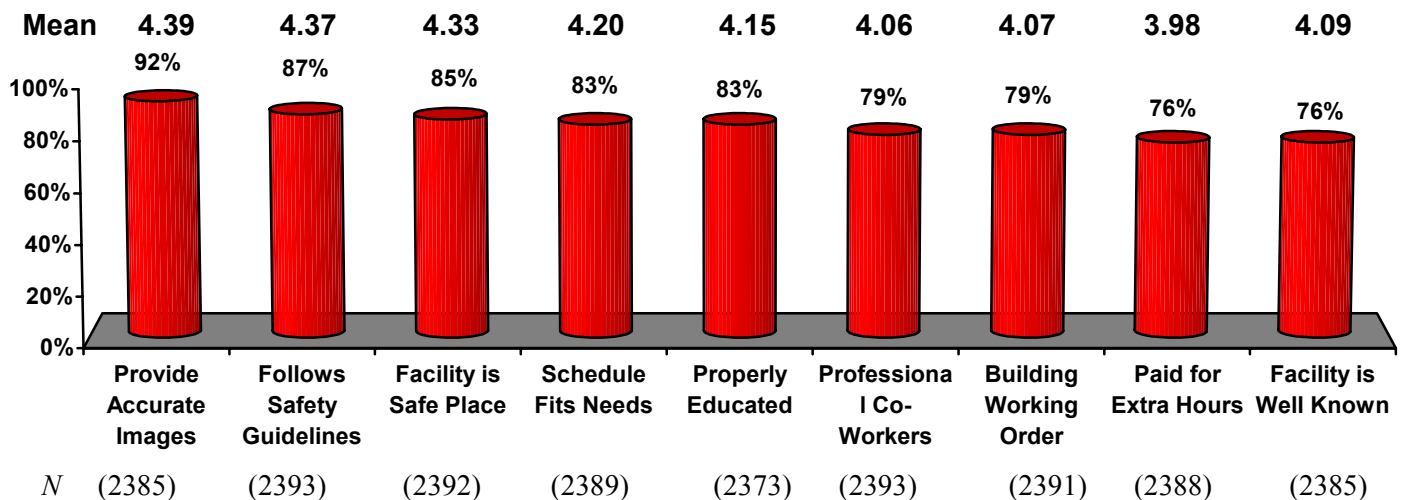
The facility characteristics that respondents were asked to rate for agreement were:

A. Compared to other facilities in the area, this facility offers better wages for technologists.	J. Technologists receive respect from physicians.	S. Technologists are not required to be on-call.
B. This facility follows occupational safety guidelines for radiation and disease exposure.	K. Technologists receive respect from nurses.	T. Technologists have job security (do not worry about being laid off).
C. This facility is a safe place to work in terms of neighborhood and building security.	L. Technologists can provide accurate images.	U. The radiologic staff acts professionally.
D. This facility has state-of-the-art imaging equipment.	M. Technologists can control their careers.	V. This facility is well-known.
E. The overall layout of the radiology department is designed with the job of the technologist in mind.	N. Technologists receive sufficient Internal/onsite training.	W. Technologists are properly educated in their jobs.
F. This facility offers satisfactory insurance benefits.	O. This facility meets personal needs of staff such as convenient location, daycare/senior care, etc.	X. Technologists receive proper performance evaluation(s).
G. This facility offers satisfactory retirement benefits.	P. This facility is in proper working order (elevators, lighting, etc).	Y. The radiology department has adequate support staff.
H. This facility offers a work schedule that fits my personal needs.	Q. There is good communication within the radiology department.	Z. Technologist input is welcome.
I. In this facility, Technologists spend the proper amount of time with each patient.	R. Technologists get reimbursed for work-related expenses.	AA. Technologists receive proper compensation for extra hours.

Q6 Overall = average of all 27 ratings. Letters used to designate attributes in tables, graphs.

When respondents were asked to rate the performance of their current facility, “providing accurate images” received the most top-two (ranked 4 or 5 on a 5-point scale) box ratings and highest mean score. Unlike the importance ratings, facility-specific attributes tended to receive similarly ranked top-two box and mean scores.

**Current Facility Rating**  
**Summary of Top-Two Box (Completely and Somewhat Agree) and Mean Score**  
**Scale: 1 = Completely Disagree to 5 = Completely Agree**

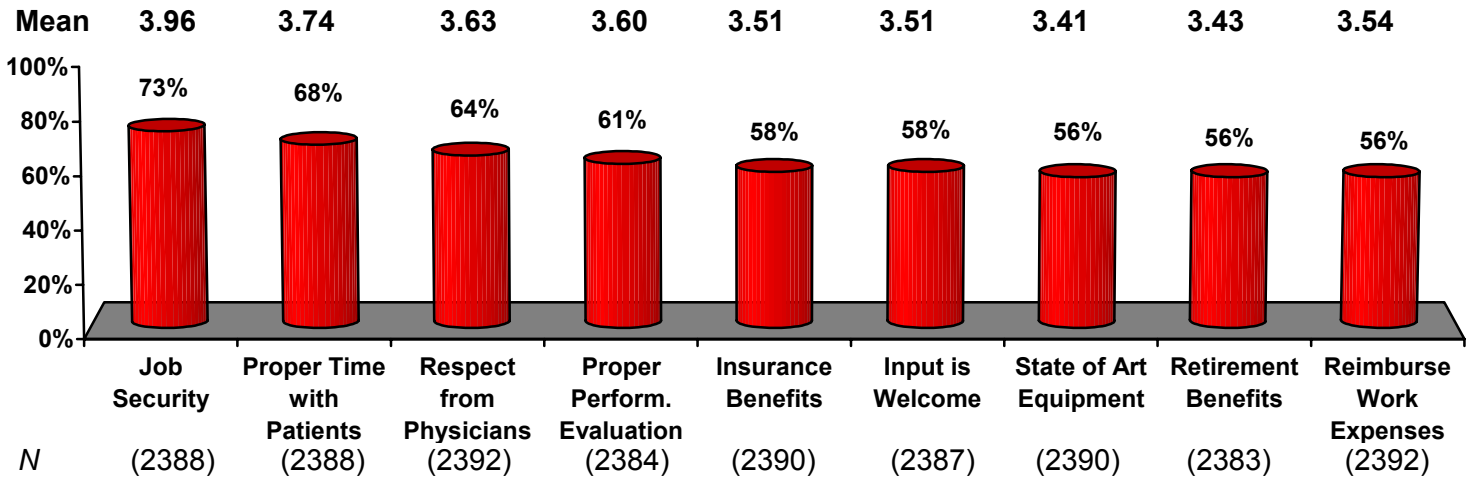


N (2385) (2393) (2392) (2389) (2373) (2393) (2391) (2388) (2385)

Base: Respondents Answering (N = varied)

Q6. Please tell us, how much you agree with the following statements using a 5-point scale where ... Once again, we are speaking about your CURRENT JOB at the PRIMARY FACILITY you work at.

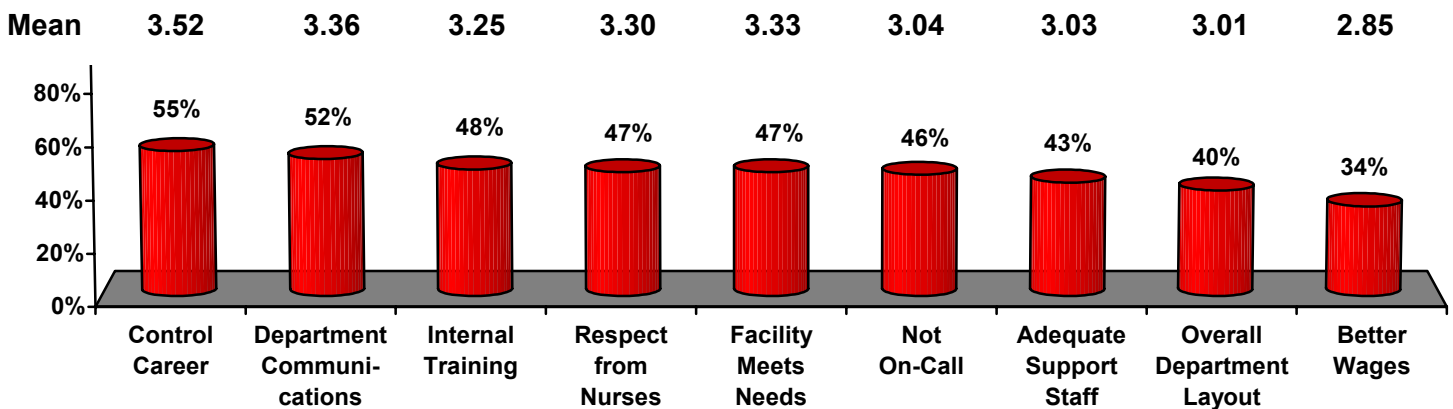
**Current Facility Rating**  
**Summary of Top 2 Box and Mean Score**  
**Scale: 1 = Completely Disagree to 5 = Completely Agree**



Base: Respondents Answering (N = varied)

Q6. Please tell us, how much you agree with the following statements using a 5-point scale where ...  
 Once again, we are speaking about your CURRENT JOB at the PRIMARY FACILITY you work at.

**Current Facility Rating**  
**Summary of Top-Two Box and Mean Score**  
**Scale: 1 = Completely Disagree to 5 = Completely Agree**



## Importance vs. Current Facility Ranking

The largest negative gaps between attribute importance rankings and workplace rankings on those attributes occurred for “pay above average” and “adequate support staff.” “Overall department layout,” “internal training” and “respect from nurses” all ranked in the bottom six for importance and performance. The facility attributes showing the biggest gaps tended to be the attributes on which facilities performed well (Q6) but that were lower on the importance scale (Q4).

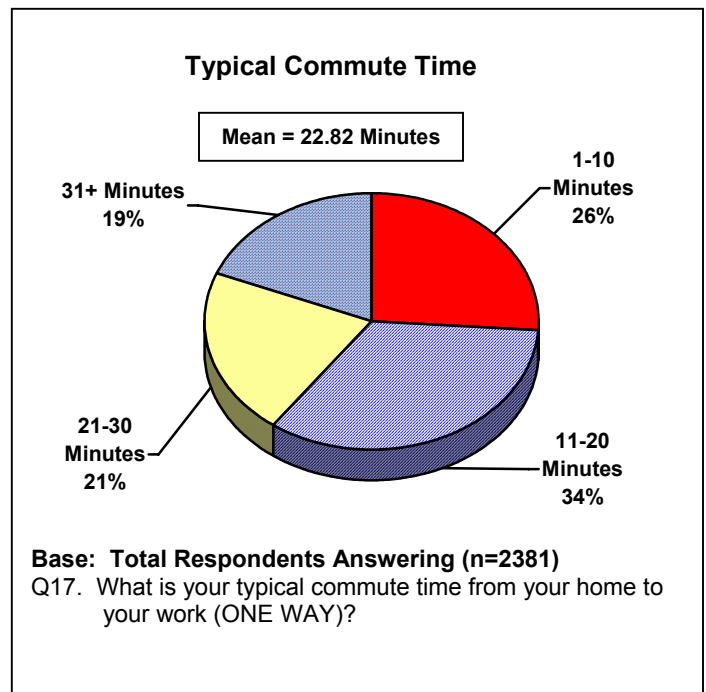
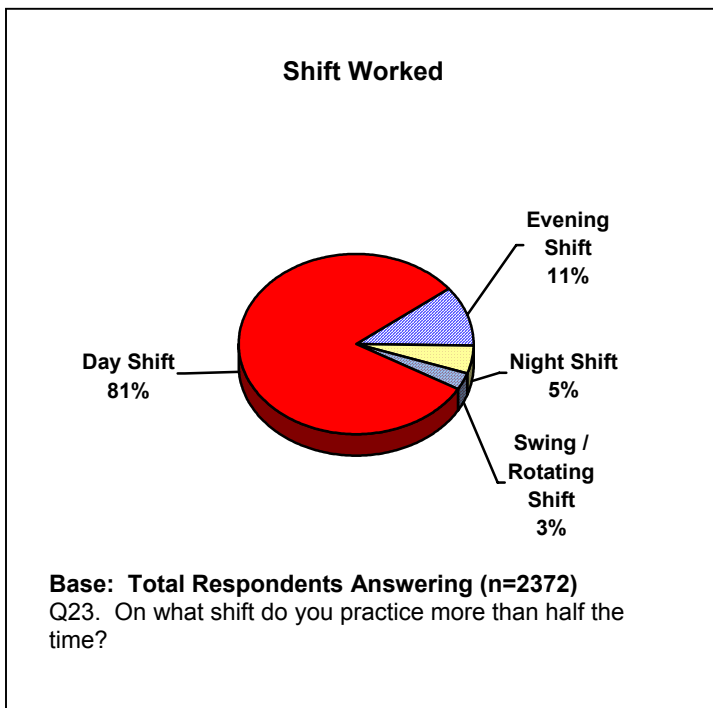
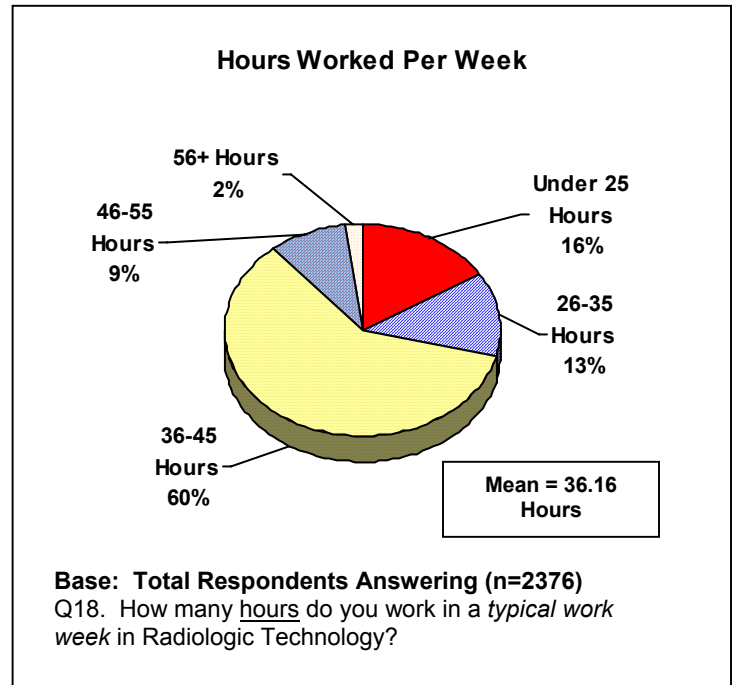
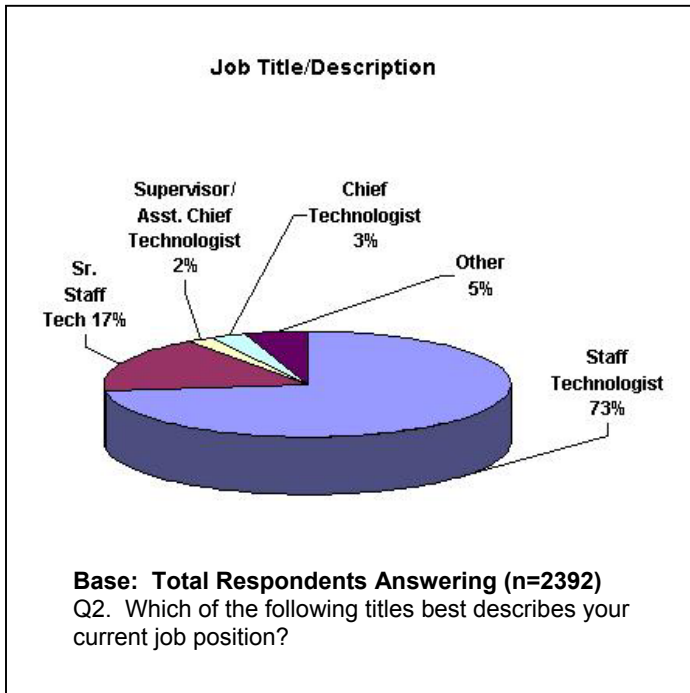
Attribute	Importance Ranking (Q4)	Current Facility Ranking	Difference (Importance – Performance)
Schedule fits needs	1	4	-3
Respect from physicians	2	12	-10
Pay above average	3	27	-24
Job security	4	10	-6
Provide accurate images	5	1	4
Properly educated	6	5	1
Insurance benefits	7	16	-9
Adequate support staff	8	25	-17
Professional coworkers	9	8	0
Proper time with patients	10	11	-1
Follows safety guidelines	11	2	9
Retirement benefits	12	18	-6
Paid for extra hours	13	9	4
Input is welcome	14	16	-2
Not on call	15	24	-9
State-of-the-art equipment	16	19	-3
Department communications	17	20	-3
Facility is a safe place	18	3	15
Location/facility meets needs	19	21	-2
Control career	20	15	5
Proper performance evaluation	21	13	8
Respect from nurses	22	22	0
Internal training	23	23	0
Reimburse work expenses	24	14	10
Facility is well-known	25	6	19
Building in working order	26	7	19
Overall department layout	27	26	1

### Base: Respondents Answering (N=varied)

Q4. We would like you to tell us which attributes and workplace characteristics you, yourself feel are the most important to you in terms of judging a facility as a place to work.

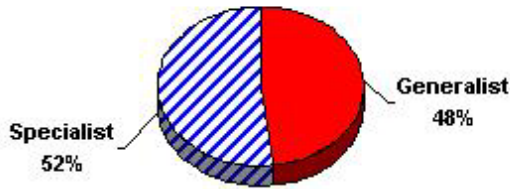
Q 6. Please tell us, how much you agree with the following statements using a 5-point scale where...Once again, we are speaking about your current job at the primary facility you work at.

## Characteristics of Current Position



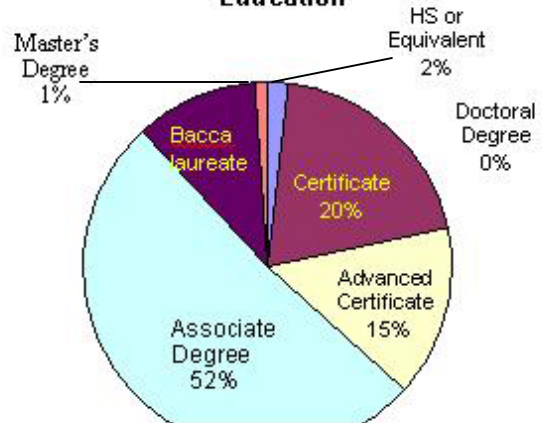


### Generalist/Specialist



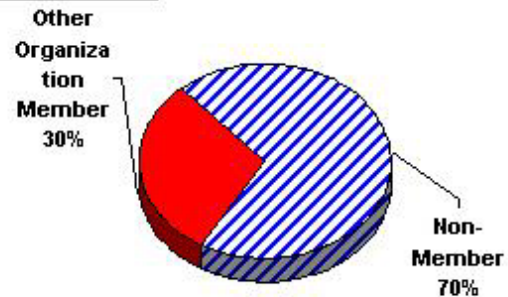
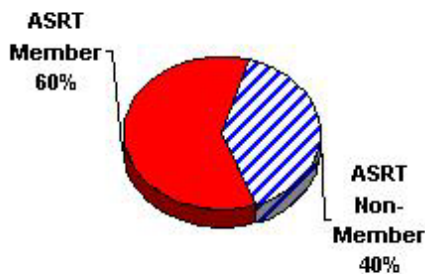
**Base: Total Respondents Answering (n=2376)**  
 Q24. Would you consider yourself a (generalist/specialist)?

### Education



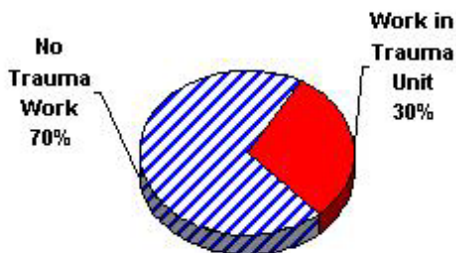
**Base: Total Respondents Answering (n=2377)**  
 Q11. Highest level of education you completed.

### Association Membership



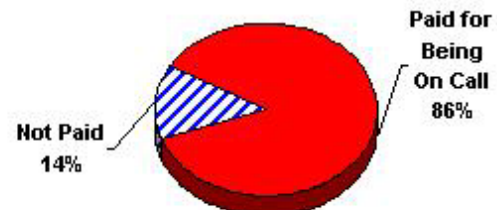
**Base: Respondents Answering ASRT (n=2380); Other Organization (n=2361)**  
 Q13. Are you a current member of the ASRT (American Society of Radiologic Technologists)?  
 Q14. Are you a member of any other industry organizations?

### Work in Trauma Unit



**Base: Q25 Total Respondents (n=2376);**  
 Q25. Do you work in the trauma unit at least once per week?

### Paid for Being On-Call (Among 44% who indicate Technologists are required to be on-call)

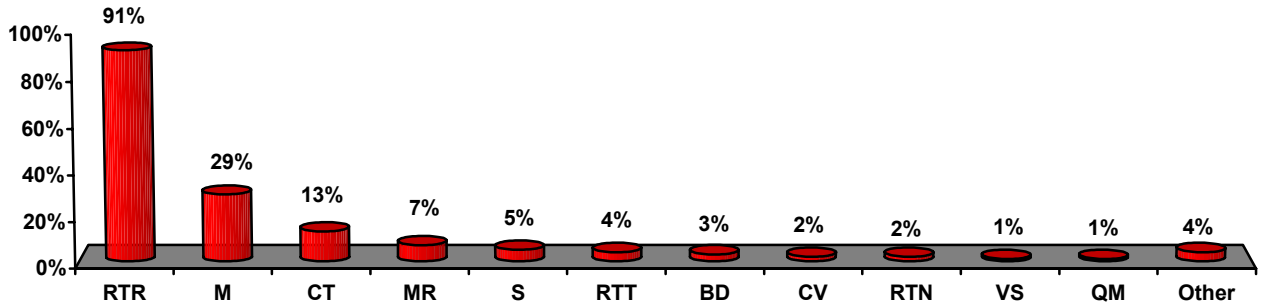


**Q26. Somewhat or completely disagree with Q6 "Technologists are not required to be on-call" (n=1060)**  
 Q26. Are you paid for being on call?

## Certification

**Base: Total Respondents Answering (n=2318)**

Q12. Which of the following Certificates do you currently have?



RTR = Radiography

M = Mammography

CT = Computed Tomography

MR = Magnetic Resonance Imaging

S = Sonography

RTT = Radiation Therapy

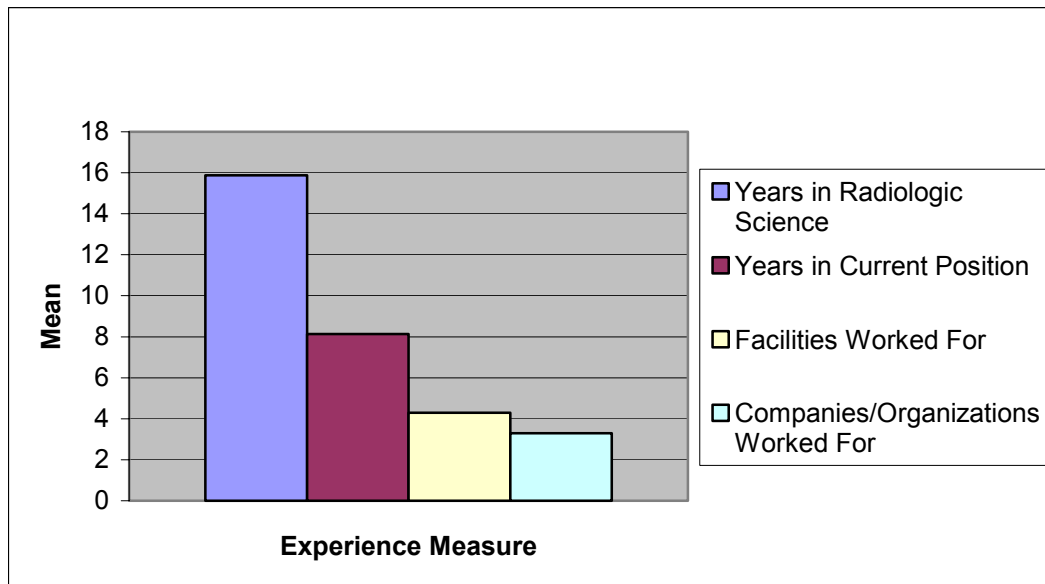
BD = Bone Densitometry

CV = Cardiovascular-Interventional

RTN = Nuclear Medicine

VS = Vascular Ultrasound

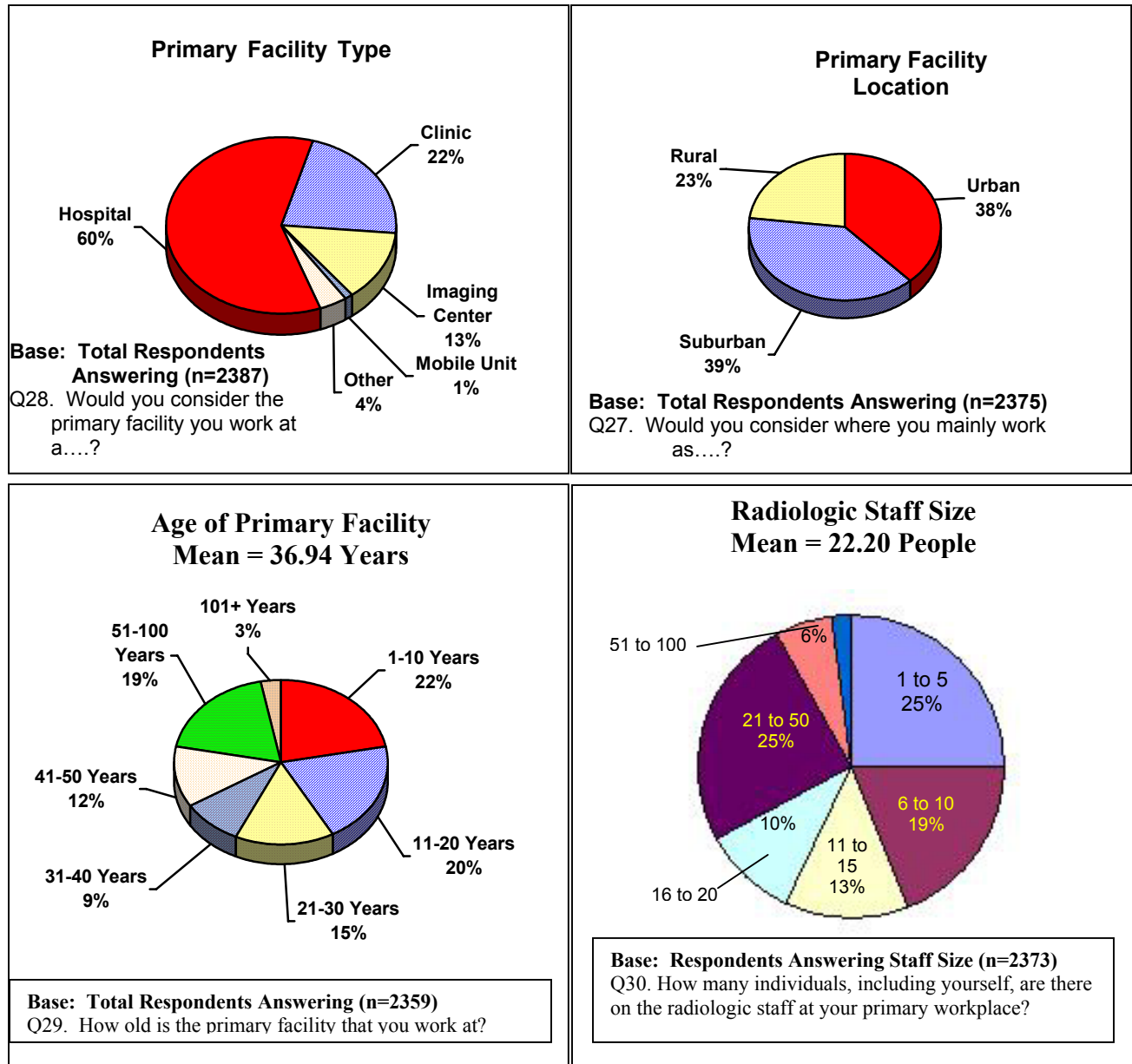
QM = Quality Management

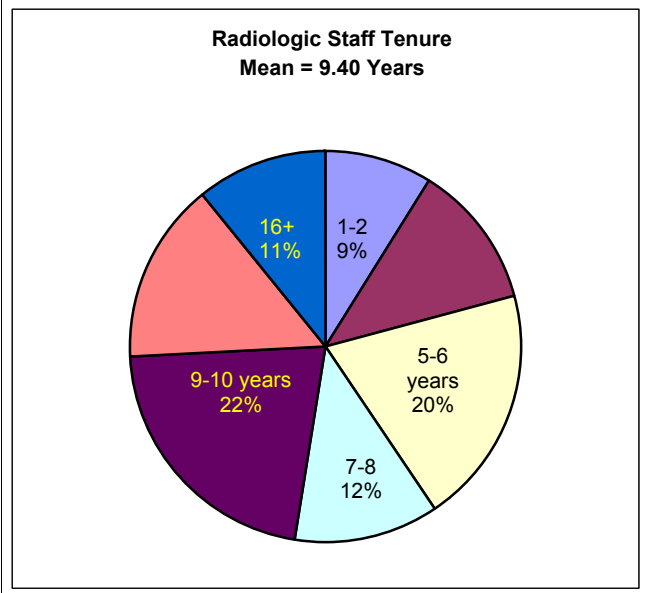


Results from Questions 15, 16, 19 and 20.

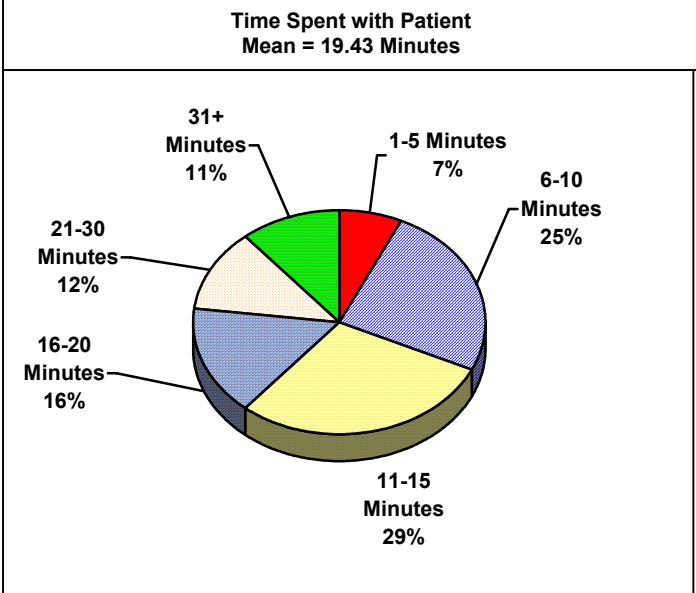
## Other Current Facility Characteristics

Sixty percent of respondents worked in a hospital and 25% worked in a clinic. About 25% of respondents considered their primary workplace to be in a rural setting. The remaining respondents were evenly split between a suburban or urban location.

