American Society of Radiologic Technologists

Survey of the Future of Radiologic Technology

Fall 2005

A Nationwide Survey of Technologists,
Physicians, Educators and Industry Representatives

Conducted by the
American Society of Radiologic Technologists

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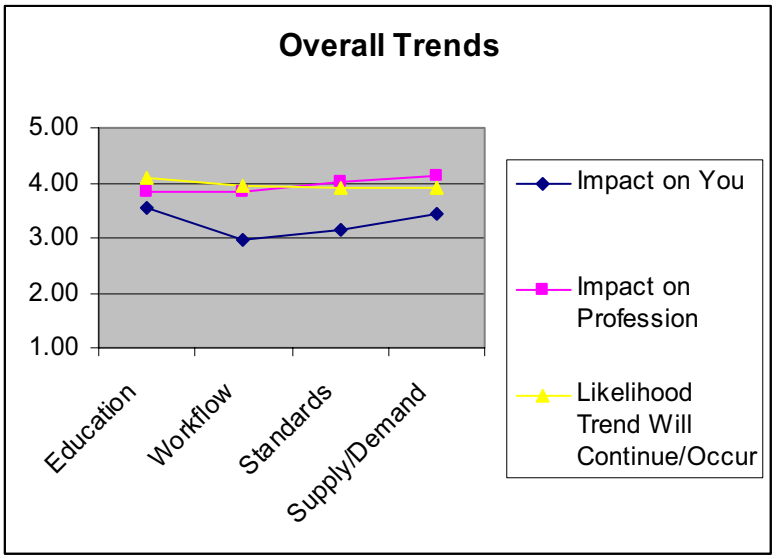
Executive Summary

- The low percentage of invitees who responded to the survey indicates a rather low level of concern about and/or familiarity with developing trends in the radiologic sciences. (Over 10,000 invitations sent to random samples of R.T.s, radiologists, radiation oncologists, program directors and industry folks yielded 842 respondents. A *rEsources* appeal for participation that went to every ASRT member for whom we have an email address — about 65,000 folks — only netted the last 45 or so of those returns.)

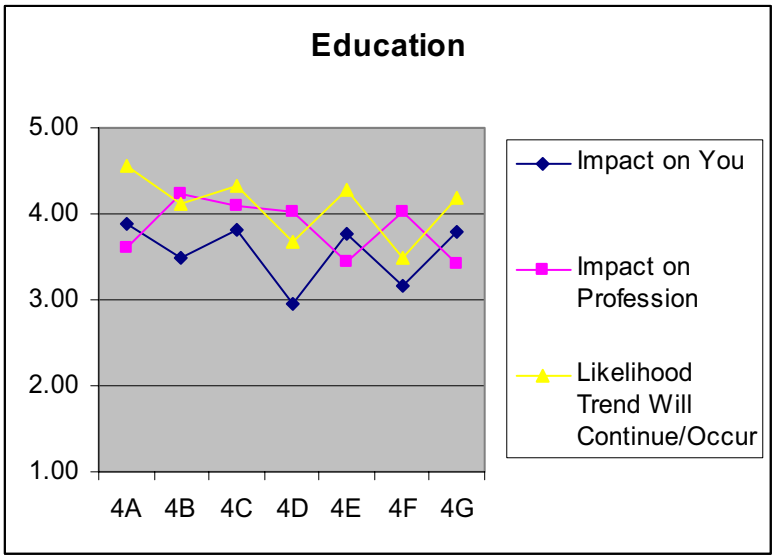
- Among those who responded to the survey, familiarity varies considerably across the four areas and across the trends within each area. The percentage of respondents who have had personal experience with a given trend varied from 76.2% (Education trend C. Emphasis on importance of lifelong education) down to 7.9% (Standards Trend D. Institution of international standards for imaging, radiation therapy personnel). Conversely, the percentage of respondents who reported never having heard of a given trend before seeing it listed in the FutureScan questionnaire varied from 4.3% (Education Trend C) to 66.1% (Standards Trend D).

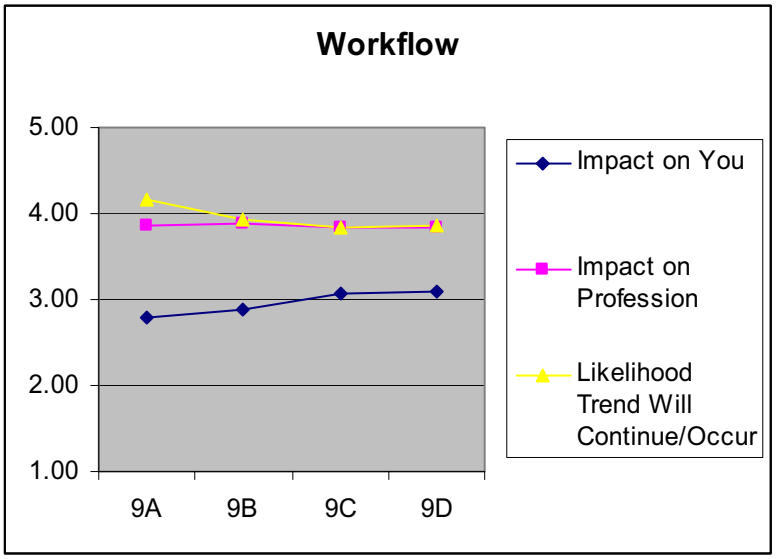
- Many respondents accepted the invitation to describe their personal experiences with the various trends: 44% reported on experiences with trends in R.T. education; 24%, workflow trends; 17%, standards trends; and 12%, personnel supply & demand trends.

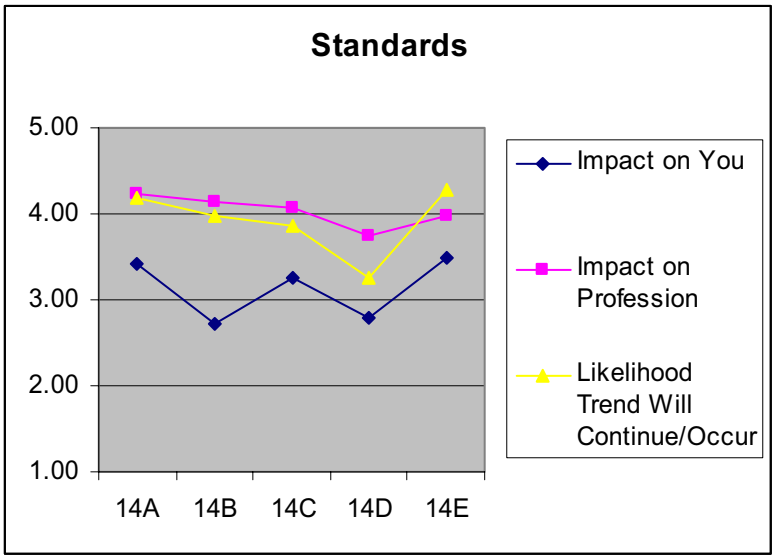


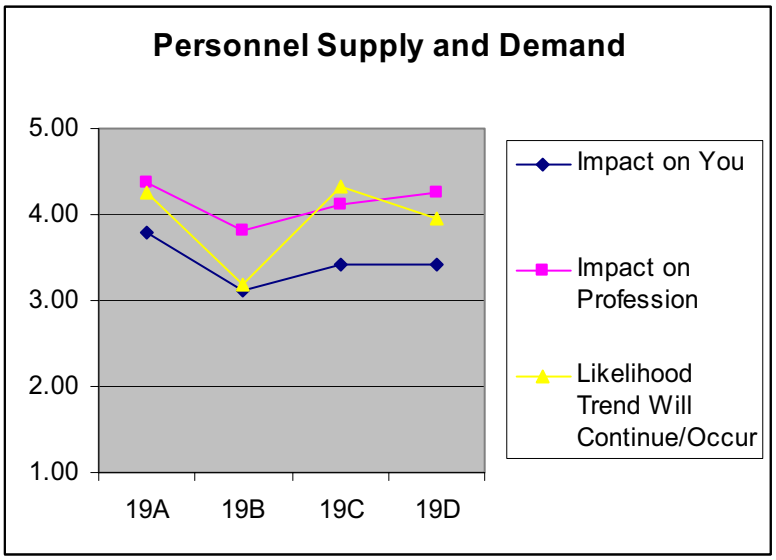
The following charts display the mean ratings of each trend within each area with respect to perceived likelihood of continuing/occurring, impact on self and impact on the profession[1]:

[1] Labels attached to impact ratings were 1: Very Minor Impact, and 5: Very Major Impact. No verbal labels were attached to the numbers 2, 3 and 4. Labels attached to likelihood ratings were Very Unlikely, Unlikely, About 50-50, Likely and Very Likely. No numbers appeared beside the verbal labels, but responses were scored from 1, for Very Unlikely, through 5, for Very Likely.









- On average, Education trends were rated as having a 76% likelihood of occurring or continuing over the next 5 to 10 years; Workflow trends, 72% likelihood; and trends in the Standards area and in the Workforce Supply & Demand area, 71% each. The mean rated likelihood of individual trends varied from a high of 85% (Education trend A. Increasing use of electronic forms of education, including online) to a low of 54% (Supply/Demand trend B. Reduction in need for operator involvement in image acquisition, therapy delivery).

- In general, respondents rated the various trends as having more impact on the profession as a whole (4.0 on a scale from 1 = very minor impact to 5 = very major impact) than on one's own practice (3.3). Further, mean rated impact on both one's own practice and the profession was higher, on average, for Education (3.6 impact on self, 3.9 on the profession) and Supply/Demand (2.9, 3.8) trends than for Workflow (3.1, 4.0) and Standards (3.4, 4.1) trends.

- Only a few statistically significant differences showed in familiarity with, rated likelihood of, or perceived impact of the various trends as a function of respondent's role (Physician, R.T., M.D. & R.T., Educator, R.T. & Educator, Corporate).

Background and Objectives[2]

To help technologists anticipate and manage change, in 2004 the American Society of Radiologic Technologists launched a three-year research project called FutureScan. The goal of FutureScan is to collect quantitative and qualitative data so that radiologic technologists and others can make informed decisions about the future of medical imaging and radiation therapy. FutureScan will provide the "big picture" so that individuals and organizations can make the "big decisions."

The FutureScan initiative has a three-year timeline that covers an aggressive scope of work. Key events in the project include:

- In late 2004 the ASRT commissioned Access Innovations Inc., a consulting and research firm located in Albuquerque, N.M., to identify factors that will influence the delivery of radiologic technology during the next five to 20 years. The result was a 228-page environmental scan that revealed the field's biggest challenges and best opportunities. The report focused on seven areas of change: technology, social, regulatory, education, workplace, legal and reimbursement, and disruptive innovation.

  Disruptive innovation can be defined as the supplanting of previous ideas, technology or processes by emerging ones. For example, the train replacing the horse-and-buggy in the last century; the computer replacing the typewriter in the last decade; and digital photography replacing film photography today. As the environmental scan pointed out, the rate of disruptive innovation is escalating in the health care industry. The introduction of new systems and procedures to the industry will bring benefits in cost, quality and productivity, but also will exact an unknown toll on those who must adjust and adapt to survive in the new environment.

- Highlights from the environmental scan were the basis of a lively discussion at the ASRT Annual Conference in June 2005. More than 200 ASRT members attended a briefing on the report's findings and implications for radiologic technologists, managers and educators.

  Just a few weeks later, the ASRT convened an expert panel to provide qualitative feedback on nine main trends and 54 subtrends that emerged from the environmental scan. The nine main trends studied by the panel were: applied technology; marketplace changes; legal, regulatory and insurance changes; molecular imaging; education; workplace changes; demographics; informed consumers; and a trend that the panel called "smaller, faster, cheaper." This trend focused on the decentralization of medical imaging, made possible in part by the portability of imaging equipment and its increasing use by nonradiologist physicians.

  Among the 21 panel members were representatives from the regulatory, education,

[2] Adapted from McElveny C. Scanning the Future. *Radiol Technol* November/December, 2005;77(2):91-92.

research, manufacturing, health care administration and health care provider communities. The Institute of Medicine sent a participant, as did the American Registry of Radiologic Technologists, the American College of Radiology and equipment manufacturers Kodak, Siemens, GE and Philips. Panel members assessed each of the trends from their perspective and provided the ASRT with valuable insight into how, where and when each trend would appear.

- The present survey was launched in October 2005 to survey radiologic technologists, radiologic science educators and managers, physicians and other key stakeholders to validate or refute the trends identified in the environmental scan.
- In June 2006 the ASRT will assemble a consensus conference of key stakeholders to review all the FutureScan data and recommend actions. The ASRT Board of Directors and staff will use information collected at the consensus conference to develop strategies and set priorities. The consensus conference will occur immediately prior to the 2006 ASRT/AERS Annual Conference, which is scheduled for Denver in conjunction with the International Society of Radiographers and Radiological Technologists' 14th World Congress.

Methodology

Samples

Number of Questionnaires/Invitations Sent Out

1,500 hard-copy packets to radiologists and radiation oncologists (each including an invitation to respond online if at all possible, but providing a hard-copy questionnaire and a postage-paid reply envelope for those who preferred that route).
399 ARRT registrants holding medical degrees (315 hard-copy packets, 84 e-mailed invitations to respond online).
1,048 ARRT-registrant program directors (617 via e-mail).
1,001 ARRT-registrant corporate representatives (431 via e-mail).
8,000 ARRT registrants who are not PDs or corporate reps (2,349 via e-mail).
386 invitations e-mailed to the subscriber list for ASRT's e-mail newsletter, *InFocus* (industry representatives with whom ASRT has a business relationship).
33,640 invitations e-mailed (as an item in the *rEsources* newsletter) to every ASRT member for _____ whom we had an email address
45,974 invitations to participate
+ an unknown number of visitors exposed to the invitations posted on the ASRT home page.

(However, it is likely that only about 35,000 individuals received an invitation, due to overlap among the samples)

Number of questionnaires returned

841 (about 2.4% of individuals invited to participate) as of Jan. 16, 2006, when the sample was "closed" for analysis.

Margin of Error

The sample size of 841 returns yields a margin of error for overall percentages (width of the 95% confidence interval for the population percentage) of a maximum plus or minus 3.5%.

For percentages computed on subsets of respondents, the margin of error increases as the square root of the size of the subset. Thus, the margin of error for percentages based on a subset of 100 respondents would be plus or minus 10% or less, and for a subset of 30 respondents, plus or minus 18% or less. (The "or less" comes from the fact that the margin of error for percentages is greatest for percentages in the 40% to 60% range and is less than one-half as wide for percentages less than 5% or greater than 95%.)

Definitions of Statistics

The statistics reported in the question summaries include:

- **Frequency** (The number of responses given for each variable.)
- **Percent** (The number of responses for each variable divided by the total number of usable surveys, including missing values.)

- **Valid Percent** (The number of responses for each variable divided by the total number of usable surveys, excluding missing values.)
- **Missing** (The number of respondents who either did not answer the question or who gave an unusable response.)
- **Mean** (The arithmetic average; sum of the values of all observations divided by the number of observations.)
- **Median** (The value above and below that one-half of the observations fall; 50th percentile.) Usually, because of rounding, no number precisely satisfying the definition of the median exists. In such cases, linear interpolation is used to estimate what the median in the population of unrounded scores would be.
- **Mode** (The figure that more respondents report than any other figure.)
- **Standard Deviation** (The square root of the average squared difference between each score in the set and the mean score.) Subsets of respondents who have nearly identical responses on a given variable will have a near-zero standard deviation, while subsets of respondents with very different responses will have a high standard deviation. The major reason for using this relatively complex measure of variation is its close relationship to percentiles: For most sets of scores, about 95% of the individual scores will fall within 2 standard deviations of the mean. And the mean of the set of scores will have a 95% chance of falling within 2 "standard errors" of the corresponding population mean, where the standard error is simply the standard deviation divided by the square root of the number of scores in the set.
- ***F*** (A sample statistic value that is used to test the null hypothesis that the differences between two or more means in the sample are due entirely to chance fluctuation around corresponding means that do *not* differ from one another in the population to which results are generalized.) The larger the absolute value of *F*, the more implausible the null hypothesis is and, thus, the more confident one can be that the direction of each difference in the sample matches the direction of the corresponding population difference. Because differences based on large samples more closely approximate the differences in the population from which they were sampled. And because the opportunity for one or more discrepancies between the sample and population directions of pairwise differences among the means increases as the number of means involved increases. *F* has two degree of freedom parameters (usually listed as a pair of subscripts immediately after the *F*, as in "$F_{3,1471}$") associated with it.
- ***P*-value** (This is the probability that an *F* as large as or even larger in absolute value than the one observed in the sample would occur in random sampling from a population in which the null hypothesis of a zero population difference is true.) If this value is smaller than some preselected value (often .05, but in the present report usually .01) called the alpha level (or just "level") of the test, the observed sample differences are discussed as though at least some of them are representative of (i.e., have the same sign or direction as) the corresponding population differences. However, when more than two means are involved in determining *which* of the various patterns of differences among the means (e.g., the mean of group A vs. the average of means B, C and E) can be safely assumed to mirror the sign of the corresponding patterns in the population, it requires that that particular difference yield an *F* computed specifically for that difference for which the *p* value is sufficiently low. (The first degree-of-freedom parameter for each such *specific comparison* or *contrast F* is 1.)

Detailed Results

Composition of Sample

23. What is your primary role in medical imaging and/or radiation therapy?

Role	Specialty within role	Frequency	Percent of Respondents	Percent of Respondents Who Checked One or More Roles
Physician whose primary role is	Radiologist	40	4.8	4.9
	Radiation oncologist	34	4.0	4.2
	Cardiologist	1	.1	0.1
	Other physician specialty (Please specify below.)	30	3.6	3.7
	Total	**105**	**12.5**	**12.9**
R.T. whose primary discipline/ sphere of employment is	Radiography	282	33.5	34.8
	Radiation therapy	59	7.0	7.3
	Nuclear medicine	33	3.9	4.1
	Mammography	43	5.1	5.3
	Sonography	40	4.8	4.9
	Computed tomography	53	6.3	6.5
	Radiography & Mammography	124	14.7	15.3
	Radiography & CT	7	.8	0.9
	Radiography & Other	11	1.3	1.4
	Radiation therapy & Other	3	.4	0.4
	Mammography & Other	1	.1	0.1
	Sonography & Other	1	.1	0.1
	Radiography, Nuclear medicine, & Other	1	.1	0.1
	Radiography, Mammography, & CT	1	.1	0.1
	Radiography, CT, & Other	2	.2	0.2
	Mammography, Sonography, & Other	1	.1	0.1
	Radiography, Radiation therapy, Nuclear medicine, & CT	1	.1	0.1
	Radiography, Mammography, Sonography, & CT	1	.1	0.1
	Radiography, Nuclear medicine, Mammography, Sonography, & CT	1	.1	0.1
	RTT, NM, Mammography,	1	.1	0.1

	Sonography, & CT			
	Other	1	.1	0.1
	Total	**667**	**79.2**	**82.2**
Educator, in particular	Program director	176	20.9	21.7
	Clinical coordinator	20	2.4	2.5
	Didactic faculty	16	1.9	2.0
	Clinical instructor	36	4.3	4.4
	Program director & Didactic faculty	32	3.8	3.9
	Didactic faculty & Clinical instructor	1	.1	0.1
	Program director, Clinical coordinator, & Didactic faculty	1	.1	0.1
	Program director, didactic faculty, & Clinical instructor	1	.1	0.1
	Other	3	.4	0.4
	Total	**286**	**34.0**	**35.2**
Corporate (e.g., sales, equipment vendor)	38	4.5	4.7	
Other		33	3.9	4.1
Total valid responses		1129	133.9	139.1
Total Valid Cases		811	96.3	100.0
None checked		31	3.7	---
Total		842	100.0	---

24. For how many years (not necessarily consecutive but not including precertification training) have you been working in your primary role?