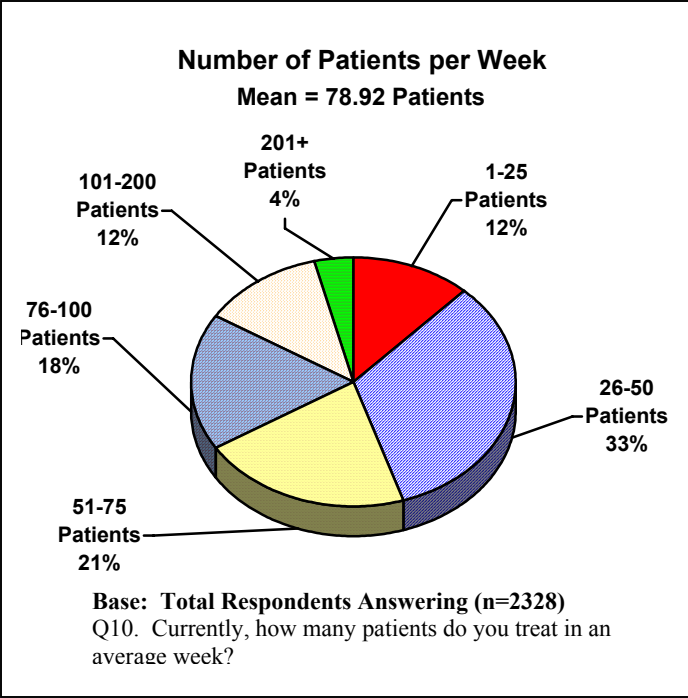




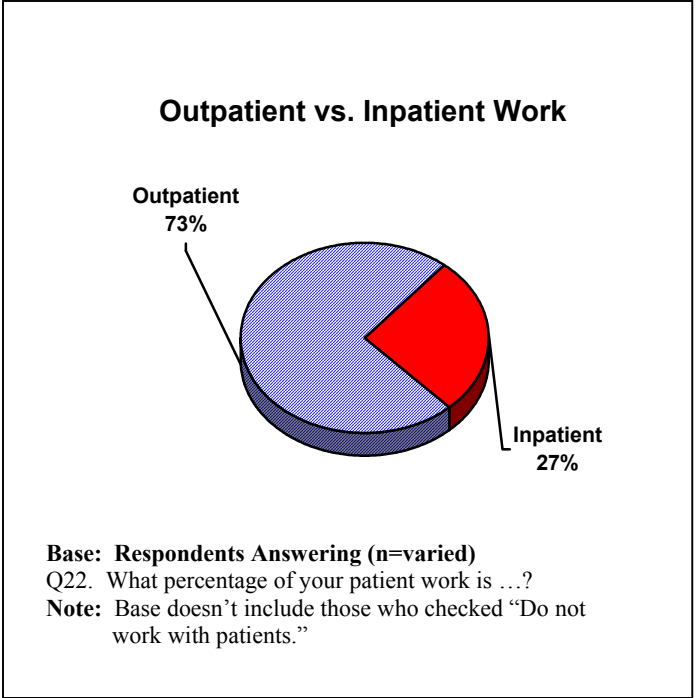
**Base: Respondents Answering Staff Tenure (n=2356)Q32.**  
 What is the average length of time (tenure) the radiologic staff has been working at your primary workplace?



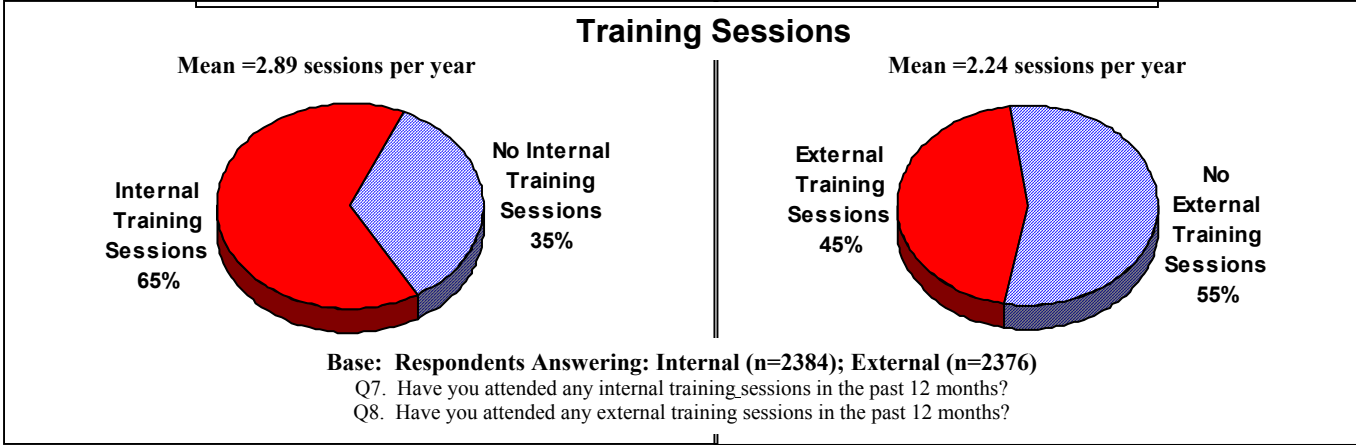
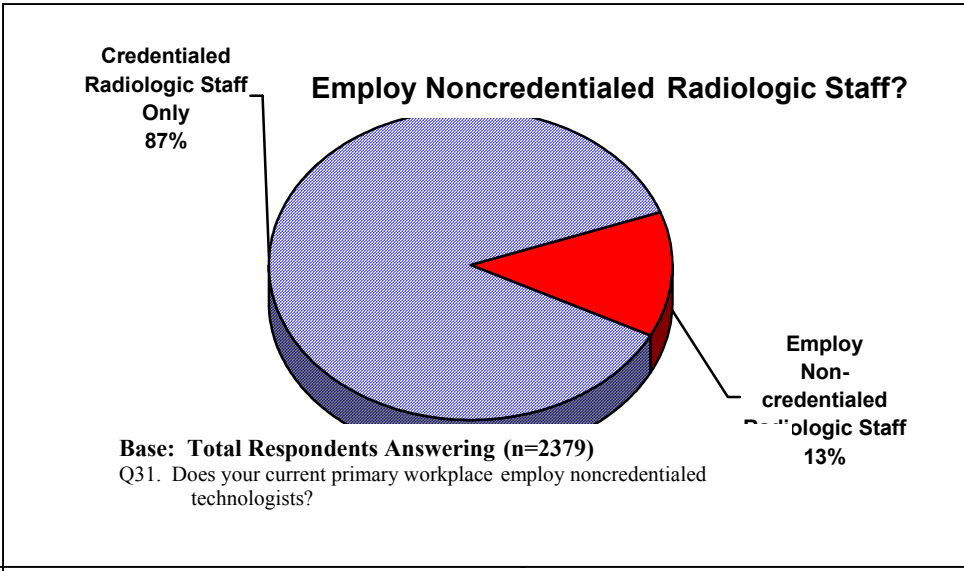
**Base: Total Respondents Answering (n=2360)**  
 Q9. Currently, how many minutes, on average, do you spend with each patient?



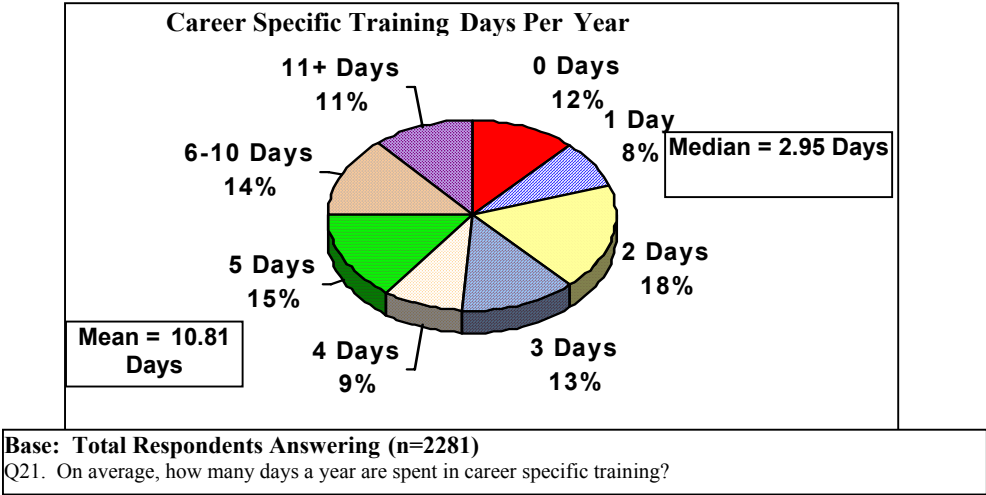
**Base: Total Respondents Answering (n=2328)**  
 Q10. Currently, how many patients do you treat in an average week?



**Base: Respondents Answering (n=varied)**  
 Q22. What percentage of your patient work is ...?  
**Note:** Base doesn't include those who checked "Do not work with patients."



Although 12% of respondents did not attend career-specific training, the majority spent one to five days per year training and 14% spent six to ten days. Eleven percent of respondents spent more than 10 days training per year, but this group included respondents who viewed every day as a “training day,” resulting in an average of more than 10 days per year. The median number of training days was three per year. One half of respondents spent less than three days per year training and one half of the respondents spent at least three days per year.



## Demographics

### Age, Gender, Marital Status and Ethnicity

	Total
Base: Total Respondents	(2386)
<b>Age</b>	
18 to 30	18%
31 to 35	14%
36 to 40	15%
41 to 45	17%
46 to 50	16%
51 to 55	12%
56 and older	8%
Mean Age	41.14

	Total
Base: Total Respondents	(2396)
<b>Gender</b>	
Male	16%
Female	84%
Base: Total Respondents	(2387)
<b>Marital Status</b>	
Married	73%
Single	27%

	Total
Base: Total Respondents	(2386)
<b>Ethnicity</b>	
Caucasian	93%
African-American	3%
Hispanic	3%
Asian/Pacific Islander	1%
Other	0%

### Household Size and Children

	Total
Base: Total Respondents	(2389)
<b>Household Size</b>	
(1) 1 person	10%
(2) 2 people	32%
(3) 3 people	23%
(4) 4 people	25%
(5) 5 people	9%
(7) 6+ people	2%
Mean Household Size	3.00

	Total
Base: Total Respondents	(2388)
<b>Children in Household</b>	
(0) 0 children	49%
(1) 1 child	21%
(2) 2 children	22%
(3) 3 children	6%
(4) 4 children	1%
(5) 5 children	0%
(7) 6+ children	-
Mean Children in Household	0.90

## Predictors of Satisfaction

Concentrating first on overall satisfaction (all six Question 3 satisfaction ratings averaged), a multiple regression analysis (MRA) yielded a multiple correlation ( $R$ ) of .620 between overall satisfaction and the optimal linear combination of the 27 facility attributes in Question 6. The statistically significant predictors from the equation were:

Predictor	Raw-score coefficient	Standardized (z-score)	p-value
Q6a:	0.038	0.060	0.002
Q6b:	0.063	0.065	0.002
Q6i:	0.073	0.098	<.001
Q6m:	0.051	0.064	0.002
Q6q:	0.104	0.151	<.001
Q6u:	0.124	0.145	<.001
Q6v:	0.038	0.064	0.008
Q6z:	0.083	0.119	<.001

A facility was likely to receive a very high overall satisfaction rating if respondents strongly agreed that it offered better wages than other facilities in the area, followed occupational safety guidelines, had good communication within the radiology department, had adequate support staff, welcomed technologist input and allowed technologists to spend the proper amount of time with each patient, control their careers and act professionally.

In fact, the simple, unweighted average of level of agreement with the above eight statements about the facility correlated .596 with the average of the technologist's six satisfaction ratings. A radiographer who strongly agreed with all eight statements was predicted to give the facility an overall rating of 5.1, while one who strongly disagreed with all eight was predicted to rate the facility 2.3 overall. However, zeroing in on these eight statements wasn't critical because the simple average of agreement level with all 27 favorable statements about the facility correlated .571 with overall satisfaction. Relative insensitivity to the details of any of the 27 core attributes held true for predicting individual satisfactions ratings (Q3a through Q3f).

Satisfaction With ...	$R$ Using All 27 Attributes	Significant Predictors	$r$ with Ave of Signif Pred's*	$r$ with Ave of All 27 Pred's
Primary facility	.509	A, B, D, H, I, Q, T, U, Y, Z	.486	.478
Radiol dept	.577	A, B, D, E, J, M, Q, U, Y, Z	.550	.519
Your job	.421	B, H, I, J, M, Q, T, Y	.400	.379
Coworkers	.427	M, Q, -S, U	.315#	.301
Radiol admin	.625	A, E, P, Q, U, X, Y, Z	.577	.530
Patient care	.484	B, E, -H, I, L, U	.435	.430

\*If regression weight negative, reverse-scored the item before averaging.

#Correlation with Q6u by itself was .386; z-score regression weight for Q6u more than 3 times as large as second-largest weight.

“Your coworkers” was the only substantial exception to this pattern of predicting satisfaction. In this case, prediction worked better based on using the core attribute U (“The radiologic staff acts professionally”) by itself rather than the average of all 27 attributes or the average of the four statistically significant predictors (M, Q, reverse of S and U).

### **Other Facility Characteristics as Predictors**

In addition to the 27 core attributes, respondents provided information on 21 other workplace attributes: number of internal and external training sessions in the past 12 months, urban vs. suburban vs. rural location, age of the facility and so on. The regression analyses were repeated, adding these 21 additional predictors. The results supported the hypothesis that the 27 core attributes truly were “core” to predicting satisfaction: For each of the individual satisfaction ratings, as well as for overall satisfaction, the increment to  $R^2$  provided by adding the 21 other facility characteristics to the 27 core attributes was small and statistically nonsignificant. Further, of the 147 regression coefficients for noncore attributes (21 coefficients in each of seven prediction equations), only five proved statistically significant at the .05 level of significance.

This of course does *not* mean that technologist satisfaction is unaffected by these other characteristics. Although none of the 147 correlations for noncore attributes was larger than  $\pm .16$ , many were statistically significant for the sample size at the .001 level.

### **Consistency With Phases 1 and 2**

Readers of the *Environmental Scan of the Radiographer’s Workplace: Technologist vs. Administrator Perspectives, 2001* ([www.radsciresearch.org](http://www.radsciresearch.org), click on “Research,” then “currently available”) will notice an imperfect correspondence between the Phase 1 report’s list of six statistically significant predictors of technologists’ satisfaction and the lists of statistically significant predictors in the Phase 3 report.

Phase 1 results were based on a total sample size of 418 staff and senior staff technologists, whereas the current report is based on more than 2,300 respondents. Second, regression analysis tends to be highly context dependent, so that the statistical significance of a given predictor’s contribution to prediction depends on the other predictors included in the equation. The present study’s 27 core attributes provide a different context than the 87 attributes employed in Phase 1. Foremost, Phase 3 attributes are a distinct subset of Phase 1 attributes; they have been further differentiated and supplemented based on the results of Phase 2 telephone interviews with very satisfied and very dissatisfied Phase 1 respondents. Despite these differences, however, consistency among the three phases of the environmental scan with respect to prediction of technologists’ satisfaction has continued.

The most appropriate comparison can be seen in Question 3a, satisfaction with the primary facility. The statistically significant Phase 1 predictors were “safe environment at work” (differentiated in this phase, on the basis of Phase 2 feedback, between core attribute B, “this facility follows occupational safety guidelines for radiation and disease” and attribute C, “this facility is a safe place to work in terms of neighborhood and building”), “state-of-the-art-imaging equipment” (D), “ability to influence your career” (attribute M), “working order of building” (P), “facility well-known” (V), and “adequate support staff” (Y). Three of these seven core attributes (D, Y and B, but not C) were statistically significant predictors of satisfaction with a facility in the present study, while two others (P and V) had modest-sized and marginally significant



regression coefficients (.035 and .035, respectively, with corresponding *P* values of .13 and .10). When just those seven attributes were entered into a regression equation, they yielded a multiple *R* of .448, and all but one (C) had a regression coefficient that was statistically significant at the .01 level. Further, the average of the six core attributes (omitting C) correlated +.430 with facility satisfaction, close to the .486 correlation achieved by the average of the 10 attributes that were statistically significant predictors of facility satisfaction in the present study and the .478 calculated by averaging all 27 core attribute ratings. Further, the discrepancy between the contribution of attribute B “following occupational safety guidelines” vs. attribute C “safe neighborhood and building” validated Phase 2’s finding that “safe environment at work” needed to be split between these two aspects.

## Detailed Findings: Segmentation

### Segment Analysis Techniques

Researchers used several different analytical techniques to cluster technologist subgroups and facility types.

**Cluster Analysis.** This multivariate technique grouped respondents and facilities together according to ratings from a wide array of questions. Technologists formed six distinct groups based on their feelings and rankings of importance in selecting a facility in which to work (Q4). Facilities were segmented into seven types according to the performance ratings they received from the technologists (Q6).

**Significance Testing.** After the subgroups were formed, researchers compared responses to the individual questions and tested them at the 0.95 confidence level to identify differences that were deemed statistically significant. This method was applied to individual questions or attributes and used, together with multivariate analysis of variance (also known as discriminant analysis), to identify areas of differences between subgroups.

**Correlations.** A correlation matrix analyzed to what extent any given attribute related to another question. For this analysis, researchers compared how the respondent's rating for a given facility attribute correlated with the respondent's satisfaction with that facility. The analysis focused on attributes with a correlation of 0.30 or greater as a line of delineation between top attributes and less influential attributes. The full matrices are included in the appendices.

**CART.** Classification and regression trees (CART) analysis had many applications, including finding the key variables and variable interactions associated with subgroup membership (i.e., attributes that helped determine satisfaction). CART is a multivariate procedure that searches for complex variable interactions in a data set. Analyzing the crosstabulations helped identify differences among subgroups and facility types. This showed the relationship of each individual variable with the segments. Researchers compared differences to identify the variables or their combinations that would be the most prominent predictor for a subgroup. CART proved useful not only to further define the segments, but also to identify the core characteristics or differentiators of a subgroup (i.e., what separated a satisfied subgroup member from a dissatisfied respondent).

CART's focus on item-by-item construction of its classification trees, however, risked overlooking important linear combinations of variables that could better represent the underlying dimensions along which technologists and facilities differed. Its single-item focus limited pairing to a single independent variable with a single dependent variable. Therefore, "classic" multivariate techniques that consider linear combinations of individual questions and attributes also were employed.

**Multiple Regression Analysis.** Multiple regression analysis (MRA) determined the linear combination of a set of predictor variables most strongly correlated with a single outcome variable. For example, MRA could determine respondents' ratings of the importance of 27 workplace attributes with the same respondents' ratings of their overall satisfaction with their

facilities. The correlation between the optimal linear combination of predictors (the combining weights by the *regression coefficients*) and the outcome variable is called the *multiple correlation coefficient*. The coefficient was larger than the correlation between the outcome measure and any single predictor variable.

**Multivariate Analysis of Variance/Discriminant Analysis.** Multivariate analysis of variance (MANOVA) tested the differences among groups by searching for a linear combination of respondents' scores on several variables, such as all attributes' importance rankings that yielded the strongest evidence that the corresponding subgroups differed on these variables. When there were  $k = 3$  or more groups being examined, MANOVA also identified a second, third, ..., ( $k-1$ ) first linear combination (*discriminant function*) of the variables that (a) were uncorrelated with any of the preceding discriminant functions and (b) discriminated more strongly among the subgroups than any other linear combination that was uncorrelated with the preceding functions. Discriminant analysis then combined the information provided by the discriminant functions to generate a procedure for classifying new cases (e.g., technologists who were not part of the original sample) into the various subgroups.

**Principal Component Analysis.** Principal component analysis (PCA) examined the correlations among a set of variables and derived from them a new set of "underlying" variables (each a linear combination of the original that (a) were mutually uncorrelated and thus provided nonoverlapping, nonredundant information about how cases differed from each other and (b) were hierarchically ordered. Cases differed from each other with respect to the first principal component (PC) more than they differed with respect to the second PC, which in turn accounted for more of the individual differences on the original variables than did the third PC, etc. PCA thus gave a quick "read" as to how many mutually uncorrelated dimensions (PCs) were required to account for, say, 50%, 75% or 90% of the total individual-difference disparity in the set of variables.

**Canonical Correlation.** This technique (Canona) examined the correlations between two sets of variables (e.g., importance ratings of 27 workplace attributes and the respondent facilities' corresponding ratings by on those same 27 attributes) and derived from those correlations a new set of pairs of *canonical variates* such that (a) the canonical variates for the variables in set A were linear combinations of those variables, (b) the same held true for set B, (c) the canonical variates for each set of variables were mutually uncorrelated, and (d) each member of a pair of canonical variates correlated only with the corresponding canonical variate for the other set while being uncorrelated with the other canonical variates for "its" set of variables and also uncorrelated with any of the other canonical variates for the other set of variables. The  $s$  (= # of variables in the smaller set) pairs of canonical variates thus reduced the information provided by the myriad of pairwise correlations into just  $s$  uncorrelated dimensions along which the two sets were related.

Use of the above multivariate techniques led to at least two substantial improvements in the analysis of the technologist and workplace segments:

- A much simpler, three-dimensional system for classifying a given facility into types of workplaces. In addition to being simpler than the CART-based system, this MANOVA/discriminant analysis-derived system correctly classified a higher percentage (73%) of the technologists in the sample than the CART system (67%).

- An equally complex, but more efficient system for determining into which subgroup a given technologist should be classified (93% correct classification vs. 59% for CART).

## Identifying Technologist Subgroups

### Overall Descriptions

#### Paying Dues (19%)

Technologists in this segment most likely worked in an older hospital and in the trauma unit. They've worked for the fewest number of employers. Paying Dues technologists tended to place greater importance on professional procedures and care and less importance on personal gain and comfort. Although not especially young, they tended to be newer to the profession and to report no children in the household.

More likely than many other subgroups to:	Less likely than other subgroups to:
Feel providing accurate images is most important	Feel being paid above industry average is most important
Find coworker professionalism most important	Find a schedule that fits personal needs most important
Feel safety guidelines are most important	Feel insurance and retirement benefits most important
Find department communications most important	Be concerned about reimbursement for work-related expenses
Work in a hospital and older facility	Feel not being on-call is most important
Work in the trauma unit	Work with outpatients
Work swing/night shift and be on-call	Work in a new facility
Work fewer years as a technologist	Have children

**Career Focused (18%).** This subgroup’s respondents reported working hard and expected the compensation and environment to match their efforts. Career attributes such as wages and benefits were important. Career Focused respondents tended to work in larger, urban hospitals with correspondingly large radiology departments, an important factor because these technologists placed high value on a facility’s capabilities. These types of facilities are few, so the subgroup’s technologists appeared more flexible with their schedules and commutes. A need for patient care efficiency reflected in high productivity among these respondents.

More likely than many other subgroups to:	Less likely than other subgroups to:
Feel pay above local industry average is most important	Feel a schedule that fits personal needs is most important
Feel insurance and retirement benefits most important	Feel respect from doctors is most important
Feel state-of-the-art equipment is most important	Feel providing accurate images is most important
Place importance on performance evaluations and overtime compensation	Feel co-workers that act professionally is most important
Work as a specialist	Feel department communications is most important
Work in a hospital with a large, young technologist department	Have been in the profession for a long time
Treat the most radiology patients and work the most hours	Feel spending proper time with patients is most important
Have a long commute	Be female
Be younger	

**Balancing Family/Job (14%).** Respondents in this more “average” subgroup were more likely to work as generalists in suburban nonhospital facilities. Not new to the profession, they placed strong emphasis on their facilities. Balancing Family/Job technologists were more likely than those in many segments to be married, female and have children. They tended to place a higher priority on family values and personal lifestyle than their jobs.

More likely than many other subgroups to:	Less likely than other subgroups to:
Consider not being on-call as most important	Feel respect from physicians is most important
Feel that working at a location that fits personal needs is most important	Feel insurance and retirement benefits are most important
Feel that working in a well-known, well-maintained facility is most important	Feel the ability to provide accurate imaging is most important
Be a generalist	Spend a long time with patients
Work in a suburban facility with a small technologist staff	
Work in an imaging center	
Be married with children	

**Seeking Stability (14%).** Respondents’ adversity to change and conflict primarily characterized this somewhat average segment. Radiographers viewed their jobs not simply as second incomes, but as their careers. Benefits were important to these technologists. They seemed to want to do their jobs and not “make waves.”

More likely than many other subgroups to:	Less likely than other subgroups to:
Feel insurance and retirement benefits most important	Feel respect from doctors is most important
Feel a work location that meets their needs is most important	Feel adequate support staff is most important
Feel working at a safe facility that follows safety guidelines is most important	Feel a staff that acts professionally is most important
Avoid working in the trauma unit	Feel that their input being welcomed is most important
Work in a suburban clinic	Feel a proper performance evaluation is most important
Have a short commute	Feel department communications is most important
Work with a senior staff	
Have spent the longest time in their current position	

**Satisfied Overall (18%).** Technologists in this subgroup were most satisfied with all aspects of their jobs. Radiographers wanted to do their jobs well and seemed to have the time to spend with patients. They did not appear to rely on their jobs for long-term financial needs. Satisfied Overall respondents considered accuracy and professionalism important, but they had paid their “dues” and expected to be treated as such. They most likely worked in clinics.

More likely than many other subgroups to:	It is less likely than other subgroups to:
Be most satisfied with all job aspects	Feel pay above local industry average is most important
Feel a schedule that fits personal needs is most important	Feel job security is most important
Feel respect from doctors and nurses is most important	Feel insurance and retirement benefits are most important
Feel that providing accurate images is most important	Feel adequate support staff is most important
Feel that coworkers acting professionally is most important	Work on-call
Work in a newer clinic with a small staff	
Treat the fewest patients	
Be older, married and female	

**Least Satisfied (17%).** Respondents in this subgroup were the least satisfied of all technologist clusters, tending to place more emphasis on personal comfort and well being than on job functions. Although average in demographics, their common characteristic appeared to be a concern about personal benefits and pay over facility and job attributes.

More likely than many other subgroups to:	Less likely than other subgroups to:
Feel a schedule that fits personal needs is most important	Be satisfied with any aspect of their job
Feel pay above the local industry average is most important	Feel providing accurate imaging is most important
Feel insurance & retirement benefits are most important	Feel that coworkers acting professionally is most important
Feel not being on-call is most important	Feel following safety guidelines is most important
Feel overtime compensation is most important	Feel working in a well-known facility is most important
	Feel being properly educated in job is most important
	Feel safe facility is most important

### Differences in Attribute Importance

Question 4 respondents were asked the following:

We would like you to tell us which attributes and workplace characteristics you, yourself feel are the most important to you in terms of judging a facility as a place to work. Please identify the five most important attributes in the first column. Then, please identify the next five most important attributes in the second column, the next five most important attributes in the third column and finally the next five most important attributes in the fourth column.

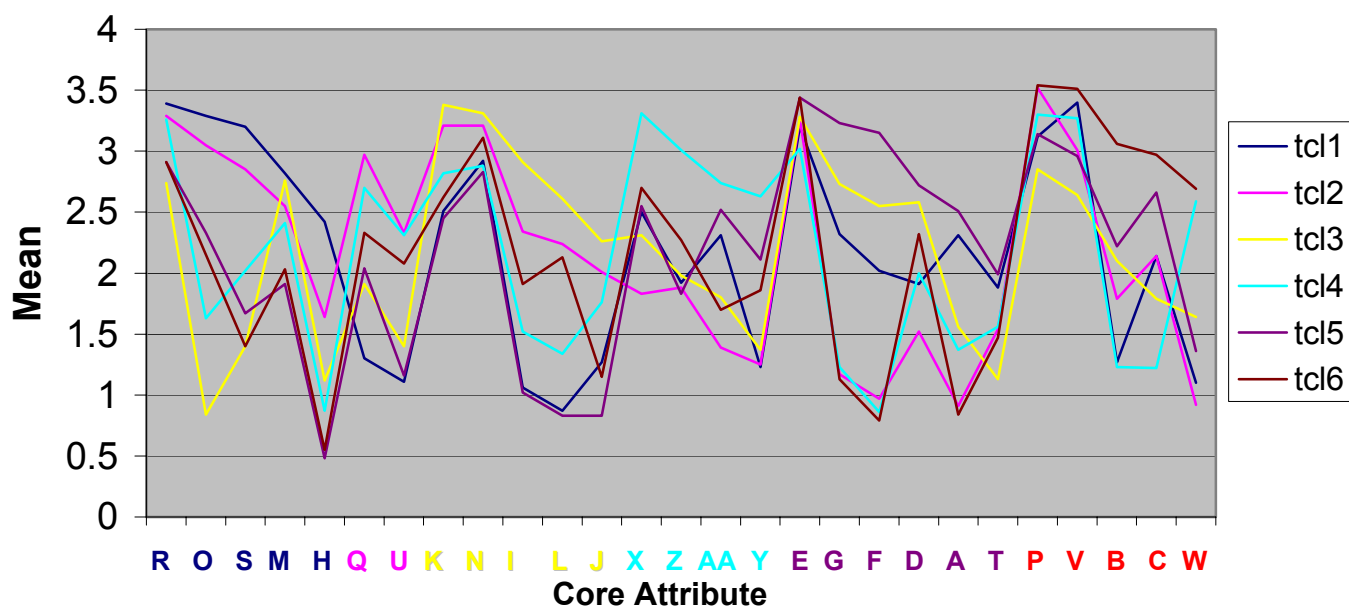
The facility characteristics (presented on a rotational basis) that respondents were asked to rank for importance were\*:

A. Pay is above industry average for your geographic area	J. Respect from physicians	S. Not being required to be on-call
guidelines in terms of radiation and disease exposure	K. Respect from nurses	T. Job security (no worry about being laid off)
place (i.e., safe neighborhood, building security)	L. Ability to provide accurate images	U. Coworkers act professionally
D. State-of-the-art imaging equipment	M. Have control over your career	V. Facility is well-known
E. Overall layout of the Radiology department	N. Internal/on-site training	W. Being properly educated in the job you do
F. Insurance benefits	O. Location meets personal needs such as convenient location, day/senior care, etc.	X. Receive proper performance evaluation
G. Retirement benefits	P. Working order of building (i.e., elevators, etc.)	Y. Have adequate support staff
H. Schedule fits your personal needs	Q. Communications within radiology department	Z. Your input is welcome
I. Can spend proper time with patients	R. Reimbursement for work-related expenses	AA. Receive proper compensation for extra hours

\*Letter (A, B, etc.) is used to designate core attributes (Questions 4 and 6) in tables, graphs.



## Technologist Subgroup Means, Importance of Core Attributes



tcl1 = Paying Dues	tcl3 = Balancing Fam/Job	tcl5 = Satisfied Overall
tcl2 = Career Focused	tcl4 = Seeking Stability	tcl6 = Least Satisfied

Mean Importance of Core Attributes and (Percent Rating Among 5 Most Important) x  
 Technologist Subgroup  
 Scale: 0 = Not Among Top 20 Attributes to 4 = Among Top 5 Attributes

Core Attribute	Technologist Subgroup						
	Overall	Paying Dues	Career Focused	Balance Fam/Job	Seek Stability	Satisfied Overall	Least Satisfied
	N = 2397	N=452	N=430	N=344	N=339	N=429	N=413
Q.4a Pay is above industry average for your geographic area	2.3963	1.6903 (16%) (E)	3.0860 (51%) (A,C-E)	2.4401 (37%) (AE)	2.6342 (39%) (AE)	1.4895 (15%)	3.1622 (58%) (A,C-E)
Q.4b Follows occupational safety guidelines in terms of radiation and disease	2.0492	2.7323 (35%) (BCEF)	2.2116 (17%) (CEF)	1.9042 (10%) (F)	2.7699 (31%) (BCEF)	1.7809 (15%) (F)	.9370 (2%)

Q.4c Primary facility you work at is a safe place (i.e., safe neighborhood, building)	1.8039	1.8629 (15%) (EF)	1.8581 (11%) (EF)	2.2126 (22%) (ABEF)	2.7817 (32%) (ALL)	1.3450 (8%) (F)	1.0266 (2%)
Q.4d State-of-the-art imaging equipment	1.8373	2.0863 (22%) (CEF)	2.4814 (32%) (ALL)	1.4192 (13%)	1.9971 (20%) (CEF)	1.2821 (12%)	1.6780 (15%) (CE)
Q.4e Overall layout of the radiology department	.7196	.8009 (3%) (EF)	.7372 (2%) (EF)	.7246 (2%) (EF)	.9794 (4%) (ALL)	.5618 (2%)	.5593 (2%)
Q.4f Insurance benefits	2.2691	1.9779 (15%) (CE)	3.0349 (44%) (ACE)	1.4461 (14%) (E)	3.1445 (48%) (ACE)	.8485 (4%)	3.2131 (51%) (A-C,E)
Q.4g Retirement benefits	2.0259	1.6770 (10%) (CE)	2.8302 (33%) (ACE)	1.2695 (6%) (E)	2.7670 (32%) (ACE)	.7739 (2%)	2.8741 (35%) (ACE)
Q.4h Schedule fits your personal needs	2.7906	1.5841 (12%)	2.3581 (28%) (A)	2.8832 (54%) (AB)	3.1327 (54%) (A-C)	3.5175 (68%) (A-D)	3.4504 (68%) (A-D)
Q.4i Can spend proper time with patients	2.2466	2.9358 (45%) (B-D,F)	1.6558 (11%) (C)	1.0928 (5%)	2.4808 (25%) (BCF)	2.9790 (40%) (B-D,F)	2.0872 (13%) (BC)
Q.4j Respect from physicians	2.4885	2.7301 (38%) (B-D)	1.9860 (18%) (C)	1.7365 (19%)	2.2360 (18%) (BC)	3.1748 (50%) (ALL)	2.8499 (33%) (B-D))
Q.4k Respect from nurses	1.1932	1.4934 (8%) (B-D)	.7930 (2%) (C)	.6228 (2%)	1.1799 (2%) (B-D)	1.5524 (8%) (B-D)	1.3801 (4%) (B-D)
Q.4l Ability to provide accurate images	2.3642	3.1261 (51%) (B-D,F)	1.7628 (12%) (C)	1.3862 (9%)	2.6578 (28%) (BCF)	3.1678 (48%) (B-D,F)	1.8717 (12%) (C)
Q.4m Have control over your career	1.5937	1.1792 (6%)	1.4512 (9%) (AC)	1.2365 (11%)	1.5870 (10%) (A-C)	2.0909 (16%) (A-D)	1.9734 (15%) (A-D)
Q.4n Internal/onsite training	.9620	1.0774 (4%) (BCF)	.7907 (2%)	.6916 (2%)	1.1180 (3%) (BCF)	1.1725 (3%) (BCF)	.8862 (3%) (C)
Q.4o Location meets personal needs such as convenient location, day care, senior care	1.6984	.7146 (2%)	.9535 (6%) (A)	3.1647 (56%) (ALL)	2.3717 (33%) (ABEF)	1.6667 (13%) (AB)	1.8450 (19%) (AB)
Q.4p Working order of building (i.e., elevators, etc.)	.7451	.8850 (2%) (BDF)	.4767 (1%)	1.1467 (3%) (ALL)	.6991 (1%) (BF)	.8648 (1%) (BDF)	.4600 (1%)
Q.4q Communications within radiology department	1.8073	2.6991 (31%) (ALL)	1.0326 (4%)	2.0898 (16%) (BDF)	1.2979 (5%)	1.9604 (15%) (BDF)	1.6683 (9%) (BD)
Q.4r Reimbursement for work-related expenses	.9045	.6062 (1%)	.7140 (2%)	1.2575 (4%) (ABDE)	.7434 (0%) (A)	1.0862 (2%) (ABD)	1.0872 (4%) (ABD)
Q.4s No on-call requirements	1.8632	.7987 (4%)	1.1465 (11%) (A)	2.5988 (40%) (ABDE)	1.9794 (25%) (AB)	2.3310 (33%) (ABD)	2.5981 (39%) (ABDE)
Q.4t Job security (no worry about being laid off)	2.38048	2.11504 (26%)	2.46279 (41%) (AE)	2.86527 (42%) (ALL)	2.43953 (35%) (AE)	2.00699 (22%)	2.53269 (33%) (AE)
Q.4u Coworkers act professionally	2.2845	2.8872 (39%) (B-D,F)	1.6721 (14%)	2.5988 (27%) (BDF)	1.6903 (11%)	2.8415 (34%) (B-D,F)	1.9177 (12%) (BD)

Q.4v Facility is well-known	.8536	.6040 (2%)	.9860 (6%) (ADF)	1.3623 (10%) (ALL)	.7286 (5%) (F)	1.0396 (5%) (ADF)	.4867 (1%)
Q.4w Being properly educated in the job you do	2.3242	2.9004 (45%) (C-F)	3.0814 (48%) (ALL)	2.3563 (23%) (E)	1.4071 (9%) (ACE)	2.6387 (35%)	1.3051 (5%) (A-C,E)
Q.4x Receive proper performance evaluation	1.4881	1.5000 (6%) (D)	2.1651 (16%) (ALL)	1.6916 (8%) (A,D-F)	.6903 (2%)	1.4499 (5%) (D)	1.3002 (6%) (D)
Q.4y Have adequate support staff	2.2820	2.7699 (36%) (D-F)	2.7512 (35%) (D-F)	2.6347 (28%) (D-F)	1.3658 (9%)	1.8881 (12%) (D)	2.1356 (20%) (DE)
Q.4z Your input is welcome	1.8828	2.0841 (14%) (DF)	2.1233 (13%) (DF)	2.0210 (12%) (DF)	.9941 (4%)	2.1748 (17%) (DF)	1.7264 (9%) (D)
Q.4aa Receive proper compensation for extra hours	1.9307	1.6903 (8%) (DE)	2.6093 (26%) (ALL)	2.1976 (20%) (ADE)	1.2566 (7%)	1.4755 (8%) (D)	2.2978 (24%) (ADE)

(LETTERS) This subgroup's mean is significantly higher statistically (at the 95% confidence level) than the mean of each subgroup designated by a letter within parentheses. Note that statistical significance is symmetric: if x is significantly higher than y, then y is significantly lower than x.

## Differences in Demographics

### Age

	Total	Technologist Subgroups					
		Paying Dues	Career Focused	Balancing Family/Job	Seeking Stability	Satisfied Overall	Least Satisfied
		(A)	(B)	(C)	(D)	(E)	(F)
Base: Total Resp.	(2386)	(450)	(427)	(334)	(338)	(427)	(410)
<b>Age</b>							
18 to 30	18%	20% (E)	19% (E)	19% (E)	18%	13%	20% (E)
31 to 35	14%	15%	17%	13%	13%	13%	12%
36 to 40	15%	13%	16%	18% (A)	14%	14%	17%
41 to 45	17%	16%	19%	16%	15%	16%	19%
46 to 50	16%	16%	16%	17%	18%	18%	15%
51 to 55	12%	11%	9%	10%	15% (B)	16% (ABCF)	10%
56 and older	8%	9% (B)	5%	7%	8%	10% (BF)	6%
Mean Age	41.14	41.06	39.83	40.61	41.79 (B)	43.11 (ABCF)	40.41

(Letters): Groups named in parentheses differ significantly from this group.

### Gender and Marital Status

	Total	Technologist Subgroups					
		Paying Dues	Career Focused	Balancing Fam/Job	Seeking Stability	Satisfied Overall	Least Satisfied
		(A)	(B)	(C)	(D)	(E)	(F)
Base: Total Respondents	(2396)	(451)	(430)	(334)	(339)	(429)	(413)
<b>Gender</b>							
Male	16%	18% (CDE)	23% (CDE)	13%	12%	10%	20% (CDE)
Female	84%	82%	77%	87% (ABF)	88% (ABF)	90% (ABF)	80%
Base: Total Respondents	(2387)	(451)	(429)	(333)	(338)	(425)	(411)
<b>Marital Status</b>							
Married	73%	69%	68%	79% (ABDF)	70%	84% (ABDF)	72%
Single	27%	31% (CE)	32% (CE)	21%	30% (CE)	16%	28% (CE)

(Letters): Groups named in parentheses differ significantly from this group.

### Ethnicity

	Total	Technologist Subgroups					
		Paying Dues	Career Focused	Balancing Fam/Job	Seeking Stability	Satisfied Overall	Least Satisfied
		(A)	(B)	(C)	(D)	(E)	(F)
Base: Total Respondents	(2386)	(450)	(427)	(333)	(337)	(427)	(412)
<b>Ethnicity</b>							
Caucasian	93%	92%	92%	93%	91%	96% (ABD)	93%
African-American	3%	3%	4% (F)	4% (F)	4%	3%	2%
Hispanic	3%	3% (E)	4% (E)	2% (E)	4% (E)	1%	3% (E)
Asian / Pacific Islander	1%	1%	1%	1%	2% (B)	1%	2% (B)
Other	0%	0%	0%	0%	0%	-	1%

(Letters): Groups named in parentheses differ significantly from this group.

### Household Size

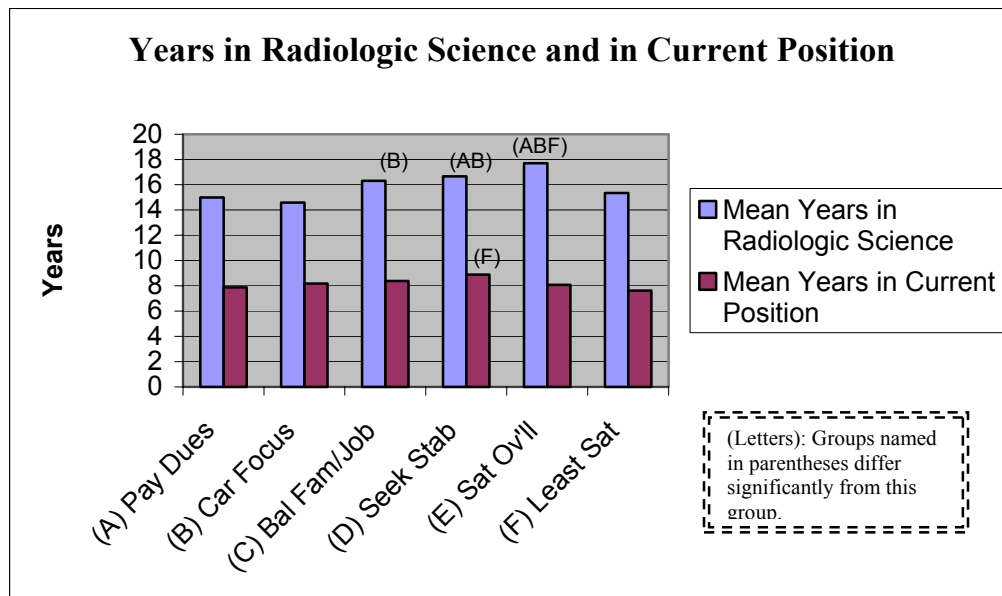
	Total	Technologist Subgroups					
		Paying Dues	Career Focused	Balancing Fam/Job	Seeking Stability	Satisfied Overall	Least Satisfied
		(A)	(B)	(C)	(D)	(E)	(F)
Base: Total Respondents	(2389)	(451)	(429)	(334)	(337)	(428)	(410)
<b>Household Size</b>							
(1) 1 person	10%	10% (E)	12% (E)	8%	11% (E)	6%	11% (E)
(2) 2 people	32%	38% BCDF	27%	28%	31%	33%	32%
(3) 3 people	23%	24%	22%	21%	27% (E)	20%	24%
(4) 4 people	25%	20%	26% (A)	31% (ADF)	23%	28% (A)	23%
(5) 5 people	9%	6%	11% (A)	10%	7%	11% (A)	7%
(7) 6+ people	2%	1%	3%	2%	1%	3%	3% (AD)
Mean Household Size	3.00	2.79	3.07 (A)	3.13 (AD)	2.90	3.15 (ADF)	2.97 (A)

(Letters): Groups named in parentheses differ significantly from this group.

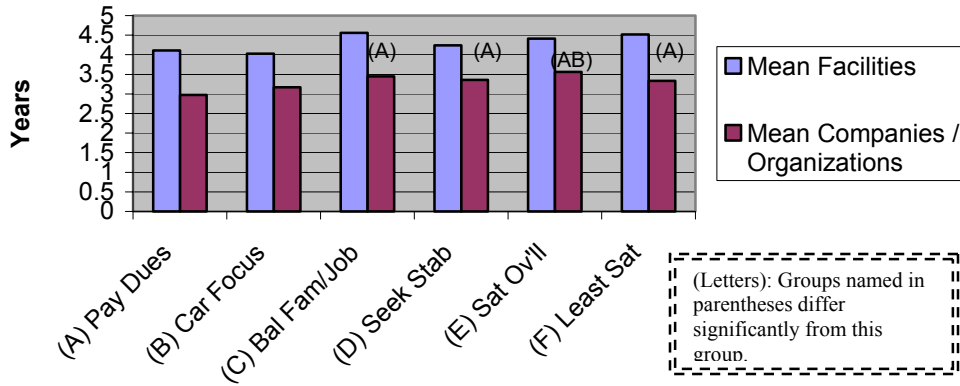
### Children in Household

	Technologist Subgroups						
	Total	Paying Dues	Career Focused	Balancing Fam/Job	Seeking Stability	Satisfied Overall	Least Satisfied
		(A)	(B)	(C)	(D)	(E)	(F)
Base: Total Respondents	(2388)	(449)	(430)	(334)	(338)	(428)	(409)
<b>Children in Household</b>							
(0) 0 children	49%	58% (BCEF)	45%	45%	51%	47%	48%
(1) 1 child	21%	21%	21%	20%	23%	20%	21%
(2) 2 children	22%	16%	25% (A)	27% (AD)	20%	23% (A)	23% (A)
(3) 3 children	6%	5%	7%	7%	6%	8% (A)	6%
(4) 4 children	1%	0%	2%	1%	0%	2%	2%
(5) 5 children	0%	0%	0%	0%	-	-	1%
(7) 6+ children	-	-	-	-	-	-	-
Mean Children in Household	0.90	0.70	1.00 (AD)	1.00 (AD)	0.81	0.98 (AD)	0.93 (A)

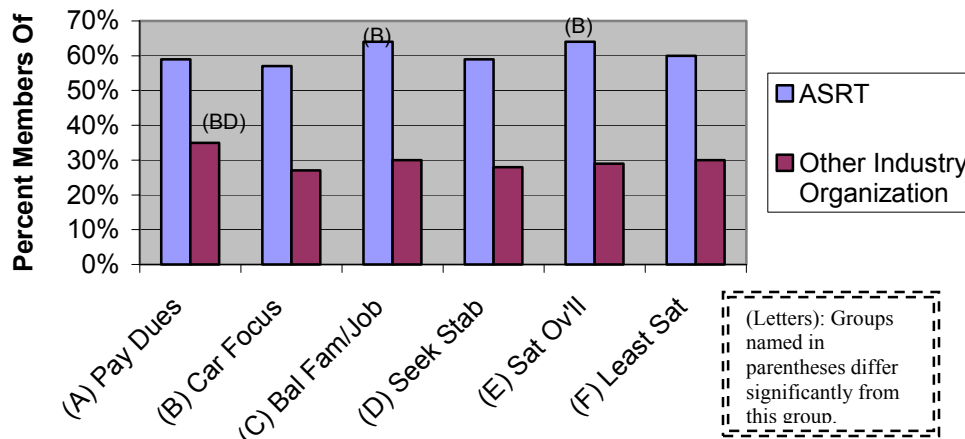
(Letters): Groups named in parentheses differ significantly from this group.



### Number of Facilities and Companies/Organizations Worked For

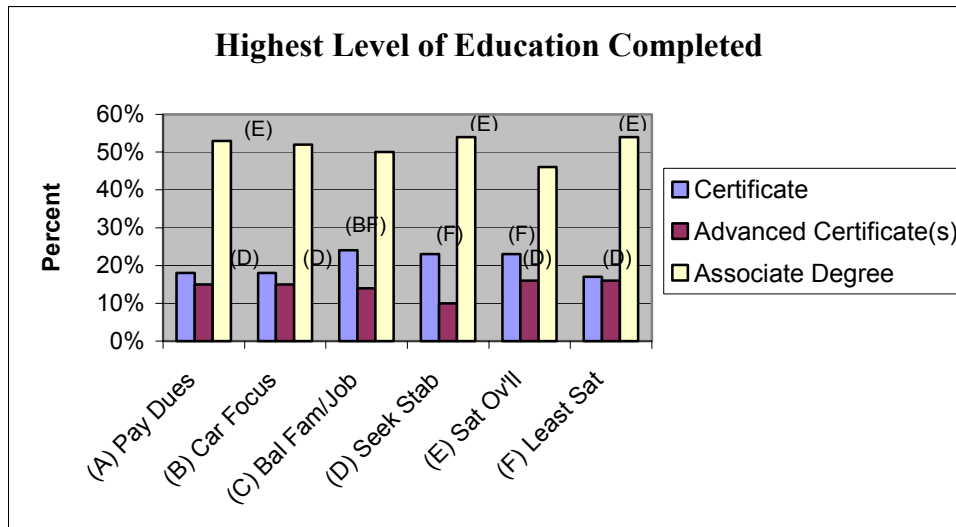


### Association Membership



### Certification

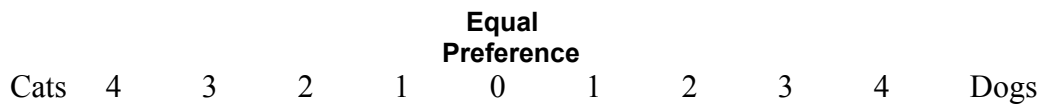
Radiography	93% (C)	90%	88%	93%	89%	90%
Mammography	25%	23%	31% (B)	33% (AB)	35% (AB)	31% (B)
Computed Tomography	12%	15% (E)	11%	11%	10%	15% (E)
Magnetic Resonance Imaging	6%	7%	8%	6%	6%	7%
Sonography	5% (D)	5%	4%	2%	5% (D)	6% (D)
Radiation Therapy	4%	5%	2%	2%	4%	3%
Bone Densitometry	3%	3%	3%	2%	2%	3%
CV-Interventional Technology	3%	3%	2%	1%	2%	3%
Nuclear Medicine Technology	3% (F)	2%	1%	2%	2%	1%
Vascular Sonography	2% (B)	0%	1%	2%	2% (B)	1%
Quality Management	1%	0%	1%	1%	1%	1%
Other	6%	4%	4%	5%	3%	4%
N for Subgroup	434	421	317	332	412	402



### Differences in Broad Preferences

Question 5 asked respondents the following:

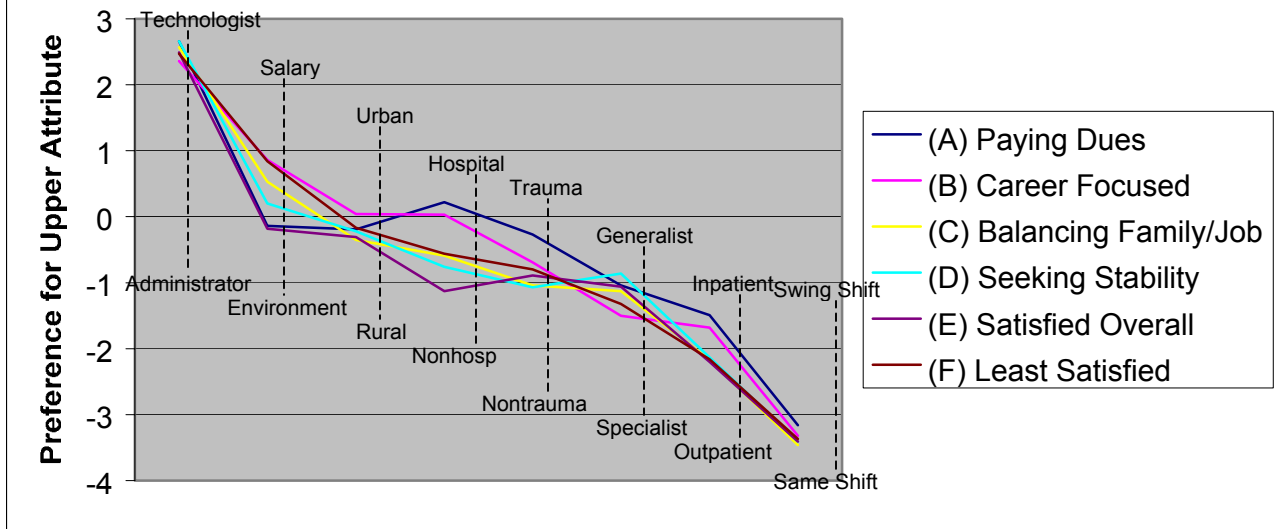
Next, we would like to see your preference, if any, between selected attributes. An example: If you totally prefer dogs over cats then you would circle the 4 under “Dogs.” If you prefer dogs over cats but still like cats a little then you would circle 3, 2 or 1 on the “Dogs” side of 0, depending on your preference. You would circle 0 if you have equal preference. If you preferred cats over dogs then you would circle 1, 2, 3 or 4 on the “Cats” side of 0 depending on amount of preference.



The eight attributes that respondents were asked to rate for preference were:

	Equal Preference									
	4	3	2	1	0	1	2	3	4	
Great Work Environment	4	3	2	1	0	1	2	3	4	Great Salary
Rural	4	3	2	1	0	1	2	3	4	Urban
Nonhospital	4	3	2	1	0	1	2	3	4	Hospital
Administrator	4	3	2	1	0	1	2	3	4	Technologist
Specialist	4	3	2	1	0	1	2	3	4	Generalist
Nontrauma	4	3	2	1	0	1	2	3	4	Trauma
Same Shift	4	3	2	1	0	1	2	3	4	Swing Shift
Outpatient	4	3	2	1	0	1	2	3	4	Inpatient

### Broad Preferences x Technologist Subgroup



	Tech vs. Admin	Salary vs. Environment	Urban vs. Rural	Hospital vs. Nonhosp	Trauma vs. Nontrauma	Generalist vs. Specialist	Inpatient vs. Outpt	Swing vs. Same Shift
(A) Paying Dues	2.66(B)	-0.14	-0.19	0.22(C-F)	-0.27(ALL)	-1.04(B)	-1.49(C-F)	-3.16(C-E)
(B) Career Focused	2.36	0.86(A,C-E)	0.04(CE)	0.03(C-F)	-0.69	-1.50	-1.68(C-F)	-3.32
(C) Balancing Fam/Job	2.57	0.53(AE)	-0.35	-0.59	-1.04	-1.13	-2.17	-3.46
(D) Seeking Stability	2.66(B)	0.20(AE)	-0.22	-0.76	-1.07	-0.86(BF)	-2.13	-3.41
(E) Satisfied Ov'll	2.49	-0.18	-0.31	-1.13	-0.89	-1.06(B)	-2.20	-3.41
(F) Least Sat	2.47	0.84(ADE)	-0.17	-0.56	-0.8	-1.32	-2.16	-3.37

(Letters): Groups listed in parentheses differ from this group at the .95 level of confidence.

### Differences in Satisfaction

Question 3 asked respondents the following:

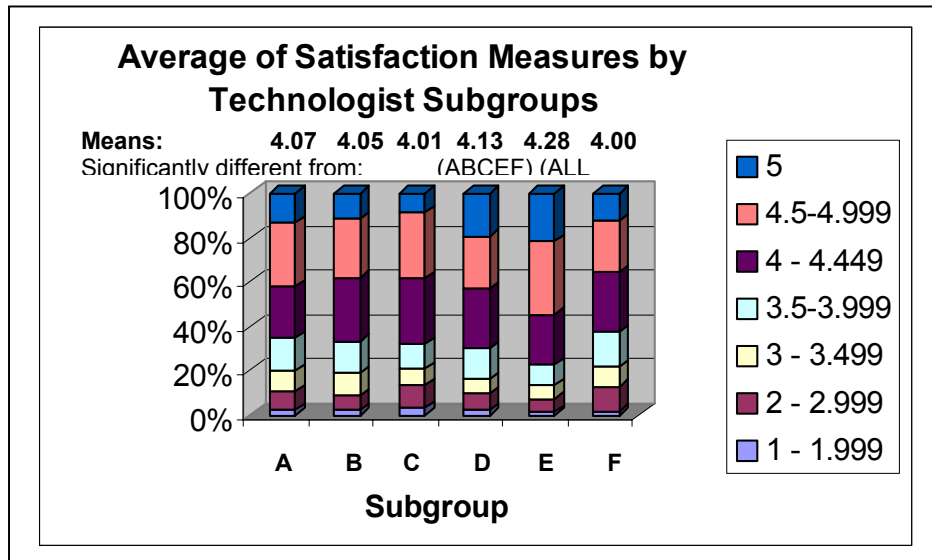
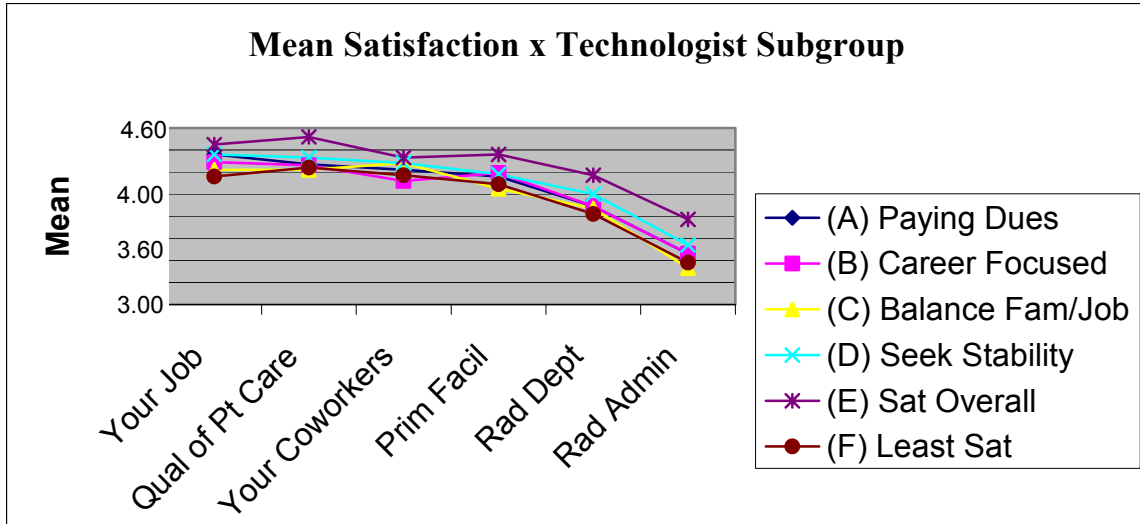
Using the scale below (1 = Very Dissatisfied, 2 = Somewhat Dissatisfied, 3 = Neither Satisfied nor Dissatisfied, 4 = Somewhat Satisfied, 5 = Very Satisfied), please give your overall satisfaction with the following:

The six key areas that respondents were asked to rate for overall satisfaction were:

- Primary work facility.
- Radiology department.
- The job.
- Coworkers.
- Radiology administration.
- Quality of patient care.



These measures were substantially and significantly correlated with each other (+.40 to +.71 across all technologists); therefore, overall satisfaction (i.e., the simple average of the six satisfaction measures, omitting radiology department and radiology administration if N/A) was also examined.



Tech Subgroup	Satisfaction	Your Job	Quality of Patient Care	Your Coworkers	Primary Facility	Radiology Department	Radiology Administration
(A) Paying Dues	%	88%	86%	83%	81%	75%	58%
	Mean	4.36 (CF)	4.27	4.22	4.16	3.89	3.46
(B) Career Focused	%	87%	85%	80%	85%	74%	59%
	Mean	4.29	4.26	4.12	4.19	3.89	3.46
(C) Bal Family/Job	%	84%	86%	85%	80%	76%	57%
	Mean	4.22	4.22	4.28(B)	4.05	3.87	3.33
(D) Seeking Stability	%	88%	88%	85%	82%	76%	61%
	Mean	4.36 (F)	4.33	4.28(B)	4.18	4.00(F)	3.54(C)
(E) Satisfied Overall	%	90%	92%	87%	87%	82%	69%
	Mean	4.45 (BCF)	4.52(ALL)	4.33(BF)	4.36(ALL)	4.17(ALL)	3.77(ALL)
(F) Least Satisfied	%	84%	83%	80%	81%	72%	56%
	Mean	4.16	4.24	4.17	4.09	3.82	3.38

## Differences in Facility Ratings

### Current Facility, Core Attributes

Question 6 asked respondents the following:

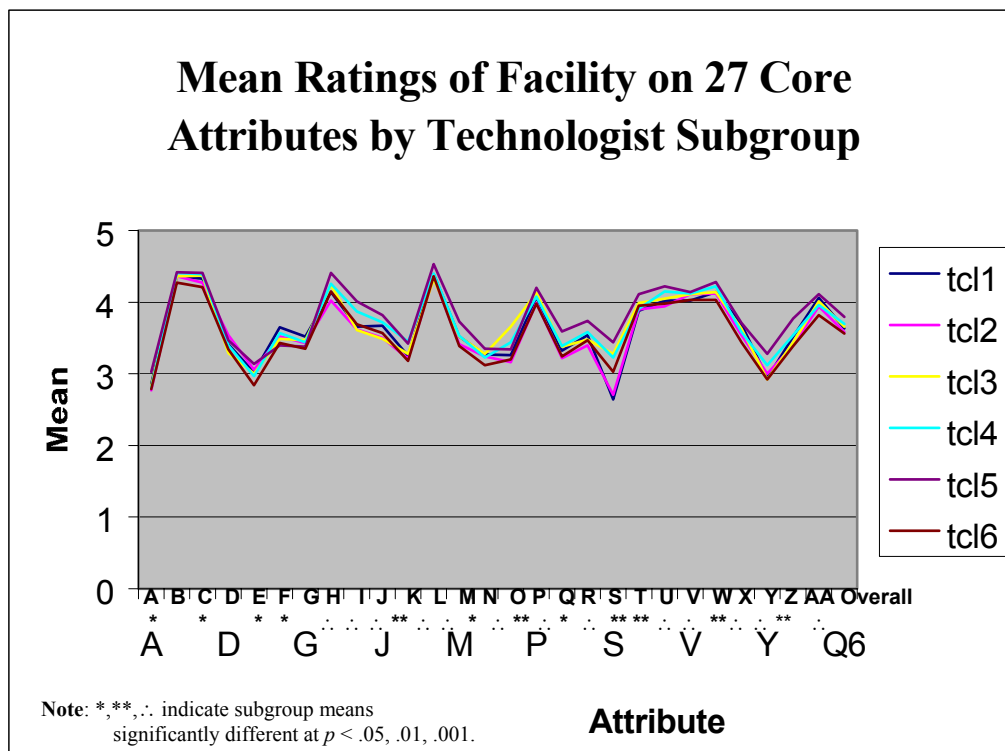
Please tell us, how much you agree with the following statements using a 5-point scale where 1 = I completely disagree with this statement, 2 = I somewhat disagree with this statement, 3 = I neither agree nor disagree with this statement, 4 = "I somewhat agree with this statement" and 5 = I completely agree with this statement. Once again, we are speaking about your current job at the primary facility you work at.