Summary Statistics

N	Valid	774
	Missing	68
Mean		16.93
Median[a]		17.21
Mode		30
Std. Deviation		10.947
Minimum		0
Maximum		46
Percentiles[a]	5	1.29
	95	34.79

[a] Calculated from grouped data.

Frequency Distribution

	Years in Primary Role	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<1 year	7	.8	.9	.9
	1-3 years	97	11.5	12.5	13.4
	4-5 years	64	7.6	8.3	21.7
	6-10	101	12.0	13.0	34.8
	11-15	87	10.3	11.2	46.0
	16-20	134	15.9	17.3	63.3
	21-25	100	11.9	12.9	76.2
	26-30	108	12.8	14.0	90.2
	31-40	64	7.6	8.3	98.4
	41-46	12	1.4	1.6	100.0
	Total	774	91.8	100.0	
Missing	System	68	8.2		
Total		842	100.0		

27. In which of the following types of facility is your primary workplace located?

Type of Facility	Responses		Percent of Those Who Answered the Question
	N	Percent	
Hospital with fewer than 100 beds.	62	6.9%	7.6%
Hospital with 101-300 beds.	186	20.6%	22.9%
Hospital with more than 300 beds.	182	20.1%	22.4%
Free-standing clinic.	95	10.5%	11.7%
Private physician practice or group practice.	82	9.1%	10.1%
Educational setting.	181	20.0%	22.3%
Mobile unit.	13	1.4%	1.6%
Veterinary facility.	1	.1%	.1%
Locum tenens.	8	.9%	1.0%
Corporate (e.g., vendor representative).	46	5.1%	5.7%
Other	49	5.4%	6.0%
Total	905	100.0%	111.4%

Note: 31 respondents did not indicate the type of facility where they practice.

25. Gender?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	229	27.2	28.5	28.5
	Female	575	68.3	71.5	100.0
	Total	804	95.5	100.0	
Missing	System	38	4.5		
Total		842	100.0		

26. Year of Birth and Age at Which Took on Current Role

Summary Statistics

Statistic		26. Year of birth?	Age at which took on role in rad sci
N	Valid	760	731
	Missing	82	111
Mean		1959.56	28.7204
Median [a]		1958.50	26.5263
Mode		1952	21.00

Std. Deviation		10.630	8.38543
Minimum		1931	17.00
Maximum		1985	66.00
Percentiles [a]	5	1943.71	19.5225
	95	1978.70	46.6556

[a] Calculated from grouped data.

Frequency Distribution

	Year of Birth	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1931-1940	17	2.0	2.2	2.2
	1941-1945	34	4.0	4.5	6.7
	1946-1950	97	11.5	12.8	19.5
	1951-1955	146	17.3	19.2	38.7
	1956-1960	137	16.3	18.0	56.7
	1961-1965	118	14.0	15.5	72.2
	1966-1970	81	9.6	10.7	82.9
	1971-1975	48	5.7	6.3	89.2
	1976-1980	59	7.0	7.8	97.0
	1981-1985	23	2.7	3.0	100.0
	Total	760	90.1	100.0	
Missing	System	82	9.7		
Total		842	100.0		

Age at which took on role in rad sci (= 2005 – year of birth – years in role)

	Age at entry into radiologic sciences	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	17-19	26	3.1	3.6	3.6
	20-24	278	33.0	38.1	41.7
	25-29	153	18.2	21.0	62.7
	30-34	105	12.5	14.4	77.1
	35-39	89	10.6	12.2	89.3
	40-44	32	3.8	4.4	93.7
	45-49	27	3.2	3.7	97.4
	50-54	12	1.4	1.6	99.0
	55-59	6	.7	.8	99.9
	60 or great	1	.1	.1	100.0
	Total	729	86.6	100.0	
Missing	System	113	13.4		
Total		842	100.0		

Familiarity with Radiologic Science Trends

1. Where have you heard about each of these trends in R.T. education? ("Check" all that apply by filling in the button completely, as in) .)

Source of Information About Trend	Education Trend A[b]		Education Trend B[b]		Education Trend C[b]		Education Trend D[b]	
	N	%[a]	N	%[a]	N	%[a]	N	%[a]
Personal Experience	596	71.7	424	51.0	638	76.8	427	51.4
Professional Journals	454	54.6	399	48.0	491	59.1	197	23.7
Colleagues/Co-workers	434	52.2	359	43.2	332	40.0	235	28.3
Supervisors/Managers	202	24.3	316	38.0	288	34.7	86	10.3
Physicians	95	11.4	136	16.4	130	15.6	28	3.4
Popular Press	111	13.4	84	10.1	149	17.9	82	9.9
I hadn't heard about this trend	45	5.4	83	10.0	36	4.3	282	33.9
No response to this trend, but response(s) to other trends in area	5	0.6	13	1.6	7	0.8	14	1.7

Source of Information About Trend	Education Trend E[b]		Education Trend F[b]		Education Trend G[b]		Other Education Trend	
	N	%[a]	N	%[a]	N	%[a]	N	%[a]
Personal Experience	562	67.6	274	33.0	542	65.2	52	6.3
Professional Journals	321	38.6	260	31.3	323	38.9	22	2.6
Colleagues/Co-workers	307	36.9	116	14.0	295	35.5	26	3.1
Supervisors/Managers	268	32.3	98	11.8	223	26.8	16	1.9
Physicians	105	12.6	113	13.6	100	12.0	9	1.1
Popular Press	108	13.0	50	6.0	72	8.7	10	1.2
I hadn't heard about this trend	125	15.0	344	41.4	132	15.9	41	4.9
No response to this trend, but response(s) to other trends in area	19	2.3	17	2.0	43	5.2	717	86.3

[a] Percent of those who responded to one or more trends in the radiologic technology Education area

[b] Note: Eleven (11) individuals gave no response to any trend in the radiologic technology Education area

Education trend A. Increasing use of electronic forms of education, including online.

Education trend B. Increasing need for technologists to be multidisciplinary (e.g., molecular imaging, fusion techniques such as PET/CT and mammography/ultrasound).

Education trend C. Emphasis on importance of lifelong education.

Education trend D. Influx of nontraditional students.

Education trend E. Increasing need for information access skills.

Education trend F. More need to understand and apply reports of research results.

Education trend G. Need for more emphasis on flexible learning skills, and on basics (e.g., because rapid changes in technology outpace changes in curricula).

Other Education Trends Specified:

Response	Frequency	Percent
Blank	801	95.1
1) Decreasing student population willing to put in the time and effort required to become a truly competent and well-educated radiologic technologist for the career and financial return, 2) Poorer student preparation in reading, comprehension and written and oral communication skills prior to beginning professional education.	1	0.1

	Advance magazine. *Radiology Today*	1	0.1
	Also a need for cross-career field training. Need to draw lab work, understand lab results, start IVs, perform EKG [sic], perform breast examinations, perform rectal examinations, etc.	1	0.1
	ASRT doesn't care about education, all they care about is $$$$$$$$$$$$.	1	0.1
	At the college we have many applicants who are nontraditional students. As long as the field keeps increasing and as us “baby boomers” start retiring, it gives the nontraditional student more opportunities, especially if the employment field they were in closes down positions.	1	0.1
	BIG emphasis on cost-efficiency. I see lots of hospitals and clinics concerned about this and discussing the problem and ways to become more efficient, save money.... BUT, few if any hospitals and clinics actually do a good job of it! Still it is a growing concern.	1	0.1
	C. Speaks for itself, i.e., as in real life, so in radiology.	1	0.1
	CULTURAL COMPETENCE.	1	0.1
	Emphasis on the importance of diversity training.	1	0.1
	Entry-level R.T.s have the bare minimum skills required to perform. They have not been educated in problem-solving techniques, critical thinking, and are basically showing up as button pushers. There should be a wider set of core educational competencies in general education to help “round out” R.T.s’ knowledge base so they can interact as key members of the health care team.	1	0.1
	GIVE R.T.S EXPOSURE MANDATORY TO CHANGES IN CURRICULA.	1	0.1
	Having switched from working as a tech to a teacher, I can definitely understand the changes in curricula. Need to stay up with the times. Education should always be ongoing. More nontraditional students are returning to school to further their education.	1	0.1
	I believe there is a fundamental need to first establish the minimum criteria of education for this occupation at the/a degree level. Secondly, building on that fundamental understanding, all other areas/modality/specialty can be integrated with parallel or higher levels of degreed education. Thirdly, all certificate programs should be articulated with a sponsoring college/university or other recognized degree-granting institution to assure that all graduates have at least a minimum of an associate degree. Fourth, I believe it is critical to establish guidelines for nontraditional faculty or e-faculty, tele-faculty, or whatever the preferred term might be, to assist in meeting the 'forecasted' shortage of educators. Finally, to meet the needs of the imaging profession, it is essential to act rather than talk of change and the implementation of change. Providing opportunities in the nontraditional sense for current practicing imagers must consider the need to meet them where they are.	1	0.1
	I CURRENLTY AM AN INDEPENDENT CONTRACTOR FOR OB OFFICE.	1	0.1
	I see a definite decline in the patient care aspect of our profession. I routinely see graduate technologists who have been baffled when the patients could not perform “Merrill’s” position requests and feel that the exam cannot be completed, when a little patient care information would help them deal with the situation (i.e., medicated abdomen series, patient who needs assistance to stand, not just some one to pull on their arms.) They seem to be spending a lot of classroom time and not much clinical time.	1	0.1
	I WOULD LIKE TO SEE RULES AND REGULATIONS TAUGHT AND LISTED IN OUR MAGAZINES ABOUT DIFFERENT STATE LAWS FOR LICENSING. IT WOULD BE NICE TO HAVE A LIST OF ALL THE STATES THAT NOW REQUIRE A DIFFERNT OPERATORS LICENSE. WHEN I WENT TO SCHOOL I BELIEVE THERE WERE ONLY TWO STATES THAT REQUIRED THEIR OWN LICENSE. NOW, I UNDERSTAND ALMOST ALL OF THEM REQUIRE YOU TO HAVE THEIR STATE LICENSE TO WORK IN THEM.	1	0.1
	Importance of credentials (B.S. R.T. or B.S. R.S.) in employment and for promotions.	1	0.1
	Increasing need to cross-train into other departments.	1	0.1
	Increasing numbers of unlicensed/uncertified technologists (e.g., CT technologist working in nuclear medicine, x-ray technologists working in ultrasound) getting “on-the-job” training so hospitals may save money, forcing licensed professionals to seek lower paying, less satisfactory positions.	1	0.1
	Letter F above: Good for the BS level and RA and specialty programs. Not sure how soon it will be needed for entry-level R.T.	1	0.1
	Like to know what the best extra skills are that I should have for future security of my job with increase in age and physical requirement needed in radiology field.	1	0.1

	Merging of interdepartmental responsibilities. Is this a good thing for patient care or just a benefit for corporate bottom line? For example, billing responsibilities and billing codes within the past few years have become an additional responsibility of the radiation therapist, in addition to other tasks. The ability to review a patient chart before treatment has decreased in my view over the last few years.	1	0.1
	More education to advance in radiography. Not necessarily to have multi-imaging skills.	1	0.1
	More need to emphasize important aspects of current procedures such as radiation reduction during CT procedures on small adults and, especially, children. This comes into play more when children are scanned in a predominantly adult setting, such as a typical hospital. Is not as much of a problem in dedicated pediatric settings.	1	0.1
	My vocation as an applications specialist keeps me “overall” informed as to trends in radiology departments nationwide!!	1	0.1
	NEED FOR BACHELOR DEGREE LEVEL NMT.	1	0.1
	NEED FOR DIGITAL PACS TRAINING.	1	0.1
	Need for more emphasis for problem-solving skills in order to meet challenges of patient care while performing diagnostic imaging.	1	0.1
	NEED FOR MORE KNOWLEDGE OF MEDICAL CONDITIONS.	1	0.1
	Need to replace OJT with board certification.	1	0.1
	SOMETIMES THE TESTING /TESTS AREN'T UP TO DATE WITH CURRENT TECHNOLOGY.	1	0.1
	Stop teaching/testing cobalt. I haven't seen one in 15 years!	1	0.1
	Students need to know digital radiography and our faculty are not fully trained to teach this area. We, as educators, are compelled to teach both film/screen and digital imaging because our graduates will be employed in facilities where one or both of these modalities are required. It appears that we are required to teach more and more topics, yet the length of training remains the same!	1	0.1
	The current trend to fill the vacancy in medical radiologic technology with the advent proliferation of institutions that facilitate crash courses has been a shortfall. Too many of these students are not ready to be employed as registered technologists, because of the fact that they had not been properly trained due to the time length of the curriculum, and also the fact that the screening process in accepting applicants to the course has been elevated. In the metro area of Kansas City we have four schools and too many of the students graduating are not fully qualified to work in a hospital setting.	1	0.1
	The imaging profession is too complex for an individual to obtain multiple competencies and to retain these competencies. Just as radiologists now specialize in diagnostic radiology, radiation therapy, nuclear medicine or medical sonography, R.T.s can obtain further education and make lateral career moves, But it is unrealistic to expect them to remain competent is all subspecialties.	1	0.1
	THE RADIOLOGY PHYSICIAN ASSISTANT.	1	0.1
	The rising costs of transportation are making online classes more desirable as a way to reduce education costs.	1	0.1
	The RPA position is wonderful for those of us who love to learn more about our profession and who are willing to invest a huge amount of time, money and energy into attaining a higher degree of education than the majority of the technologists.	1	0.1
	THE SHORTAGE OF TECHS OVERALL.	1	0.1
	The underdeveloped countries of the world are mostly devoid of these trends. Radiologic technology is yet to be explored in these places; the worst of all is less skilled manpower without professionalism and haphazard practice or unsafe use of radiation makes the situation dreadful. With the introduction of advanced modalities in the field and enrollment of dynamic professionals in the study of radiologic technology, we are slowly but surely changing the scenario. These trends are being experienced mostly on the basis of personal experience.	1	0.1
	Vendors provide education on “newer” pharmaceuticals.	1	0.1
	Total	842	100

2. If you have had direct experience with or have been affected by any of these trends (professionally or personally), please describe that experience briefly.

370 (43.9%) of the respondents related one or more direct experiences with trends in radiologic technology Education. See Appendix B for a list of those responses.

6. Where have you heard about each of these trends in workflow?

	Workflow Trend A[b]		Workflow Trend B[b]		Workflow Trend C[b]		Workflow Trend D[b]		Other Workflow Trend	
Source of Information About Trend	N	%[a]	N	%[a]	N	%[a]	N	%[a]		
Personal Experience	368	46.1	211	26.4	381	47.7	283	35.4	25	3.1
Professional Journals	281	35.2	573	71.7	286	35.8	193	24.2	19	2.4
Colleagues/Co-workers	325	40.7	359	44.9	260	32.5	218	27.3	19	2.4
Supervisors/Managers	218	27.3	148	18.5	199	24.9	192	24.0	26	3.3
Physicians	314	39.3	189	23.7	198	24.8	125	15.6	11	1.4
Popular Press	138	17.3	119	14.9	142	17.8	48	6.0	9	1.1
I hadn't heard about this trend	134	16.8	73	9.1	193	24.2	284	35.5	52	6.5
No response to this trend, but response(s) to other trends in area	4	0.5	1	0.1	9	1.1	59	7.4	693	86.7

[a] Percent of those who responded to one or more trends in the Workflow area
[b] Note: Forty-three (43) individuals gave no response to any trend in the Workflow area

Workflow trend A. "Nighthawking" and "dayhawking" (time-shifted or remote reads of medical images to augment local personnel).

Workflow trend B. New career level opportunities for R.T.s as physician extenders (introduction of Radiologist Assistant, possible introduction of advanced practice roles for specialties).

Workflow trend C. Decentralization of medical imaging away from traditional medical centers.

Workflow trend D. Decreasing scanning time leading to patient management as major factor limiting throughput.

Other Workflow Trends (specified)

Response	Frequency	Percent
Blank	829	98.5
1) Effect on workflow when CR or DR imaging is introduced into the work environment with little or poor education on the technology.	1	.1
Additional comment on Item D: Patient communication has ALWAYS been a problem, but in recent years it has gotten much worse owing to the fragmentation of medical practice. We have patients who show up for enemas who were never told to prep by their doctor, by the scheduler or the receptionist -- who have no medical background to speak of anyway -- and by the time they get to us, it's too late. It's not their fault, and it isn't ours, either. I feel that doctors are too fixated on patient volume to explain things adequately to individual patients. I know they are pressured to be this way by the insurance companies, but have they lost sight of their patients as people? Patients do not appreciate having to be rescheduled, and often don't bother to keep the new appointment. Since the system doesn't seem to care, why should they?	1	.1
Efficiency (Doing more with less.)	1	.1
I do not understand what you mean with workflow trend D.	1	.1
Imaging use in private physician offices.	1	.1
In NYS, the major problem I see is that fusion technology is not allowed because of our restricted licenses. What will have to happen is that the four year colleges with radiography, RTT and Nuc Med program could combine into a fusion schedule. That is what I would like to happen here at Manhattan College. If we implement an x-ray program, then we could have all the students take cross sectional anatomy class, plus a PET along with CT/MR that we have currently in our programs. Eventually just as simulators, whether conventional or CT, will come under the jurisdiction of the radiation oncologist, just as the	1	.1

	PET/CT will, and our therapist will be trained to execute.		
	Investors Business Daily and *Wall Street Journal*. Topic= outsourcing medical tasks and imaging interpretation involving radiology and radiation therapy. My interpretation is that China (for example) is positioning its marketability much the same as its history in retail. The combination of this and American corporations' quest to increase bottom line at all cost, I believe this is going to have a very NEGATIVE effect on careers in the radiologic fields....In the USA.	1	.1
	Major problems with workflow everywhere. The managers have not changed how things are done when moving to digital, so lots of workflow problems. There is a change when converting to digital that is more than technology, but no one is working on that and so techs are stressed and managers just don't get it. They need to look at how a department runs as a whole, not just how to get techs to use the new CR/DR equipment.	1	.1
	Offshore reading of radiologic examinations.	1	.1
	OUTPATIENT CENTERS APPEARING. PHYSICIAN ASSISTANT.	1	.1
	Radiation therapy is experiencing a new trend in image-guided radiation therapy and I believe this will affect workflow.	1	.1
	The organization I work for has many outlying offices and chooses to have lay persons perform radiologic exams at them, but require registered techs for the main hospital. Is the office patient any less deserving than an inpatient?	1	.1
	This also allows immediate second reads or consultative services for specific imaging experts without delaying report turnarounds.	1	.1
	Total	842	100.0

7. If you have had direct experience with or have been affected by any of these trends (professionally or personally), please describe that experience briefly.

200 (23.7%) of the respondents related one or more direct experiences with trends in R.T. Workflow. See Appendix B for a list of those responses.

11. Where have you heard about each of these trends in standards? ("Check" all that apply by filling in the button completely, as in) .)

	Standards Trend A[b]		Standards Trend B[b]		Standards Trend C[b]	
Source of Information About Trend	N	%[a]	N	%[a]	N	%[a]
Personal Experience	326	40.5	81	10.1	203	25.2
Professional Journals	322	40.0	320	39.8	413	51.3
Colleagues/Co-workers	259	32.2	195	24.2	194	24.1
Supervisors/Managers	390	48.4	146	18.1	112	13.9
Physicians	294	36.5	298	37.0	64	8.0
Popular Press	214	26.6	256	31.8	90	11.2
I hadn't heard about this trend	160	19.9	210	26.1	254	31.6
No response to this trend, but response(s) to other trends in area	3	0.4	12	1.5	17	2.1

	Standards Trend D[b]		Standards Trend E[b]		Standards Trend - Other	
Source of Information About Trend	N	%[a]	N	%[a]	N	%[a]
Personal Experience	64	8.0	444	55.2	15	1.9

	Professional Journals	195	24.2	341	42.4	10	1.2
	Colleagues/Co-workers	77	9.6	256	31.8	6	0.7
	Supervisors/Managers	44	5.5	216	26.8	7	0.9
	Physicians	33	4.1	163	20.2	7	0.9
	Popular Press	49	6.1	289	35.9	12	1.5
	I hadn't heard about this trend	532	66.1	111	13.8	18	2.2
	No response to this trend, but response(s) to other trends in area	4	0.5	26	3.2	760	94.4

[a] Percent of those who responded to one or more trends in the Workflow area
[b] Note: Thirty-seven (37) individuals gave no response to any trend in the Workflow area

Standards Trend A. Declining/scrutinized reimbursement.
Standards Trend B. Increasing malpractice suits, particularly in mammography.
Standards Trend C. Institution of national standards for imaging and radiation therapy personnel.
Standards Trend D. Institution of international standards for imaging, radiation therapy personnel.
Standards Trend E. "Patient consumerism" on the rise (patients more likely to seek information on, question the competence of health care personnel).

Other Standards Trends (specified)

		Frequency	Percent
	Blank	839	99.6
	A. Threat of layoffs in community hospitals due to this e. (patient consumerism). Experience this in CT frequently.	1	.1
	Access to the Internet has made many patients smarter about their illness, better informed. They ask more questions and are generally smarter about things.	1	.1
	Pre-authorization requirements for high-end testing will slow pace and utilization short-term, but not stop its long-term growth.	1	.1
	Total	842	100.0

12. If you have had direct experience with or have been affected by any of these trends (professionally or personally), please describe that experience briefly.

144 (17.1%) of the respondents related one or more direct experiences with trends in standards. See Appendix B for a list of those responses.

16. Where have you heard about each of these trends in personnel supply and demand? ("Check" all that apply by filling in the button completely, as in) .

		Personnel S/D Trend A[b]		Personnel S/D Trend B[b]		Personnel S/D Trend A[b]		Personnel S/D Trend A[b]		Other Personnel S/D Trend	
	Source of Information About Trend	N	%[a]	N	%[a]	N	%[a]	N	%[a]		
	Personal Experience	458	60.5	146	19.3	344	45.4	310	41.0	23	3.0
	Professional Journals	394	52.0	152	20.1	477	63.0	376	49.7	13	1.7
	Colleagues/Co-workers	320	42.3	119	15.7	288	38.0	253	33.4	13	1.7
	Supervisors/Managers	297	39.2	83	11.0	230	30.4	258	34.1	15	2.0
	Physicians	225	29.7	50	6.6	229	30.3	144	19.0	2	0.3
	Popular Press	195	25.8	47	6.2	171	22.6	142	18.8	8	1.1
	I hadn't heard about this trend	97	12.8	455	60.1	77	10.2	139	18.4	16	2.1
	No response to this trend, but response(s) to other trends in area	4	0.5	2	0.3	9	1.2	29	3.8	703	92.9

[a] Percent of those who responded to one or more trends in the Workflow area
[b] Note: Thirty-eight (38) individuals gave no response to any trend in the Workflow area

Supply/Demand Trend A. Increase in demand for imaging and radiation therapy procedures.
Supply/Demand Trend B. Reduction in need for operator involvement in image acquisition, therapy delivery.
Supply/Demand Trend C. Increasing use of computer-assisted detection and other diagnostic aids.
Supply/Demand Trend D. Shortages of personnel skilled in particular specialties (e.g., PET/CT fusion, geriatric health care) and/or particular techniques (e.g., post-image processing).

Other Supply/Demand Trend (specified)

Response	Frequency	Percent
Blank	831	98.7
Although I have heard about "shortages," I have not seen much of it. And I have heard of schools increasing their student output, so... I wonder if it's not so much a true "shortage" as much as just some hospitals/clinics that people do not want to work at. People look for a job not only for the money, but also for job SATISFACTION these days; unfortunately, many places do not do a very good job in the 'job satisfaction' category. Supervisors and administrations need to learn this in order to keep their workers; otherwise, employees quit and go to work someplace else!	1	.1
Continued shortage of radiographers and radiation therapists and the trend for additional education required for entry level will exacerbate the shortage of truly qualified R.T.s unless the educational and accrediting institutions realize that they cannot adequately prepare these professionals in a 2-year period unless they have had significant previous education at the collegiate level.	1	.1
Decreasing pool of qualified radiologic science faculty	1	.1
Digital imaging equipment will reduce overall numbers of needed equipment. More efficient. Shift to advanced modalities.	1	.1
Imaging is used more and more every day to assist physicians in diagnosing. I believe CT imaging is used more and more as physicians are leery of, and afraid of missing something and then possibly being involved in malpractice suits. I believe the technology involved in imaging is increasingly becoming more computer assisted, and I believe it will continue to evolve in this manner. I have found that a large percentage of our radiography graduates continue their education to learn specialty techniques. Sometimes I feel there is more of a shortage of techs willing and wanting to do routine radiography work. I feel one of the reasons people want to continue with their education is because they know they will be able to earn higher salaries. I think routine radiography work, especially in a large not-for-profit hospital, is more strenuous and challenging than that involved in some of the specialty areas, and I believe the pay should be higher for diagnostic radiographers than it is.	1	.1
Increased workload for techs.	1	.1
Our hospital does use a CAD system for aid in diagnosing mammograms. As for a decrease in need for operator involvement, I have only seen this in CT where it seems you need to know very little to operate the equipment. I find this scary, because I have seen people trained to "operate" the equipment who are neither interested in the technology nor the procedures. They are just learning the modality to get a pay raise. It seems we always have a shortage of qualified, experienced technologists when it comes to certain procedures that aren't done very often. Especially in MRI and CT, but also in general x-ray.	1	.1
Our new technology has taken the Art out of radiography. The new tech knows that if they get within the ballpark the image will be usable.	1	.1
People are not choosing x-ray as a career. X-ray orders are taken from computers.	1	.1
Shortages of R.T.s with sufficient computer skills to hold a position in health care informatics.	1	.1
With the increasing radiation therapy technologies, I feel that there will be a greater need for therapists, especially for monitoring the treatment machines as they become more complex. What I am finding in the New York area is that the shortage is diminishing, and I feel that in approximately two years, unless many baby boomers retire, that there will be a	1	.1

	glut of therapists in this area. I understand that another school opened in New Jersey, which makes a total of four. I do not think that we needed another two programs there and NO more in New York. I feel guilty when my students do not obtain a position right away. So far I have been lucky in that all of my December grads will obtain positions, mostly in my clinic affiliates.		
	Total	842	99.8

17. If you have had direct experience with or have been affected by any of these trends (professionally or personally), please describe that experience briefly.

104 (12.4%) of the respondents related one or more direct experiences with trends in personnel supply and demand. See Appendix B for a list of those responses.

Familiarity with Radiologic Science Trends as a Function of Role in the Radiologic Sciences

Various combinations of broadly-defined roles (physician, R.T., educator, corporate, other) were as follows:

Role combination		Frequency	Percent	Valid Percent	Level of Broad-role Variable
Valid	Other only	9	1.1	1.1	7
	Corporate only	9	1.1	1.1	6
	Educator only	84	10.0	10.4	5
	Educator & other	1	.1	.1	5
	R.T.	399	47.4	49.2	3
	R.T. & other	11	1.3	1.4	3
	R.T. & corporate	18	2.1	2.2	6
	R.T. & educator	162	19.2	20.0	4
	R.T., educator & other	6	.7	.7	4
	R.T., educator & corporate	7	.8	.9	6
	Physician only	39	4.6	4.8	1
	Physician & educator	2	.2	.2	1
	M.D. & R.T.	36	4.3	4.4	2
	M.D., R.T. & Other	2	.2	.2	2
	M.D,, R.T. & corporate	2	.2	.2	2
	M.D,, R.T. & educator	18	2.1	2.2	2
	M.D., R.T., educator & other	4	.5	.5	2
	M.D., R.T., educator & corporate	2	.2	.2	2
	Total Valid	811	96.2	100.0	
Missing	-9.0	31	3.7		
Total		842	100.0		

Applying the conversions listed in the last column of the above table gives the following breakdown of roles into six broad categories:

Role within rad sci (6 broad categories)

Broad Role		Frequency	Percent	Valid Percent
Valid	Physician	41	4.9	5.1
	M.D. & R.T.	64	7.6	7.9
	R.T.	410	48.7	50.6
	R.T. & Educator	168	20.0	20.7
	Educator	85	10.1	10.5
	Corporate	34	4.0	4.2
	Other role combos	9	1.1	1.1
	Total	811	96.3	100.0
Missing	-9.00	31	3.7	
Total	842	100.0		

Proportion of Trends in Each Area Respondent has Personal Experience With as a Function of Role

Role within rad sci	Statistic	Propn of trends in educ with personal experience	Propn of trends in workflow with personal experience	Propn of trends in standards with personal experience	Propn of trends in supply-demand with personal experience
Physician	Mean	.5244	.1829	.3707	.1951
	N	41	41	41	41
	Std. Deviation	.26987	.20367	.27408	.23447
	Grouped Median	.5703	.1413	.3455	.1517
	Minimum	.00	.00	.00	.00
	Maximum	.88	.88	.80	1.00
M.D. & R.T.	Mean	.5098	.1660	.2844	.2031
	N	64	64	64	64
	Std. Deviation	.25907	.20419	.27787	.24558
	Grouped Median	.5489	.1108	.2400	.1478
	Minimum	.00	.00	.00	.00
	Maximum	.88	1.00	.80	.80
R.T.	Mean	.4622	.2055	.2873	.1951
	N	410	410	410	410
	Std. Deviation	.23572	.19428	.25956	.21975
	Grouped Median	.4736	.1734	.2497	.1564
	Minimum	.00	.00	.00	.00
	Maximum	1.00	1.00	1.00	1.00
R.T. & Educator	Mean	.6332	.0856	.3179	.1512
	N	168	168	168	168
	Std. Deviation	.22525	.13059	.26295	.18114
	Grouped Median	.6743	.0651	.2927	.1262
	Minimum	.00	.00	.00	.00
	Maximum	1.00	.88	.80	1.00
Educator	Mean	.6456	.0956	.3529	.1576
	N	85	85	85	85
	Std. Deviation	.21291	.13590	.23227	.16930
	Grouped Median	.6818	.0699	.3440	.1382
	Minimum	.13	.00	.00	.00
	Maximum	.88	.63	.80	.60
Corporate	Mean	.5625	.1397	.3588	.1235
	N	34	34	34	34
	Std. Deviation	.17476	.12970	.25479	.16341

	Grouped Median	.5658	.1250	.3444	.1034
	Minimum	.25	.00	.00	.00
	Maximum	1.00	.50	.80	.60
Other role combos	Mean	.4861	.1389	.2889	.1333
	N	9	9	9	9
	Std. Deviation	.34485	.24562	.22608	.20000
	Grouped Median	.5417	.0536	.2800	.1000
	Minimum	.00	.00	.00	.00
	Maximum	.88	.63	.60	.60
Total	Mean	.5282	.1614	.3075	.1790
	N	811	811	811	811
	Std. Deviation	.24594	.18370	.25988	.20871
	Grouped Median	.5518	.1187	.2809	.1435
	Minimum	.00	.00	.00	.00
	Maximum	1.00	1.00	1.00	1.00
F(6,804) for differences among roles		14.848, *P* < .001	1.615, *P* = .140	6.252, *P* < .001	2.953, *P* =.007
Roles significantly above or below average[a]		R.T.s-, Educs[b]+	None	M.D.s+, R.T.s-	R.T.s-
Number of trends in area (including "Other")		8	5	6	5

[a] *P* < .01. [b] "Educs" = both "Educator" and "R.T. & Educator" groups.

Proportion of Trends in Each Area Respondent Hadn't Heard About as a Function of Role in Rad Sci

Role within rad sci	Statistic	Propn of trends in educ hadn't heard about	Propn of trends in workflow hadn't heard about	Propn of trends in standards hadn't heard about	Propn of trends in supply-demand hadn't heard about
Physician	Mean	.3862	.1992	.4390	.1854
	N	41	41	41	41
	Std. Deviation	.19163	.11914	.24988	.13704
	Grouped Median	.3733	.2010	.4435	.1818
	Minimum	.00	.00	.00	.00
	Maximum	.83	.50	1.00	.40
M.D. & R.T.	Mean	.2318	.2474	.3438	.2000
	N	64	64	64	64
	Std. Deviation	.24237	.27377	.29701	.23637
	Grouped Median	.1786	.1667	.3304	.1520
	Minimum	.00	.00	.00	.00
	Maximum	.83	1.00	1.00	1.00
R.T.	Mean	.1988	.2825	.2961	.2317
	N	410	410	410	410
	Std. Deviation	.19637	.24348	.26059	.21727
	Grouped Median	.1667	.2484	.2656	.1972
	Minimum	.00	.00	.00	.00
	Maximum	.83	1.00	1.00	1.00
R.T. & Educator	Mean	.2431	.2480	.3571	.1750
	N	168	168	168	168
	Std. Deviation	.21181	.23428	.26277	.16980
	Grouped Median	.2202	.2111	.3605	.1567
	Minimum	.00	.00	.00	.00
	Maximum	.83	1.00	.80	.80
Educator	Mean	.2569	.2216	.3624	.1529
	N	85	85	85	85
	Std. Deviation	.19340	.18436	.24784	.15629
	Grouped Median	.2390	.2047	.3488	.1378
	Minimum	.00	.00	.00	.00
	Maximum	.67	.83	.80	.80
Corporate	Mean	.2794	.2451	.3529	.1353

	N	34	34	34	34
	Std. Deviation	.23109	.20199	.26542	.15351
	Grouped Median	.2647	.2315	.3375	.1200
	Minimum	.00	.00	.00	.00
	Maximum	.83	.67	.80	.60
Other role combos	Mean	.2407	.1667	.2889	.1556
	N	9	9	9	9
	Std. Deviation	.22222	.20412	.20276	.21858
	Grouped Median	.2222	.1190	.3000	.1143
	Minimum	.00	.00	.00	.00
	Maximum	.50	.50	.60	.60
Total	Mean	.2300	.2591	.3290	.2020
	N	811	811	811	811
	Std. Deviation	.20878	.23265	.26385	.20024
	Grouped Median	.2035	.2253	.3117	.1721
	Minimum	.00	.00	.00	.00
	Maximum	.83	1.00	1.00	1.00
F(6,804) for differences among roles		11.568, *P* < .001	1.718, *P* = .140	1.874, *P* = .083	3.694, *P* = .001
Roles significantly above or below average[a]		R.T.s+, Educs[b]-	None	R.T.s+	R.T.s+
Number of trends in area (including "Other")		8	5	6	5

[a] *P* < .01. [b] "Educs" = both "Educator" and "R.T. & Educator" groups.

R.T.s were less likely than the other six groups to have had personal experience with, and more likely to indicate that they had never heard of, trends in education, standards and supply/demand. In addition, Educators and those who indicated they were both educators and R.T,s were more likely to have had personal experience with and less likely to say they had never heard of trends in education. Finally, physicians were above average in the likelihood of having had experience with the trends in standards.

Perceived Likelihood of Radiologic Science Trends

3,8,13,18. Considering all of the evidence you've encountered with respect to each of these trends in R.T. education/ workflow / standards / workforce supply-demand, how likely do you believe it is that each trend will continue or will evidence itself over the next 5-10 years? (Fill in the button for only one alternative for each trend.)

		Percent Judging Trend's Occurrence/Continuation to Be					Summary Statistics	
Trend	N	Very Unlikely	Rather Unlikely	About 50-50	Rather Likely	Very Likely	Mean Likelihood[a]	Std. Deviation
Education A	789	4.4%	.8%	5.2%	14.8%	74.8%	85.1711	21.56627
Education B	786	4.2%	3.4%	18.4%	25.2%	48.7%	75.4771	24.54285
Education C	787	5.1%	1.3%	10.0%	23.9%	59.7%	80.2414	23.57259
Education D	771	5.3%	9.3%	27.2%	28.7%	29.4%	65.6874	26.38589
Education E	770	4.4%	1.8%	10.3%	28.3%	55.2%	79.4740	22.96495
Education F	767	5.7%	12.4%	30.0%	30.6%	21.3%	61.5450	26.13467
Education G	751	4.0%	2.0%	12.9%	32.8%	48.3%	77.6431	22.65917
Education Other	105	8.6%	2.9%	14.3%	23.8%	50.5%	74.0952	28.09480
Workflow A	775	4.0%	2.8%	16.5%	25.7%	51.0%	76.8452	23.90392
Workflow B	793	3.5%	5.2%	22.4%	31.5%	37.3%	71.7970	24.13175
Workflow C	782	3.3%	8.3%	26.1%	25.4%	36.8%	69.3606	25.49711
Workflow D	742	3.8%	5.9%	25.3%	31.0%	34.0%	69.8518	24.52886
Workflow Other	60	6.7%	1.7%	43.3%	25.0%	23.3%	63.3333	24.62716
Standards A	776	3.4%	3.6%	15.3%	26.3%	51.4%	77.3003	23.48010
Standards B	771	2.1%	3.1%	25.4%	34.5%	34.9%	72.6135	21.74554

Standards C	765	2.4%	3.7%	30.7%	33.2%	30.1%	69.8562	22.20897
Standards D	760	8.8%	15.4%	36.4%	20.9%	18.4%	55.7039	27.33071
Standards E	771	1.6%	2.9%	13.0%	32.4%	50.2%	79.2802	20.28932
Standards Other	40	10.0%	5.0%	37.5%	27.5%	20.0%	60.1250	26.94932
Standards A	776	3.4%	3.6%	15.3%	26.3%	51.4%	77.3003	23.48010
Standards B	771	2.1%	3.1%	25.4%	34.5%	34.9%	72.6135	21.74554
Standards C	765	2.4%	3.7%	30.7%	33.2%	30.1%	69.8562	22.20897
Standards D	760	8.8%	15.4%	36.4%	20.9%	18.4%	55.7039	27.33071
Standards E	771	1.6%	2.9%	13.0%	32.4%	50.2%	79.2802	20.28932
Standards Other	40	10.0%	5.0%	37.5%	27.5%	20.0%	60.1250	26.94932

[a] Scoring Very Unlikely = 5% chance, Unlikely = 25%, About 50-50 = 50%, Likely = 75%, Very Likely = 95%.