The facility characteristics that respondents were asked to rate for agreement with were:

A. Compared to other facilities in the area, this facility offers better wages for technologists.	J. Technologists receive respect from physicians.	S. Technologists are not required to be on-call.
B. This facility follows occupational safety guidelines for radiation and disease exposure.	K. Technologists receive respect from nurses.	T. Technologists have job security (do not worry about being laid off).
C. This facility is a safe place to work in terms of neighborhood and building security.	L. Technologists can provide accurate images.	U. The radiologic staff acts professionally.
D. This facility has state-of-the-art imaging equipment.	M. Technologists can control their careers.	W. This facility is well-known.
E. The overall layout of the radiology department is designed with the job of the technologist in mind.	N. Technologists receive sufficient internal/on-site training.	V. Technologists are properly educated in their jobs.
F. This facility offers satisfactory insurance benefits.	O. This facility meets personal needs of staff such as convenient location, daycare/senior care, etc.	X. Technologists receive proper performance evaluation(s).
G. This facility offers satisfactory retirement benefits.	P. This facility is in proper working order (elevators, lighting, etc).	Y. The radiology department has adequate support staff.
H. This facility offers a work schedule that fits my personal needs.	Q. There is good communication within the radiology department.	Z. Technologist input is welcome.
I. In this facility, technologists spend the proper amount of time with each patient.	R. Technologists get reimbursed for work-related expenses.	AA. Technologists receive proper compensation for extra hours.

Q6 Overall = average of all 27 ratings. Letters used to designate attributes in tables, graphs.

A number of statistically significant differences among the subgroups occurred. Most notably, the Paying Dues and Career Focused subgroups rated their facilities' on-call policies lower. These differences were generally quite small, relative to the similarity among groups with respect to areas where their facilities were strongest and weakest.



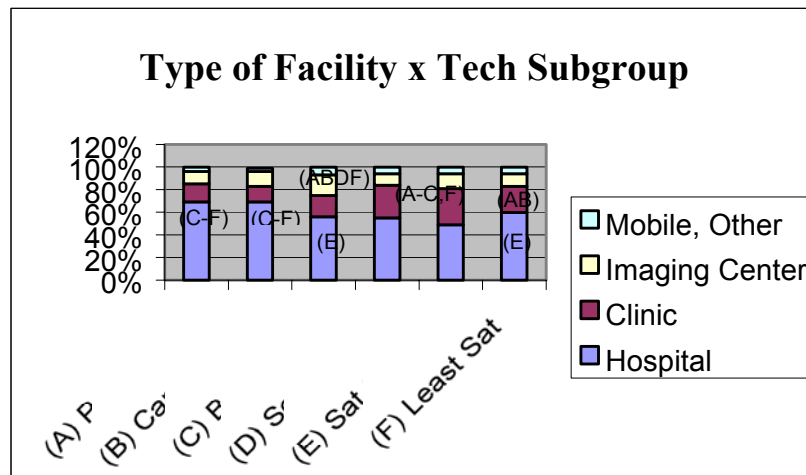
tcl1 = Paying Dues	tcl3 = Balancing Fam/Job	tcl5 = Satisfied Overall
tcl2 = Career Focused	tcl4 = Seeking Stability	tcl6 = Least Satisfied

#### Mean Satisfaction Rating and Proportion Agreeing or Strongly Agreeing x Technologist Subgroup

	Tech cluster, 6-segment solution						Total
	Tcl 6.1 Paying dues	Tcl 6.2 Career Focus	Tcl 6.3 Balance Fam/Job	Tcl 6.4 Seeking Stability	Tcl 6.5 Satisfied Overall	Tcl 6.6 Least Satisfied	
Q.6a Compared to other facilities in the area, this facility offers better wages	2.8644 .3556	2.7651 .3140	2.8258 .3483	2.7959 .3314	3.0258 .3794	2.7869 .3317	2.8469 .343
Q.6b This facility follows occupational safety guidelines for radiation and disease exposure	4.3606 .8650	4.3636 .8671	4.3634 .8649	4.4142 .8698	4.4242 .8951	4.2743 .8350	4.3656 .866
Q.6c This facility is a safe place to work in terms of neighborhood and building	4.3304 .8492	4.2721 .8349	4.3683 .8683	4.3894 .8643	4.4089 .8832	4.2073 .8049	4.3265 .849
Q.6d This facility has state-of-the-art imaging equipment	3.4116 .5660	3.5419 .6000	3.2883 .5165	3.4012 .5723	3.4673 .5794	3.3366 .5375	3.4134 .563
Q.6e The overall layout of the	3.0200	3.0561	2.9970	2.9734	3.1402	2.8366	3.0067

radiology department is designed with the job in mind	.4156	.4112	.3934	.4053	.4182	.3439	.398
Q.6f This facility offers satisfactory insurance benefits	3.6467	3.5221	3.4940	3.5740	3.4042	3.4286	3.5117
	.6244	.6244	.5542	.6272	.5047	.5860	.581
Q.6g This facility offers satisfactory retirement benefits	3.5212	3.4302	3.4683	3.4448	3.3779	3.3471	3.4310
	.5880	.5581	.5559	.6000	.5305	.5485	.5620
Q.6h This facility offers a work schedule that fits my personal needs	4.1375	4.0233	4.2432	4.2604	4.4112	4.1537	4.2009
	.8049	.7552	.8438	.8550	.9042	.8195	.828
Q.6i In this facility, technologists spend the proper amount of time with each patient	3.6615	3.6200	3.6084	3.8724	4.0140	3.6878	3.7441
	.6659	.6270	.6205	.7359	.7944	.6463	.682
Q.6j Technologists receive respect from physicians	3.6689	3.4953	3.4910	3.7168	3.8182	3.5655	3.6288
	.6467	.5837	.5663	.6814	.7319	.6311	.641
Q.6k Technologists receive respect from nurses	3.2472	3.2136	3.2848	3.4540	3.4211	3.1838	3.2957
	.4652	.4484	.4582	.5460	.4904	.4240	.470
Q.6l Technologists can provide accurate images	4.3916	4.3450	4.3193	4.4000	4.5318	4.3641	4.3945
	.9292	.9091	.8916	.9194	.9388	.9005	.915
Q.6m Technologists can control their career	3.5236	3.4065	3.5166	3.5298	3.7254	3.3927	3.5160
	.5416	.4977	.5650	.5536	.6667	.4976	.553
Q.6n Technologists receive sufficient internal/on-site training	3.2711	3.2419	3.2831	3.2337	3.3520	3.1217	3.2510
	.4756	.4814	.5000	.4556	.5198	.4428	.479
Q.6o This facility meets personal needs of staff such as convenient location	3.2572	3.1639	3.6587	3.4366	3.3364	3.2000	3.3265
	.4346	.3934	.6168	.5251	.4463	.4195	.465
Q.6p This facility is in proper working order (elevators, lighting, etc)	4.0664	3.9884	4.1291	4.0767	4.1986	3.9804	4.0715
	.7854	.7581	.8198	.7817	.8037	.7653	.784
Q.6q There is good communication within the radiology department	3.3164	3.2191	3.3814	3.3947	3.5911	3.2396	3.3551
	.5133	.4569	.5405	.5371	.6098	.4817	.522
Q.6r Technologists get reimbursed for work-related expenses	3.5402	3.4000	3.4790	3.5841	3.7383	3.4722	3.5364
	.5603	.5186	.5359	.5664	.6425	.5448	.562
Q.6s Technologists are not required to be on call	2.6370	2.7110	3.2823	3.2301	3.4390	3.0315	3.0356
	.3519	.3776	.5165	.5074	.5704	.4697	.460
Q.6t Technologists have job security (do not worry about being laid off)	3.8758	3.8970	3.9880	3.9110	4.1121	3.9492	3.9552
	.7029	.6979	.7410	.7181	.7710	.7240	.725
Q.6u The radiologic staff acts professionally	4.0221	3.9394	4.0480	4.1475	4.2243	3.9806	4.0577
	.7677	.7669	.8078	.8083	.8505	.7549	.791
Q.6v This facility is well-known	4.0156	4.1075	4.1111	4.1217	4.1379	4.0316	4.0851
	.7210	.7523	.7477	.7893	.7944	.7348	.755
Q.6w Technologists are properly educated in their jobs	4.1371	4.1244	4.1441	4.2173	4.2759	4.0293	4.1534
	.8135	.8169	.8378	.8333	.8656	.7848	.824
Q.6x Technologists receive proper performance evaluation(s)	3.6933	3.5372	3.6273	3.5774	3.7073	3.4380	3.5982
	.6622	.6093	.6333	.5863	.6393	.5377	.612
Q.6y The radiology dept. has adequate support staff	2.9446	3.0047	2.9192	3.1243	3.2757	2.9197	3.0322
	.4080	.4056	.4132	.4349	.5234	.3869	.429
Q.6z Technologist input is welcome	3.5178	3.4019	3.4401	3.5371	3.7694	3.3874	3.5111
	.5644	.5304	.5479	.5935	.6988	.5133	.575
Q.6aa Technologists receive proper compensation for extra hours	4.0600	3.9438	4.0060	3.9643	4.1075	3.8160	3.9845
	.7822	.7471	.7695	.7381	.7827	.7119	.755
N	445-452	426-430	330-334	335-339	418-429	408-413	2357-2393

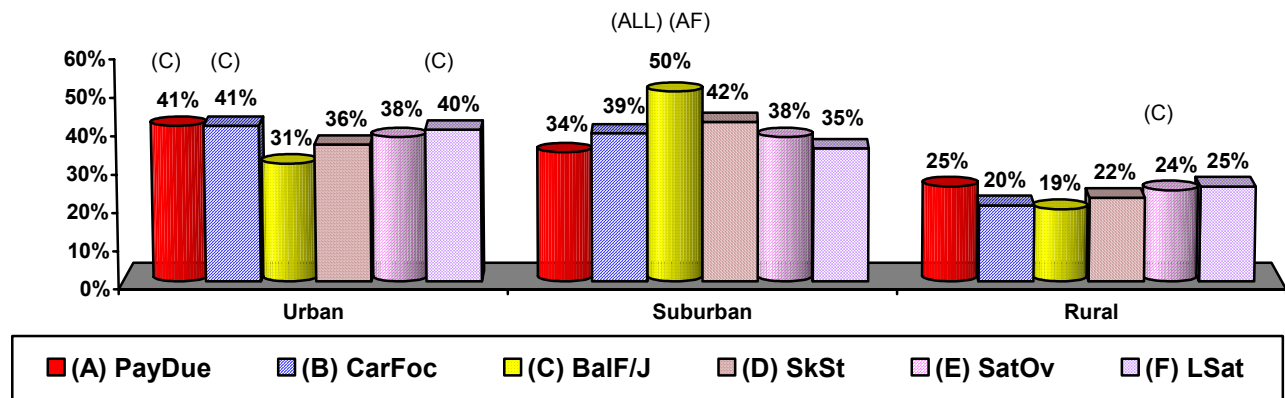
## Current Facility, Other Attributes



Paying Dues and Career Focused respondents worked in hospitals more than respondents in other groups. A higher percentage of Seeking Stability and Satisfied Overall radiographers than other groups worked in clinics and a higher percentage of Balancing Family/Job technologists worked in imaging centers.

Differences in “mobile unit” and “other” facilities were not reported separately due to their small percentages.

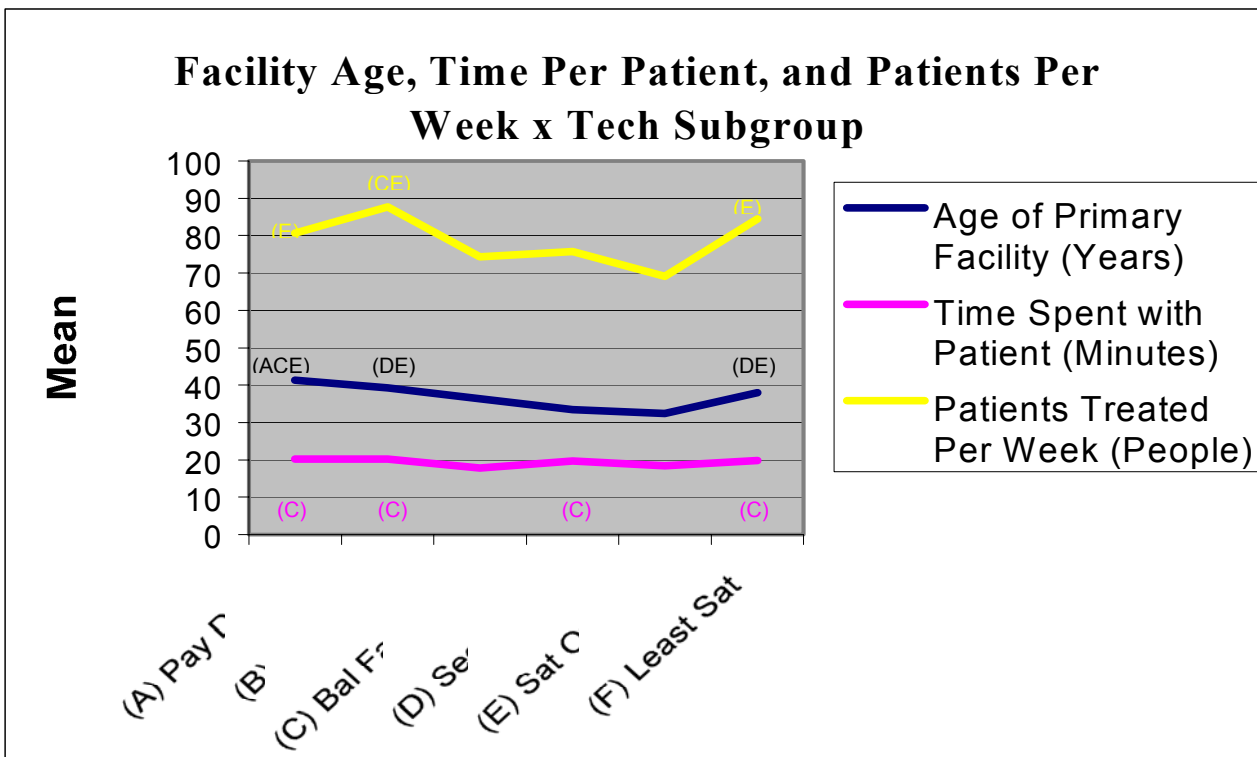
## Primary Facility Location by Technologist Subgroups



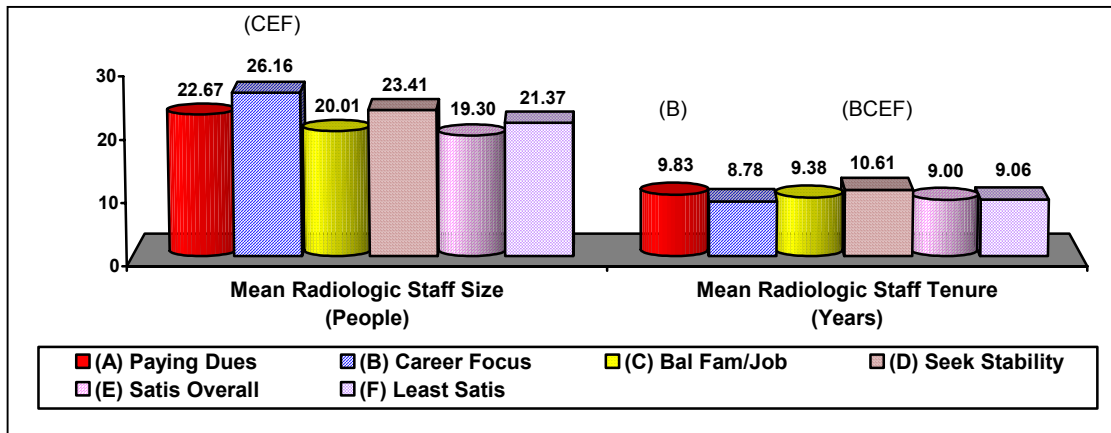
Differences in the distribution of technologist subgroups among ASRT regions were sufficiently strong to suggest the existence of regional norms.

	Technologist Subgroups					
	Paying Dues Dues	Career Focused	Balancing Family/Job	Seeking Security	Satisfied Overall	Least Satisfied
	(A)	(B)	(C)	(D)	(E)	(F)
<b>ASRT Region</b>						
1: AZ,CA,GU,NV,HI	8%	6%	3%	14%	5%	8%
2:AK,Canada,Foreign, ID,MT,OR,UT,WA	5%	4%	2%	10%	3%	5%
3:CO,NM,OK,TX,WY	7%	12%	3%	18%	6%	10%
4: IL,MN,ND,SD,WI	11%	5%	7%	12%	19%	17%
5: AR,IA,KS,MO,NE	7%	3%	4%	6%	15%	10%
6: IN,KY,MI,OH,WV	15%	22%	12%	14%	21%	17%
7:AL,FL,GA,LA,MS, PR,TN,VI	14%	26%	8%	9%	11%	13%
8:DC,MD,NJ,NC,SC,VA	14%	17%	18%	6%	6%	7%
9:CT,DE,ME,MA,NH, NY,PA,RI,VT	19%	12%	42%	10%	13%	14%

Note: Differences between percents within a given subgroup of 6% or more were statistically significant at the .05 level. Overall chi-square for table = 494.5 with 40 df,  $p < .001$ .

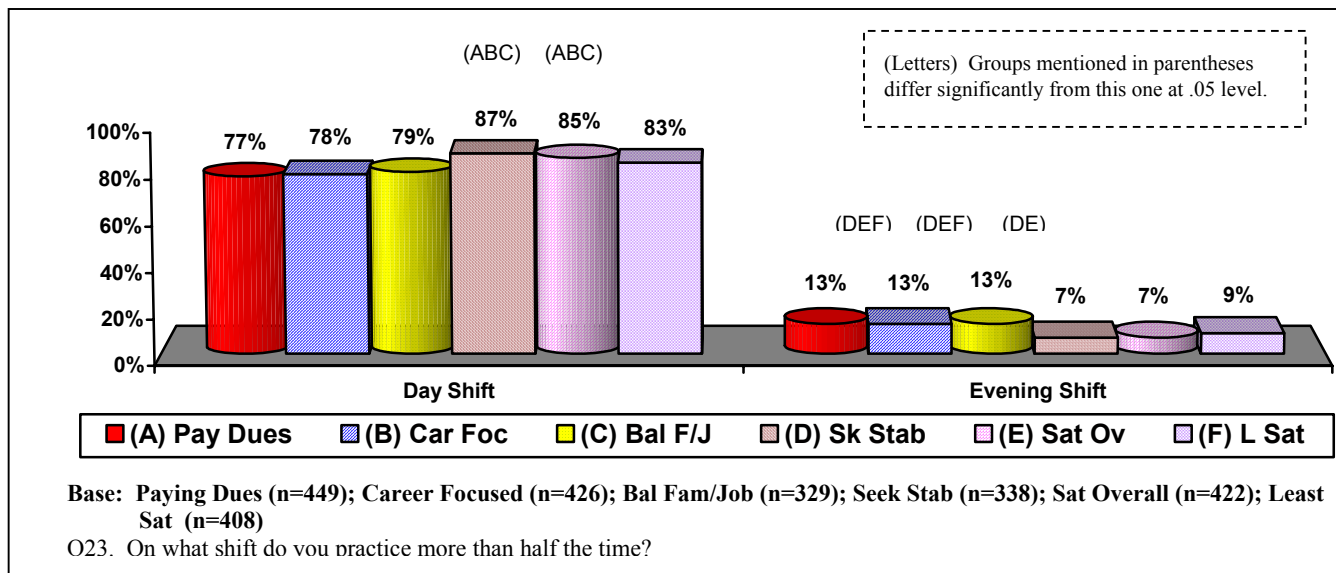


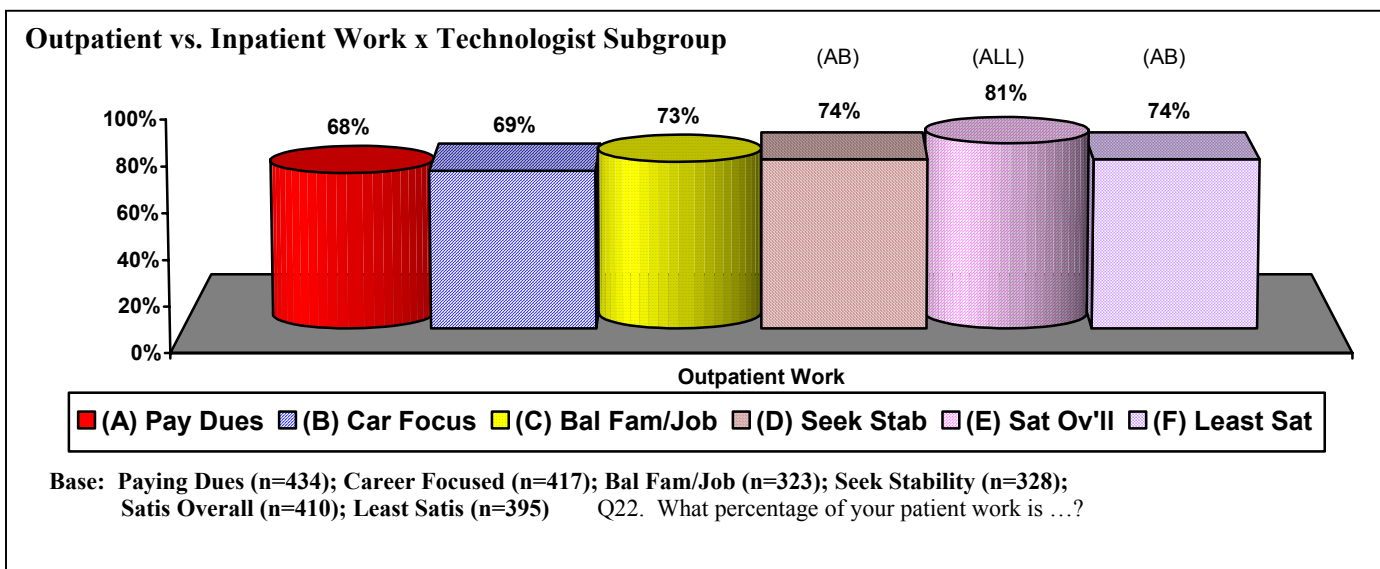
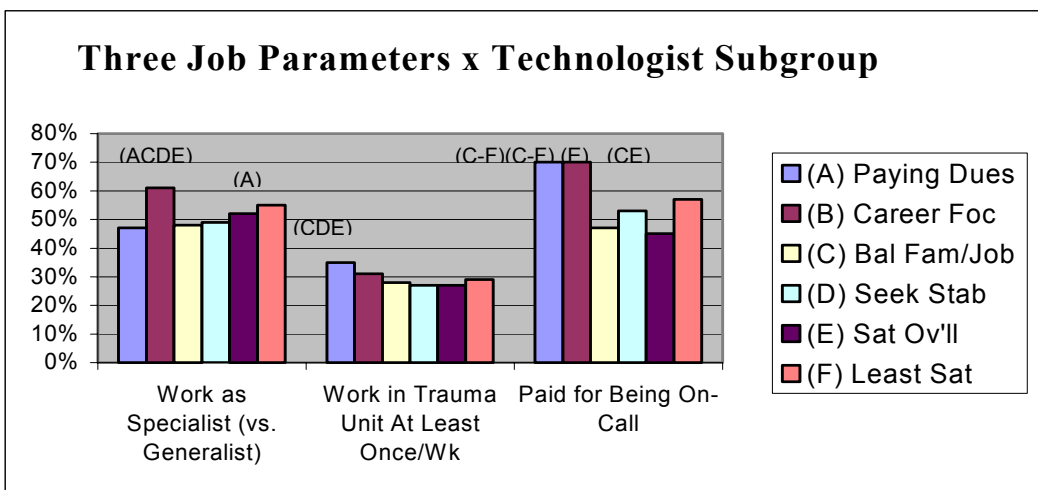
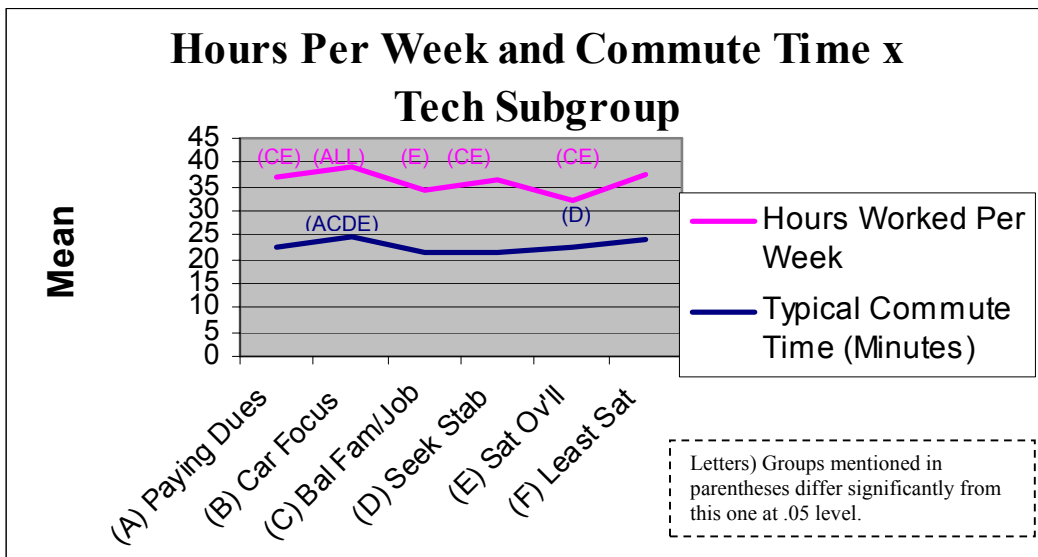
### Mean Radiologic Staff Size and Tenure by Technologist Subgroups



Paying Dues, Career Focused and Balancing Family/Job technologists were more likely than those in the other three subgroups to work the evening shift and less likely to work the day shift.

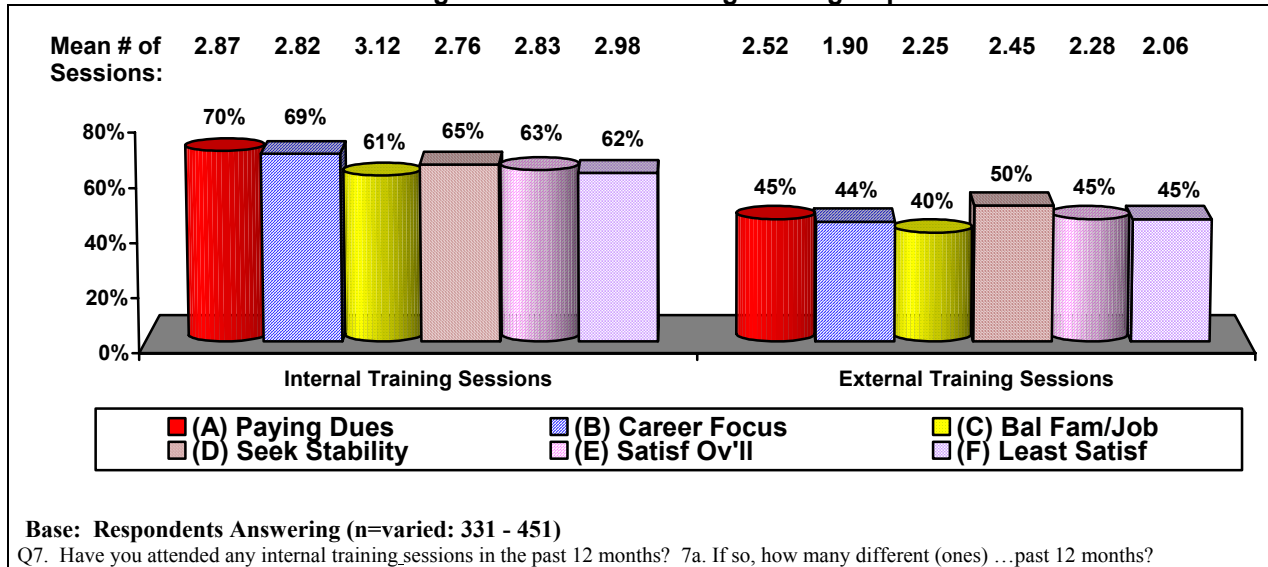
### Shift Worked by Technologist Subgroups







### Training Sessions x Technologist Subgroups



### Determining Technologist Subgroup

Managers can use the Phase 3 survey and methodology in their own facilities. To determine into which of the six subgroups a given respondent falls based on the 27 core attributes importance ratings, take the following steps:

1. For each of the technologist's responses to questions 4a to 4aa, assign a score of 4 if the attribute was chosen as one of the five most important attributes, 3 if it was listed among the five second-most important attributes, 2 if listed in the third grouping, 1 if listed in the fourth grouping, and 0 if this attribute does not appear in any of the above.
2. Combine the resulting 27 question - 44 scores to determine the respondent's score on each of five importance dimensions as follows:
  - a. Dimension 1:  $5 * (\text{score on Q4f}) + 4 * (\text{score on Q4g}) + 2 * (\text{score on Q4a}) + (\text{sum of scores on Q4d and Q4aa}) - (\text{sum of scores on Q4j, L, o, p, r, s, v, w, \& z}) - 2 * (\text{sum of scores on Q4q \& Q4u})$ .
  - b. Dimension 2:  $4 * \text{Q4i} + 3 * \text{Q4l} + 2 * \text{Q4m} + (\text{sum of scores on Q4k, Q4m, and Q4n}) - (\text{sum of scores on Q4a, c, p, r, s, t, v, x, y, \& z}) - 3 * \text{Q4o}$ .
  - c. Dimension 3:  $5 * \text{Q4h} + 2 * (\text{Q4m} + \text{Q4s}) + (\text{sum of scores on Q4a, n, r, \& o}) - (\text{sum of scores on Q4b, c, d, f, p, t, u, \& aa}) - 3 * (\text{Q4q} + \text{Q4y})$ .
  - d. Dimension 4:  $3 * (\text{Q4o} + \text{Q4q}) + 2 * \text{Q4s} + (\text{sum of Q4f, i, j, k, n, t, \& u}) - (\text{sum of Q4b, d, v, y, z, \& aa}) - 2 * \text{Q4x} - 5 * \text{Q4w}$ .
  - e. Dimension 5:  $3 * \text{Q4aa} + 2 * (\text{Q4j} + \text{q4y}) + (\text{sum of Q4a, h, m, q, r, s, u, x, \& z}) - (\text{sum of Q4d, e, l, n, \& v}) - 2 * \text{Q4o} - 4 * (\text{Q4b} + \text{Q4c})$ .

Alternatively, use the following table, computing the technologist's score on the importance dimension represented in each column by multiplying his or her score on the question represented in each row by the coefficient (if any) in the corresponding column of the table and then adding up the resulting products:

Importance Dimension

	1	2	3	4	5
Q4a	2	-1	1		1
Q4b			-1	-1	-4
Q4c		-1	-1		-4
Q4d	1		-1	-1	-1
Q4e					-1
Q4f	5		-1	1	
Q4g	4				
Q4h			5		1
Q4i		4		1	
Q4j	-1	2		1	2
Q4k		1		1	
Q4l	-1	3			-1
Q4m		1	2		1
Q4n		1	1	1	-1

Importance Dimension

	1	2	3	4	5
Q4o	-1	-3	1	3	-2
Q4p	-1	-1	-1		
Q4q					
Q4r	-2		-3	3	1
Q4s	-1	-1	1		1
Q4t	-1	-1	2	2	1
Q4u			-1	1	
Q4v	-2	-1	-1	1	1
Q4w	-1		1	-1	-1
Q4x	-1	-1		-5	
Q4y				-2	1
Q4z		-1	-3	-1	2
Q4aa	-1	-1		-1	1

Score on each importance dimension = (coefficient in a given row) times (technologist's score on the question heading that row), added up across all 27 questions.

- Next, compare the technologist's profile of scores on these five dimensions to the following six profiles typical of each of the six technologist clusters:

Tech Cluster	Approx. Average Score on Dimension...				
	1	2	3	4	5
1	-2	14	-16	-2	4
2	20	-2	-5	-12	8
3	-6	-15	1	5	6
4	15.5	4	6	12	-1
5	-15	13	9	4	10
6	16.5	1	8	12	19

If this technologist's scores clearly match a profile, assign the respondent to that cluster. If not, proceed to the next step:

- Compute the square of the Euclidean distance of this technologist's set of dimensional scores from each technologist cluster's profile of average scores as follows:

■ Squared distance from Tech Cluster 1 =  $(\text{nertdcv1} + 2)^2 + (\text{nertdcv2} - 14)^2 + (\text{nertdcv3} + 16)^2 + (\text{nertdcv4} + 2)^2 + (\text{nertdcv5} - 4)^2$ .

- Squared distance from Tech Cluster **2** =  $(\text{nertdcv1} - 20)^2 + (\text{nertdcv2} + 2)^2 + (\text{nertdcv3} + 5)^2 + (\text{nertdcv4} + 12)^2 + (\text{nertdcv5} - 8)^2$ .
- Squared distance from Tech Cluster **3** =  $(\text{nertdcv1} + 6)^2 + (\text{nertdcv2} + 15)^2 + (\text{nertdcv3} - 1)^2 + (\text{nertdcv4} - 5)^2 + (\text{nertdcv5} - 6)^2$ .
- Squared distance from Tech Cluster **4** =  $(\text{nertdcv1} - 15.5)^2 + (\text{nertdcv2} - 4)^2 + (\text{nertdcv3} - 6)^2 + (\text{nertdcv4} - 12)^2 + (\text{nertdcv5} + 9)^2$ .
- Squared distance from Tech Cluster **5** =  $(\text{nertdcv1} + 15)^2 + (\text{nertdcv2} - 13)^2 + (\text{nertdcv3} - 9)^2 + (\text{nertdcv4} - 4)^2 + (\text{nertdcv5} - 10)^2$ .
- Squared distance from Tech Cluster **6** =  $(\text{nertdcv1} - 16.5)^2 + (\text{nertdcv2} - 1)^2 + (\text{nertdcv3} - 8)^2 + (\text{nertdcv4} - 12)^2 + (\text{nertdcv5} - 19)^2$ .

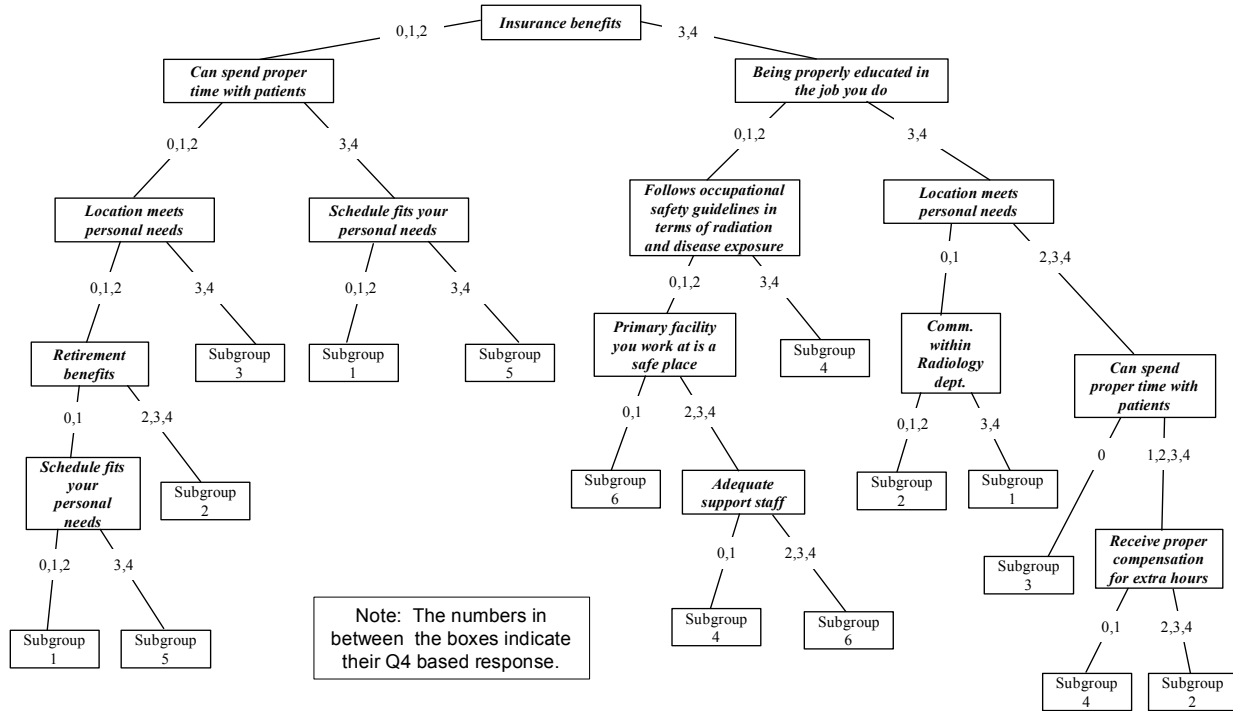
5. Assign the technologist to the cluster for which the computed distance measure was smallest.

The above procedure correctly classified from 89 to 96% of the technologists in each of the six clusters in our sample, for an overall correct classification rate of 93.1%.

Alternatively, the CART classification tree on the following page, which correctly classified only 59%, is a bit simpler to use.

**CART-BASED TECHNOLOGIST CLASSIFICATION**

This CART tree provides the questioning that can be used to predict into which subgroup a technologist falls. The overall probability of predicting the correct subgroup using this tree is 59%.



The matrix below shows the level of success the classification tree would have in sorting technologists into their predicted segments. The rows indicate the subgroup into which each respondent would fall according to the algorithm on the previous page. The columns indicate the actual subgroup in which the respondent is classified.

For example, of those respondents that answered the classification questions in a manner predicting they belonged in the Paying Dues subgroup, 66% actually fell in the Paying Dues subgroup and 10% in the Career Focused segment. This compared to a one in six chance of predicting the correct subgroup randomly.

		Predicted Technologist Subgroup						Actual Base
		PD	CF	FJ	SS	SO	LS	
Actual Technologist Subgroup	Paying Dues (PD)	66%	13%	3%	12%	13%	7%	452
	Career Focused (CF)	10%	56%	9%	11%	4%	13%	430
	Balancing Family/Job (FJ)	7%	5%	64%	5%	11%	7%	334
	Seeking Stability (SS)	1%	9%	6%	52%	8%	9%	339
	Satisfied Overall (SO)	14%	5%	11%	4%	57%	3%	429
	Least Satisfied (LS)	3%	13%	7%	16%	8%	62%	413
Predicted Base		369	458	290	393	531	356	

Note: Percentages are calculated on "Predicted Base."

## Identifying Types of Facilities: Overall Descriptions

**Type 1: Ideal Facility (15%).** Workplaces in this type consistently scored highest on all satisfaction and facility attributes. Smaller clinics and imaging centers mostly made up this segment. Of special interest were the variety of credentials held by the radiology staff in these facilities and the fact that it was the least likely segment to employ noncredentialed radiology personnel.

More likely than many other segments to:	Less likely than other segments to:
Be the most satisfying facility in all job aspects	Require large number of hours worked per week
Be rated higher on all facility attributes	Work technologists in the trauma unit
Not require technologists to take call	Be a hospital
Work technologists on day shift only	Have noncredentialed radiologic staff
Be a newer facility	
Have a small radiology staff	
Have mainly outpatients	
Have diverse certification and number of chief technologists	

**Type 2: Good Overall, On Call Required (16%).** Typically, a large hospital that respondents reported as a satisfying place to work represented this segment. On-call work was required, pulling the overall satisfaction rating below that of the Ideal Facility, and working in the trauma unit was prevalent. This facility type consistently performed well on all attributes. It was the least likely of the predominantly hospital segments (types 2, 4, and 6) to employ noncredentialed radiology personnel.

More likely than many other segments to:	Less likely than other segments to:
Be the second most satisfying facility (just behind "Ideal nonhospital") in all job aspects	Not require technologists to work on-call
Be rated higher on most facility attributes than almost all the other segments (except "Ideal nonhospital")	Have technologists who have been in radiology a long time
Be a hospital	Have noncredentialed radiologic staff than other hospital segments
Work technologists in the trauma unit	
Be an older facility	
Have a large radiology staff	
Spend the most time with patients	
Provide the most internal training	

**Type 3. Very Good, Except for Equipment (12%).** The small facility prevalent in this type was more likely located in a rural or suburban setting than an urban area. Respondents tended to classify themselves as specialists and many as chief technologists. This type of facility treated the least number of patients, and although technologists spent the least amount of time with patients, they were more likely than those in many segments to feel their facilities allowed them to spend the proper amount of time with patients. Overall, Type 3 facilities received very good ratings from respondents.

It is <u>more</u> likely than many other segments to:	It is <u>less</u> likely than other segments to:
Allow schedules to meet personal needs	Be well known
Allow Technologists to spend proper time with patients	Promise job security
Not require Technologists to be on-call	Provide good insurance & retirement benefits
Technologists receive respect from doctors	Have state of the art imaging equipment
Employ Chief Technologists	Provide internal training
Employ Specialists	Be in an urban community
Be a clinic	Have Technologists work a large number of hours per week
Be a new facility with a small Radiology staff	Spend a lot of time with patients
Spend proper time with patients	

**Type 4: OK Overall (22%).** Hospitals typically made up this workplace type, which rated average in many aspects. Although most technologists were generally satisfied with many parts of their jobs, they tended to be less satisfied with some specifics of their radiology departments, such as the administration and general radiology environment.

More likely than many other segments to:	Less likely than many other segments to:
Be a hospital	Have technologists satisfied with radiology administration
Have technologists with many years in current position	Employ coworkers who act professionally
Have technologists working in the trauma unit	Allow technologists to feel they spend proper time with patients
Be in an older facility	Allow technologists to feel they radiology department has good communications
Have a fairly large radiology staff	Have adequate support staff
	Have technologists who are pleased with overall department layout

**Type 5: Very Good, Including Equipment (14%).** This type of facility tended to rate average in many aspects. Most technologists were generally satisfied with their jobs, and they expressed satisfaction with some specifics of their radiology departments, such as the administration and general radiology environment. Type 5 facilities stood out primarily because of their high ratings for possessing state-of-the-art imaging equipment.

More likely than many other segments to:	<u>Less</u> likely than many other segments to:
Have state-of-the-art imaging equipment	Have technologists satisfied with radiology administration
Be a mixture of hospitals, clinics and imaging centers	Employ coworkers who act professionally
Have technologists with many years in current position	Allow technologist to feel they spend proper time with patients
Have technologists working in the trauma unit	Allow technologists to feel radiology department communications are good
Be in an older facility	Have adequate support staff
	Have technologists who are pleased with overall department layout
	Be located in a rural community

**Type 6. Only Fair Overall (11%).** This segment characterized the worst of all facilities. These workplaces tended to employ more noncredentialed radiology department personnel than other facility types. While staff spent the most days in training, they were not likely to receive it from a structured internal or external training class. This type received the lowest rating (though still above the midpoint of the scale overall) of all segments on almost every attribute, particularly those involving communication, support and respect. These hospitals were located in urban, suburban and rural communities.

More likely than many other segments to:	Less likely than many other segments to:
Have technologists with the most years spent in their current position	Have technologists who are satisfied with any aspect of the job or facility
Have technologists working evenings	Have technologists who are mammography certified
Have technologists working in the trauma unit	Conduct outpatient work
Be a hospital	Provide external training sessions
Be an old facility	Not require technologists to work on-call
Employ noncredentialed radiologic staff	
Have technologists who spent more days in training but not in structured classes	

**Type 7: Good Overall, On Call Not Required (10%).** This was the smallest segment, with average ratings for location and number of patients treated per week. Facilities were located in all geographic settings and consisted of hospitals, clinics and imaging centers. Type 7 facilities consistently rated lower on all satisfaction and attribute scores than any of the other segments except Only Fair Overall (Type 6). These workplaces were more likely than most to employ noncredentialed radiology personnel and treated the highest number of radiology patients.

More likely than many other segments to:	Less likely than many other segments to:
Have Technologists that are not on-call	Have Technologists that are satisfied with <u>any</u> aspect of the job or facility
Treat the most patients per week and spend little time with patients	Have Technologists who are mammography certified
Have out-patients	Conduct out-patient work
Employ non-credentialed Technologists	Provide external training sessions
Have Technologists who consider themselves Specialists	Not having Technologists on-call
Have Technologists who have worked in many different facilities & for many different companies	

### Differences in Satisfaction Ratings

Question 3 asked respondents the following:

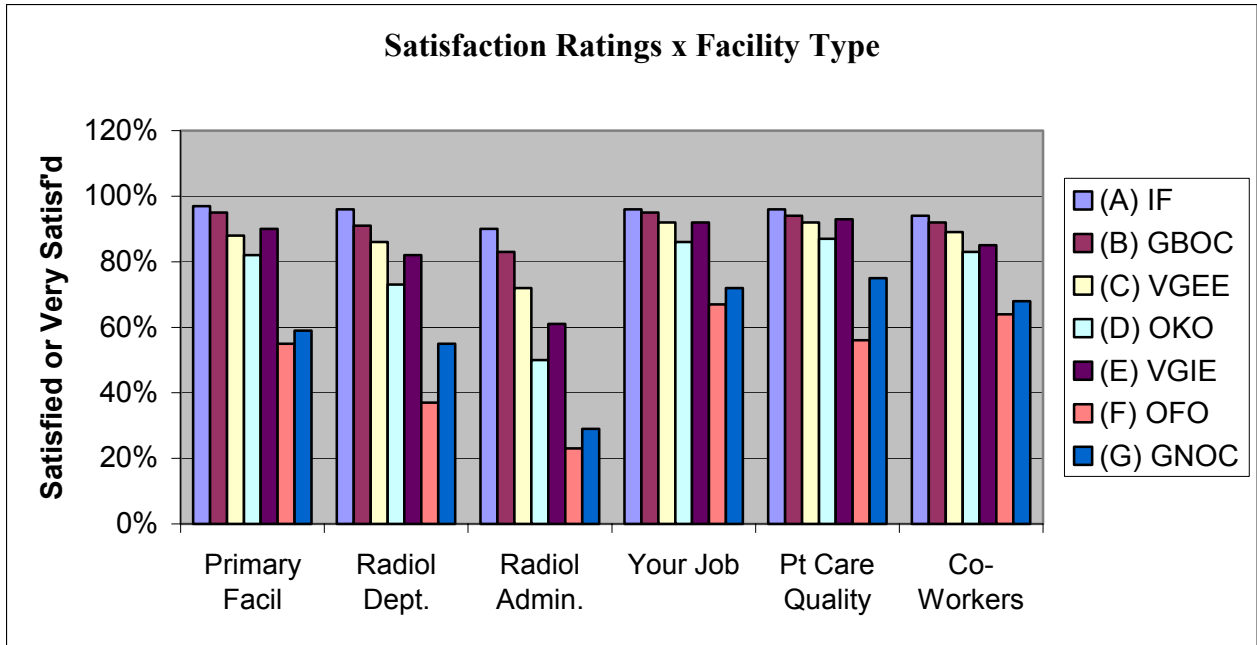
Using the scale below (1 = Very Dissatisfied, 2 = Somewhat Dissatisfied, 3 = Neither Satisfied nor Dissatisfied, 4 = Somewhat Satisfied, 5 = Very Satisfied), please give your overall satisfaction with the following:

The six key areas that respondents were asked to rate for overall satisfaction were:

- Primary work facility.
- Radiology department.
- The job.
- Coworkers.
- Radiology administration.
- Quality of patient care.

Researchers also examined overall satisfaction, or the average of the six satisfaction ratings.

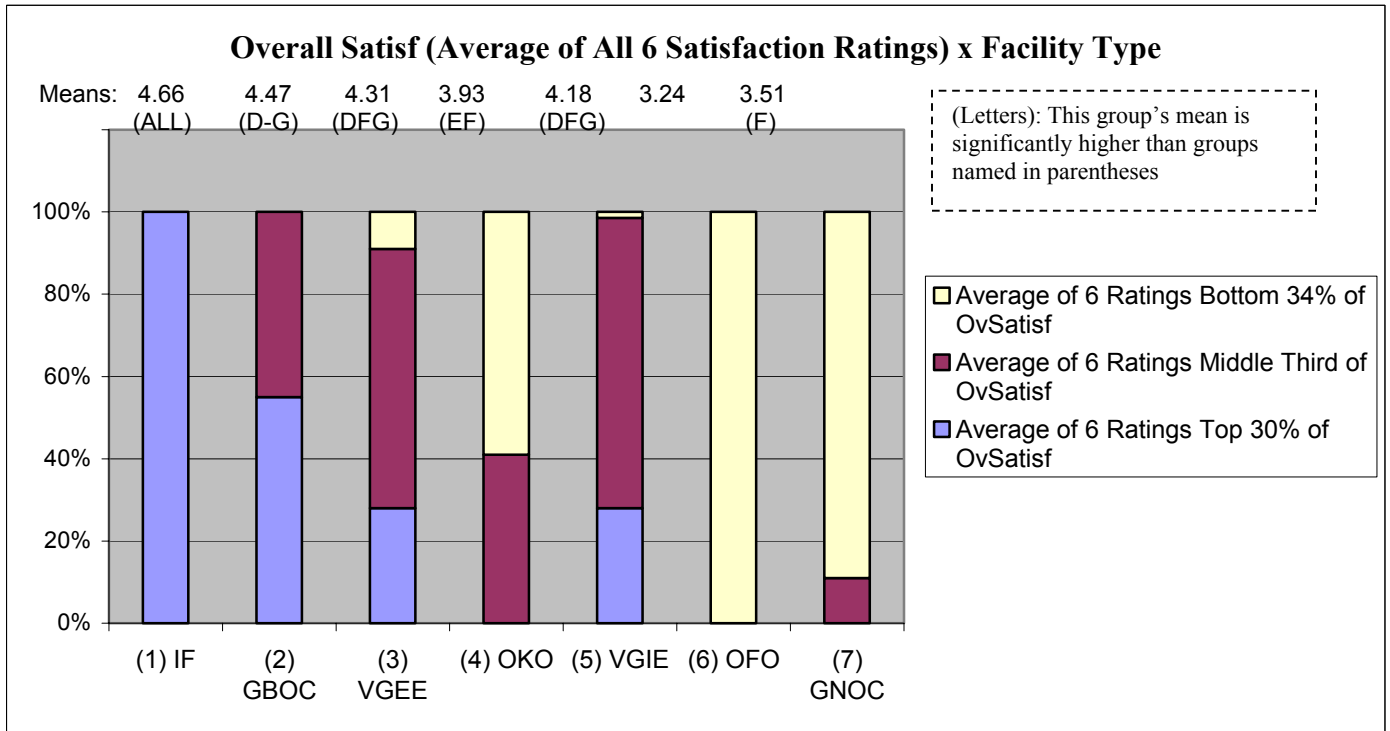




Base: IF (n=322-367); GBOC (n=361-384); VGEE (n=230-275); OKO (n=515-528); VGIE (n=303-332); OFO (n=250-254); GNOC (n=227-244)

Q3. Using the scale below, please give your overall satisfaction with the following ...

Note: Two groups with percentage differing by 9% or more vary significantly in this respect at the .05 alpha level.



## Differences in Facility Ratings

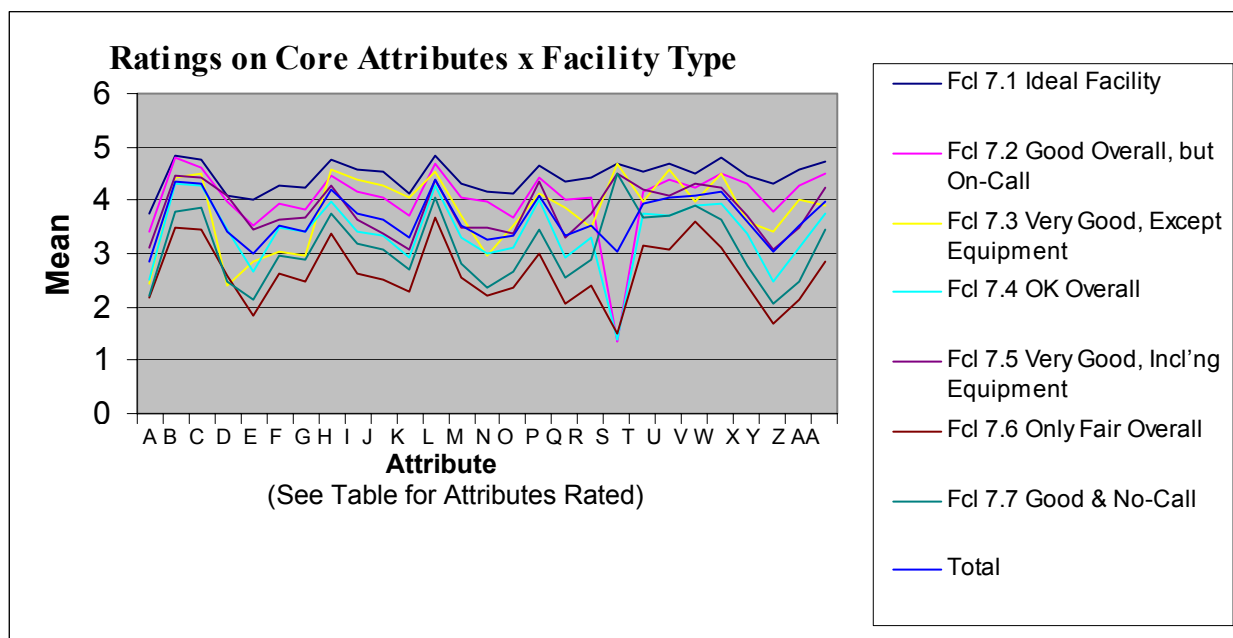
### Ratings on Core Facility Attributes

Question 6 asked respondents the following:

Please tell us, how much you agree with the following statements using a 5-point scale where 1 = I completely disagree with this statement, 2 = I somewhat disagree with this statement, 3 = I neither agree nor disagree with this statement, 4 = I somewhat agree with this statement and 5 = I completely agree with this statement. Once again, we are speaking about your current job at the primary facility you work at.

The facility characteristics that respondents were asked to rate for agreement with were:

A. Compared to other facilities in the area, this facility offers better wages for technologists.	J. Technologists receive respect from physicians.	S. Technologists are not required to be on-call.
B. This facility follows occupational safety guidelines for radiation and disease exposure.	K. Technologists receive respect from nurses.	T. Technologists have job security (do not worry about being laid off).
C. This facility is a safe place to work in terms of neighborhood and building security.	L. Technologists can provide accurate images.	U. The radiologic staff acts professionally.
D. This facility has state-of-the-art imaging equipment.	M. Technologists can control their careers.	V. This facility is well-known.
E. The overall layout of the Radiology department is designed with the job of the technologist in mind.	N. Technologists receive sufficient internal/on-site training.	W. Technologists are properly educated in their jobs.
F. This facility offers satisfactory insurance benefits.	O. This facility meets personal needs of staff such as convenient location, daycare/senior care, etc.	X. Technologists receive proper performance evaluation(s).
G. This facility offers satisfactory retirement benefits.	P. This facility is in proper working order (elevators, lighting, etc).	Y. The radiology department has adequate support staff.
H. This facility offers a work schedule that fits my personal needs.	Q. There is good communication within the radiology department.	Z. Technologist input is welcome.
I. In this facility, technologists spend the proper amount of time with each patient.	R. Technologists get reimbursed for work-related expenses.	AA. Technologists receive proper compensation for extra hours.



**Mean Satisfaction Rating and Proportion Agreeing or Strongly Agreeing  
x Facility Type**

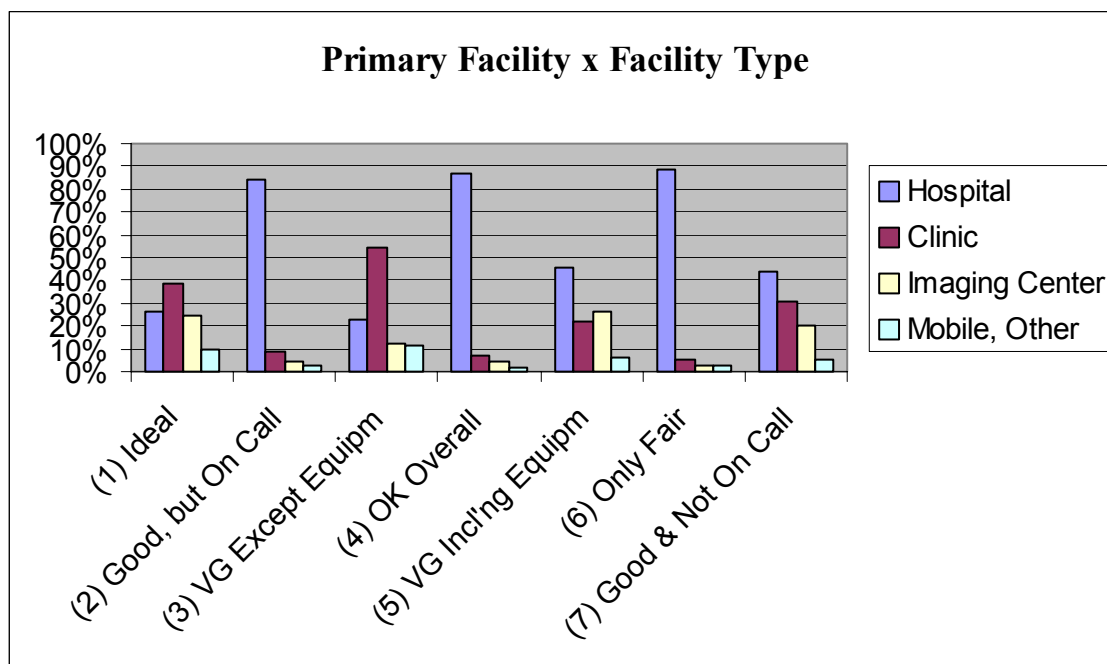
	Facility cluster number, 7-segment solution							Total
	1: Ideal Facility	2: Good Overall, On Call Req'd	3: Very Good, Except Equipment	4: OK Overall	5: Very Good, Incl'ng Equipment	6: Only Fair Overall	7: Good & No-Call	
	Mean Prop Sat	Mean Prop Satisf'd	Mean Prop Satisf'd	Mean Prop Sat	Mean Prop Satisf'd	Mean Prop Sat	Mean Prop Sat	
Q.6a ** Compared to other facilities in the area, this facility offers better wages	3.7520 .6485	3.3964 .5155	2.4239 .1703	2.4953 .2344	3.1164 .4209	2.1614 .1417	2.2008 .1516	2.8469 .3438
Q.6b ** This facility follows occupational safety guidelines for radiation and d	4.8447 .9891	4.7902 .9845	4.4332 .8773	4.3226 .9000	4.4760 .9102	3.4727 .5508	3.7737 .6790	4.3656 .8663
Q.6c ** This facility is a safe place to work in terms of neighborhood and build	4.7602 .9728	4.6208 .9351	4.5162 .9061	4.2879 .8466	4.4328 .8896	3.4492 .5586	3.8525 .7254	4.3265 .8499
Q.6d ** This facility has state-of-the-art imaging equipment **	4.0874 .7869	3.9896 .7565	2.4073 .1964	3.4556 .5652	4.0923 .8036	2.5781 .3008	2.4669 .2769	3.4134 .5636
Q.6e ** The overall layout of the radiology department is designed with the job	4.0191 .7657	3.5363 .5803	2.8478 .3007	2.6743 .2381	3.4448 .5552	1.8510 .0510	2.1440 .1605	3.0067 .3984
Q.6f ** This facility offers satisfactory Insurance benefits **	4.2923 .8525	3.9275 .7591	3.0505 .4152	3.4943 .5779	3.6548 .6220	2.6353 .2392	2.9631 .3893	3.5117 .5812
Q.6g ** This facility offers satisfactory retirement benefits **	4.2398 .8311	3.8104 .7013	2.9451 .4139	3.3962 .5505	3.6776 .6537	2.4646 .1969	2.9016 .3893	3.4310 .5627
Q.6h ** This facility offers a work schedule that fits my personal needs **	4.7459 .9672	4.4779 .9143	4.5652 .9312	3.9905 .7856	4.2649 .8750	3.3735 .5603	3.7686 .6818	4.2009 .8288
Q.6i ** In this facility, technologists spend the proper amount of time with eac	4.5640 .9537	4.1766 .8519	4.3718 .9278	3.4072 .5644	3.6276 .6667	2.6063 .2323	3.1885 .4713	3.7441 .6822
Q.6j ** Technologists receive respect from physicians **	4.5204 .9455	4.0519 .8130	4.2852 .8953	3.3189 .5302	3.3743 .5389	2.5117 .2422	3.0658 .4280	3.6288 .6417
Q.6k ** Technologists receive respect from nurses **	4.1333 .7694	3.7031 .6510	4.0400 .7236	2.9280 .3485	3.0654 .3178	2.2980 .1686	2.6966 .2265	3.2957 .4701
Q.6l ** Technologists can provide accurate images **	4.8420 .9918	4.6979 .9818	4.5560 .9603	4.2784 .9337	4.4054 .9550	3.6784 .6588	4.0415 .8216	4.3945 .9157
Q.6m ** Technologists can control their career **	4.3087 .9016	4.0443 .8021	3.6968 .5884	3.2933 .4400	3.4834 .5468	2.5455 .1897	2.8083 .2250	3.5160 .5535
Q.6n ** Technologists receive sufficient internal/on-site training **	4.1694 .8169	3.9844 .7662	2.9527 .3564	2.9905 .3598	3.4940 .5655	2.2109 .1406	2.3730 .1557	3.2510 .4795
Q.6o ** This facility meets personal needs of staff such as convenient location,	4.1362 .7793	3.6779 .5844	3.5217 .5181	3.1245 .3887	3.3910 .4657	2.3636 .1581	2.6790 .2263	3.3265 .4650
Q.6p ** This facility is in proper working order (elevators, lighting, etc) **	4.6621 .9510	4.4141 .9062	4.1341 .8043	4.0151 .7826	4.3333 .9137	2.9922 .3789	3.4650 .5720	4.0715 .7846
Q.6q ** There is good communication within the radiology department **	4.3678 .9046	4.0233 .8135	3.8628 .6715	2.9260 .3416	3.2934 .4850	2.0549 .0706	2.5620 .2273	3.3551 .5222
Q.6r ** Technologists get	4.4142	4.0597	3.4819	3.2817	3.7522	2.4141	2.8852	3.5364