Differences in Perceived Likelihood of Trends as a Function of Area and Role in the Radiological Sciences

Perceived likelihood of the various trends' occurring or (if already in evidence) continuing over the next five to10 years was not very strongly affected by a respondent's role in the radiologic sciences. The only individual trends showing statistically significant differences among the six roles were the three included in the following table:

Role in the Radiologic Sciences		N	Mean	Std. Deviation	95% Confidence Interval for Mean		Overall *F*(6,*N*-7)
					Lower Bound	Upper Bound	
Education Trend D: **Influx of nontraditional students.**	Physician	36	58.3333	24.52404	4.08734	50.0356	3.358, *P* =.003
	M.D. & R.T.	59	64.0678	27.09298	3.52721	57.0073	
	R.T.	370	63.2973	26.38198	1.37153	60.6003	
	R.T. & Educator	165	70.3636	27.84738	2.16792	66.0830	
	Educator	85	73.1765	23.04043	2.49909	68.2068	
	Corporate	33	59.6970	23.58295	4.10526	51.3348	
	Other role combos	7	67.1429	17.52549	6.62401	50.9345	
	Total	755	65.6556	26.40358	.96092	63.7692	
Workflow Trend B: **New career level opportunities for R.T.s as physician extenders.**	Physician	39	61.9231	21.38665	3.42460	54.9903	3.246, *P* = .004
	M.D. & R.T.	62	64.6774	28.29689	3.59371	57.4914	
	R.T.	390	72.6538	22.86814	1.15797	70.3772	
	R.T. & Educator	167	72.9940	24.95816	1.93132	69.1809	
	Educator	84	77.2024	23.30199	2.54246	72.1455	
	Corporate	32	70.3125	23.65537	4.18172	61.7838	
	Other role combos	7	59.2857	29.78095	11.25614	31.7429	
	Total	781	71.8310	24.06939	.86127	70.1403	
Standards Trend D: **Institution of international standards for imaging and radiation therapy personnel.**	Physician	38	41.1842	29.53317	4.79091	31.4769	4.954, *P* < .001
	M.D. & R.T.	59	60.6780	30.57576	3.98063	52.7099	
	R.T.	371	59.6226	25.82410	1.34072	56.9863	
	R.T. & Educator	156	52.0513	28.18643	2.25672	47.5934	
	Educator	83	49.7590	24.93777	2.73728	44.3137	
	Corporate	33	50.3030	27.29868	4.75209	40.6233	
	Other role combos	7	62.8571	26.27691	9.93174	38.5551	
	Total	747	55.7095	27.32178	.99965	53.7470	

Further, when the 605 individuals who rated the likelihood of trends in each of the four areas were considered, no statistically significant differences were found among the six main roles (excluding "other role combos") in their average likelihood rating across all trends and areas or in the pattern of the differences among the four areas' average likelihood ratings.

Those differences in the average likelihood of the trends within each of the four areas *were* highly statistically significant, multivariate $F(3,597) = 6.800$, $P < .001$.

Area:	Education	Workflow	Standards	Workforce Supply & Demand
Mean likelihood of trends in area[a]	75.244	71.946	70.983	71.178

[a] Scoring Very Unlikely = 5% chance, Unlikely = 25%, About 50-50 = 50%, Likely = 75%, Very Likely = 95%.

Respondents rated the likelihood of the trends in education as significantly more likely (about a 75% chance of occurring or continuing) than the trends in the other three areas (71% to 72% likelihood), $F(1,599) = 19.016$, $P < .001$, accounting for 96.6% of the variation among the four means.

Probable Impact of Trends

4. How big an impact will each of these education trends have on your own practice as an imaging or radiation therapy specialist if that trend continues or evidences itself? How big an impact do you believe it will have on the radiologic technology profession/industry as a whole? (Use a scale from 1 to 5, where "1" represents a very minor impact and "5" represents a very major impact.)

Edu-cation Trend	Likely Impact (If that Trend Continues/Occurs) On											
	You						Radiologic Technology as a Whole					
	1: Very Minor Impact	2	3	4	5: Very Major Impact	Mean Impact	1: Very Minor Impact	2	3	4	5: Very Major Impact	Mean Impact
A	10.2%	6.0%	13.6%	24.7%	45.4%	3.89	3.6%	3.3%	12.4%	28.1%	52.7%	3.59
B	13.7%	8.5%	21.5%	27.2%	29.0%	3.49	2.6%	5.0%	17.2%	31.4%	43.8%	4.23
C	9.1%	6.8%	18.3%	25.2%	40.5%	3.81	3.9%	5.8%	16.6%	32.1%	41.6%	4.09
D	24.5%	12.9%	25.3%	17.4%	19.8%	2.95	9.4%	12.1%	28.3%	25.3%	24.9%	4.02
E	7.7%	6.1%	21.2%	30.8%	34.1%	3.78	3.0%	4.3%	19.6%	33.4%	39.6%	3.44
F	15.3%	13.6%	27.8%	25.2%	18.1%	3.17	9.0%	11.4%	30.8%	26.8%	22.1%	4.02
G	7.8%	7.7%	16.6%	33.2%	34.7%	3.79	2.5%	5.0%	18.9%	33.9%	39.7%	3.42
Other specif	12.7%	5.1%	27.8%	19.0%	35.4%	3.79	8.6%	2.5%	25.9%	28.4%	34.6%	4.03

9. How big an impact will each of these workflow trends have on your own practice as an imaging or radiation therapy specialist if that trend continues or evidences itself? How big an impact do you believe it will have on the radiologic technology profession/industry as a whole? (Use a scale ...)

Work-flow Trend	Likely Impact (If that Trend Continues/Occurs) On											
	You						Radiologic Technology as a Whole					
	1: Very Minor Impact	2	3	4	5: Very Major Impact	Mean Impact	1: Very Minor Impact	2	3	4	5: Very Major Impact	Mean Impact
A	33.5%	10.1%	20.8%	15.2%	20.2%	2.79	7.0%	5.7%	22.7%	24.6%	40.1%	3.85
B	26.3%	13.3%	24.0%	17.3%	19.1%	2.89	4.7%	5.2%	24.3%	28.6%	37.3%	3.89
C	22.0%	11.3%	25.3%	21.1%	20.4%	3.07	4.0%	5.2%	27.4%	30.7%	32.7%	3.83
D	23.4%	9.3%	24.4%	21.4%	21.5%	3.08	4.9%	4.7%	25.5%	30.9%	34.0%	3.84
Other specif	24.1%	7.6%	27.8%	19.0%	21.5%	3.06	9.1%	6.1%	31.8%	22.7%	30.3%	3.59

14. How big an impact will each of these standards trends have on your own practice as an imaging or radiation therapy specialist if that trend continues or evidences itself? How big an impact do you believe it will have on the radiologic technology profession/industry as a whole? (Use a scale...)

Stand-ards Trend	Likely Impact (If that Trend Continues/Occurs) On											
	You						Radiologic Technology as a Whole					
	1: Very Minor Impact	2	3	4	5: Very Major Impact	Mean Impact	1: Very Minor Impact	2	3	4	5: Very Major Impact	Mean Impact
A	17.9%	7.6%	21.3%	21.6%	31.5%	3.41	4.6%	2.9%	14.5%	21.6%	56.4%	4.22
B	32.2%	14.8%	19.6%	14.7%	18.7%	2.73	4.6%	2.9%	14.5%	21.6%	56.4%	4.15
C	18.5%	8.6%	26.4%	22.3%	24.2%	3.25	3.4%	3.8%	20.0%	26.7%	46.0%	4.08
D	30.2%	11.3%	24.9%	17.0%	16.6%	2.78	6.9%	8.6%	25.4%	22.2%	36.9%	3.74
E	12.6%	8.0%	25.6%	24.8%	29.0%	3.50	3.2%	4.5%	24.0%	28.3%	40.1%	3.98
Other specif	22.8%	8.8%	23.7%	19.3%	25.4%	3.16	13.7%	10.2%	31.1%	19.7%	25.4%	3.33

19. How big an impact will each of these supply/demand trends have on your own practice as an imaging or radiation therapy specialist if that trend continues or evidences itself? How big an impact do you believe it will have on the radiologic technology profession/industry as a whole? (Use a scale...)

Supply-demand Trend	Likely Impact (If that Trend Continues/Occurs) On											
	You						Radiologic Technology as a Whole					
	1: Very Minor Impact	2	3	4	5: Very Major Impact	Mean Impact	1: Very Minor Impact	2	3	4	5: Very Major Impact	Mean Impact
A	11.2%	4.9%	16.8%	28.4%	38.8%	3.79	1.9%	2.1%	11.0%	25.9%	59.0%	4.38
B	21.6%	9.5%	27.2%	18.0%	23.6%	3.12	6.1%	7.0%	22.9%	27.5%	36.4%	3.81
C	14.7%	9.2%	24.7%	23.4%	28.0%	3.41	3.1%	3.0%	18.4%	30.6%	44.8%	4.11
D	15.4%	9.2%	22.0%	24.7%	28.8%	3.42	2.2%	2.6%	14.3%	28.4%	52.4%	4.26
Other specif	25.0%	4.2%	37.5%	6.3%	27.1%	3.06	15.2%	0%	30.4%	21.7%	32.6%	3.57

Impact on You/Profession as Function of Area and Role

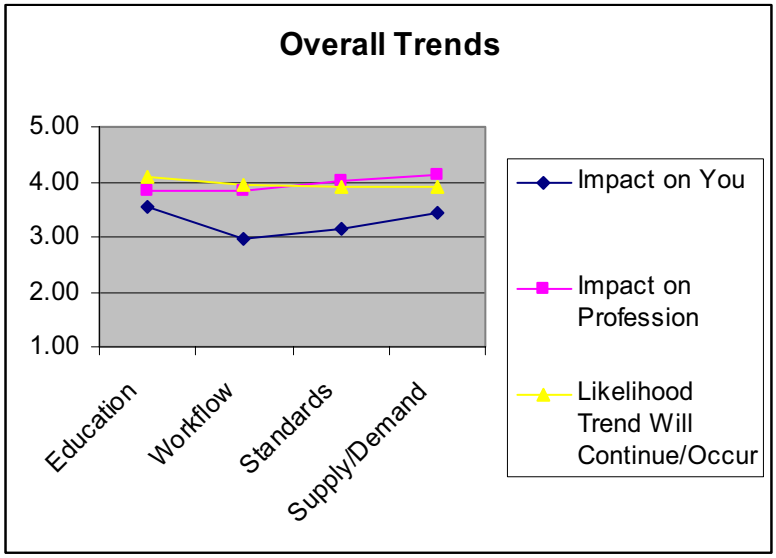
The mean rated impact of the trends within each area is provided below for each of the six broad roles.

Role	Statistic	Impact of Education Trends on		Impact of Workflow Trends on		Impact of Standards Trends on		Impact of Supply/ Demand Trends on	
		You	Rad Technol	You	Rad Technol	You	Rad Technol	You	Rad Technol
Physician	Mean	3.3446	3.7395	3.0833	3.3943	3.4000	3.6727	3.4776	4.0014
	N	36	34	36	35	37	22	38	35
	Std. Deviation	.92488	.85099	1.07404	.93304	.90431	.88057	.89183	.82207
	Grouped Median	3.5000	3.8286	3.0357	3.4063	3.6000	3.7333	3.5313	4.0385
M.D. & R.T.	Mean	3.7377	4.1433	2.9474	3.6793	3.5462	4.2174	3.5776	4.1621
	N	61	61	57	58	57	48	58	58
	Std. Deviation	1.11399	.76647	1.23846	1.13837	1.07069	.86300	1.24764	1.02274
	Grouped Median	3.9388	4.2071	3.1200	3.7250	3.6167	4.3778	3.8833	4.5000
R.T.	Mean	3.4182	3.8643	3.0096	3.8872	3.1061	4.0098	3.3169	4.0761
	N	371	369	365	356	359	235	376	368
	Std. Deviation	.94692	.80592	1.18731	.86667	1.11154	.87165	1.16753	.85865
	Grouped Median	3.5679	3.9421	3.1231	4.0070	3.1708	4.1277	3.5088	4.2333
R.T. & Educator	Mean	3.7832	3.9614	2.9441	3.8833	3.2121	4.0951	3.6071	4.2624
	N	159	157	161	156	152	130	161	157
	Std. Deviation	.91973	.80520	1.18825	.81667	1.09388	.89282	1.08603	.76942
	Grouped Median	4.0000	4.0659	2.9643	3.9318	3.2000	4.2667	3.7763	4.3906
Educator	Mean	3.8458	3.8051	2.6906	3.8854	2.8873	4.0218	3.5712	4.2344
	N	84	85	80	79	79	55	78	80
	Std. Deviation	.74588	.76445	1.14812	.88452	1.01621	.77524	.90171	.65765
	Grouped Median	3.8571	3.9048	2.6500	3.9762	2.9286	4.0364	3.7059	4.2500
Corporate	Mean	3.5478	3.9854	2.7532	3.9161	2.5750	3.8160	3.3145	4.1917
	N	34	33	31	31	32	25	31	30
	Std. Deviation	1.05955	.59393	1.21119	.74031	.98995	.71629	1.08006	.48991
	Grouped Median	3.7500	4.0833	3.0313	4.0417	2.5600	3.7200	3.4500	4.1750
Other role combos	Mean	3.2270	3.7347	2.7429	3.6643	2.5500	3.8500	3.3500	3.9250
	N	7	7	7	7	8	4	7	8
	Std. Deviation	1.05477	.53724	1.05689	.83002	.91652	.86987	1.00995	.61991
	Grouped Median	3.1429	3.5714	3.0000	3.5000	2.4500	3.7000	3.2500	3.8333
Total	Mean	3.5696	3.8993	2.9461	3.8447	3.1245	4.0268	3.4343	4.1393
	N	752	746	737	722	724	519	749	736
	Std. Deviation	.95593	.79272	1.18240	.88536	1.09344	.86251	1.11802	.82071
	Grouped Median	3.7111	3.9786	3.0308	3.9243	3.1547	4.1741	3.6180	4.2445
F(6,N-7) for differences among roles		4.998, *P* <.001	1.801, *P* =.096	1.051, *P* =.391	2.164, *P* =.045	4.442 *P* <.001	1.444, *P* = .196	1.772, *P* =.102	1.420, *P* =.204
Roles significantly above or below average[a]		Educs[b]+				M.D.s[c]+, Corp-			

[a] *P* < .01. [b] "Educs" = both "Educator" and "R.T. & Educator." [c]"M.D.s" = both "Physicians" and "M.D. & R.T."

Focusing on the 443 respondents who omitted no more than one trend in any area in rating those trends' impacts on themselves and on the profession as a whole, there was a statistically significant tendency to perceive these trends as having more impact on the profession as a whole (4.00 on a scale from 1 = very minor impact to 5 = very major impact) than on one's own practice (3.32), $F(1,437) = 239.99$, $P < .001$.

This tendency to see the trends as having more impact on radiologic technology as a whole than on one's own practice held for all four areas, but it was lower (.30 difference in means) for education trends than for supply and demand trends (.66 mean difference) — $F(1,400) = 29.41$, $P < .001$ and these two areas' differentials were significantly lower than the .91 mean differential between impact on own practice vs. on the profession for the standards and workflow areas combined, $F(1,400) = 56.55$, $P < .001$.



The impact on both one's own practice and the profession was higher, on average, for education and supply and demand trends than for workflow and standards trends. However, there were significant differences among the six roles in how much impact they perceived the trends in the education and standards areas would have on them personally: Educators expect the education trends to have significantly more of an impact on them than do the other six groups. Physicians (including those who checked both "physician" and "R.T.") anticipate that the standards trends will impact them significantly more than do the other six groups, while corporate representatives are significantly below average in their ratings of the personal impact of the standards trends.

General Comments

5. Are there any other comments you would like to share with respect to any of these trends in R.T. education?

43 respondents provided additional comments. See Appendix B for those comments.

10. Are there any other comments you would like to share with respect to any of these trends in imaging/ radiation therapy workflow?

38 respondents provided additional comments. See Appendix B for those comments.

15. Are there any other comments you would like to share with respect to any of these trends in imaging/therapy standards?

35 respondents provided additional comments. See Appendix B for those comments.

20. Are there any other comments you would like to share with respect to any of these trends in imaging/ radiation therapy personnel supply and demand?

42 respondents provided additional comments. See Appendix B for those comments.

21. If there are particular specialties or techniques you feel are apt to be or become in short supply over the next 5-10 years, even if there is no overall shortage of radiologic technologists, please briefly describe those specialties or techniques here:

88 respondents accepted the invitation to comment on particular specialties or techniques. See Appendix B for those comments.

22. If there are other trends that you believe are likely to have a major impact(s) on the profession over the next 5-10 years but that you don't believe fit into any of the above four categories, please specify those other trends below. Please also briefly describe why you believe each is likely to occur and what you feel its most important impacts are apt to be.

67 respondents accepted the invitation to comment on other trends. See Appendix B for those comments.

Appendix A:

Questionnaire and Cover Letter

[ASRT letterhead]

October 2005

Dear Radiologic Sciences Professional [or “Radiologist or Radiation Oncologist” or “Radiologic Science Educator” or “Radiologic Sciences Industry Professional”]

What will medical imaging and radiation therapy work, workers and workplaces look like in five years from today? Twenty years from today? To begin to answer those questions, the American Society of Radiologic Technologists recently undertook a three-year research project called FutureScan. The goal of FutureScan is to help those in industry, government, education and research make better decisions about their contributions to the quality of patient care in medical imaging and radiation therapy.

An environmental scan conducted for ASRT by Access Innovations and the deliberations of an expert panel that convened in Albuquerque in late June have identified a number of likely trends and the trends’ potential effects on the radiologic sciences. The next step is to seek feedback from representative samples of radiologic sciences stakeholders about their experiences and beliefs regarding these trends.

An especially important stakeholder group consists of those who actually perform medical imaging and radiation therapy procedures [or “the radiologists and radiation oncologists who oversee medical imaging and radiation therapy procedures” or “those who guide aspiring R.T.s through acquisition of the skills they need to enter the profession and who help them maintain their proficiency thereafter” or “those who work in the equipment, supply and education firms that serve medical imaging and radiation therapy”] – you and your colleagues. I would appreciate your participating in the Future of Radiologic Technology survey at your earliest convenience. You can do this by connecting to www.asrt.org/futurescan to complete the questionnaire online. We will summarize the data, and the results will be made broadly available. Neither individuals nor the names of their facilities will be identified.

Thanks in advance for your participation in this effort to map the future of your profession.

Lynn’s signature here

Lynn May
ASRT Chief Executive Officer

The Future of Radiologic Technology

This questionnaire seeks your feedback on a number of current and/or future trends in the practice of medical imaging and radiation therapy that could have a major impact on the profession over the next 5 to 10 years. For each trend, we will ask:

- **Whether you have heard of such a trend and, if so, where.**
- **Whether you have had any direct experience with this trend and, if so, in what way.**
- **Whether, considering all sources of evidence, you believe this trend currently exists and/or will exist in the future.**
- **How big an impact this trend will have on your own professional practice and on the profession of radiologic technology as a whole, if it does in fact occur.**

The trends we would like you to consider fall into four general areas, beginning with:

Education

Education trend A. Increasing use of electronic forms of education, including online.
Education trend B. Increasing need for technologists to be multidisciplinary (e.g., molecular imaging, fusion techniques such as PET/CT and mammography/ultrasound).
Education trend C. Emphasis on importance of lifelong education.
Education trend D. Influx of nontraditional students.
Education trend E. Increasing need for information access skills.
Education trend F. More need to understand and apply reports of research results.
Education trend G. Need for more emphasis on flexible learning skills and on basics (e.g., because rapid changes in technology outpace changes in curricula).

1. Where have you heard about each of these trends in R.T. education? ("Check" all that apply by filling in the button completely, as in) .)

	Source(s) of Information About This Trend						
Education Trend	**Personal Experience**	**Professional Journals**	**Colleagues/ Coworkers**	**Supervisors/ Managers**	**Physicians**	**Popular Press**	**I hadn't heard about this trend**
A	*	*	*	*	*	*	*
B	*	*	*	*	*	*	*
C	*	*	*	*	*	*	*
D	*	*	*	*	*	*	*
E	*	*	*	*	*	*	*
F	*	*	*	*	*	*	*
G	*	*	*	*	*	*	*
Other (Please Specify_____ _____)	*	*	*	*	*	*	*

2. If you have had direct experience with or have been affected by any of these trends (professionally or personally), please describe that experience briefly.