	Facility cluster number, 7-segment solution							Total
	1: Ideal Facility	2: Good Overall, On Call Req'd	3: Very Good, Except Equipment	4: OK Overall	5: Very Good, Incl'ng Equipment	6: Only Fair Overall	7: Good & No-Call	
	Mean Prop Sat	Mean Prop Satisf'd	Mean Prop Satisf'd	Mean Prop Sat	Mean Prop Satisf'd	Mean Prop Sat	Mean Prop Sat	
reimbursed for work related expenses **	.8638	.7558	.5181	.4669	.6358	.1797	.3607	.5623
Q.6s ** Technologists are not required to be on call **	4.6948 .9264	1.3639 .0000	4.6715 .8989	1.3769 .0019	4.4940 .8512	1.4824 .0392	4.5041 .8811	3.0356 .4609
Q.6t ** Technologists have job security (do not worry about being laid off) **	4.5383 .9126	4.1736 .7876	3.9673 .7164	3.7330 .6591	4.2179 .8448	3.1518 .4358	3.6846 .6390	3.9552 .7253
Q.6u ** The radiologic staff acts professionally **	4.7057 .9646	4.4010 .9375	4.5797 .9529	3.7132 .7075	4.0804 .8274	3.0623 .3930	3.7160 .6708	4.0577 .7915
Q.6v ** This facility is well-known **	4.4986 .9019	4.2519 .8312	3.9819 .7256	3.9027 .7004	4.3243 .8318	3.6016 .5508	3.8889 .6790	4.0851 .7556
Q.6w ** Technologists are properly educated in their jobs **	4.7842 .9836	4.5117 .9634	4.4891 .9234	3.9527 .8030	4.2538 .8943	3.0960 .3920	3.6432 .6515	4.1534 .8247
Q.6x ** Technologists receive proper performance evaluation(s) **	4.4441 .8883	4.3109 .8782	3.5957 .6101	3.3740 .5324	3.7267 .6667	2.3858 .1929	2.7654 .3128	3.5982 .6124
Q.6y ** The radiology dept. has adequate support staff **	4.3025 .8856	3.8031 .7124	3.4043 .5415	2.4679 .1962	3.0597 .4030	1.6706 .0431	2.0788 .1079	3.0322 .4291
Q.6z ** Technologist input is welcome **	4.5777 .9591	4.2565 .8808	4.0072 .7978	3.1080 .3693	3.4880 .5629	2.1529 .1176	2.4708 .1958	3.5111 .5752
Q.6aa ** Technologists receive proper compensation for extra hours **	4.7330 .9564	4.5052 .9171	3.8978 .7080	3.7561 .7202	4.2530 .8661	2.8419 .3794	3.4403 .5679	3.9845 .7559
Q6Overall = Ave. of all 27 ratings	4.4500 (B-G)	4.0364 (C-G)	3.8041 (DFG)	3.3735 (FG)	3.8272 (DFG)	2.6358	3.1135 (F)	3.6533
N	367	382-386	274-277	524-530	321-336	250-257	234-244	2357-2393

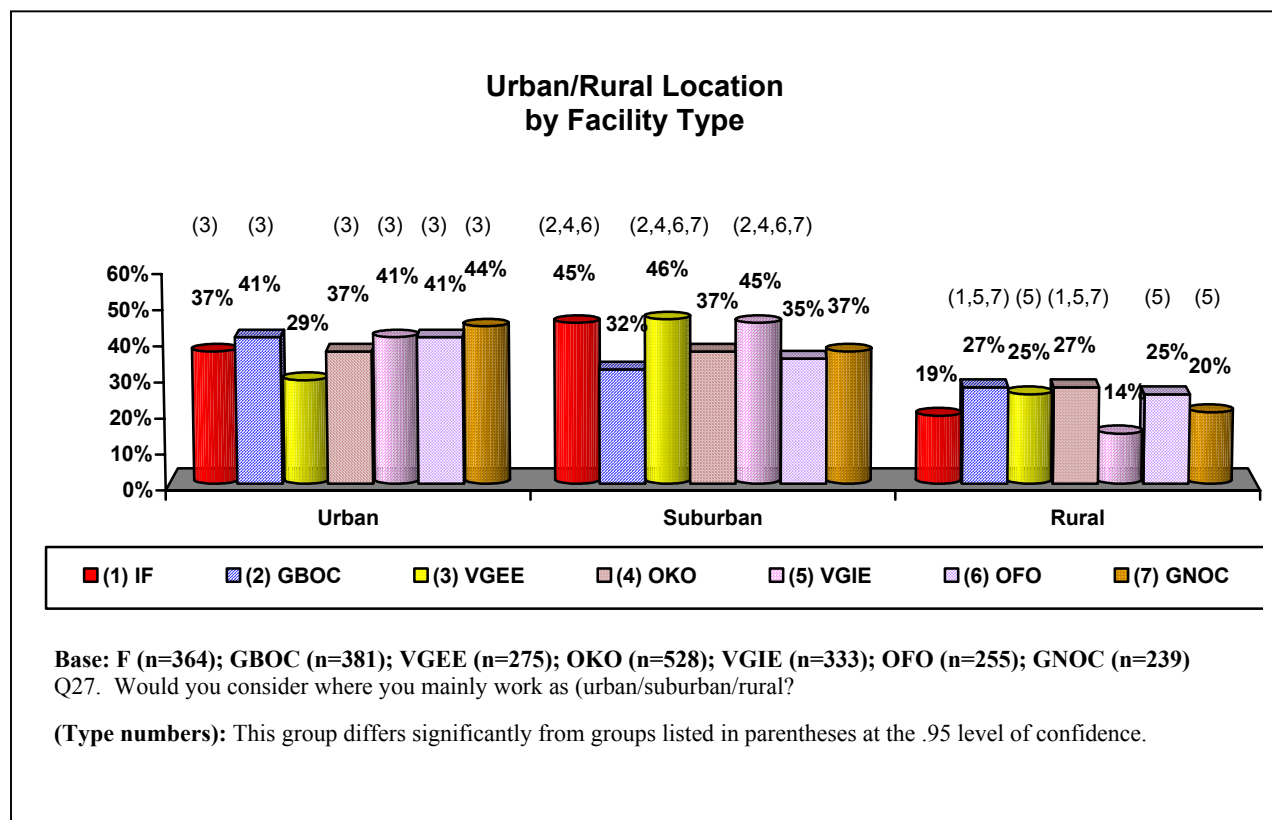
(Letters) This group differs from groups listed in parentheses at the .05 level of significance (.95 level of confidence).

The results revealed statistically significant differences among the facility types in overall agreement (averaged across all 27 core attributes) concerning a facility's positive attributes. However, the results demonstrated a high degree of consistency among facility types on the facilities' most favorable attributes.

## Ratings on Other Facility Attributes

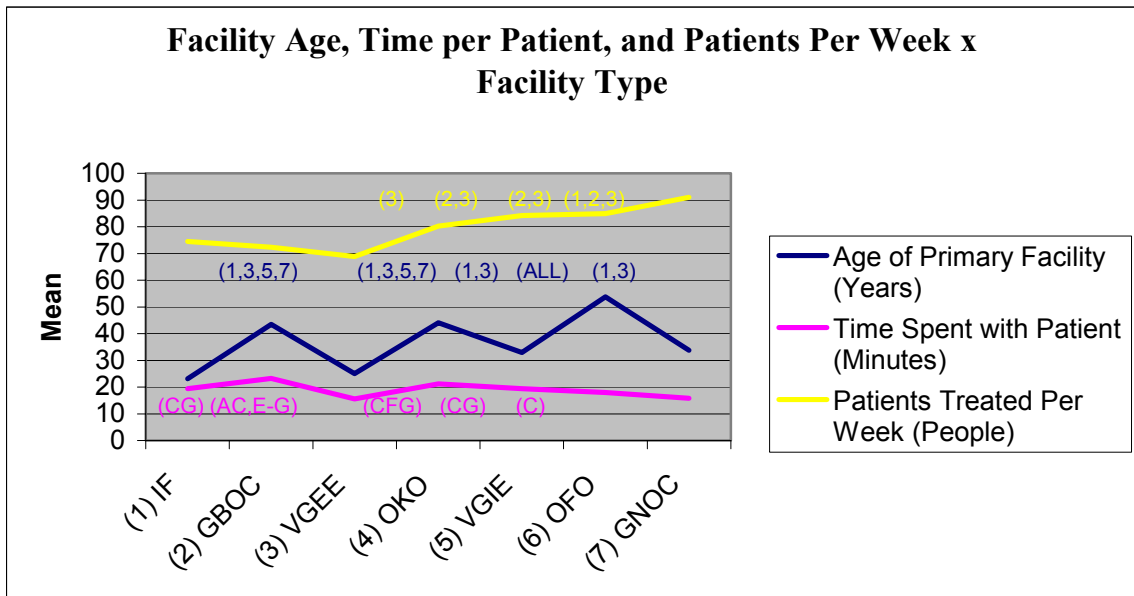


Primarily hospitals formed facility types 2, 4, and 6 (85% to 90%), while less than half (47%) of facility types 5 and 7 were hospitals. Only about one fourth (27%) of facility types 1 and 3 were hospital workplaces.

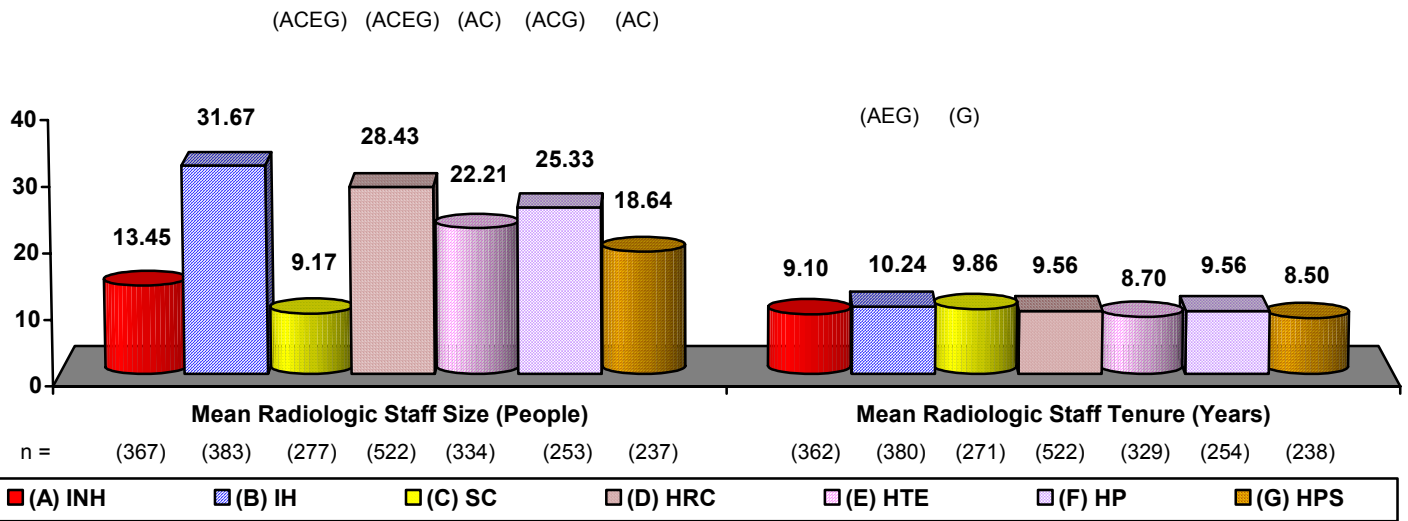


### Region by Facility Type

	Facility Type							
	Ideal Facility Type	Good, but On-Call	Very Good Exc. Equip.	OK Overall	Very Good, Incl. Equip.	Only Over	Fair All	Good & Not On Call
	-1	-2	-3	-4	-5	-6	-7	
<b>ASRT Region</b>								
1: AZ,CA,GU,NV,HI	10.2 %	10.2 %	15.8 %	19.2 %	15.8 %	15.8 %	12.4 %	
2: AK,Canada,Foreign, ID,MT,OR,UT,WA	14.5 %	20.9 %	10.9 %	18.2 %	20 %	8.18 %	7.27 %	
3: CO,NM,OK,TX,WY	15 %	17.6 %	9.33 %	23.3 %	11.4 %	11.9 %	11.4 %	
4: IL,MN,ND,SD,WI	15.9 %	22.1 %	15.2 %	19.4 %	12.5 %	8.3 %	6.57 %	
5: AR,IA,KS,MO,NE	15.2 %	15.8 %	12.5 %	25.5 %	14.1 %	10.3 %	6.52 %	
6: IN,KY,MI,OH,WV	15.9 %	14.4 %	14.4 %	23.4 %	23.4 %	13.4 %	13.4 %	
7: AL,FL,GA,LA,MS, PR,TN,VI	18.7 %	12.6 %	11.7 %	23.006 %	13.5 %	8.28 %	12.3 %	
8: DC,MD,NJ,NC,SC,VA	17.8 %	13.3 %	10.7 %	24.4 %	13 %	7.04 %	13.7 %	
9: CT,DE,ME,MA, NH,NY,PA,RI,VT	13 %	13 %	10.4 %	21.6 %	14.2 %	14 %	10.9 %	



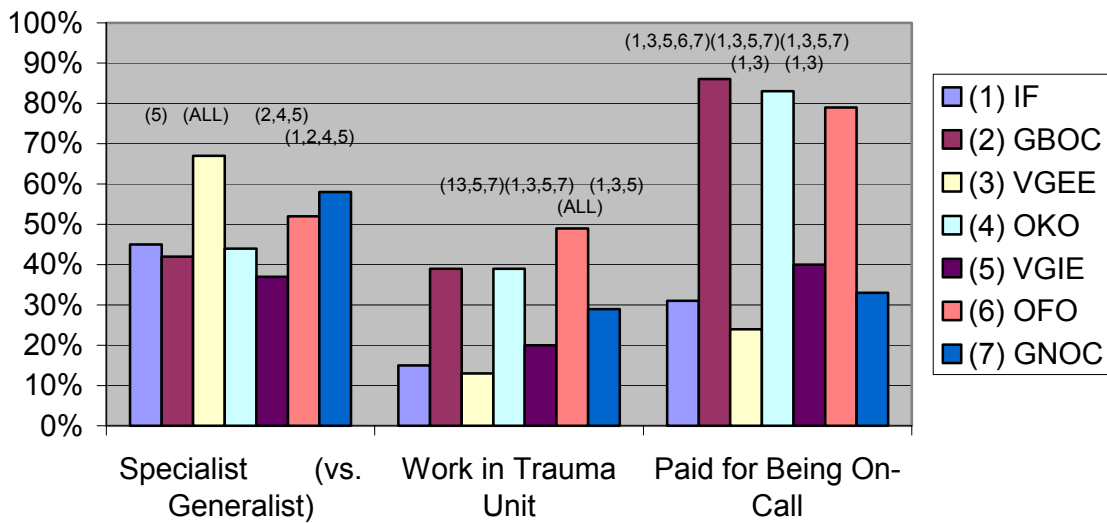
### Mean Radiologic Staff Size and Tenure by Technologist Subgroups



Q30. How many individuals, including yourself, are there on the Radiologic staff at your primary workplace?

Q32. What is the average length of time (tenure) the Radiologic staff has been working at your primary workplace?

### Three Job Parameters x Facility Type

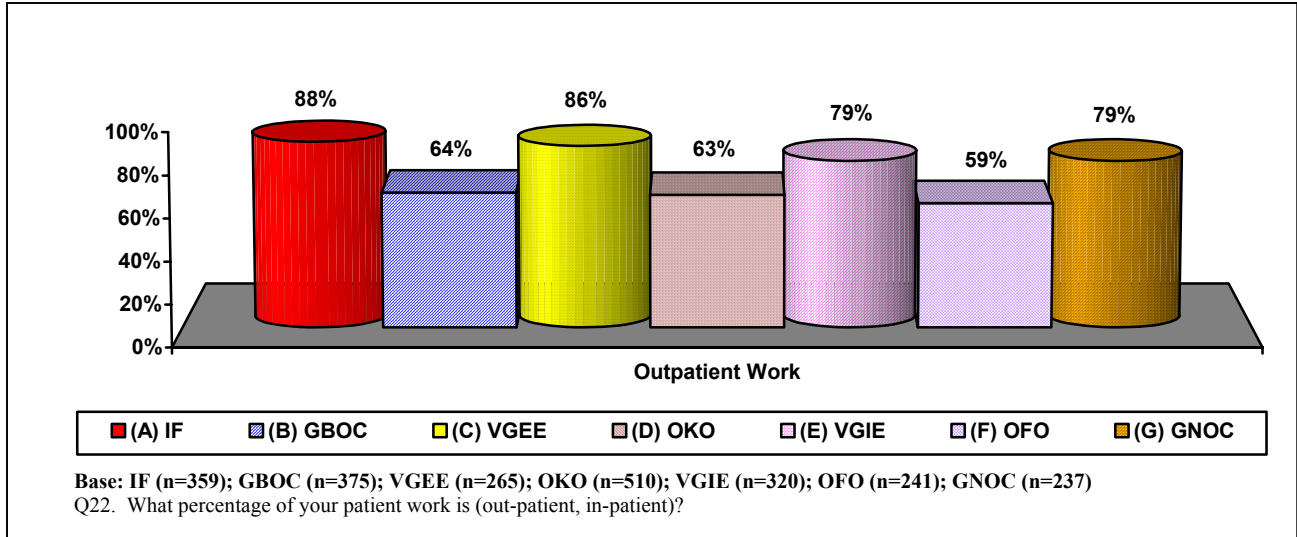


Q24. Would you consider yourself a (specialist/generalist)?

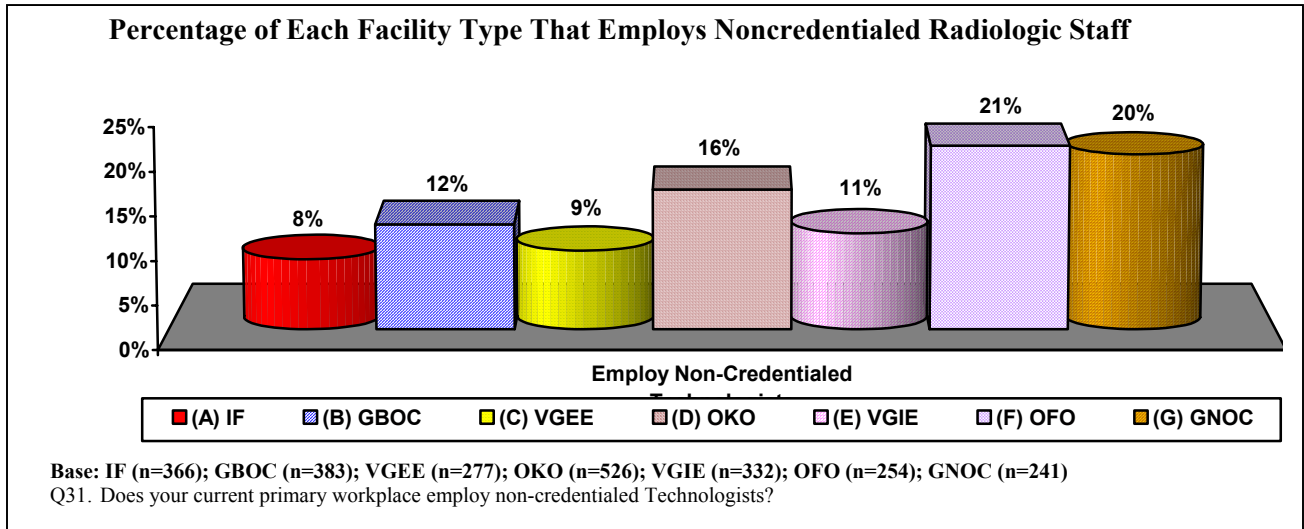
Q25. Do you work in the trauma unit at least once per week?

Q26. Are you paid for being on call?

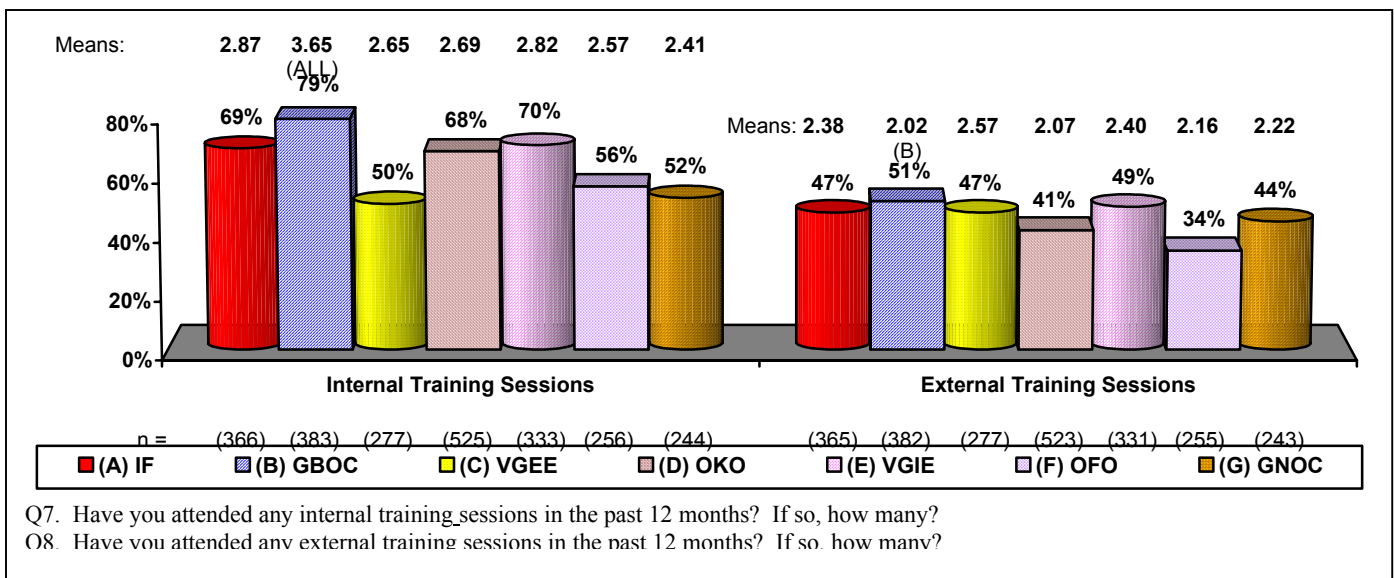
### Outpatient vs. Inpatient Work x Facility Type



### Percentage of Each Facility Type That Employs Noncredentialed Radiologic Staff

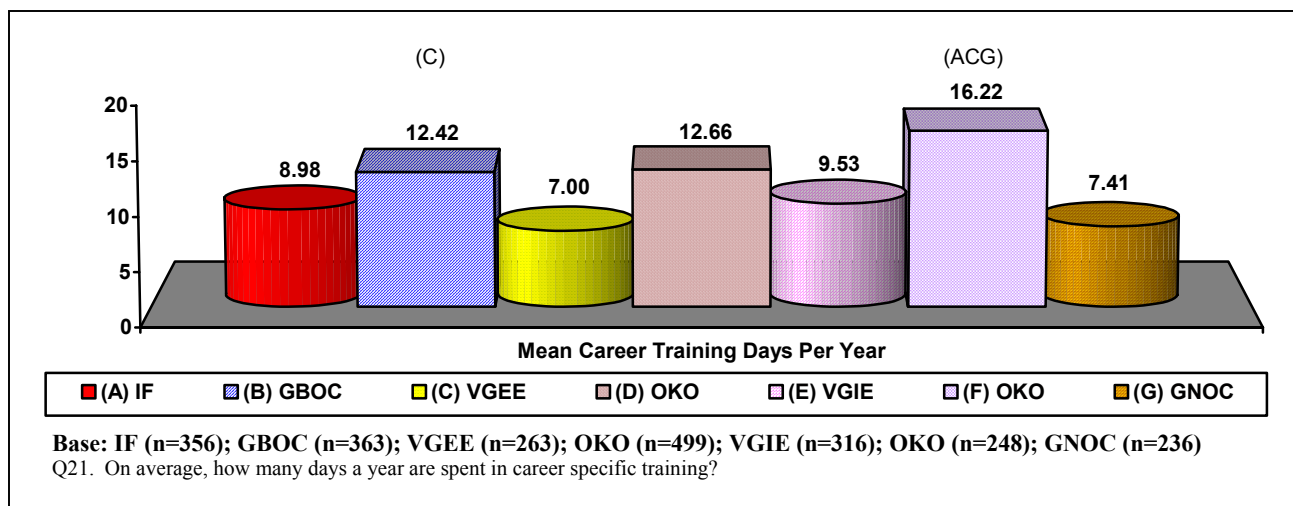


### Training Sessions x Facility Type





## Mean Career Specific Training Days Per Year by Facility Type



### Determining Type of Facility

Examining the ratings one or more technologists gave a facility on the Question 6 helped determine into which of the seven types a given facility fell.

From those ratings, researchers computed the following three numbers:

- Q6 Overall: The average rating received by the facility on all 27 attributes.
- SOAE: Average level of agreement with item Q6d: This facility has state-of-the-art imaging equipment.
- NROC: Average level of agreement with item Q6s: Technologists are not required to be on call.

From those three numbers, the facility's score was computed on the following three "simplified facility discriminant functions:"

- $Fdfsmp1 = 3 * Q6Overall + NROC$ ;  $Fdfsmp2 = NROC - 3 * Q6Overall$ ; and  $Fdfsmp3 = SOAE - Q6Overall$

Researchers applied the following decision rules to determine the facility's workplace type:

- If  $Fcvsmpl \geq 17.5$ , assign this facility to Facility Type 1.
- If  $15.0 < Fcvsmpl < 17.5$  and  $Fcvsmpl3 > -.6$ , assign this facility to Facility Type 5.
- If  $15.0 < Fcvsmpl < 17.5$  and  $Fcvsmpl3 \leq -.6$ , assign to Facility Type 3.
- If  $12.0 \leq Fcvsmpl \leq 15.0$  and  $Fcvsmpl2 \geq -7.8$ , assign to Facility Type 7.
- If  $12.0 \leq Fcvsmpl \leq 15.0$  and  $Fcvsmpl2 < -7.8$ , assign to Facility Type 2.
- If  $10.0 \leq Fcvsmpl < 12.0$ , assign to Facility Type 4.
- If  $(Fcvsmpl < 10.0)$ , assign to Facility Type 6.

Tentative interpretations for these three dimensions of differences among facilities:

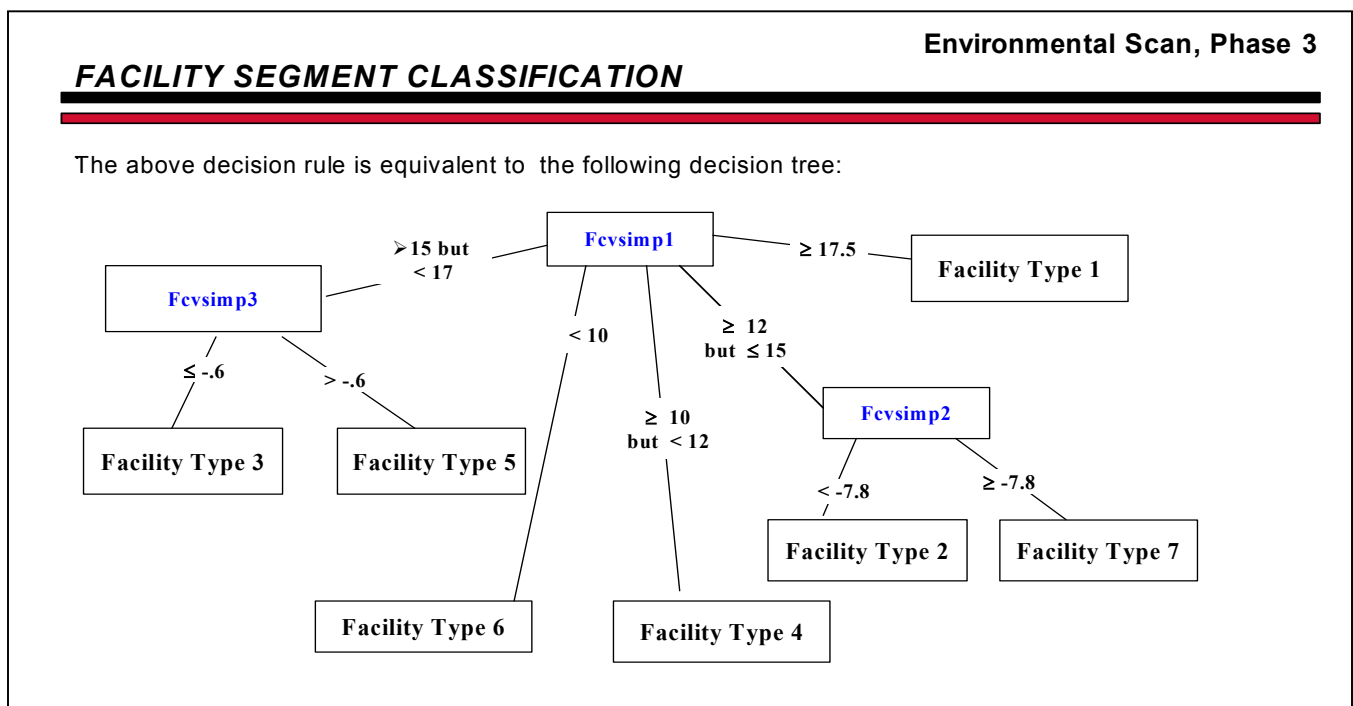
- $Fdfsmp1$ : Overall positivity, with extra emphasis on not having to be on call.
- $Fdfsmp2$ : Extent to which on-call policy is this facility's strong point (i.e., is rated much more favorably than its average rating across all attributes).

- Fdfsmp3: Extent to which having state-of-the-art imaging equipment is this facility's strongpoint.

Labels for the resulting seven types of facilities:

- Facility Type 1: Ideal facility.
- Facility Type 2: Good overall, on call required.
- Facility Type 3: Very good, except for equipment.
- Facility Type 4: OK overall.
- Facility Type 5: Very good, including equipment.
- Facility Type 6: Only fair overall.
- Facility Type 7: Good overall, on call not required.