3. **Considering all of the evidence you've encountered with respect to each of these trends in R.T. education, how likely do you believe it is that each trend will continue or will evidence itself over the next 5-10 years? (Fill in the button for only one alternative for each trend.)**

	Likelihood That Trend Will Continue or Will Occur Over Next 5-10 Years				
Education Trend	**Very Unlikely**	**Rather Unlikely**	**About 50-50**	**Rather Likely**	**Very Likely**
A	*	*	*	*	*
B	*	*	*	*	*
C	*	*	*	*	*
D	*	*	*	*	*
E	*	*	*	*	*
F	*	*	*	*	*
G	*	*	*	*	*
Other (as specified in question 1 table)	*	*	*	*	*

4. **How big an impact will each of these education trends have on your own practice as an imaging or radiation therapy specialist if that trend continues or evidences itself? How big an impact do you believe it will have on the radiologic technology profession/industry as a whole? (Use a scale from 1 to 5, where "1" represents a very minor impact and "5" represents a very major impact.)**

Education Trend	**Likely Impact (If that Trend Continues/Occurs) On**									
	You					**Radiologic Technology as a Whole**				
	1: Very Minor Impact	**2**	**3**	**4**	**5: Very Major Impact**	**1: Very Minor Impact**	**2**	**3**	**4**	**5: Very Major Impact**
A	*	*	*	*	*	*	*	*	*	*
B	*	*	*	*	*	*	*	*	*	*
C	*	*	*	*	*	*	*	*	*	*
D	*	*	*	*	*	*	*	*	*	*
E	*	*	*	*	*	*	*	*	*	*
F	*	*	*	*	*	*	*	*	*	*
G	*	*	*	*	*	*	*	*	*	*
Other (as specified In Question 1 table)	*	*	*	*	*	*	*	*	*	*

5. **Are there any other comments you would like to share with respect to any of these trends in R.T. education?**

Workflow

Workflow trend A. "Nighthawking" and "dayhawking" (time-shifted or remote reads of medical images to augment local personnel).
Workflow trend B. New career level opportunities for R.T.s as physician extenders (introduction of Radiologist Assistant, possible introduction of advanced practice roles for specialties).
Workflow trend C. Decentralization of medical imaging away from traditional medical centers.
Workflow trend D. Decreasing scanning time leading to patient management as major factor limiting throughput.

6. Where have you heard about each of these trends in workflow? ("Check" all that apply by filling in the button completely, as in ● .)

	Source(s) of Information About This Trend						
Workflow Trend	**Personal Experience**	**Professional Journals**	**Colleagues/ Coworkers**	**Supervisors/ Managers**	**Physicians**	**Popular Press**	**I hadn't heard about this trend**
A	●	●	●	●	●	●	●
B	●	●	●	●	●	●	●
C	●	●	●	●	●	●	●
D	●	●	●	●	●	●	●
Other (Please Specify_____ _____)	●	●	●	●	●	●	●

7. If you have had direct experience with or have been affected by any of these trends (professionally or personally), please describe that experience briefly.

8. Considering all of the evidence you've encountered with respect to each of these trends in imaging/therapy workflow, how likely do you believe it is that each trend will continue or will evidence itself over the next 5-10 years? (Fill in the button for only one alternative for each trend.)

	Likelihood That Trend Will Continue or Will Occur Over Next 5-10 Years				
Workflow Trend	**Very Unlikely**	**Rather Unlikely**	**About 50-50**	**Rather Likely**	**Very Likely**
A	●	●	●	●	●
B	●	●	●	●	●
C	●	●	●	●	●
D	●	●	●	●	●
Other (as specified In Question 6 table)	●	●	●	●	●

9. How big an impact will each of these workflow trends have on your own practice as an imaging or radiation therapy specialist if that trend continues or evidences itself? How big an impact do you believe it will have on the radiologic technology profession/industry as a whole? (Use a scale from 1 to 5, where "1" represents a very minor impact and "5" represents a very major impact.)

Workflow Trend	Likely Impact (If that Trend Continues/Occurs) On									
	You					Radiologic Technology as a Whole				
	1: Very Minor Impact	2	3	4	5: Very Major Impact	1: Very Minor Impact	2	3	4	5: Very Major Impact
A	*	*	*	*	*	*	*	*	*	*
B	*	*	*	*	*	*	*	*	*	*
C	*	*	*	*	*	*	*	*	*	*
D	*	*	*	*	*	*	*	*	*	*
Other (as specified In Question 6 table)	*	*	*	*	*	*	*	*	*	*

10. Are there any other comments you would like to share with respect to any of these trends in imaging/ radiation therapy workflow?

Standards

Standards Trend A. Declining/scrutinized reimbursement.
Standards Trend B. Increasing malpractice suits, particularly in mammography.
Standards Trend C. Institution of national standards for imaging and radiation therapy personnel.
Standards Trend D. Institution of international standards for imaging, radiation therapy personnel.
Standards Trend E. "Patient consumerism" on the rise (patients more likely to seek information on, question the competence of health care personnel).

11. Where have you heard about each of these trends in imaging/therapy standards? ("Check" all that apply by filling in the button completely, as in) .)

	Source(s) of Information About This Trend						
Standards Trend	**Personal Experience**	**Professional Journals**	**Colleagues/ Coworkers**	**Supervisors/ Managers**	**Physicians**	**Popular Press**	**I hadn't heard about this trend**
A	*	*	*	*	*	*	*
B	*	*	*	*	*	*	*
C	*	*	*	*	*	*	*
D	*	*	*	*	*	*	*
E	*	*	*	*	*	*	*
Other (Please Specify_____ _____)	*	*	*	*	*	*	*

12. If you have had direct experience with or have been affected by any of these trends (professionally or personally), please describe that experience briefly.

_____

_____

_____

_____

_____

13. Considering all of the evidence you've encountered with respect to each of these trends in imaging/therapy standards, how likely do you believe it is that each trend will continue or will evidence itself over the next 5-10 years? (Fill in the button for only one alternative for each trend.)

	Likelihood That Trend Will Continue or Will Occur Over Next 5-10 Years				
Standards Trend	**Very Unlikely**	**Rather Unlikely**	**About 50-50**	**Rather Likely**	**Very Likely**
A	*	*	*	*	*
B	*	*	*	*	*
C	*	*	*	*	*
D	*	*	*	*	*
E	*	*	*	*	*
Other (as specified in question 11 table)	*	*	*	*	*

14. How big an impact will each of these standards trends have on your own practice as an imaging or radiation therapy specialist if that trend continues or evidences itself? How big an impact do you believe it will have on the radiologic technology profession/industry as a whole? (Use a scale from 1 to 5, where "1" represents a very minor impact and "5" represents a very major impact.)

Standards Trend	Likely Impact (If that Trend Continues/Occurs) On									
	You					Radiologic Technology as a Whole				
	1: Very Minor Impact	2	3	4	5: Very Major Impact	1: Very Minor Impact	2	3	4	5: Very Major Impact
A	*	*	*	*	*	*	*	*	*	*
B	*	*	*	*	*	*	*	*	*	*
C	*	*	*	*	*	*	*	*	*	*
D	*	*	*	*	*	*	*	*	*	*
E	*	*	*	*	*	*	*	*	*	*
Other (as specified In Question 11 table)	*	*	*	*	*	*	*	*	*	*

15. Are there any other comments you would like to share with respect to any of these trends in R.T. education?

Personnel Supply and Demand

Supply/Demand Trend A. Increase in demand for imaging and radiation therapy procedures.
Supply/Demand Trend B. Reduction in need for operator involvement in image acquisition, therapy delivery.
Supply/Demand Trend C. Increasing use of computer assisted detection and other diagnostic aids.
Supply/Demand Trend D. Shortages of personnel skilled in particular specialties (e.g., PET/CT fusion, geriatric health care) and/or particular techniques (e.g., postimage processing).

16. Where have you heard about each of these trends in personnel supply and demand? ("Check" all that apply by filling in the button completely, as in) .)

	Source(s) of Information About This Trend						
Supply/ Demand Trend	**Personal Experience**	**Professional Journals**	**Colleagues/ Coworkers**	**Supervisors/ Managers**	**Physicians**	**Popular Press**	**I hadn't heard about this trend**
A	*	*	*	*	*	*	*
B	*	*	*	*	*	*	*
C	*	*	*	*	*	*	*
D	*	*	*	*	*	*	*
Other (Please Specify_____ _____)	*	*	*	*	*	*	*

17. If you have had direct experience with or have been affected by any of these trends (professionally or personally), please describe that experience briefly.

18. Considering all of the evidence you've encountered with respect to each of these trends in personnel supply and demand, how likely do you believe it is that each trend will continue or will evidence itself over the next 5-10 years? (Fill in the button for only one alternative for each trend.)

	Likelihood That Trend Will Continue or Will Occur Over Next 5-10 Years				
Supply/Demand Trend	**Very Unlikely**	**Rather Unlikely**	**About 50-50**	**Rather Likely**	**Very Likely**
A	*	*	*	*	*
B	*	*	*	*	*
C	*	*	*	*	*
D	*	*	*	*	*
Other (as specified In Question 16 table)	*	*	*	*	*

19. How big an impact will each of these supply/demand trends have on your own practice as an imaging or radiation therapy specialist if that trend continues or evidences itself? How big an impact do you believe it will have on the radiologic technology profession/industry as a whole? (Use a scale from 1 to 5, where "1" represents a very minor impact and "5" represents a very major impact.)

Supply/Demand Trend	Likely Impact (If that Trend Continues/Occurs) On									
	You					Radiologic Technology as a Whole				
	1: Very Minor Impact	2	3	4	5: Very Major Impact	1: Very Minor Impact	2	3	4	5: Very Major Impact
A	*	*	*	*	*	*	*	*	*	*
B	*	*	*	*	*	*	*	*	*	*
C	*	*	*	*	*	*	*	*	*	*
D	*	*	*	*	*	*	*	*	*	*
Other (as specified In Question 16 table)	*	*	*	*	*	*	*	*	*	*

20. Are there any other comments you would like to share with respect to any of these trends in imaging/ radiation therapy personnel supply and demand?

21. If there are particular specialties or techniques you feel are apt to be or become in short supply over the next 5-10 years, even if there is no overall shortage of radiologic technologists, please briefly describe those specialties or techniques here:

Other Trends

22. If there are other trends that you believe are likely to have a major impact(s) on the profession over the next 5-10 years but that you don't believe fit into any of the above four categories, please specify those other trends below. Please also briefly describe why you believe each is likely to occur and what you feel its most important impacts are apt to be.

Professional Profile

23. What is your primary role in medical imaging and/or radiation therapy?
___Radiologist ___Radiation oncologist ___Cardiologist
___Other physician specialty (Please specify_____)
___Radiologic technologist whose primary discipline/sphere of employment is
___Radiography ___Radiation therapy ___Nuclear medicine
___Mammography ___Sonography ___Computed tomography
___Other (Please specify_____)
___Educator, in particular
___Program director ___Clinical coordinator ___Didactic faculty
___Clinical instructor ___Other (Please specify_____)
___Corporate (e.g., sales, equipment vendor)
___Other (Please specify_____)

24. For how many years (not necessarily consecutive but not including precertification training) have you been working in your primary role? _____

25. Gender? ___Male ___Female

26. Year of birth? ____

27. In which of the following types of facility is your primary workplace located?
___Hospital with fewer than 100 beds.
___Hospital with 101-300 beds.
___Hospital with more than 300 beds.
___Freestanding clinic.
___Private physician practice or group practice.
___Educational setting.
___Mobile unit.
___Veterinary facility.
___Locum tenens.
___Corporate (e.g., vendor representative).
___Other (Please specify _____)

Thanks very much for your participation in this scan of the future of radiologic technology!

Appendix B:

Verbatim Responses to

Most General Questions

(2, 7, 12, 17; 5, 10, 15, 20; 21 and 22)

Table of Appendix Contents

Direct Experience with Trends

Education Area

2. If you have had direct experience with or have been affected by any of these trends (professionally or personally), please describe that experience briefly.

Response	Frequency	Percent
Blank	473	56.2
1) Have had a number of the nontraditional students in our program and I only see this as a growing trend. 2) We have experienced more students asking for flexible learning to meet their personal needs and using technology to enhance the experience.	1	.1
1. Internet, 2. Power Point teaching; 3. Need to cross-train to provide an economic need/efficient.	1	.1
1. More forms/ fill out can be done online; 2. harder to fill positions/less staff more responsibilities; 3. I need CEUs; 4. I went back for a B.S degree. E. Goes along TA, also PACS; G. keep up with journals.	1	.1
1. More need to correlate results of other radiologic exams and lab work. 2. Radiopharmaceutical vendors promote and educate newer product lines.	1	.1
A. A lot of CE can be done online. B. My workplace wants al techs to be able to use multimodalities. C. You need to be able to use Internet to get additional info.	1	.1
A. Continuing education online. B. X-ray tech/nuclear medicine tech.	1	.1
A. CEUs available online is a great assistance and meets many R.T.s' needs. B. Multidisciplinary techs are helpful to any facility, but not required. D. As a nontraditional student my focus was clearer as was my determination. E. The availability of information is useless without the skills to access it. G. Technology indeed changes but the basics are vital to success.	1	.1
A. I finished a bachelor of radiologic science through the Florida Hospital College of Health Sciences distance learning programs. B. We have PET/CT and have to fuse diagnostic with PET scans. D. My online program is a nontraditional method of education.	1	.1
A new ER opened and they were only hiring dual modality trained technologists.	1	.1
A recent buyout of our hospital has resulted in a system that had currently been working on card files, typewriters and footwork. Went to an online system and PACS in a matter of eight months. It was quite a shellshock but a greatly needed one.	1	.1
A. As the College increased the technology available in the classroom, I created PowerPoint presentations for all classes I teach. I am currently learning WebCT so that I can also provide information and testing to students online. C. Our program emphasizes the need for life-long learning. As faculty I model the behavior I expect from students by being active in my professional organizations and taking continuing education seriously. D. Our College is located in an area of many plant closures, so we had an influx of middle-aged students who had never attended college. We are now seeing fewer of those students but are having ones who already earned bachelor's and master's degrees seeking program admission. E. The increased technology in the classroom and the clinical sites requires me to improve my information access skills. F. With increasing technology in radiology departments and new educational theory, the need to understand and apply research information will increase.	1	.1
A. I have an electronic component to all my classes, have developed online courses and recently developed a learning object (sectional anatomy study tool) to help improve student learning.	1	.1
A. Use of online CE, electronic journals, review of meeting presentations... B. Maintenance of Certification efforts. E. Increasing use of computer directed treatment techniques. F. Continuing translational research efforts to move new techniques in active use faster.	1	.1
A. As an educator, I currently use an interactive educational system to communicate with a remote classroom to teach radiography classes.	1	.1
A. ASRT Directed Readings. C. Changes in teaching content to keep current with new technology. Changes in job responsibilities. D. Ongoing in our program for many years. E. Need for up-to-date information requires seeking information in locations	1	.1

	other than textbooks. F. Need more information about changes in technology and practices to keep up with needs of students in a changing environment. G. Information about equipment used in our clinical sites is needed to adequately provide instruction for students. Must depend on manufacturer or trial and error to present information to students as nothing is available in texts. In addition, the quality of textbooks is decreasing — becoming a poor reference source for often needed in-depth understanding.		
	A. CE credits are online. G. Going to PACS AND CR.	1	.1
	A. CME requirements — easier access online. C. Constant need to keep abreast of new techniques, etc. D. Poor skills from college-based programs. E. PACS and HIS systems.	1	.1
	A. College education — first job after school trend. B. People were being cross-trained. Trend C. My personal importance, studying to be an M.D. Trend D. Nontraditional student. I already had a bachelor's and was going back in my 30s. I see plenty of older students. Trend E. I was trained on PACs for my first job out of x-ray. Also, used DR right away.	1	.1
	A. Competing CEC online. C. Need for CEC. E. Computers in workplace and everyday life. G. To keep up with life; in and out of the workplace.	1	.1
	A. Continuing education post-tests and pre-tests. B. Job stability increases with multiple discipline experience. D. State licensing has only allowed this non-registered tech employment. G: Students must be proficient, with the ability to, familiarity with, and exposure to newer equipment and to multidisciplinary tasks.	1	.1
	A. Doing required ed on computer. C. Required CE by ARRT AND JCAHO. D. Most students doing clinicals in my hospital are nontraditional. G. On-site in service of new equipment.	1	.1
	A. I do some online CE, but prefer classroom seminars, to interact with presenters and colleagues. E. All technologists need are skills. My peers who are technophobic are falling behind.	1	.1
	A. I have completed my CEUs online. I am an R.T.(T) and an R.T.(R), and I still work in both disciplines. I am required to do CT scans and must study and pass the boards for CT as a requirement of my jobs. C. Because I have long-term experience, I am asking to share this previous knowledge often.	1	.1
	A. I have used online to obtain CME. D. Our local college has a weekend ultrasound program.	1	.1
	A. I know students enrolled in an online rad therapy program. B. I know nuc med techs who are seeking certification in PET/CT. C. I am an educator and have seen many changes. The need for education is apparent. D. I have many nontraditional students enrolled in my program. E. Most students do their research online and need tools to access legitimate Web sites and journals. G. There is always something new to learn. I tell all applicants they must be flexible to be an R.T.	1	.1
	A. I participated in an online dosimetry training course while prepping for the boards. B. I am certified in x-ray, therapy and dosimetry and have some CT and ultrasound experience. I use all these disciplines to get the job done. We are always looking for new and better technologies, but knowing how to put the old and new together is what really benefits the patient the most. C. You need to keep up with the competition to stay marketable.	1	.1
	A. Increasing use of electronic forms of education, including online. Not only am I currently working on my B.S. degree online. but I complete almost all of my continuing education exams online as well.	1	.1
	A. It is easier to get credit online.	1	.1
	A. My company offers online information and education in-services. Online information and education in-services. B. I am currently registered (R) (CT) AND soon MR.	1	.1
	A. Online education is increasingly valuable. B. Almost critical today and today's market. C. We should be constantly learning. Changes happen almost every day.	1	.1
	A. Our institution is using more platforms to provide electronic transmission of content to students. We are also asking students to apply to our program. D. Our program has seen a dramatic increase in applicants who are second career, and international students at the B.S. level.	1	.1
	A. Patient records going electronic; CEUs online popular. E. Computer literacy mandatory. G. Technology outpacing formal education.	1	.1
	A. We have MED NEL available at our hospital. B. There is an NCT program in our	1	.1

	area.		
	A. Workplace has gone from subsidizing trips to meeting seminars to paying for professional organization memberships to enhance CE. D. Have met people doing ultrasound training online..	1	.1
	A. Currently includes Web-enhanced components in traditional classes and one Web-based advanced course. Also compete with Web-based program in Boston. D. Our program is 60 percent to 65 percent non-traditional career changers. E&F course has been used for over five years in our program's teaching office, computer science, etc. Additionally, effective writing and critical thinking are incorporated. F. Still somewhat limited to supervisors/mangers. G. Need for effective teaching strategies and outcomes.	1	.1
	AAMD journal is online and CEU tests can be taken online.	1	.1
	Ability to interpret ultrasound; perform ultrasound. And CT scans for planning radiation therapy.	1	.1
	Advancement levels have increased in more knowledge	1	.1
	Advancement will not happen without additional education/professional student.	1	.1
	All coursework even for on-campus degree is based in the Blackboard electronic format. Developing online version of B.S. degree program for R.T.s to complete their B.S. degrees. RA program is an online distance format.	1	.1
	All results/images/medical records are electronic — most education that can be accessed at anytime is electronic. You cannot work in this profession effectively if you do not commit to lifelong education — technology and treatment advances are only a few drivers. We provide clinical experience for two local colleges — students are coming from all different backgrounds. Changing factors are age, communication difficulties and ethnic beliefs that affect the learning experience. Computer skills/knowledge are imperative in this market and ability to access information and research ideas online are necessary.	1	.1
	Almost all textbooks come with online assistance. I have found that more and more classroom aids are online.	1	.1
	Am computer illiterate. No. G has been difficult for me, but I have learned digital DR and digital info systems.	1	.1
	Am encouraging my staff to convert lecture material to an electronic format for ease of presentation. We continue to be role models for the students in participation and attending professional meetings — lifelong learning. About half of my student population enrolled are nontraditional students. Not all nontraditional students are as savvy as the traditional student in computer skills.	1	.1
	Anything online makes it easier and faster. Constant learning is absolutely necessary to compete in the future.	1	.1
	As a clinical instructor, it will be required that I have a B.S. degree by 2007.	1	.1
	As a CT technologist, I now work in a post-processing lab doing CTA post-processing only.	1	.1
	As a didactic instructor for a radiography program, I am continually updating course materials to reflect both global changes and changes within in our own departments. This requires that I stay abreast of new advances. Our program is hospital-based and we are selecting fewer candidates directly out of high school. The average age has increased as well as the level of educational and/or work experience.	1	.1
	As a former program director, the need is for "advanced placement" for individuals coming from nontraditional backgrounds. Very few programs offer convenient placement options. Many hospitals refuse to cross-train their employees. Difficult to have access to the clinical experience required before taking an advanced certification examination; i.e., mammography. How do you learn mammo if you can't work in the facility unless you are certified. It becomes a "not what you know – but who do you know" experience.	1	.1
	As a nontraditional graduate of my rad tech program — lifelong education has been part of my continuous employment plan. I have to be flexible enough to adapt and learn in new digital environments.	1	.1
	As a program director, it's been a challenge to keep the curriculum current — adding too many new courses, modules, rotations, etc. Very few imaging protocols totally go away, so it seems new things just got added every year. YEAR. PET/CT is one of the most exciting to be added.	1	.1
	As a program director I see more and more nontraditional students, especially older	1	.1