The above decision rule is equivalent to the following decision tree:

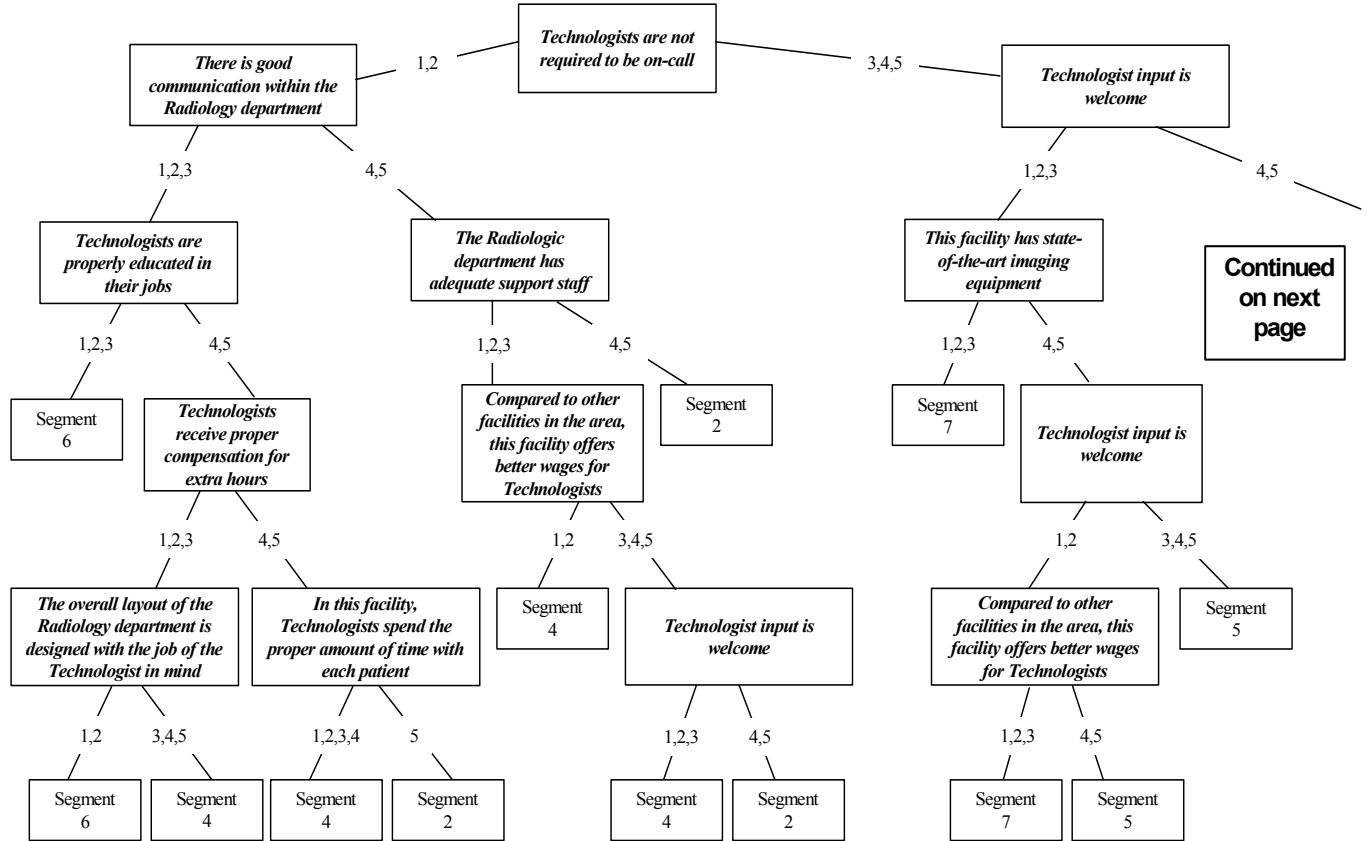


Use of the decision rule or the corresponding decision tree correctly classified from 58% to 86% of the facilities described in the sample, for an overall correct classification rate of 73.1%.

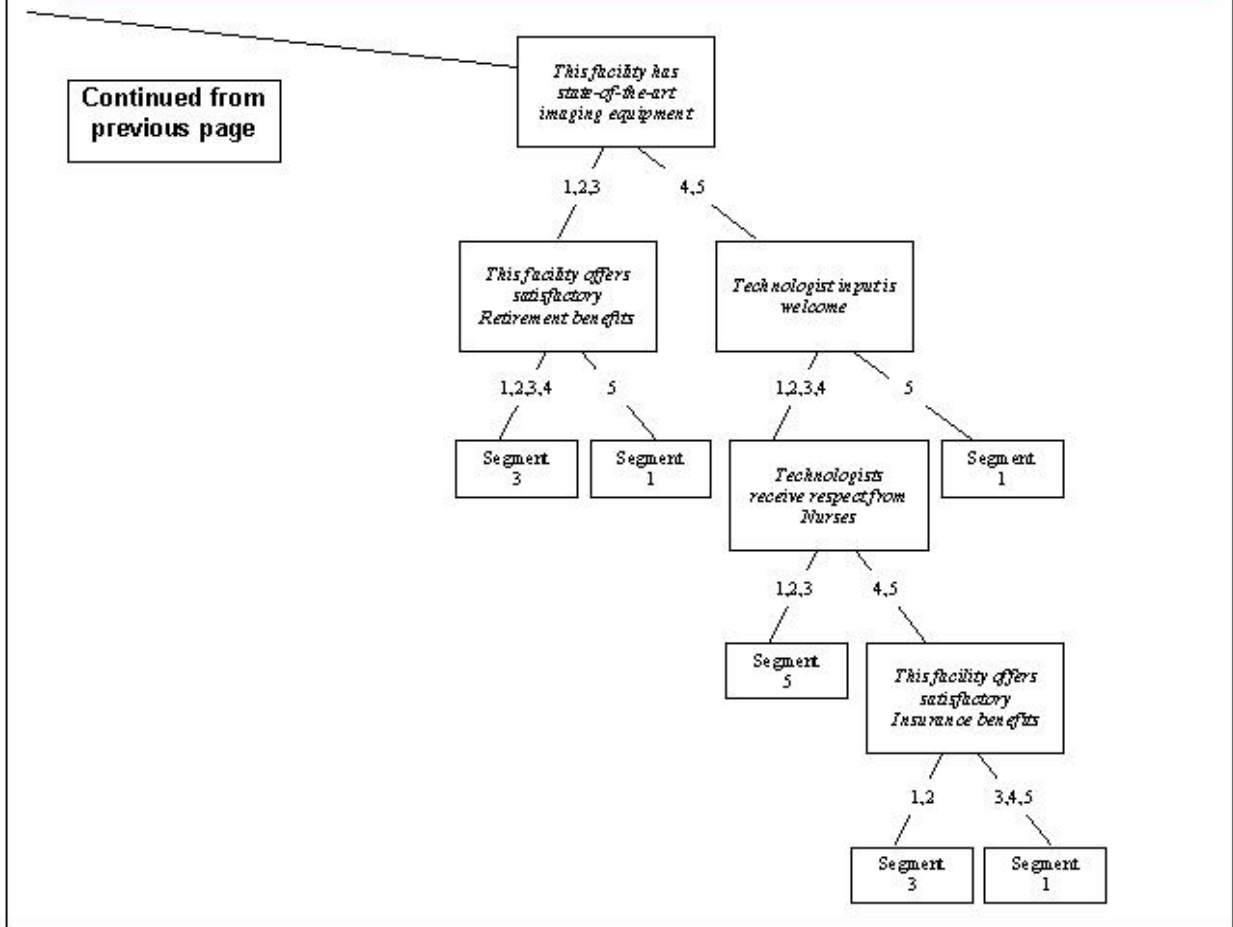
Alternatively, the CART classification tree correctly segmented 67% of the facilities rated by the sample.

## CART FACILITY SEGMENT CLASSIFICATION

This CART tree provides the questioning that can be used to predict into which segment a Facility falls. The overall probability of predicting the correct segment using this tree is 67%.



## FACILITY SEGMENT CLASSIFICATION (Cont.)



The matrix below shows the success level of the CART classification tree in sorting facilities into their predicted segments. The rows indicate the segment into which each facility fell according to the algorithm on the previous page. The columns indicate the actual segment into which the facility was classified.

For example, of those that answered the facility classification questions in a manner predicting that the facility belonged in the Ideal Facility type, 67% actually belonged in the Ideal Facility segment. This compared to a one in seven chance of predicting the correct segment randomly.

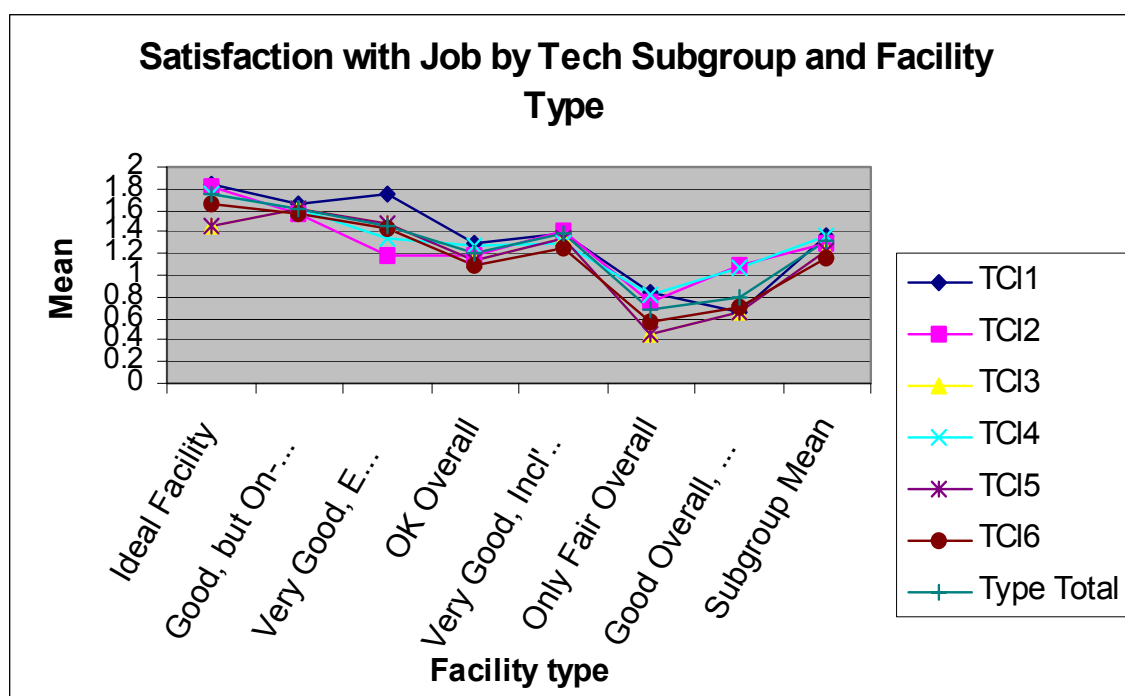
		Predicted Facility Segment						Actual Base	
		IF	GBOC	VGEE	OKO	VGIE	OFO		GNOC
Actual Facility Segment	Ideal Facility (IF)	67%	0%	13%	0%	13%	0%	1%	367
	Good Overall, but On-Call (GBOC)	5%	78%	5%	13%	3%	1%	0%	386
	Very Good, Except. Equipment (VGEE)	9%	0%	59%	0%	6%	1%	15%	277
	OK Overall (OKO)	1%	20%	0%	75%	7%	34%	6%	530
	Very Good, Including Equipment (VGIE)	16%	1%	12%	0%	64%	0%	15%	336
	Only Fair Overall (OFO)	0%	1%	1%	11%	1%	63%	8%	257
	Good Overall, On-Call Not Req'd (GNOC)	2%	0%	11%	0%	6%	0%	55%	244
Predicted Base		440	362	287	421	272	279	336	

## Detailed Findings: Relationships Among Technologist Characteristics, Facility Characteristics and Satisfaction with Workplace

As a primary goal, Phase 3 aimed to identify subpopulations of radiographers with distinct profiles of work-related values and subpopulations of workplace environments with distinct physical and social characteristic profiles. Then, the data could help researchers match radiographers to the workplace environments they would find most satisfying. More generally, the research hoped to answer whether technologist and workplace characteristics would interact in determining technologists' satisfaction with their workplace environments.

### Differences Among Subgroups in Most Satisfying Facility Type(s)

Employing a MANOVA of satisfaction ratings as a function of the two cluster-membership variables and their interaction, researchers initially checked for clusters' utility in matching respondents to workplaces employed. This resulted in a small, statistically nonsignificant interaction effect. The relationship between type of facility and workplace satisfaction did not differ significantly from one technologist subgroup to the next. For instance, mean satisfaction with "your job" for the 42 technologist subgroup/facility type combinations were as follows:



The interaction between facility type and technologist subgroup was small, accounting for only 7% of the total variation among the 42 subgroup/type means. Differences among facility types, averaged across subgroups, accounted for 81% of the variation among the 42 means and were statistically significant at the 99.9% confidence level.

This same pattern – a large, statistically significant main effect of facility type; a smaller and only sometimes statistically significant main effect of technologist subgroup, and a small, usually statistically nonsignificant interaction effect – held for the other five satisfaction measures and

for the average of all six measures. In short, the most satisfying type of facility did not differ much from one subgroup of technologists to the next.

### Match Between Technologist Subgroup and Facility Type

The above results could have been due to relatively successful “assortative mating” of respondents to workplaces. In this case, a strong violation of independence between the two membership variables would be expected, with members of each technologist subgroup working primarily in facility types they found particularly satisfying, but those in other subgroups did not. The following table explores that possibility:

	Technologist Segments					
	Paying Dues	Career Focused	Balancing Fam/Job	Seeking Stability	Satisfied Overall	Least Satisfied
Base: Respondents Answering	(452)	(430)	(334)	(339)	(429)	(413)
<b>Facility Types</b>						
Ideal Facility	13%	10%	16%	19%	21%	14%
Good, but On-Call	20%	20%	13%	14%	17%	12%
Very Good, Except Equipment	6%	7%	14%	15%	18%	10%
OK Overall	28%	22%	22%	21%	16%	23%
Very Good, Including Equipment	12%	16%	16%	13%	15%	14%
Only Fair Overall	10%	15%	9%	9%	7%	14%

The shaded columns designate facility types in which more of a subgroup’s technologists worked than in any other, i.e., the “modal” facility type for the subgroup. In the Satisfied Overall subgroup, respondents were 5% more likely to work in an Ideal Facility. Respondents in the remaining five subgroups “chose” the OK Overall facility type as their modal facility. Researchers soundly rejected the null hypothesis that the distribution of technologists across various facility types is identical for all subgroups – chi-square for the above table is 119.4 with 30 *df*,  $P < .001$  – yet technologists clearly have not strongly gravitated toward subgroup-specific preferred facility types.

Lack of a strong match between technologist subgroups and facility types did not eliminate the possibility that the match between some characteristic or set of characteristics of technologists and the attributes of their workplaces is important. Nor does it preclude the possibility that different subgroups of technologists (defined by characteristics other than ratings of core-attribute importance) gravitate toward workplace environments that uniquely suit them. The next section of this report addresses this broader question – the extent to which radiographers have sorted themselves into the workplace environments in which they can be most satisfied.

## Is the Radiographer's Workplace Panglossian?

*"It is demonstrable," said he, "that things cannot be otherwise than as they are; for as all things have been created for some end, they must necessarily be created for the best end."*

Dr. Pangloss, in Voltaire's *Candide*

Is the radiographer's workplace environment Panglossian? The Phase 3 data provide an opportunity to examine the extent to which respondents' preferences among workplace types matched their perceptions of their workplace environments.

### General Preferences: Match Between Preferences and Workplace Environment

Question 5a through 5h, which tapped general preferences, asked if the radiographer would prefer:

- 5a: A great salary or a great work environment.
- 5b: Working in a hospital vs. working in some other institution.
- 5c: Being a specialist vs. a generalist.
- 5d: Working on the same shift full time or working a rotating/swing shift.
- 5e: Working in a rural vs. an urban setting.
- 5f: Being a technologist vs. an administrator.
- 5g: Working on the trauma unit at least some of the time vs. no trauma work.
- 5h: Working primarily with outpatients vs. inpatients.

With the exception of the salary vs. work environment preference, respondents who preferred a given end of each of these dimensions more likely reported that their workplace environment fit the "matching" end of the dimension. In particular, the overall correlation between preference and perceived environment was statistically significant for hospital vs. nonhospital ( $r = +.58, P < .001$ ), specialist vs. generalist ( $r = +.61, P < .001$ ), same shift vs. swing shift ( $r = +.22, P < .001$ ), rural vs. urban ( $r = +.48, P < .001$ ), administrator vs. technologist ( $r = +.18, P < .001$ ), trauma unit work or no trauma unit ( $r = +.40, P < .001$ ), and outpatient vs. inpatient work (preference for working with outpatients correlated +.51 with percent of time spent working with outpatients and -.49 with percent of time spent with inpatients,  $P < .001$  in each case). However, even though respondents may have reported that workplaces did not "match" their salary needs, they did not tend to place greater importance on wages than on their overall satisfaction with their facilities ( $r = -.03, ns$ ).

In particular:

- 96% of those who indicated a preference for a hospital work setting actually worked in hospitals, while only 24% of those who preferred a nonhospital setting nevertheless worked in a hospital (overall chi-square = 1042.8 with 2 *df*,  $P < .001$ ).
- 90% of respondents who said they would rather be generalists considered themselves to be generalists; the corresponding percentage for specialists was 78% (overall chi-square = 815.5 with 2 *df*,  $P < .001$ ).
- 98% of radiographers who indicated a preference for working the same shift full time did so more than half the time; only 18% of those who preferred the swing/rotating shift worked it more than half the time. However, this was significantly more than the 2% of those with a

same-shift preference who nonetheless worked the swing/rotating shift more than half the time (overall chi-square = 112.5 with 2 *df*,  $P < .001$ ).

- 80% of respondents who said they would rather be a technologist than an administrator indicated that staff technologist most aptly described their job. A lower percentage (though still a majority at 64%) of those who preferred to be an administrator were nonetheless currently working as staff technologists. Similarly, four times as many (but still only 13%) of those with a preference for administration as those who preferred being a technologist currently held a position as supervisor, assistant chief technologist or chief technologist (overall chi-square = 68.8 with 4 *df*,  $P < .001$ ). Because the survey sample was restricted to those who listed staff or senior staff technologists as their positions on the ARRT registration/renewal form, the 116 respondents who reported that they worked in a supervisory position must have moved into those positions quite recently.
- 57% of radiographers who preferred to work in trauma units reported that they did so at least once per week, whereas this was true of only 13% of those who preferred to avoid the trauma unit (overall chi-square = 349.4 with 2 *df*,  $P < .001$ ).
- 70% of radiographers who preferred to work with inpatients did so 50% to 100% of the time, compared with 14% of those who preferred outpatient work. Conversely, only 7% of those who preferred working with inpatients never did so, while nearly one half (47%) of respondents who preferred outpatient work avoided inpatient work altogether (overall chi-square = 493.5 with 4 *df*,  $P < .001$ .)
- 58% of radiographers who preferred to work on an outpatient basis did so more than 90% of the time (and 86% more than one half time), compared with 8% of those who preferred inpatient work, 30 % of whom worked on an inpatient basis half of the time (overall chi-square = 540% with 4 *df*,  $P < .001$ .)
- 62% of radiographers who preferred an urban environment reported that they worked in urban workplaces and only 4% worked in a rural setting. On the other hand, 46% of rural-preference radiographers worked in rural settings, with another 39% in suburban settings (overall chi-square = 518.7 with 4 *df*,  $P < .001$ ).

The great salary/great work environment preference failed to correlate with the corresponding balance on the actual environment side. This may have been due in large part to the difficulty of finding a good measure of the environment. Unlike the other seven workplace environment dimensions, there was no single question that tapped the radiographer's perception of the extent to which the quality of his or her salary exceeded the quality of his or her workplace environment. Researchers approximated this balance as the difference between agreement level (on a 1 to 5 scale) with the statement, "compared to other facilities in the area, this facility offers better wages for technologists" and rating of satisfaction with "your job." However, above average wages don't necessarily equate well with a "great salary," and job satisfaction is by no means equal to a "great" work environment.

### **Cautions with Respect to Interpretation of the Match**

When interpreting the documented tendency for general workplace environment preferences to match the respondents' perceptions of their workplace environments, three cautions arise:

- The match was far from perfect, leaving substantial percentages of respondents – in some cases, a majority of those with a given preference – with conflicts in preferred and perceived environments.



- The data did not indicate whether the match resulted from respondents who preferred a given facility type having successfully found that type of workplace, from technologists who worked in a given type of facility coming to prefer that kind of workplace or some combination of the two.
- Some or all of the respondents' preferred workplace dimensions may not have been important determinants of workplace satisfaction. The next section addresses the relationship between the preferred/perceived environment match and radiographers' job satisfaction.

### Does the Match Matter?

A series of analyses of variance (ANOVAs) employed respondents' ratings of overall satisfaction with their primary workplace facilities (Q3a), the radiology department (Q3b), their job (Q3c), radiology administration (Q3d), their coworkers (Q3e), overall patient care and the average response to all six questions (Q3Overall). The dependent variables for each ANOVA were the respondent's general preference with respect to a given aspect of the workplace environment and where the respondent perceived the job fit on that same dimension. The survey did not, however, include the great salary/great work environment dimension, since the definition of the actual job side of that dimension used one of the dependent variables (satisfaction with job). If the match between preferred and perceived environment mattered, results should have shown a large, statistically significant interaction between the two independent variables, with a mean satisfaction rating higher for radiographers whose preferred and perceived environment matched.

Each of the seven dimensions except specialist/generalist showed a statistically significant ( $P < .05$ ) preference-actuality interaction on at least one of the satisfaction measures, as follows:

Match		Mean Satisfaction With						
Preference	Current Job	Prim Facil	Radiol Dept	Your Job	Co Wokers	Radiology Administr'n	Patient Average of Care	
All 6								
Hosp	Hosp	4.17	3.87	4.37	4.2	3.42	4.19	4.03
	Nonhosp	4.13	3.88	4.26	4.33	3.67	4.07	4.02
No Pref.	Hosp	4.05	3.76	4.2	4.13	3.36	4.22	3.95
	Nonhosp	4.07	3.95	4.2	4.14	3.51	4.23	4.01
Non-Hosp	Hosp	3.83	3.61	4.07	4.09	3.16	4.09	3.81
	Nonhosp	4.37	4.23	4.41	4.37	3.77	4.56	4.29
	<i>N</i>	2365	2219	2369	2355	2227	2368	2299
Interaction	<i>P</i>	<.001	0.001	0.003	0.094	0.016	<.001	<.001

Scale:

Very Dissatisfied (1)    Somewhat Dissatisfied (2)    Neither Satisfied nor Dissatisfied (3)    Somewhat Satisfied (4)    Very Satisfied (5)    Does Not Apply (X)

XThe effect of hospital/nonhospital preference/actuality match lacked consistency across the six satisfaction measures and the averages. Those who preferred working in hospitals could more easily adapt to working in nonhospital facilities. Radiographers who preferred a nonhospital setting

demonstrated from .3 to .6 of a unit more satisfaction with their primary facilities, their radiology departments, their jobs and their coworkers when they worked in a setting other than a hospital.

Despite the large total sample size for these analyses, none of the interactions between generalist/specialist preference and current role as a generalist or specialist reached statistical significance ( $P$  for the six measures and their average from .12 to .99). As shown by the next table, radiographers who preferred working in the trauma unit at least once a week weren't very disappointed if they did not, but those who preferred to avoid the trauma unit were noticeably (one fourth to one third of a unit) less satisfied with various aspects of their workplace if they had to work in a trauma setting once a week or more. This difference rated at a statistically significant level for all measures except satisfaction with the radiology department and satisfaction with radiology administration.

**Satisfaction as a Function of Preference/Current Job Match With Respect to Trauma Unit Duty**

Match		Mean Satisfaction with						
Preference	Current Job	Prim Facil	Radiol Dept	Your Job	Co-Workers	Radiol Administration	Patient Care	Average of All 6
Trauma unit ≥ once/wk	Trauma unit ≥ once/wk	4.15	3.84	4.40	4.20	3.39	4.23	4.04
	Infrequent trauma unit	4.15	3.90	4.30	4.26	3.55	4.27	4.06
No pref	Trauma unit ≥ once/wk	4.08	3.81	4.20	4.11	3.28	4.18	3.94
	Infrequent trauma unit	4.23	4.00	4.36	4.25	3.50	4.31	4.11
Trauma unit < once/wk	Trauma unit ≥ once/wk	3.82	3.68	4.00	4.00	3.18	4.09	3.80
	Infrequent trauma unit	4.25	4.05	4.34	4.28	3.63	4.42	4.16
<i>N</i>		2342	2196	2346	2332	2206	2346	2277
Interaction <i>p</i>		.002	.081	.001	.023	.149	.031	.003

**Satisfaction as a Function of Preference/Current Job Match With Respect to Shift Worked**

Match		Mean Satisfaction with						
Preference	Current Job	Prim Facil	Radiol Dept	Radiol Dept	Radiol Dept	Radiol Dept	Radiol Dept	Radiol Dept
Swing Shift	Same shift	4.09	3.75	3.75	3.75	3.75	3.75	3.75
	Swing shift	4.41	4.37	4.37	4.37	4.37	4.37	4.37
No Preference	Same shift	4.36	3.93	3.93	3.93	3.93	3.93	3.93
	Swing shift	4.21	3.18	3.18	3.18	3.18	3.18	3.18
Same Shift	Same Shift	4.18	3.98	3.98	3.98	3.98	3.98	3.98
	Swing Shift	3.90	3.93	3.93	3.93	3.93	3.93	3.93
<b>N</b>		2351	4.29	4.29	4.29	4.29	4.29	4.29
<b>Interaction p</b>		.18	4.50	4.50	4.50	4.50	4.50	4.50

Technologists who preferred swing shifts rated their satisfaction higher on every measure and the average of all six measures if they worked the swing shift at least half time. Respondents who preferred to work the same shift full time expressed slightly greater satisfaction when they did so than when they had to work the swing shift more than half the time. The variance between these two differences was statistically significant for ratings of satisfaction with coworkers, patient care and the average of all six measures. The variance was almost significant for satisfaction with the radiology department as well.

**Satisfaction as a Function of Preference/Current Job Match with Respect to Working as Technologist versus as Administrator**

Match		Satisfaction with						
Preference	Current Job	Prim Facil	Radiol Dept	Your Job	Coworkers	Radiol Administr'n	Patient Care	Average of All 6
<b>Technologist</b>	Staff tech	4.20	3.98	3.98	3.98	3.98	3.98	3.98
	Sr. staff tech	4.15	4.35	4.35	4.35	4.35	4.35	4.35
	Supervisor, Administr.	4.39	4.27	4.27	4.27	4.27	4.27	4.27
<b>No preference</b>	Staff tech	4.12	3.51	3.51	3.51	3.51	3.51	3.51
	Sr. staff tech	4.09	4.34	4.34	4.34	4.34	4.34	4.34
	Supervisor, Administr.	4.27	4.11	4.11	4.11	4.11	4.11	4.11
<b>Administrator</b>	Staff tech	3.95	3.90	3.90	3.90	3.90	3.90	3.90
	Sr. staff tech	4.08	4.30	4.30	4.30	4.30	4.30	4.30
	Supervisor, Administr.	4.71	4.20	4.20	4.20	4.20	4.20	4.20
<b>N</b>		2239	3.43	3.43	3.43	3.43	3.43	3.43
<b>Interaction p</b>		.287	4.25	4.25	4.25	4.25	4.25	4.25

In general, respondents who preferred to work as technologists rather than as administrators did not express significantly different satisfaction with various aspects of their current positions as a function of where they fell on the administrative ladder. Those with administrative ambitions, however, were substantially (about three fourths of a unit on the five-unit scale) more satisfied if they currently held a position as supervisor or administrator than if they worked as a staff technologist. This difference, however, was statistically significant only for ratings of satisfaction with “your job,” though it approached significance for ratings of coworkers and for the average the satisfaction ratings. The Phase 1 finding that the senior staff rung on the administrative ladder was less satisfying than being a staff technologist held true for those radiographers in our sample who either expressed a preference for working as a technologist or who had no strong preference between technologist and administrator. However, radiographers with administrative leanings showed a monotonic increase in satisfaction ratings as their position increased from staff technologist through senior staff technologist to supervisor/administrator.

With one minor exception, radiographers who preferred inpatient work expressed higher satisfaction the more time they spent working with inpatients, while those who preferred outpatient work were less satisfied the more time they spent working with inpatients. The satisfaction impact showed in significant ratings differences for satisfaction with the primary facility, the radiology department and the average of all six workplace aspects.

**Satisfaction as a Function of Preference/Current Job Match with Respect to Inpatient/Outpatient Work**

Match		Mean Satisfaction with						
Preference	Current Job	Prim Facil	Radiol Dept	Your Job	Co-Workers	Radiol Administr ation	Patient Care	Average of All 6
Inpatient	Never inpatient	3.85	3.64	4.23	4.31	4.00	4.33	4.06
	Inpatient 1-49% of time	4.18	3.96	4.36	3.89	3.04	4.18	3.93
	Inpatient ≥ 50% of time	4.41	4.06	4.50	4.35	3.54	4.39	4.20
No pref	Never inpatient	4.05	3.98	4.28	4.25	3.64	4.27	4.09
	Inpatient 1-49% of time	4.12	3.87	4.30	4.13	3.44	4.21	4.01
	Inpatient ≥ 50% of time	4.09	3.75	4.23	4.18	3.44	4.15	3.97
Outpatient	Never inpatient	4.36	4.22	4.40	4.37	3.74	4.53	4.28
	Inpatient 1-49% of time	4.12	3.85	4.31	4.17	3.37	4.27	4.01
	Inpatient ≥ 50% of time	3.93	3.71	4.13	4.13	3.24	4.13	3.89
<b>N</b>		2363	2218	2367	2354	2227	2367	2299
Interaction <i>p</i>		.001	.035	.18	.376	.163	.118	.029

The overall pattern with respect to outpatient work mirrored that of inpatient work. Radiographers who preferred inpatient work reported less satisfaction with various aspects of their workplace environment as the proportion of their time spent working with outpatients increased, while increasing involvement with outpatients increased satisfaction ratings by radiographers preferring outpatient work. Significant differences in satisfaction ratings for the

primary facility, the radiology department, patient care and for the average of all six satisfaction ratings demonstrated respondents' strong outpatient preferences.

### Satisfaction as a Function of Preference/Current Job Match with Respect to Rural/Suburban/Urban Location

Match		Mean Satisfaction with						
Preference	Current Job	Prim Facil	Radiol Dept	Your Job	Co-Workers	Radiol Administration	Patient Care	Average of All 6
Urban	Urban	4.22	4.94	4.38	4.20	3.57	4.25	4.10
	Suburban	4.15	4.83	4.30	4.23	3.36	4.29	4.03
	Rural	4.04	4.50	4.30	4.42	3.39	4.42	4.02
No pref	Urban	4.15	4.93	4.33	4.20	3.40	4.37	4.06
	Suburban	4.14	4.96	4.25	4.27	3.47	4.31	4.07
	Rural	4.12	4.01	4.32	4.29	3.46	4.27	4.08
Rural	Urban	3.92	3.67	4.14	4.16	3.25	4.07	3.88
	Suburban	4.20	3.99	4.28	4.29	3.57	4.31	4.10
	Rural	4.30	4.04	4.37	4.19	3.63	4.40	4.15
<b>N</b>		2339	2194	2343	2330	2203	2343	2275
Interaction <i>p</i>		.027	.010	.314	.67	.036	.029	.08

### Relationship Between Satisfaction With, Importance of Workplace Attributes

Workplaces appeared “Panglossian” if the workplace attributes radiographers deemed most important were also the ones they rated as most favorable in their current workplaces.