	students who have been working and want to change careers. We try to encourage students to use computers more because so many of our clinical facilities are going to computed radiography.		
	As a radiation oncologist, I personally encounter the need for the items I checked above as "Personal Experience" in the clinic.	1	.1
	As a radiation therapy educator, I have participated in nontraditional education as a student and as a clinical instructor for a nontraditional program. I am also a multidisciplined technologist. Recently, I had the opportunity to lecture on the integration of other modalities in radiation therapy. I have seen ultrasound, flouro, CT and MRI used in the planning and positioning of patients for radiation therapy treatments.	1	.1
	As a radiology educator in MRI, I have experienced the change from paper forms to electronic submissions of CE credits, and have worked to produce homestudy courses consisting of online Directed Reading activities.	1	.1
	As a vendor rep, the company I work for expects me to learn new information on my own through online training and written programs.	1	.1
	As an administrator, I have seen a dramatic change in the entry-level education for R.T.s. Many allied health programs are using online courses for core subject areas and the computer expertise needed in the clinical setting is increasing at an amazing pace. The rapid changes in the technology mandate life-long learning in a nontraditional manner, especially as it applies to mature adults (not traditional students).	1	.1
	As an educator I have experienced several of these trends in dealing with a diverse student population and changing trends in the way students learn and adapt throughout our changing profession. Also, there is a need to continue education with the rapid pace our profession changes.	1	.1
	As an educator, I am constantly adding more information to our curriculum.	1	.1
	As an educator, I am aware of a cultural shift that is occurring in our classrooms. More students seem less prepared to handle the serious nature of this profession at such a young age. They are basically good kids, but they are not resilient, they cannot perform under pressure and do not know how to handle conflict. Because they have grown up with technology, they are not intimidated by the technology that they have to learn; however, they tend to think that the technology will do the job for them, not that they are in control of how the technology will help them do the job better. I am continually reminding them that computed radiography will not make a bad tech better; it will make a bad tech even worse.	1	.1
	As an educator, I have been a part of the changing of the profession in all areas. I am waiting for the time when the two-year curriculum has to increase for all the new material that will be added to it.	1	.1
	As an educator, I must stay abreast of changes in the profession. We have an increased number of nontraditional students needing more support, and varied teaching methods. We periodically need to adjust teaching methods to better reflect the current technology of healthcare systems.	1	.1
	As an educator, many of our teaching materials and delivery methods have been connected to electronic forms.	1	.1
	As for "B", techs are more likely to specialize.	1	.1
	As for lifelong education, I think it's common sense as technology is ever changing. We need to keep learning if we want to provide the best care possible for our patients. As for the influx of nontraditional students, if you mean those who are changing careers at a later stage in life ... well I'm one of them. There were many of us in my class, it's not easy but it can be done.	1	.1
	As I have pursued my master's, read journals and attended conferences, I have learned more. In admissions to the program and directing the program, I have seen the changes.	1	.1
	As program director, Trends A, C, D, E and G have been increasing or need to be increased in our program.	1	.1
	As program director and past faculty, I agree with the statement of technology outpacing the curricula. Not only are there not enough books being produced to teach, the technology changes occurring are so rapid it seems impossible to keep abreast of the challenges.	1	.1
	B. Have experience in angio/CT and registered in mammo – soon to be in DEXA. C.	1	.1

	See above. D. Some coworkers are older adults seeking new careers. E. More and more and more systems are going paperless and filmless.		
	B. Multidisciplinary needs of small staff, rural hospital. C. Continuing education requirements. D. I am a nontraditional student now. A second career. E. Personal need, not from “computer generation.	1	.1
	B. My husband is with a new company developing new technology for breast imaging. It's an ultrasound product, but mammographers will be trained to use it. A person with both skills would be the perfect fit. C. The technology is changing so rapidly. I still remember the procedures that we are no longer performing and am overwhelmed by the new advances in the profession. Unless you stay current by reading and attending conferences related to the direction your position is taking, you will be left behind. E. With the Internet, chartless systems, worklist, PACS, etc., the need for constant training is a must. I work in a university setting — student health service — and we recently went chartless and purchased a CR. Talk about a learning curve! It wasn't that long ago that this place still had manual processing! I'm not the most computer literate, but this has forced me to try to embrace it.	1	.1
	B. Although having multidisciplinary techs, my belief is that this will not happen. Techs are placed into a particular modality and work in that area.	1	.1
	B. Go second job moonlighting as knowledge — multimodality. D. Have seen students coming from different backgrounds. E. As work patient info systems changes a lot. G. With changing technology having to learn and adopt new things, techniques, etc.	1	.1
	Being an applications specialist, I hear a lot about people wanting online CE credit opportunities. Physicians are very interested in knowing what kind of research is going on and the "hot topic" or procedure everyone is trying now.	1	.1
	Being an educator and NMT, I have experienced a lot of these trends through my career.	1	.1
	Being multiskilled is a requirement in smaller facilities, such as the hospital I work for. As a diagnostic tech, I have been cross-trained in bone densitometry, CT and mammography. The need for this type of cross-training is prevalent in most of the hospitals in my area. More computer-related skills are required also and online training info is required of us.	1	.1
	Being part of a clinical setting that is used as a specialty rotation site for a hospital based rad tech program, I have encountered more students who have families, previous careers and many who are quite a bit older than my 35 years.	1	.1
	Biggest problem is equal access to electronic information and online materials by students. Also concerned about losing teacher-student personal interaction. Time-consuming to develop interesting material.	1	.1
	By being adept at multiple disciplines has gotten me many jobs in the past. Cross-training is very important out in the working world!!	1	.1
	C. and F. Procedures and techniques are constantly changing. Have seen resistance to change in many settings. I suppose this is human nature, but changing this mindset among radiology professionals is critical to good patient care. Also, need for profession-wide standardization of protocols seems to be a good thing. Have been a traveler for 10 years in many different settings and the application of even common procedures is different in every one, sometimes vastly so.	1	.1
	C. I do bone densitometry — acquired real machine VFA. E. Which means more education to do my job. Always updating education to keep current to meet standards of care.	1	.1
	C. I was a limited x-ray technician for many years and decided to return to school to get my full license due to the trends to go to digital x-ray. California. G. Recently took mammography class taught on film/screen but most places are digital. The licensure will be based on film-based technology.	1	.1
	C. Technology has changed in our department (i.e., CR-PACS). There is a need to understand this evolving technology. D. This is demonstrated daily in our department.	1	.1
	CE and competency of policy and procedure for safety issues worked out on the computer.	1	.1
	Certain outpatient imaging centers are training laypeople (receptionists, file room clerks, family friends) for jobs usually held by technologists, (e.g., MRI tech, venipuncture for contrast, assisting radiologists during fluoroscopic exams). The State of California does not seem too concerned about all this. I have also seen receptionists give babies chloral hydrate and be responsible for monitoring the	1	.1

	sedated patient. This goes on a lot out here in California.		
	Completed some online courses for my M.S. degree. Simulator therapists fuse CT and MRI images to aid in treatment planning in my department.	1	.1
	Continuing education is done a lot online. Also, when I was a student (I graduated in June 2005) the curriculum was behind the new technology and was behind on what exams were being outdated.	1	.1
	Continuing education, especially in the advance modalities is a must for technologists. It is their responsibility to acquire the best diagnostic images for the examinations the physicians request. With the advancement in technology, there should be resources available to the technologist so that they may utilize both their experience and expertise with the advance technology available to them.	1	.1
	Cross-training in all aspects is emphasized especially by management.	1	.1
	Cross-training of techs would increase their job security, as backup of more than one area is crucial.	1	.1
	CT simulation, PET scanning as part of treatment planning. I use online CE all the time and online journal access..	1	.1
	Currently, I am completing my B.S. in health arts. Online breast imaging in ultrasound is easier for me than other for other sonographers in my department because I used to be a mammo tech in x-ray.	1	.1
	Direct experience with all these trends as former chair of radiology department. Former director of schools of radiologic technology.	1	.1
	E. Information access skills are very dynamic, which requires the technologist to become highly skilled in retrieving and sending data through the use of various computer applications and vendor-specific software platforms.	1	.1
	Education is moving forward as a whole. Radiologic technology has lagged behind in professionalism for years and the need for better educated professionals will continue to be an issue for years to come.	1	.1
	Education points is how I learn about education trends.	1	.1
	Electronic access has made a tremendous positive difference.	1	.1
	Electronic forms of education - I have only recently joined the ranks of the R.T.s, so I feel that I can comment on the use of electronic forms of education, having just completed a course online within the last year. I did not care for the impersonal method of an online course. I feel that the younger generation is lacking in interpersonal skills, and in the medical profession caring for patients requires one to draw on the various depths of skills we learn from society as a whole. Unfortunately for us all, in time WE will be the patients, I feel that this trend will continue.	1	.1
	Electronic forms of education currently being used, from Web-enhanced to paperless clinical evaluations, in our program	1	.1
	Electronic information continues to be the trend in applications training. Most sites that I visit are in the process of making all medical records and x-ray studies electronic.	1	.1
	Everything is becoming computerized.	1	.1
	Evidence-based medicine involves all patient care areas. You must read literature to care for patients.	1	.1
	Experience/Learning on new CR and DR equipment. More emphasis on multi-modality usage.	1	.1
	Experienced multidisciplinary technologist — each new modality experience, enhanced both disciplines.	1	.1
	Flexible learning skills - DEXAS (computer software and testing) mammography - weekend workshop classes.	1	.1
	Flexible learning skills. – We just upgraded to a GE VCT 64-slice – We do 3-D imaging and some cardiac procedures.	1	.1
	Frustrating experience with PET CT and Pinnacle Fusion – Unable to accomplish, despite great input of radiation therapy.	1	.1
	G. Technology changes quickly in the CVIT field. I am currently using technology and equipment that wasn't even invented when I was in training. Much of the equipment is almost standard in most labs: IABP, IVUS, FFR, Rotablator, Cryoplasty, etc. Flexible learning skills are a must in this field.	1	.1
	Getting more CEU, online, more job opportunities if knowledgeable in more than one modality, encouraged to continue education for life, continue to gain more computer skills.	1	.1

	Had an online class on radiation protection. Many of my classmates felt we did not get a complete education with this format.	2	.2
	Have noticed that more and more items are electronic or online.	1	.1
	Have taught online courses and had technologists trained by online courses. Through lifelong learning have acquired computer skills and cross-disciplinary skills and instructed in multiple technologies and disciplines. Thorough command of basics and common principles needed to make the transitions both in skills and underlying thinking.	1	.1
	Having to get CE points through the internet cue to employers not fronting education seminars like they used to.	1	.1
	Here at the college, I have been using Blackboard in my education classes, Powerpoint sessions, integrating cross-sectional anatomy with CT with our nuclear med and radiation therapy students. The college also uses the Banner system, online resources for educators and students. I have been placing grades, etc., on these systems and students register online for all courses.	1	.1
	Hospital funds for radiation therapy education and travel are limited, making online training more important.	1	.1
	I've spent 40 years in radiology – Diagnostic neuroradiology, nuclear medicine and now mammography – We're expected to be flexible in more modalities, computer literate, etc. Frankly, by the end of 2006, I plant to retire – it's no longer rewarding or fun – too stressful.	1	.1
	I am a chiropractor who was granted advanced standing in a JRCERT-accredited program. I was a nontraditional student who did well on Boards.	1	.1
	I am a first year instructor in a B.S. degree program and I am currently pursuing my master's degree in radiologic sciences.	1	.1
	I am a multimodality applications specialist. The profession is constantly changing and staying current is always a challenge.	1	.1
	I am a multidiciplinary technologist registered in x-ray, mammo, CT and MRI. My primary discipline is MRI, but I am always reading/studying to try to keep up with our changing technology. I mentor one to two students per year in MRI and have used online study materials for them. Most of the students at my hospital are nontraditional students (second or third career).	1	.1
	I am a nontraditional (48-year-old) student enrolled in a Web-based course. I also have multidisciplinary training (radiology, ultrasound, mammography, CT, quality management) and credentials R.T.(R)(M)(QM). I have also worked as a preceptor and as the clinical instructor for a community college (associates program) at one of the hospital clinical sites.	1	.1
	I am a nontraditional student (44-year-old recent nuc-med grad).	1	.1
	I am a part-time instructor in a radiography program where we are trying to shift to a more Web-based learning. I'm also a CT tech on an off-shift who needs to keep up with current practices, but has limited access to daytime education, so I use the Web.	1	.1
	I am a program director and technology in our field is foremost, so it is logical to use it in teaching (WebCT, etc.). I currently am working toward my doctorate, so I highly value and encourage R.T.s and others to continue their education.	1	.1
	I am a program director at a private proprietary school. The instructors that I hire are so far behind in technology and how to teach that it is difficult to run a program and teach these individuals how to teach. Also, in education the compensation for teaching is so low in comparison to working in radiology that it is extremely difficult to attract qualified people. The trends mentioned above are real and I believe in the future that the way we have done business (personal or professional) is going to continue to change as fast at the technology is developed. Older technologists are just waiting to retire so they do not have to experience this change, but the change is not just in the profession.	1	.1
	I am a program director in a radiography school. I have experienced a number of the trends mentioned. The first of two that I have experienced the greatest number of times is the influx of nontraditional students, the average age of my first year class this year is 36.1 years. That is an astounding increase over previous years and seems to be continuing. The second is the importance of lifelong education. In the last decade I have completed my B.S. and my M.S. and am looking into receiving my doctorate. I am increasingly aware that the more educated and aware you are of new modalities and trends, the more able you will be to compete in today's job market.	1	.1

	I am a traveling technologist, registered in radiology and mammography. Most assignments are looking for people with dual Registries. MOST want MRI or CT experience. However, I do believe being duel registered has helped me get positions before.	1	.1
	I am always looking for better ways to present ,and to motivate my students. Using technology prevents boredom and gives the students more "virtual experience" than their textbooks alone. As the field is ever-changing, if we don't believe in lifelong learning, we will soon be left behind in a technology-driven job market.	1	.1
	I am an educator, as well as work part-time as an R.T. I see both sides of radiology.	1	.1
	I am an educator. The trends discussed have impacted my work. The educational field must keep on top of and adapt to the changes in our profession. The ever changing technology keeps me on my toes.	1	.1
	I am attending an online school presently to achieve my B.S.R.S. degree. I work in the commercial side of radiology and a bachelor's degree is almost a definite need today when employment searching. Also, the online school I am attending is experiencing tremendous increases in enrollment.	1	.1
	I am a clinical instructor for a radiography program. I have seen an increase in nontraditional or older students entering the program as well as a need for them to be able to find and access information quickly.	1	.1
	I am currently enrolled in an online master's degree program. I am multidisciplinary.	1	.1
	I am currently attending an online college to obtain my bachelor's in health arts. I prefer to participate in my continuing education efforts in an online format. It is easier, less time consuming and more cost efficient.	1	.1
	I am currently having to obtain CEUs for both my ARRT certification as well as my main field of employment as a CNMT. I am constantly trying to keep up with enough credits to satisfy the requirements for both of these certificates.	1	.1
	I am currently on the list to start an ultrasound program in my area so I am more marketable as an imaging tech.	1	.1
	I am currently taking courses for nuc med online as well as traveling. I am already certified in x-ray as well as CT and will be certified in nuc med within one year. I became certified as x-ray tech in 2001 and have been pursuing other modalities to further my education and understanding of medical imaging since then.	1	.1
	I am currently working on my master's degree and am taking online classes.	1	.1
	I am in the field of education. Currently, I am working on developing online training.	1	.1
	I am not familiar with any of these new trends. I have only worked with accredited institutions, two universities to be exact. In these institutions, people had to meet education standards, they were allowed into the programs and properly trained. I like that process, and I think that's the way it should stay.	1	.1
	I am O.J.T. in CT but not board certified — in fact, my former employer actively discouraged me from taking courses, documenting clinical experiences and other prerequisites to taking my CT boards. When I left that job, I had to take a huge pay cut and a 'demotion' back to general tech. Although not all employers are like that, I feel that having access to reputable online courses in cross-sectional anatomy, for example, would go a long way in helping those who are otherwise unable to take conventional coursework.	1	.1
	I am putting more of my courses online, requiring computer literacy in the classroom. I am finding it hard to keep up with the rapid changes in the clinic. The material for teaching is outdated. Many therapists are now doing CT simulation and tomotherapy, which has a CT scanner and a linear accelerator in one piece of equipment	1	.1
	I am taking online courses. A portion of our nuclear medicine technology curriculum is offered online. Certainly there is a focus on PET/CT technologists at the state level and a controversy over who can perform the scans. Approximately one-half of the radiography students enrolled at my hospital are nontraditional.	1	.1
	I am teaching more and more online classes. I have turned my traditional classroom into a computer lab where the students do more simulations.	1	.1
	I am the MR customer education manager for an equipment manufacturer. The need to provide education alternatives that are inexpensive and easily accessible is very strong.	1	.1
	I appreciate the ability to get the elusive CEUs online. Private facilities demand for multidisciplinary R.T.s for cost effectiveness. After 25 years in radiology, I am dealing with thyroid problems and would like more access to research in these areas.	1	.1

	I believe if you want to be considered a professional, you need to be a lifelong learner. Otherwise, what is considered a professional today will not be in five years, as the only constant in healthcare and technology is change. Get used to it and actively pursue it to benefit yourself, our patients and our communities.	1	.1
	I believe our imaging department would greatly benefit from cross-training, but for some reason does not believe in it.	1	.1
	I believe that facilities in combination with the huge change in health benefits is hurting the numbers of us to two times as much within each modality.	1	.1
	I come in contact with nontraditional students while doing applications.	1	.1
	I completed my B.S. in radiologic sciences online with Florida Hospital College of Health Sciences. Very favorable experience.	1	.1
	I currently am PD of a graduate entry-level radiologic technology program that targets career changers. All didactic courses are taught online. Average student age on admission is about 43. Education on admission ranges from baccalaureate to post-doc.	1	.1
	I disagree on Rembrandt education for techs. I know an ambulance driver who learned MRI with on-the-job-training and sat for the Rembrandt exam to get his registry.	1	.1
	I feel I have been personally affected by the lack of valuable electronic forms of education. So many sites on the Web today list bits and pieces, not value. Coworkers are frustrated with the need for multidisciplinary technologists but the unwillingness to pay for it.	1	.1
	I finished my bachelor's degree with online courses. I work in a college health setting and see the nontraditional students.	1	.1
	I finished my degree some online. Some cardiologists are getting CT scanners and want the x-ray techs cross-trained in cath lab/echo. By 2008, all managers must have a degree at Methodist.	1	.1
	I graduated in 1998 from x-ray school. The Mayo Clinic was just starting to go to a PACS and digital radiography. Seven years later our rinky-dink community hospital is going completely filmless. We did not discuss digital radiography when I was in school. This shows that we need to keep our skills up to date, learn how to learn in school and keep learning.	1	.1
	I had no experience with computer skills outside of hospital experiences. I now need basic computer training. I had to leave the field of mammography and am going into medical coding and billing. I believe being a multitasking and multi-experienced professional in the health field is a plus.	1	.1
	I have attended two colleges online. Am multidisciplinary, such as R.T., CT, and R.T.(T). Clinical Information System, abstracted information from charts.	1	.1
	I have been an R.T. since 1974. Transcribers have lost their jobs to be replaced by "Powerscribe" (voice recognized dictation) only to be rehired as "editors" because the radiologists and/or the system doesn't do what they are supposed to do! Seventy-five thousand dollar "PACS administrator" jobs are posted and filled with an R.T. And the checklists and QC end up being performed by a clerk who understands the RIS/Powerscribe/PACS better than the tech. It seems that sometimes the more education the person has, the less understanding they are of the daily operations. Experienced mammo techs (15-30 years) who are also ultrasound breast imagers do not seem to be able to become good ultrasound techs. They get by, but that's about it. The have lots of ultrasound education and are board certified. Some institutions have the radiologist ultrasound and a tech assist. Reports can be and are often shaded to give a vice president the answers he or she is looking for. There is never compliance from the staff for informat. [TRUNCATED FROM SOURCE]	1	.1
	I have been around the block, so to say, and I work as a multimodality tech. I believe in lifelong education as well as regular testing of skills. Working with students you see some of the backgrounds. Not all are healthcare. In my opinion, most programs, no matter the discipline, are not turning out competent techs who are ready to take their place in the workforce.	1	.1
	I have been directly affected by most of these trends on the job. For example, when I received my therapy certificate, most of my classes had information online. We only attended classes two days a month.	1	.1
	I have been enrolled in a baccalaureate program based in another state, which has permitted me, a busy full-time employee with a family of six, to pursue higher education at my leisure. Indeed all areas of education are being impacted by	1	.1

	advances in technology, so R.T. education is no different than other areas of education. My 1-year-old and 3-year-old are exposed to computers at their daycare and my older kids rely heavily on technology for their education.		
	I have been in radiation therapy for 20 years. As an educator in the field, all of these issues are evident in our profession. There are radiation therapy programs that are not JRCERT approved opening up in my state and many of the individuals applying for R.T. in these non-B.S. programs have no background education, nor any communication or patient contact. This will affect how the health care industry functions and who is taking care of us as a population.	1	.1
	I have been most affected by Trends A, C, D, E and G. Technological advances have virtually changed the way that every class is taught. Online course management tools, hybrid courses and distance learning are now part of the regular curriculum. Students must have a broader range of computer skills to survive in the current educational environment. Students must also be more independent learners. The knowledge base for the profession continues to expand at a rapid rate. It is impossible to teach students everything within their program of study. Students must be capable of seeking out information on their own.	1	.1
	I have better job security due to multitasking.	1	.1
	I have completed some education requirements online — x-ray equipment has changed dramatically since I have been a tech — so the need is there to be flexible to learn it.	1	.1
	I have continued with my education to further advance myself. I have been in MRI for 19 years and became bored when I was an MRI tech for a mobile unit for many years. I attended the Weber State University Radiologic Practitioner Assistant program and also graduated from nursing school through a community college. I am looking for an RPA position, though now I work as a per diem MRI tech.	1	.1
	I have definitely become more computer literate. A large part of documenting and treating patients is done in conjunction with computers	1	.1
	I have had no direct experience.	1	.1
	I have had significant experience with these trends. I work with students who are trying to obtain a B.S. degree in radiologic technology. All of these trends are becoming increasingly important. Our faculty are looking at ways to incorporate these skills into curriculum. The workplace is demanding that students have more and more of these skills in order to be prepared to function in departments.	1	.1
	I have had to school myself in the use of electronic tools for learning. I had my first computer in 1995. Most of my students have had computers since they were in the first grade, and students today often prefer using computer programs to assist in learning, such as Mosby's Evolve programs. It has taken a lot of extra time for me to become better skilled in setting up these programs.	1	.1
	I have not been affected by these trends significantly. However, I am looking to enhance my skills and I am finding it hard to do so. I work full time and have other responsibilities. This prevents me from attending school traditionally. I have been looking for an evening program or even an online program where I can cross-train in other modalities, but I have not been successful.	1	.1
	I have personally offered and taught online classes in advanced disciplines and used online aids in general coursework. I have had to change my teaching habits due to changes in student populations and demographics.	1	.1
	I have personally used online education for continuing education credits thereby eliminating the need for costly travel. Lifelong learning is being emphasized as an important factor in patient safety, and it has impacted the practice of medicine as a whole with the return of mandatory continuing education as a part of credentialing for physicians and also for technologists.	1	.1
	I have used online education. I work in two modalities.	1	.1
	I utilized multidisciplinary technologists to improve overall operational efficiency and effectiveness when I was serving as an associate radiology and cardiology director within the Ohio State University Health System. Influx of nontraditional students (such as non-R.T.s in MRI and ultrasound) are essential as we respond to and anticipate the changing needs of our health care. Non-R.T.s already perform MR exams in various parts of our country. I welcome this move.	1	.1
	I have worked in radiology for 40 years, and the major change is need of computer skills. Your employer usually takes care of this training. D. Students are older and	1	.1

	starting second career.		
	I just graduated from college with an associate degree in radiography. I attended a commuter college and 35 out of the 42 who were accepted graduated. Only one of my classmates was directly out of high school. About 10 of us were in our late 20s or older. Many of the rest of my classmates were 22 to 23 years old.	1	.1
	I just graduated in December 2004. I have moved from diagnostic imaging to CT. Doing the move so soon out of school…. Learning skills and good appreciation for new technology helped me achieve this goal.	1	.1
	I now do PET imaging on weekends in order to stay up with current technology.	1	.1
	I personally take advantage of online education. For the past three years, I have covered both diagnostic/CT for the entire hospital on the night shift when the part-time diagnostic technologist is not working. I believe in being a lifelong learner.	1	.1
	I personally use an online site for CE. I know the field is changing and the only way to keep up with it is by constantly educating myself.	1	.1
	I really like electronic forms of education. I'm able to make it fit into my schedule a lot easier than attending meetings.	1	.1
	I really like the use of electronic forms of education.	1	.1
	I received my B.S. in radiologic science online via the Florida Hospital College of Health Sciences and am currently pursuing my M.S. online via the California College for Health Sciences. I am a radiology program director, so I deal with students and their needs every day.	1	.1
	I recently became a clinical coordinator for a radiation therapy program and I think that the increased use of electronic forms will be the norm rather than the exception. Sites lose track of their forms or run out of them, therefore when it becomes urgent for them to fill out forms, I have to fax them or send them as an e-mail attachment. There is an increasing need for technologists to be multidisciplinary. In the field of radiation therapy, our students learn how to simulate using CT and learn how to localize the prostate using CT or ultrasound. Companies are producing equipment with more and more sophistication, for example, PET/CT and tomotherapy. This is great, but if you don't have access to the new technology you become less marketable and your skills become anachronistic. As an educator you fall behind too and the students become more marketable than the educator. Lifelong education is not optional given the advances that continue to take place in the field.	1	.1
	I recently received my M.S. from MSU and did the majority of the work online or on the computer and then submitted it via email. A research course and paper was part of the MS program, and so I am now more aware of research and its results. Many of our students are nontraditional students — they are somewhat older, more mature and more focused. However, our students are not as culturally diverse as I am reading about in professional magazines. Most of our students are very computer literate and know how to access information via computers.	1	.1
	I see the need outlined by my superiors to be multi-task trained to be more marketable within our own facility. I have seen more nontraditional students enter our hospital-based school of radiologic technology over the past 10 years. I was one myself in 1990.	1	.1
	I strongly believe there should be more education on the multi-fields of radiology!!! I wish there had been when I went to school, 15 years ago!! At least spend a little time on the most commonly used specials to give students a general idea of what all is involved!!! I believe that would probably influence more students to specialize from the beginning!!!	1	.1
	I submit my CE credits online and I have been told by almost everyone in the radiology field that it is important to continue your education. I also feel it's important so I can be up to date with all of the new technologies and advances within the field.	1	.1
	I teach both medical terminology and radiographic pathology entirely online. Radiographic physics and imaging are classroom/lecture based but are enhanced by online materials.	1	.1
	I think doing the CE credits online is great..	1	.1
	I use high levels of technology in my classroom. I know of others who do the same. I am multidisciplinary (R, M, QM, CT) and know I can get a job anywhere.	1	.1
	I use online continuing education courses to maintain my CME requirements. Many of the technologists I work with are cross-trained in multiple disciplines. We often use journals, conferences and Internet information to stay up-to-date on current ideas and	1	.1

	practices.		
	I use online CME. B. Mammographers are training in ultrasound. C. My coworkers are pursuing advanced degrees. D. Our ultrasound students may be dental assistants. E. Department has new PACS. G. Our new ultrasound units have technology with which I was unfamiliar.	1	.1
	I use the computer for CE and I need to continue my education, so I will keep my ARRT.	1	.1
	I was "trained" in MRI and a radiologist wanted me “educated” in MRI.	1	.1
	I was a nontraditional student entering the field. I'm currently going to school working on a B.S. I work in an OR, so we are always doing new exams with new technology; spine navigation, for example.	1	.1
	I was a nontraditional student, starting radiography school at 49 years of age and after having owned/operated a retail business for 25 years.	1	.1
	I was a nontraditional student. Having taken the VI registry, it is apparent that the information in academia is not current with practices in the IR labs. Our radiology department has been filmless for three years, and our patient information and charting has been completely electronic for one and a half years. I have seen many nurses and doctors who cannot navigate the computer system and the programs they need to use to document patient care, order labs, order imaging and communicate with the pharmacy.	1	.1
	I was a nontraditional student, (second career, middle age). I am now beginning to cross-train in another modality.	1	.1
	I was a nontraditional student. I graduated at the age of 48. I found age discrimination in trying to get a job. Very few employers value life experience.	1	.1
	I was an applications specialist for years and personally found that online education is becoming more accepted. The medical imaging field is changing daily, and it is important to stay current on the trends and changes outlined above.	1	.1
	I was considered a nontraditional student, going back to become an R.T. at 35-years-old.	1	.1
	I was enrolled in ultrasound school two years ago. My classes are online, but the practical part is in the hospital. The ultrasound techs in the hospital are not much help, and when I told my teachers online about my predicament, they just keep saying "It will make sense as you go on." I think I don't have much faith in myself, that's why I quit. I like the old way of teaching, in the classroom.	1	.1
	I was just an MRI tech, but having the problem to find a better position, went for nuclear medicine with PET/CT. Now I have two jobs doing all three modalities. I heard about fusion of MRI with PET (Brookhaven National Lab), which is coming soon for routine performance	1	.1
	I was recently shocked when I heard, and then later read, that a sonographer doesn't have to be an R.T. first.	1	.1
	I went to a one-year MRI program to increase my modality experience.	1	.1
	I work at a clinical site for the local college that has a growing radiology program.	1	.1
	I work for a medical imaging/treatment planning systems company. We develop new tools and uses for the tools everyday.	1	.1
	I work for a mobile facility. We scan our films and send them to radiologists via computer and receive our reports on the computer..	1	.1
	I work for GE Healthcare and all CE credit programs are online. No paper credits are issued. I have also seen the need for cross-trained CT/PET techs on numerous occasions.	1	.1
	I work for various clinics within a health system and the trend at this particular system is to learn phlebotomy in addition to rad tech skills. Also EKGs and halter monitor placement.	1	.1
	I work in a cardiovascular lab that performs cardiology and interventional radiology procedures. Things change very fast (technology, i.e., stents, cryogen balloons, 64-slice CT, etc.). One area that has changed dramatically is peripheral vascular work being done by cardiologists, radiologists and surgeons.	1	.1
	I work in a clinic that has students from the technical college, so I see firsthand the type of students coming into the profession.	1	.1
	I work in a rural 50-bed hospital and all of the techs are multimodality.	1	.1
	I work in a satellite clinic that is part of a large multidisciplinary hospital system. The way that most things are communicated to us is electronically and the Internet. I was	1	.1

	never educated this way and it took a lot of adjustment on my part to feel comfortable with this way of communication.		
	I work in an interventional MRI suite. We will soon have PET/CT integrated into the suite; it would be very helpful for my techs to have multidisciplinary skills to make the suite as efficient as possible.	1	.1
	I work in Montana where large medical facilities are long distances apart, trained technologists are few, economic resources are scarce for employers and schools are scarce.	1	.1
	I worked in mammography for five years. IN THAT time, I saw changes that directly affected patients. As mammographers, we were also certified to do clinical breast exams. We were also being grained to do breast sonograms as well.	1	.1
	If you are multidisciplinary tech, you have the ability to help out with as many needs as need to be filled.	1	.1
	In a 25 year radiology career, perhaps 75 percent of what I do now is new since my original residency and fellowship training.	1	.1
	In addition to teaching, I continue to practice on a part-time basis. I have seen how much of the hands-on comprehension of treatment strategies have become more virtual, and it is very difficult to educate students using virtual scenarios. I see more nontraditional students with limitations on commuting, and the educational program has had to implement distance learning strategies to maintain accessibility.	1	.1
	In order to advance in work, you must have more modalities under you belt.	1	.1
	I n our facility, we cross-train in both breast and ultrasound. I have also seen a trend toward any management to have not only the experience, but the higher education such as a bachelor's degree as well as a master's. In my field, there needs to be more research report on film screen vs. mammography.	1	.1
	In our MR/CT practice, it is essential that technologists be more than button pushers, they need to understand anatomy, disease process changes. And the need for continuing education is essential to being an excellent technologist.	1	.1
	In September I was asked by the department chief radiologist to learn breast ultrasound. The mammography department started having mammographers do ultrasound November 2004. The two techs doing it since then quit a few months ago. I am the only one doing it now. The last hospital I worked for said they would never have a mammographer doing breast ultrasound. Is this a trend growing across the country???? I would like to know if I am learning this for a long-term skill. Please let me know.	1	.1
	Increase in nontraditional students applying to our program.	1	.1
	Increase in nontraditional students applying to our educational program.	1	.1
	Increased need to understand and have the ability to use new technology for older staff. Just to be able to use a computer for worksheets, filling out forms and updating licensure.	1	.1
	Increasing demands for 24-hour service with decreasing reimbursement causing hospitals to decrease use of on-care staff increase cross-training.	1	.1
	Increasing demands on technologists are outpacing salaries.	1	.1
	Increasing health care costs. Managers are increasingly aware of needing a tech who can really multi-task. Personally, my level of education and constant CE are what keeps me marketable. Flexibility and education are increasingly important. People expect to get what they pay for, so with increasing costs should come with increased professionalism and skill.	1	.1
	Increasing need for multidisciplinary technologists does not seem to carry over to radiation therapy	1	.1
	Increasing the need for multidisciplinary , being a woman, to go and pursue for my mammography licensure. Better opportunities, more choices.	1	.1
	Influx of nontraditional students. I've noticed the "trade" schools, for example an MRI program that accepts non-medical students and offers its own test or certifications. These individuals are not routinely qualified or trained well enough to work effectively in the radiology field.	1	.1
	Influx of nontraditional students: too many students flooding the market from accelerated programs, not being a well-rounded technologist.	1	.1
	Influx of students in ultrasound schools with no medical background. They have some degree but often in other fields. I have personally experienced these students with many struggles. I feel only R.T.s should be put into these schools.	1	.1

	Integrated PACS and radiology info systems are coming fast, even to small hospitals.	1	.1
	It helps to have access to CE online. It's difficult to get funding and time away from the job to attend seminars, which tend to be costly.	1	.1
	It seems evident that the new technologies that technologists are using are not being fully embraced by schools. It's as if they aren't positive that these "new fangled" things are going to catch on. The schools don't like that CT planning and IMRT are mainstream, and heavily used. Learning the old way is necessary as a learning tool to understand the new, but I feel that too much time is being spent on the old and not enough on the new.	1	.1
	It seems that you are hired more quickly if you are cross-trained in more than one modality these days. I was cross-trained in CT, mammography and diagnostic radiology, but never challenged the registries because of family sickness in both parents, then myself. Now I am 44 years old and only a diagnostic technologist. Cannot find a job outside of the hospital because I am not cross-trained in more than one modality. It is very discouraging. I am currently enrolled online for my B.S. in radiology. I will graduate in two and a half years. I hope to teach when I graduate. My health will not allow me to continue to work in a hospital setting. I love radiology with all of my heart, and hope that I will never have to leave this field until I am no longer able to work!	1	.1
	Journals and job searching.	1	.1
	Lifelong education is fundamental in my field of MRI research. Technology and the things we can do are changing constantly with each new idea, upgrade and wip that comes along. Pushing buttons is not an option in this field. Nothing is standard, so information and training are essential on a continuous basis — from physics to computers.	1	.1
	Lifelong learning has always been my goal. I also see the need to be multimodality experienced, both for staffing needs and to bring to the profession a more complete technologist. I personally read all I can on the modalities that I don't perform, as well as the ones I do perform. Information I learn can be utilized in my own work as well as provide information to patients and other coworkers/healthcare providers.	1	.1
	Limitations in institutional policy regarding distance faculty consideration for full-time appointment are bogged down in the traditional mindset. Change is difficult for the current powers that be.	1	.1
	Lots of students of different nationalities, and computers going into CR and PACS.	1	.1
	Make your survey easier and more simple. I do not have time to spend on this. Thank you.	1	.1
	Many CMEs are easily available online.	1	.1
	Many experiences as a program director with nontraditional students, dislocated workers, etc.	1	.1
	Many nontraditional students. The face of radiologic technology education has changed dramatically.	1	.1
	Many techs at the hospital where I work are being crossed-trained in at least two modalities. I myself am being trained in CT to go with my x-ray training. My brother has had x-ray, CT and MRI.	1	.1
	Master's - online mammography – online.	1	.1
	Master's degree requirement for current position.	1	.1
	More and more nontraditional applicants to program.	1	.1
	More and more of the students we are receiving are from colleges are older, have raised children and are now into a second career. We are required to be multimodality at our small hospital. I myself do CT, mammo, x-ray, and DEXA!	1	.1
	More flexibility for students.	1	.1
	More in-services and continuing education opportunities. More incidence of students who are changing careers. Increasing use of computers to access info. Rapidly changing service delivery systems.	1	.1
	More nontraditional students. Attendance is poor for childcare issues, so quality of education suffers. College emphasis on online education, but in healthcare profession I have found this does not work. For general eds it is OK; i.e., English, medical terminology, maybe psychology.	1	.1
	More online education available through ASRT is a terrific trend that I know will continue into the future.	1	.1
	More requests are being made by nontraditional students for online education	1	.1