Researchers computed the mean of respondents' ratings for five sets of workplace attributes (Q6), the attributes radiographers deemed most important “in terms of judging a facility as a place to work” (Q4), the attributes listed at the second level of importance, the third-most important group of attributes, the fourth-most important group and the “left-over” attributes. Mean levels of agreement with favorable statements about these five groups of attributes were as follows:

Importance level	5 Most Important Attributes#	Next 5 Most Important Attributes	3 <sup>rd</sup> Most Important Group of Attributes	4 <sup>th</sup> Most Important Group of Attributes	Least Important Group of Attributes
Mean favorability	3.80	3.76	3.72	3.61	3.50

#A few respondents listed 4 or 6 attributes as most important; ditto for the other groupings.

Scale:

1 = I completely disagree with this statement;

2 = I somewhat disagree with this statement;

3 = I neither agree nor disagree with this statement;

4 = I somewhat agree with this statement;

5 = I completely agree with this statement

N = 2186

The differences between adjacent pairs of means were statistically significant to at least the .006 level. As shown in the preceding table, mean favorability monotonically related to rated importance of the group of attributes, though the difference in mean positivity rating between the most- and the least-important group of attributes was only .03 of a unit on the 1-5 scale.

### Differences Among Subgroups in Predicting Workplace Satisfaction

Technologist Subgroup	<i>R</i> Using 27 Attributes	Significant Predictors	<i>r</i> with Ave of Signif Pred*	<i>r</i> with Ave of all-Technol Pred	<i>r</i> with Ave of All Pred
Paying Dues	.662	I, L, Q, U, Z	.642	.624	.612
Career Focused	.611	I, Q, U	.520	.570	.553
Balance Fam/Job	.551	F, -V	.060#	.467	.479
Seek Stability	.612	I, Q, Z	.524	.569	.507
Satisf Overall	.718	M, Q, U, X, Z	.682	.656	.612
Least Satisfied	.702	A, B, E, M, Q, U, Z	.619	.630	.602

\*If the regression coefficient for a given predictor was negative, reverse-scored the item before averaging.  
 # If the three predictors are (T, O and M) whose *P* values were between .05 and .07 were added, this *r* increases to .427.

A mixture of common and unique predictors produced overall satisfaction for the various technologist subgroups. Attribute Q, “communications within radiology department,” statistically predicted satisfaction for all subgroups except Balancing Family/Job technologists. Attributes U, “coworkers act professionally” and Z, “your input is welcome,” contributed significantly to predicting satisfaction for four of the six subgroups. Partly due to these common predictors, researchers lost very little predictive ability if attributes were not tailored for a particular subgroup, but instead based their prediction on the average of the eight attributes that contributed significantly to the prediction equation for all respondents. In fact, the “combined-model average” outperformed the “subgroup average” for four of the six subgroups. This was probably due to the greater reliability of averaging eight ratings instead of averaging two or three ratings. Nevertheless, attributes A, “pay above industry average,” and B, “follows occupational safety guidelines,” contributed significantly to the prediction equation for the Least Satisfied subgroup. Balancing Family/Job radiographers shared no statistically significant and only one marginally significant ( $.05 < P < .01$ ) predictor with any other subgroup.

To summarize, the highest indicators of overall satisfaction for the six subgroups were:

- Radiographers in the Paying Dues subgroup reported greatest overall satisfaction when communication was good within the radiology department, their coworkers acted professionally, their input was welcome, they were provided with the means to produce accurate images and they could spend the proper amount of time with their patients.
- Career Focused respondents’ overall satisfaction was significantly influenced by good communication within the department, coworkers who acted professionally and the ability to spend the proper amount of time with their patients. However, limiting attention to just those three predictors was less effective than averaging the ratings of all eight combined-groups predictors or simply using the average rating of all 27 attributes.

- Balancing Family/Job technologists' satisfaction was increased significantly by good insurance benefits and by working in a facility that was not well-known. In other words, a technologist was more impressed with a facility's insurance benefits than with its reputation. In addition, job security, control over their careers and conveniently located workplaces made marginally significant contributions to predicting satisfaction for this subgroup.
- Overall satisfaction of Seeking Stability technologists depended significantly on having good intradepartmental communication, being able to spend the proper amount of time with their patients and feeling that technologist input was welcome.
- Satisfied Overall respondents' satisfaction was predicted significantly by intradepartmental communications, proper performance evaluations, having control over their careers, coworkers who acted professionally, receiving proper performance evaluations and feeling that their input was welcome.
- Above average pay, overall department layout, control over their careers, intradepartmental communications, coworkers who acted professionally, confidence that occupational safety guidelines were followed and feeling that technologists' input was welcome proved to be statistically significant predictors of overall satisfaction for the Least Satisfied subgroup.

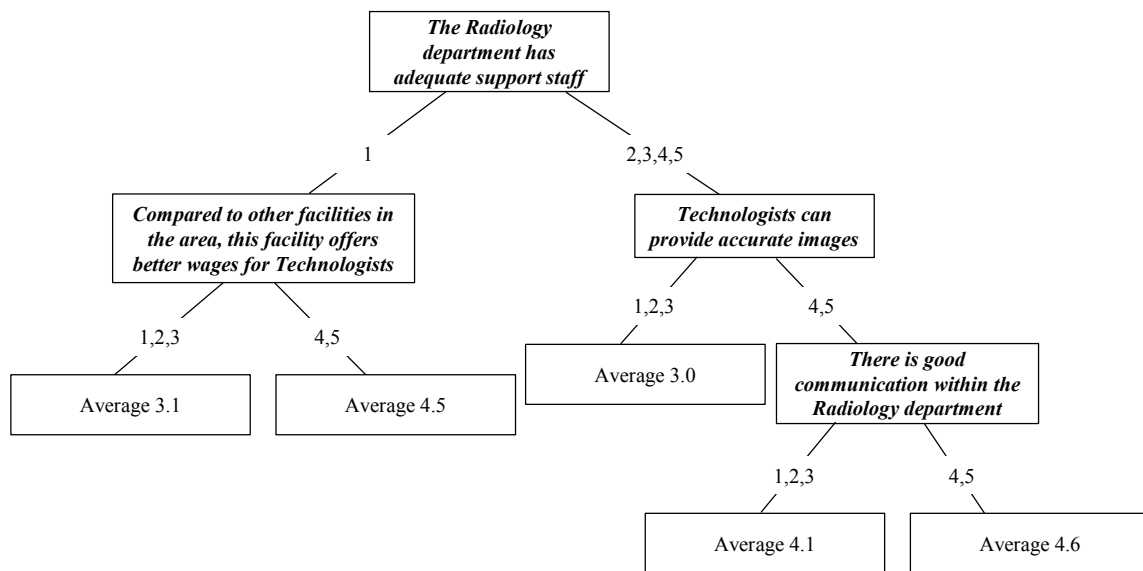
### CART-based Prediction of Satisfaction Within Subgroups

The same clustering method used to derive technologist subgroups and facility types could be used to identify clusters of radiographers within each subgroup who differed greatly in their mean satisfaction ratings. Unlike the linear combinations of predictors that MRA uses, CART analysis employs the predictors interactively. For example, determining the lowest-predicted satisfaction group solely on the basis of strong disagreement with “technologists have job security” and bringing in “adequate support staff” split the remaining subgroup members into middle- and highest-satisfaction groups. (See Balancing Family/Job radiographers flowchart below.)

## Technologist Segments (Facility Satisfaction)

### Subgroup 1 = Paying Dues (19%)

The CART tree shows that for this segment, the highest Facility Satisfaction (average of 4.6 on 5-point scale) can be achieved in a facility that scores somewhat negative to positive on “adequate support staff” (2-5 rating) and positively on “Technologists can provide accurate images” (4-5 rating) and positively on “good communications within department” (4-5 rating).

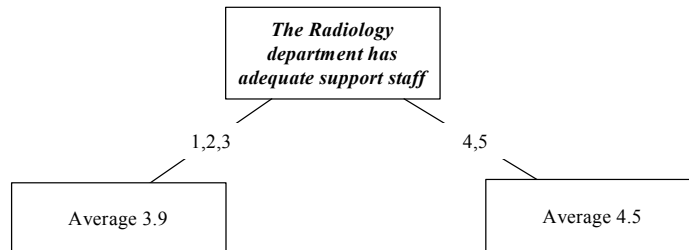




## Technologist Segments (Facility Satisfaction)

### Subgroup 2 = Career Focused (18%)

For this subgroup, the attribute that can most assist in predicting a high satisfactory rating for their facility is getting a positive rating on the "Radiology department has adequate support staff."

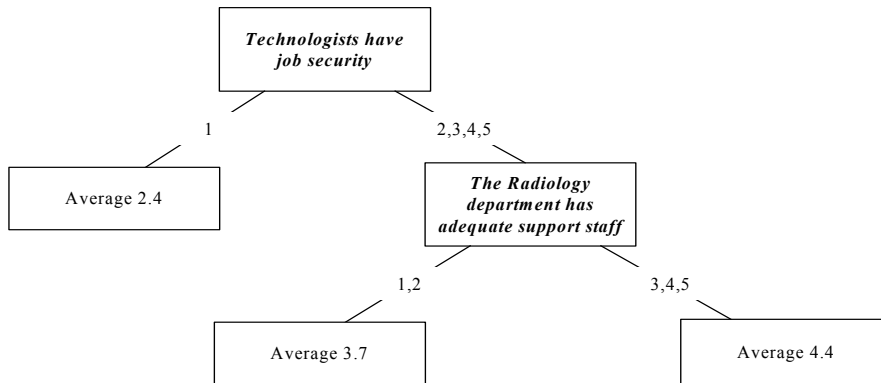


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## Technologist Segments (Facility Satisfaction)

### Subgroup 3 = "Balancing Family/Job" (14%)

For "Balancing Family/Job" radiographers, the primary attributes that will most predict their satisfaction with a facility appear to be at least a little job security and a neutral to positive rating on the radiology department having an "adequate support staff".

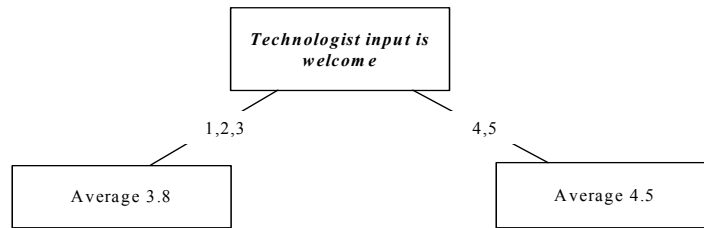


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## Technologist Segments (Facility Satisfaction)

### Subgroup 4 = Seeking Stability (14%)

For "Seeking Stability", making the technologist feel their input is welcome is especially influential to Facility Satisfaction.

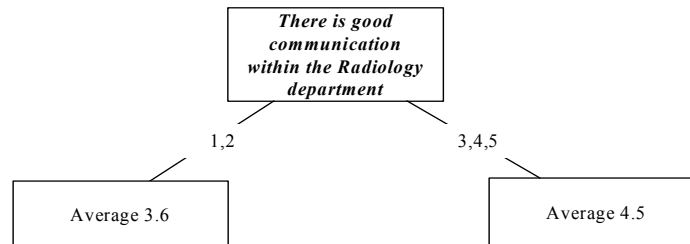


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## Technologist Segments (Facility Satisfaction)

### Subgroup 5 = Satisfied Overall (18%)

This segment is pretty satisfied with their facility as it is. Having good communications within the Radiology department is of extra importance to Facility Satisfaction.

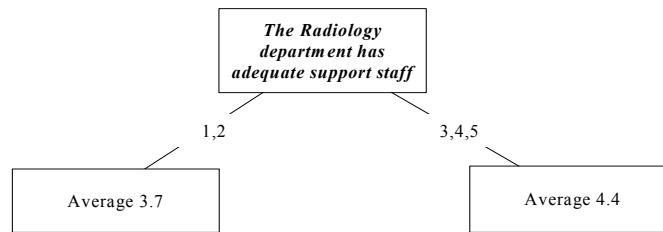


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## ***Technologist Segments (Facility Satisfaction)***

### **Subgroup 6 = “Least Satisfied” (17%)**

Having an adequate support staff also comes into play for this segment. It is the most influential in terms of predicting Facility Satisfaction for this segment.



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### **CART vs. MRA**

CART analysis limits examination to individual attribute responses, while MRA can analyze linear combinations (essentially, weighted averages) of facility ratings on those attributes. Because multiple-item averages tend to be more reliable than the single items from which they were derived, CART’s identification of low vs. high satisfaction subgroups of technologists accounts for much less of the variation in satisfaction than MRA-derived linear combinations.

For example, CART identified “adequate support staff” as the single attribute needed to differentiate between Least Satisfied respondents who were satisfied vs. relatively unsatisfied with their facilities. However, the attribute alone correlated only .37 with facility satisfaction and thus accounted for only about 14% of the individual differences in facility ratings among Least Satisfied respondents. Question 6 Overall (the simple average of ratings of the facility on all 27 attributes) on the other hand, correlated .48 with facility satisfaction and thus accounted for 23% of the individual differences among the subgroup’s technologists in facility satisfaction.

# Appendices

## Appendix A

### Correlation Matrix

Core Attribute	All Respondents		Technologist Subgroup											
			PayingDues		CareerFoc		Bal F/Job		SeekStab		SatOver		LeastSat	
	Total		Technologist Segments											
			Paying Dues		Younger Elite		"It's a Job" Moms		Safe & Secure Suburbia		Satisfying 2nd Income		Disenchanted "Selfs"	
	Job	Facility	Job	Facility	Job	Facility	Job	Facility	Job	Facility	Job	Facility	Job	Facility
Facility offers better wages	0.16	0.24	0.16	0.25	0.18	0.24	0.15	0.19	0.11	0.25	0.08	0.22	0.21	0.28
Follows safety guidelines	0.22	0.28	0.24	0.28	0.21	0.29	0.15	0.20	0.19	0.34	0.21	0.21	0.27	0.34
Safe place to work	0.15	0.20	0.13	0.20	0.15	0.25	0.19	0.24	0.17	0.20	0.15	0.20	0.12	0.14
State-of-the-art imaging equipment	0.15	0.21	0.14	0.26	0.16	0.24	0.14	0.16	0.16	0.22	0.12	0.17	0.15	0.17
Layout of department suits job	0.20	0.26	0.20	0.30	0.14	0.20	0.18	0.22	0.18	0.25	0.22	0.29	0.23	0.26
Insurance benefits	0.15	0.19	0.17	0.19	0.18	0.25	0.18	0.23	0.05	0.17	0.10	0.08	0.21	0.25
Retirement benefits	0.16	0.20	0.17	0.17	0.19	0.24	0.14	0.16	0.15	0.24	0.12	0.13	0.19	0.25
Work schedule fits personal needs	0.22	0.23	0.21	0.25	0.16	0.19	0.12	0.21	0.16	0.17	0.33	0.31	0.29	0.25
Spend proper time with patients	0.26	0.29	0.31	0.35	0.23	0.26	0.19	0.21	0.22	0.26	0.26	0.28	0.29	0.34
Respect from Doctors	0.25	0.28	0.29	0.27	0.25	0.27	0.18	0.21	0.18	0.19	0.31	0.33	0.21	0.33
Respect from Nurses	0.18	0.23	0.18	0.25	0.16	0.17	0.10	0.18	0.15	0.18	0.24	0.23	0.22	0.30
Provide accurate images	0.20	0.24	0.30	0.33	0.18	0.17	0.14	0.22	0.21	0.24	0.22	0.22	0.13	0.19
Control career	0.31	0.29	0.30	0.27	0.26	0.28	0.26	0.26	0.20	0.17	0.39	0.38	0.37	0.32
Internal/On-site training	0.23	0.28	0.28	0.31	0.27	0.29	0.10	0.14	0.18	0.27	0.27	0.38	0.22	0.25
Facility meets personal needs	0.14	0.21	0.20	0.24	0.16	0.22	0.14	0.26	0.02	0.12	0.12	0.20	0.18	0.23
Facility in proper working order	0.16	0.27	0.17	0.30	0.18	0.23	0.15	0.24	0.08	0.23	0.16	0.28	0.21	0.30
Good communication in department	0.27	0.33	0.33	0.40	0.19	0.26	0.24	0.28	0.19	0.30	0.35	0.44	0.26	0.29
Reimbursed for work expenses	0.18	0.25	0.18	0.25	0.19	0.28	0.16	0.21	0.18	0.22	0.14	0.21	0.22	0.28
Not required to be on-call	0.07	0.11	0.03	0.06	0.06	0.10	0.04	0.13	0.06	0.06	0.12	0.15	0.09	0.13
Job security	0.18	0.23	0.17	0.20	0.21	0.25	0.23	0.32	0.15	0.16	0.17	0.23	0.16	0.19
Staff acts professionally	0.23	0.28	0.25	0.25	0.19	0.27	0.24	0.26	0.18	0.27	0.30	0.36	0.20	0.25
Facility is well-known	0.09	0.17	0.10	0.21	0.15	0.20	-0.03	0.11	0.03	0.17	0.10	0.14	0.13	0.16
Properly educated in their jobs	0.22	0.27	0.21	0.29	0.24	0.24	0.27	0.27	0.08	0.18	0.29	0.33	0.16	0.25
Proper performance evaluation	0.24	0.27	0.29	0.30	0.19	0.24	0.22	0.24	0.10	0.19	0.33	0.39	0.28	0.26
Adequate support staff	0.27	0.35	0.26	0.38	0.24	0.32	0.26	0.30	0.20	0.29	0.35	0.40	0.28	0.37
Technologist input is welcome	0.29	0.36	0.37	0.38	0.19	0.26	0.24	0.29	0.20	0.39	0.40	0.44	0.26	0.38
Proper compensation for extra hours	0.19	0.24	0.18	0.27	0.22	0.21	0.17	0.22	0.14	0.25	0.14	0.23	0.26	0.24
Q6Halo (Average rating of all 27 attributes)	0.38	0.48	0.40	0.50	0.36	0.45	0.33	0.43	0.28	0.44	0.43	0.53	0.41	0.50

## Appendix B The Questionnaire

Note: To deal with “order bias,” four versions of the questionnaire were created. The order of the attributes in Question 4, Question 5 and Question 6 was rotated as follows:

	<u>Q4 Attributes</u>	<u>Q5 Attributes</u>	<u>Q6 Attributes</u>
Version 1	1-27	1-8	1-27
Version 2	8-27, 1-7	3-8, 1-2	8-27, 1-7
Version 3	15-27, 1-14	5-8, 1-4	15-27, 1-14
Version 4	22-27, 1-21	7-8, 1-6	22-27, 1-21

All other questions appeared the same in the four versions of the questionnaire.

### Cover Letter

### Environmental Scan, Phase 3



American Society of  
Radiologic Technologists

505-298-5063

March, 2002

Dear Colleague,

You have been selected to participate in ASRT’s 2002 Workplace study. This study is part of a multi-phase project designed to provide an up-to-date, comprehensive review of radiologic technologists and their workplaces across the nation.

We have selected a representative sample of professionals, so your participation is crucial in establishing a better understanding of the workplaces of radiologic science professionals and enabling the ASRT to better represent your profession to industry, government and the general public. Even if you were chosen to participate in a previous phase of this project, your participation in this phase is still crucial.

Because your time is valuable, special emphasis has been placed on keeping the questions short. In order to maintain complete confidentiality of replies, all responses will be grouped together and reported only in the form of numbers or percentages.

If you complete the enclosed survey and return it by May 17, 2002 in the postage-paid envelope provided, you will be entered into a prize drawing. The prize drawing will award one grand prize of \$500 and fifteen runner-up prizes of \$100. Thank you for your participation and support.

If you have any questions regarding this survey, please contact the Research Consultant we have contracted to conduct this study, Savitz Research Solutions. The contact person at Savitz Research Solutions is David Ditzenberger. His telephone number is 972-386-4050 ext. 294.

Sincerely,

Sal Martino  
Executive Vice President & Chief Academic Officer  
American Society of Radiologic Technologists

----- Fill out this portion to be entered into the grand prize drawing -----

Name:

Phone Number:



<b>IMPORTANCE OF CHARACTERISTICS IN TERMS OF JUDGING A FACILITY AS A PLACE AT WHICH YOU WOULD LIKE TO WORK.</b>	<b>1<sup>st</sup> Most Important Attributes – “X” FIVE ATTRIBUTES IN THIS COLUMN</b>	<b>2<sup>nd</sup> Most Important Attributes - “X” FIVE DIFFERENT ATTRIBUTES IN THIS COLUMN</b>	<b>3<sup>rd</sup> Most Important Attributes - “X” FIVE DIFFERENT ATTRIBUTES IN THIS COLUMN</b>	<b>4<sup>th</sup> Most Important Attributes - “X” FIVE DIFFERENT ATTRIBUTES IN THIS COLUMN</b>	
Facility is well-known					(13)
Being properly educated in the job you do					(14)
Receive proper performance evaluation					(15)
Have adequate support staff					(16)
Your input is welcome					(17)
Receive proper compensation for extra hours					(18)
Pay is above industry average for your geographic area					(19)
Follows occupational safety guidelines in terms of radiation and disease exposure					(20)
Primary facility you work at is a safe place (i.e., safe neighborhood, building security)					(21)
State-of-the-art imaging equipment					(22)
Overall layout of the Radiology department					(23)
Insurance benefits					(24)
Retirement benefits					(25)
Schedule fits your personal needs					(26)
Can spend proper time with patients					(27)
Respect from Doctors					(28)
Respect from Nurses					(29)
Ability to provide accurate images					(30)
Have control over your career					(31)
Internal/On-site training					(32)
Location meets personal needs such as convenient location, day care, senior care, etc.					(33)
Working order of building (i.e., elevators, etc.)					(34)
Communications within Radiology department					(35)
Reimbursement for work related expenses					(36)
Not being required to be on call					(37)
Job security (no worry about being laid off)					(38)
People you work with act professionally					(39)

**5. Next, we would like to see your preference, if any, between selected attributes.**

An example: If you totally prefer dogs over cats then you would circle the 4 under “Dogs.” If you prefer dogs over cats but still like cats a little then you would circle 3, 2 or 1 on the “Dogs” side of 0, depending on your preference. You would circle 0 if you have equal preference. If you preferred cats over dogs then you would circle 1, 2, 3 or 4 on the “Cats” side of 0 depending on amount of preference.

Do you prefer dogs or cats?									
<b>Cats</b>				<b>Equal Preference</b>		<b>Dogs</b>			
4	3	2	1	0	1	2	3	4	

Would you rather work on a swing/rotating shift or always on the same shift?									
<b>Same Shift</b>			<b>Equal Preference</b>				<b>Swing Shift</b>		
4	3	2	1	0	1	2	3	4	

Would you rather work on an in-patient care basis or an out-patient care basis?									
<b>Out Patient</b>			<b>Equal Preference</b>				<b>In Patient</b>		
4	3	2	1	0	1	2	3	4	(45)

Would you rather have a Great Salary or work in a Great Environment?									
<b>Great Work Environment</b>			<b>Equal Preference</b>				<b>Great Salary</b>		
4	3	2	1	0	1	2	3	4	

Would you rather work in an Urban or a Rural Setting?									
<b>Rural</b>			<b>Equal Preference</b>				<b>Urban</b>		
4	3	2	1	0	1	2	3	4	(46)

Would you rather work in a hospital or a non-hospital setting such as a clinic?									
<b>Non-Hospital</b>			<b>Equal Preference</b>				<b>Hospital</b>		
4	3	2	1	0	1	2	3	4	

Would you rather work as a Technologist or an Administrator?									
<b>Administrator</b>			<b>Equal Preference</b>				<b>Technologist</b>		
4	3	2	1	0	1	2	3	4	(47)

Would you rather work as a Generalist or a Specialist?									
<b>Specialist</b>			<b>Equal Preference</b>				<b>Generalist</b>		
4	3	2	1	0	1	2	3	4	

Would you rather work in a Trauma unit or a Non-Trauma unit?									
<b>Non-Trauma</b>			<b>Equal Preference</b>				<b>Trauma</b>		
4	3	2	1	0	1	2	3	4	(48)

**6. Please tell us, how much you agree with the following statements using a 5-point scale where:**

4	3	2	1	0	1	2	3	4	
---	---	---	---	---	---	---	---	---	--



**1 = I completely disagree with this statement; 2 = I somewhat disagree with this statement; 3 = I neither agree nor disagree with this statement; 4 = I somewhat agree with this statement; 5 = I completely agree with this statement**

**Once again, we are speaking about your CURRENT JOB at the PRIMARY FACILITY you work at.**

*(Please mark only ONE ANSWER per statement.)*

<b>Statements</b>	<b>Completely Disagree</b>	<b>Somewhat Disagree</b>	<b>Neither Agree nor Disagree</b>	<b>Somewhat Agree</b>	<b>Completely Agree</b>	
This facility is well-known.	1	2	3	4	5	(49)
Technologists are properly educated in their jobs.	1	2	3	4	5	(50)
Technologists receive proper performance evaluation(s).	1	2	3	4	5	(51)
The Radiology dept. has adequate support staff.	1	2	3	4	5	(52)
Technologist input is welcome.	1	2	3	4	5	(53)
Technologists receive proper compensation for extra hours.	1	2	3	4	5	(54)
Compared to other facilities in the area, this facility offers better wages for Technologists.	1	2	3	4	5	(55)
This facility follows occupational safety guidelines for radiation and disease exposure.	1	2	3	4	5	(56)
This facility is a safe place to work in terms of neighborhood and building security.	1	2	3	4	5	(57)
This facility has state-of-the-art imaging equipment.	1	2	3	4	5	(58)
The overall layout of the Radiology department is designed with the job of the Technologist in mind.	1	2	3	4	5	(59)
This facility offers satisfactory Insurance benefits.	1	2	3	4	5	(60)
This facility offers satisfactory Retirement benefits.	1	2	3	4	5	(61)
This facility offers a work schedule that fits my personal needs.	1	2	3	4	5	(62)
In this facility, Technologists spend the proper amount of time with each patient.	1	2	3	4	5	(63)
Technologists receive respect from Doctors.	1	2	3	4	5	(64)
Technologists receive respect from Nurses.	1	2	3	4	5	(65)
Technologists can provide accurate images.	1	2	3	4	5	(66)
Technologists can control their career.	1	2	3	4	5	(67)
Technologists receive sufficient Internal/On-site training.	1	2	3	4	5	(68)
This facility meets personal needs of staff such as convenient location, day care, senior care, etc.	1	2	3	4	5	(69)
This facility is in proper working order (elevators, lighting, etc.).	1	2	3	4	5	(70)
There is good communication within the Radiology department.	1	2	3	4	5	(71)
Technologists get reimbursed for work related expenses.	1	2	3	4	5	(72)
Technologists are not required to be on call.	1	2	3	4	5	(73)
Technologists have job security (do not worry about	1	2	3	4	5	(74)

being laid off).					
The Radiologic staff acts professionally.	1	2	3	4	5

(75)

7. Have you attended any internal training sessions in the past 12 months?

(76)

<sub>1</sub> Yes            <sub>2</sub> No

7a. If YES, how many different internal training sessions have you attended in the past 12 months?

\_\_\_\_\_ *different internal training sessions (Whole number please)*

(77-79)

8. Have you attended any external training sessions in the past 12 months?

(80)

<sub>1</sub> Yes            <sub>2</sub> No

8a. If YES, how many different external training sessions have you attended in the past 12 months?

\_\_\_\_\_ *different external training sessions (Whole number please)*

(81-83)

9. Currently, how many minutes, on average, do you spend with each patient?

\_\_\_\_\_ *minutes (Round to closest minute)*

(84-86)

10. Currently, how many patients do you treat in an average week?

\_\_\_\_\_ *patients (Whole number please)*

(87-89)

11. Highest level of education you completed: (SELECT ONE ONLY)

(90)

<sub>1</sub> High school or equivalent            <sub>4</sub> Associate degree            <sub>6</sub> Master's degree  
<sub>2</sub> Certificate            <sub>5</sub> Baccalaureate degree            <sub>7</sub> Doctoral degree  
<sub>3</sub> Advanced certificate(s)

12. Which of the following Certificates do you currently have? (SELECT ALL THAT APPLY)

(91)

<sub>1</sub> Bone Densitometry (BD)            <sub>7</sub> Quality Management (QM)  
<sub>2</sub> Cardiovascular-Interventional Technology (CV)            <sub>8</sub> Radiation Therapy (T)  
<sub>3</sub> Computed Tomography (CT)            <sub>9</sub> Radiography (R)  
<sub>4</sub> Magnetic Resonance Imaging (MR)            <sub>10</sub> Sonography (S)  
<sub>5</sub> Mammography (M)            <sub>11</sub> Vascular Sonography (VS)

<sub>12</sub> Other(s) specify: \_\_\_\_\_ (92-93)

13. Are you a current member of the ASRT (American Society of Radiologic Technologists)?

(94)

<sub>1</sub> Yes            <sub>2</sub> No

14. Are you a member of any other industry organizations?

(95)

<sub>1</sub> Yes            <sub>2</sub> No

14a. If YES, please list the organizations below.

---

---

(96-105)

15. How many different facilities have you worked at as a Radiologic Technologist?

\_\_\_\_\_ *different facilities (Whole number please)*

(106-107)

16. How many different companies/organizations have you worked for as a Radiologic Technologist?

\_\_\_\_\_ *different companies/organizations (Whole number please)*

(108-109)

17. What is your typical commute time from your home to your work (ONE WAY)?

\_\_\_\_\_ *minutes (Whole number please - No ranges - Write in total minutes ONE WAY)*

(110-112)

18. How many hours do you work in a *typical work week* in Radiologic Technology? (*SELECT ONE ONLY*)

(113)

<sub>1</sub> Under 16

<sub>2</sub> 16-25

<sub>3</sub> 26-35

<sub>4</sub> 36-45

<sub>5</sub> 46-55

<sub>6</sub> Over 55

19. How long have you practiced in the Radiologic sciences?

\_\_\_\_\_ *years (Round to nearest full year – Do not include number of years for preparatory education)*

(114-115)

20. How long have you practiced in this current position?

\_\_\_\_\_ *years (Round to nearest full year – Needs to be consecutive)*

(116-117)

21. On average, how many days a year are spent in career specific training?

\_\_\_\_\_ *days (Whole number please - No Ranges - Not sure - Give us your best estimate)*

(118-120)

22. What percentage of your patient work is...? (*WRITE IN PERCENTAGE SO THEY ADD TO 100%*)

In-patient care \_\_\_\_\_%      Out-patient care \_\_\_\_\_%      Do not work with patients.....[ ]

(121-123)

(124-126)

(127)

23. On what shift do you practice more than half the time? (*SELECT ONE ONLY*)

(128)

<sub>1</sub> Day Shift

<sub>2</sub> Evening Shift

<sub>3</sub> Night Shift

<sub>4</sub> Swing/Rotating Shift

24. Would you consider yourself...?

(129)

<sub>1</sub> A generalist

<sub>2</sub> A specialist

25. Do you work in the trauma unit at least once per week...?

(130)

<sub>1</sub> Yes

<sub>2</sub> No

26. Are you paid for being on call?

(131)

<sub>1</sub> Yes

<sub>2</sub> No