	programs.		
	Must implement programs to have a multidisciplinary team for cardiovascular imaging (MRI, CT, nuc med).	1	.1
	Multidisciplinary/cross-training is very important to keep radiology departments staffed and give techs a good opportunity to experience other areas to determine likes and dislikes. Keeps techs.	1	.1
	Multitasking and versatility are increasingly important, along with multidisciplinary imaging.	1	.1
	My current facility has gone through transition to include digital, CR, PACS and a paperless system.	1	.1
	My current position was only available to someone who was dual registered in ultrasound and radiography. In my ultrasound program, a large amount of class work/communication was performed online.	1	.1
	My department has recently installed CR equipment. Much training was necessary to prepare the staff for this technological change.	1	.1
	My facility is in the process of going entirely paperless. Step one is the medical record. It is planned to be completed in three years.	1	.1
	My frustration is that at our large hospital we are not encouraged to be multidisciplined. It is not encouraged at all. You learn one modality, then you do that modality. The explanation given is that, "This is how we've always done it." I think it would decrease turnaround and decrease training periods if everyone did x-ray and trained in one modality during slow periods.	1	.1
	My hospital converted into an LTACH in September 2005. Mostly those with multimodality skills were offered jobs in this new environment.	1	.1
	My institution encourages the faculty to consider distance education.	1	.1
	My institution is a teaching facility as well as research and innovation. Having said that, we constantly are implementing new procedures and exams to keep up with the technology.	1	.1
	My office computer system changes software quite often. How I access student records, control spam, submit grades, interact with colleagues, etc.? All via computer is evolving and changing continuously.	1	.1
	My x-ray physics class was online and on campus...all tests were done online and were set up like a mock-board exam.	1	.1
	Need for techs to be multidisciplinary, extremely important from a manager's point of view. I do not agree that lifelong education makes techs better. I believe they continue to grow professionally due to their own desire and the example set for them.	1	.1
	Need for more emphasis on flexible learning skills, and on basics. I have seen the need for this skill for many years and I have noticed that the therapists with these skills adapt to change more quickly and learn it to a greater degree.	1	.1
	Need to increase enrollment. Only way to do so is to increase clinical, which will need to be done with distance education techniques.	1	.1
	New advances in the clinics are more progressive than the knowledge of the vendors or textbooks. Lack of resources is very frustrating, especially when the educator wants to be the frontline resource.	1	.1
	New equipment requires computer skills. In radiation therapy, we have had to learn BAT and CT procedures as well as new technology within the field such as merge MRI and PET scans. Lots of change that will continue.	1	.1
	New technology, such as IMRT, HDR brachytherapy and BAT have been introduced as therapies in my radiation oncology department. Radiation therapists need to train to use these therapies correctly. Continuing education is an ongoing process in my department with weekly lectures/conferences for radiation therapists.	1	.1
	No.	1	.1
	No experience with new digital, but will be learning CT. Scary after 26 years on manual machines.	1	.1
	Nontraditionals taking jobs from traditionals for less money!	1	.1
	Obtained a master's degree in training and development with a concentration in learning technologies where I personally experienced some of this trend. Otherwise, I have direct experience as the program manager in a AA5 degree in sonography and at a community college.	1	.1
	Online Directed Readings make it much easier to keep up on continuing education. PACS - needed to be willing to make new changes. Several of our radiographers at	1	.1

	other clinical sites left their positions since they weren't willing to learn new computer screens and the new processing system...old dogs...new tricks.		
	Online education with my employer. In my career I am constantly asked to learn more skills.	1	.1
	Online master's degree programs.	1	.1
	Online skills tests such as blood born pathogens, fire and safety, HIPPA, etc.	1	.1
	Our hospital has gone digital and the technical application technologists were really of no help with the acquisition of the image, just the manipulation of the image by the computer. We have compromised exam results while we've been in the learning curve. I have 30 years experience, and if the application specialist cannot tell me a technique to use "because the computer will make the adjustments" and even the phototimers don't routinely meet the 's' number parameters — what's a tech to do? These computer enhanced images are not always the best and the 'art' of our profession has been robbed from us, enabling the nonregistered technologist to prevail in the workplace.	1	.1
	Our hospital is going through 'catch-up' technology. In September we got CR and de-installed our old CT. Beginning of October we learned how to use a 16-slice Acquillin. In December we get RIS and January we get PACS.	1	.1
	Our lead therapist and I are contemplating buying a homestudy on CT scanning to be better simulation techs. ASRT offers it with approved Category A CE credit.	1	.1
	Our program does have online courses and students would like more electives. They want to be out of the classroom. The influx of nontraditional students is apparent and presents challenges with communications. We have discussed possibilities with our English as a second language department to help those students understand terminology better. So far, we don't have any specific courses, but the need is increasing. The use of computerized imaging is having a major impact on basic curriculum and it does seem that we need more flexible learning skills.	1	.1
	PACS and digital integration not only in larger hospitals but also in independent clinics.	1	.1
	PACS degree - various sources - via temporary tech positions.	1	.1
	Paperless and filmless radiology departments.	1	.1
	Personally, I have dealt with professionally with B and C quite a bit. I work in a small office setting that demands more skills from me.	1	.1
	Personally involved in radiologic technology education. Currently doing computer testing, blackboard assignment, online education, etc. In keeping up with job market trends, it is evident that multidiscipline experience and education is the way of the future. Planning curriculum changes to involve more multidiscipline certifications in the radiologic technology program offered.	1	.1
	Presently, new in this field so everything is learning,	1	.1
	Pressure from supervisor to cross-train.	1	.1
	Professionally, I myself was a nontraditional student. I went back to school at 30; x-ray/CT.	1	.1
	Re Online education: At my college, faculty are getting HEAVY pressure to develop classes/programs in an online or hybrid (half online/half face-to-face) format. This is the only area our college has seen any growth in the past few years. Re Diversity Training: Because minorities are underrepresented in the field, workers need more training than provided by the schools/curriculum to provide sensitive interactions with our increasingly nonwhite clients.	1	.1
	Received R.T. as a divorced, single mother. ASRT CE credits online being multidisciplined makes for more marketable employee.	1	.1
	Recent graduates are being cross-trained to address the CT staffing needs in our facility. Training is often brief and likely performed by under-qualified personnel. Concerns among seasoned technologists are rising because green techs who have yet to get their x-ray legs are being thrown into increasingly complex technical situations. It appears the "warm body" syndrome is taking hold at the expense of patient safety and for the sole benefit of the bottom line. Multidisciplinary doesn't always equal "qualified."	1	.1
	Refer to above statement. Many college-based educators do not hold doctoral degrees. It is almost impossible on our campus to be considered "real" educators without a doctoral degree and a history of publications. To be promoted one has to write grants, do research, sit on committees, do community work, have office hours and be an outstanding educator. Time and the money to pursue a doctorate seem like	1	.1

	a dream to me.		
	Renewing ARRT online with credit submissions.	1	.1
	Seeing more nontraditional students in our program. Radiation therapy departments are increasingly using electronic and paperless forms of charting and documentation. Lifelong learning is a must to keep up with the rapid technological changes. Research results are important as a reference to providing a good education and the basis for critical thinking in the profession.	1	.1
	Started as an R.T. hospital! Trauma has CT MRT registry! Am working as a CT sim tech at a cancer care center?! Never trained in this, never knew about this, would like to have had the one year extra while I went to school for radiation therapy! Too late. What a waste of the profession. What an untapped resource; you don't know what you don't know! Too late!	1	.1
	Students definitely need to be lifelong learners and critical thinkers due to technology and rapid changes in the profession.	1	.1
	Students entering the radiography programs now have their master's degrees. So, in the classroom, I teach to students two years post high school, those with some college and those who have their bachelor's and/or master's degrees.	1	.1
	Subject matter too broad to address this way.	1	.1
	Teaching DR and CR, PACS, when the technology is so new that you as an educator have not had the opportunity to learn it so you can teach it.	1	.1
	Technologists need to be more aware of the discipline of radiology. We need more research studies performed, and need to be required to take the additional registries for our specific discipline, i.e., MR needs the MR registry etc.	1	.1
	The computer industry has changed a lot of things over recent years: allowed more capabilities for exams in nuc med; PET scanning; MRI scanning; PACS filmless systems, etc. Professionally and personally, a person must be flexible and continue to grow and adjust and change to meet the changing demands of the medical field as well as our world. (I would consider “online education” good only for continuing education type materials.) General education is worthless without good CLINICAL experience; and it is easy to tell when a student has not had that clinical experience. I have seen small hospitals go with "multidisciplinary training," but larger hospitals don't use it. (Too much work in one area and too much specialization in complex exams.)	1	.1
	The demand for online courses continues to grow. There has been a tremendous influx of nontraditional students over the past several years. This becomes quite a challenge to educators, not only in the classroom, but in the clinical setting. Clinical staff quite frequently do not understand the needs of these students and tend to compare education today to "when I was in school." We receive many inquiries regarding post primary courses for individuals looking to become "multidisciplinary," and from employers trying to make their staff more multidisciplinary.	1	.1
	The electronic forms of education are great. Accessible 24/7 with immediate proof of CE.	1	.1
	The field of medical tech is evolving from the traditional one person, one job, to the need for one person capable of understanding how each function interrelates in patient care and the ability to perform in other aspects of that care.	1	.1
	The hospital I work at has turned to computerized and digital equipment. Also the use of PACS. We have to go through a long process of training and learning of these new technologies.	1	.1
	The JRCERT requires all program directors to have a master's degree by 2009.	1	.1
	The need for more highly skilled technologists is at a great demand right now because of the increasing technical applications with CT. To be specific: cardiac imaging, PET/CT, fusion studies. The overall skill level of technologists nationwide has not kept up with level of advanced applications.	1	.1
	The need for more knowledge in CTAs at my hospital in particular because of the referring physicians' demands.	1	.1
	The need to be able to acquire additional information & education from online sources is critical. In today's atmosphere of do more with less, formalized classroom training becomes difficult at best.	1	.1
	The new students I have worked with do not have direct work experience do not seem exposed to patient care or experience dealing with exams or patients.	2	.2
	The trend that I have been impacted by the most is the increased use of electronic forms of education, including online. I currently teach online and am in the process of	1	.1

	earning a master's degree in educational technology. The use of technology in education is without a doubt a trend that will only increase as time goes on.		
	Because of different lifestyles, there are more and more students entering medical imaging fields as a second and third career. Because of these different lifestyles, distance learning is becoming the choice of more students.	1	.1
	There is a definite advantage to being multimodality.	1	.1
	There is a huge need to offer basic education on digital imaging. A great majority of working technologists received their education before digital was in use. The equipment manufacturers do not provide sufficient background education for the technologists to appropriately or efficiently utilize the equipment.	1	.1
	There is an increase in skills needed in radiation therapy concerning computers. The sad thing is the students learn to use all the new and great technology out there, and then fail to understand the concepts behind what they are doing. This causes major mistakes to happen.	1	.1
	There is a lot of push to develop as many online courses as possible	1	.1
	To stay current in radiology market education is a must.	1	.1
	Trend A : I believe online forms of education are a poor way to learn patient care, which is a hands-on mode. Trend C: I have earned a master's; no increased recognition or pay.	1	.1
	Trend B: I am currently studying to sit for the NMTCB certification in nuclear medicine to be qualified for PET/CT scanning.	1	.1
	Trend E: Changing jobs, new hospital. Need to be able to adapt and learn a new computer information system quickly.	1	.1
	Trend E: As an MRI tech, I need knowledge of where to search info on nontraditional exams. Trend C: Get CEs online. G: As MRI technology changes, our computer programs update and we must learn new technology for exams.	1	.1
	Trend G: As an apps specialist, I feel there is a little or no effort made on part of some imaging people. I use the term people as doctors and imaging centers forced to hire non professionals who are to push buttons with little or no medical background.	1	.1
	Two years ago, I read how MR will become a stand-alone modality. At the time I was concerned about the future of the diagnostic R.T. Today MR is stand-alone. I am still concerned. What will be the affect of the shortage of educators as technology continues its rapid advance? On-the-job-training has gained in stature. Technology is growing faster than programs to teach it. Though new to education (just in my third year) I have noticed a trial by fire approach to program development. Currently, I am in the process of updating my program (the equipment is not very desirable) and looking to develop other programs as well, but it still amazes me to see programs that have no energized equipment and we talk about PET/CT. This spring I will be introducing pathology as a supplemental writing skills class to enhance the students' communication skills and standardize quality improvement across the curriculum campus wide. The average age of my students is 30-something.	1	.1
	Unfortunately, as with CE, the tech is the one who bear the cost of all of the above. To date, very few hospitals or clinics offer any sort of help toward keeping up with technology!	1	.1
	Use of Internet for info.	1	.1
	Using online materials and course instruction. Average age of student rising. Requiring computers for students who enter program.	1	.1
	Using PACS, daily.	1	.1
	Utilizing the Internet for CE classes and new practices within modalities allows a tech to stay up to date with information without having to travel.	1	.1
	Vendors have online education opportunities. We are starting a multimodality position. I work at a teaching hospital and see the students. We are heavily invested in PACS and use several programs to access information, including the Internet.	1	.1
	We all need lifelong learning. I am currently teaching a class, working in a hospital and finishing my B.S. degree. Our profession changes, and can change rapidly. We all see more online testing and learning. (At my current hospital and in college online courses.) There are more students who are on their second or third careers. (Nontraditional students as myself.) As a multidisciplinary employee, I am more valuable to the institution. Also, it is an advantage when staff cuts are made in one area.	1	.1
	We all need to have at least a "BASIC" understanding of future radiology trends.	1	.1

	We are an all electric system. Using techs that are cross-trained in many different modalities.	1	.1
	We are just starting to incorporate some online educational offerings into the curriculum, and distance learning is a not-too-distant goal for us.	1	.1
	We are moving to paperless medical records and already have a filmless radiology department. I am going online more for education.	1	.1
	We had to train someone non-ARRT to do MRI at our facility so that we could take time off from work.	1	.1
	We have a student program and are experiencing older students; males starting second careers and single mothers.	1	.1
	We have graduated many nontraditional students. Our program began in 1991. Our first class graduated in 1993 and one of the first graduates is going to retire in December of 2005.	1	.1
	We have reorganized our department to foster interdisciplinary collaboration. We are also slowly changing all paper records into electronic records. Every year more of our courses and CE offerings are made available electronically. Finally, our state is experiencing one of the most rapid growth rates in Hispanic population.	1	.1
	We keep up with the latest technology, which requires the therapist to be multi-disciplinary. We also have an online radiation therapist program	1	.1
	We now have a career ladder at work. The more experience and modalities you know, the more pay you get. Before, our pay was based on years of service.	1	.1
	We went paperless 2.5 years ago. A big challenge. Our clinic mandatory learning zone is electronic. We are an internship site and also have student observers from two local colleges.	1	.1
	When I returned to school to complete my MBA (1999), I was shocked by the push from the university to take advantage of the online degree programs and classes. I am also acutely aware of the online programs available for R.T.s. Like anything, it has an up and down side. Online access for continuing education is one thing, but to think we are foregoing immediate confirmation of knowledge gained through classroom collaboration may be more of a hazard to us in the long-run. I hope we find a healthy balance.	1	.1
	Where I live in Tennessee, there where only about three colleges that offered a radiology degree/certificate. Therefore, several students that I attended class with would drive up to two hours just to attend these classes. I understand that some people do prefer to have an actual teacher standing in front of them, but there are also some people who would be willing to take online/virtual courses.	1	.1
	Where I worked before, we cross-trained, which opened many job opportunities for one. But since I've been at the hospital I work for now, no cross-training and I've lost a lot of skills. (That's very upsetting to me.) Also, the hospital I'm at now doesn't do a lot of continuing education.	1	.1
	While it doesn't apply to my current position yet, I have encountered the importance of multimodality skills in my previous job, which included general radiography, CT and MRI.	1	.1
	With the increasing in all forms of technology, it is necessary to educate ourselves and our students to be fully competent in the field of radiography.	1	.1
	With the increasing trend of outpatient facilities, I am seeing a need to cross-train into other departments. Over a year ago I took a new job that required me to train in the lab. I was told I would just need to help with the overflow by drawing patients. I have since discovered that not only do I need to draw the patients, but I also need to register the patients, put in the orders, draw the patients and then run some of the tests.	1	.1
	Worked in radiology as an R.T. for 15 years and then worked in sales, radiology products, for 15 years.	1	.1
	Working in a corporate health care IT environment, it is apparent how quickly technology is changing. Cost effectiveness allows online technology to be utilized and corrected easily as the dynamic structure of health care changes.	1	.1
	Working in a smaller hospital, we need to be doing several disciplines. CE is always important to stay abreast of the changes. We do a lot of our communication after hours via teleradiology.	1	.1
	Working in industry. It's imperative to keep up with education in the radiology field. However, increasingly it is up to me, and me alone, to get that education/information.	1	.1

	Electronic is paramount and drives E.		
	Working in the PACS field, we need R.T.s who have experience in several modalities as well as IT. These types of R.T.s are in short supply. As an R.T. working for a company, I am constantly educating myself across all modality areas; in IT, in presentation skills, in change management, training skills, etc.	1	.1
	Yes, as an educator I am the last to be trained in a new modality at the clinical site. All of my knowledge comes from attending professional meetings and reading. Too bad there isn't a method to offer hands-on educational, new technology seminars to educators PRIOR to all the students knowing how to do it.	1	.1
	Total	842	100.0

Workflow Area

7. If you have had direct experience with or have been affected by any of these trends (professionally or personally), please describe that experience briefly.

Response	Frequency	Percent
Blank	642	76.2
1. Have used the nighthawk system. 2. In hospital, our department was constantly compared to productivity modules.	1	.1
1. The physician group (cardiologists) opened their own OP imaging center, and then decreased our business by 60 percent. 2. The radiologist group broke up, causing our radiology department to begin using Nighthawk services. For the most part it works very well.	1	.1
1. Use nighthawk RA on-call coverage. 2. Increasing use of image technology by now Radiologists are major concern. 3. Multidetector CT scanner increases.	1	.1
2. Imaging centers have started up within the past 18 months.	1	.1
Four years ago the facility where I worked instituted a 7/70 shift, which at that time was progressive. I have moved to a different state and on a variety of employment apps many odd shifts are listed. (One listed nine options to check as a preferred shift!) The trend seems to be a more flexible in an effort to appease techs and provide better coverage.	1	.1
A. Nighthawk can expedite care of patients by decreasing large time of interpretation and access to personnel for interpreting.	1	.1
A. Regular use of nighthawk, a positive experience. C. Decentralization, performed locums at a facility. I had reserved feelings about quality of care issues. D. Decreased scanning, patient throughput comes from other efforts despite sacrificed scan times.	1	.1
A couple of clinical education sites have radiology assistants with whom our students work. 6D is a confusing statement. I do know that with our DR facilities, the decreased imaging time is increasing throughput and it is managed well.	1	.1
A good number of the hospitals in this area "nighthawk" to a central hospital. It leads to staff frustration when other physicians are unable to speak to a radiologist. Many administrators feel that because scan time has decreased, staff can be cut, leading to poor patient care.	1	.1
A. Have used Nighthawk services in several different hospitals. C. Rotated through both hospital and clinical facilities. D. Use of multidetector scanners in CT.	1	.1
A. I have had the opportunity to work with both of these and find they do serve a purpose, especially for your smaller rural facilities.	1	.1
A. One hospital where I work uses teleradiology on third shift. Turnaround (image out/reading back) is about 30 minutes, about the same as it is when our images are read by an attending on the premises. There have been very few problems in the two years that they have been doing this. Another hospital where — thankfully — I no longer work is still all-film. The attendings leave at 5 p.m. sharp. We were instructed to release (unread!) any films we took after that to the ordering dept (usually the ED). Films were frequently lost, not read or misread. The ED had the option of physically carrying films to another hospital for preliminary reads if they felt it necessary, but they were so short-staffed, that didn't happen very often. At least two patients died because of unread/misread/grossly-delayed read films and the hospital is now on probation by the state department of health and in danger of being shut down entirely. The radiologists there still go home at 5 p.m. sharp.	1	.1
A. Our hospital reads other hospital x-rays. D. The faster the scan, the more they order.	1	.1
A. Our radiologists cover three hospitals U/A PACS. B. We have two RPAs. D. Only throughput matters, not quality of care.	1	.1
A. Small hospital, we use nighthawks and dayhawks. C. Imaging centers. D. New scanners, digital imaging — faster times.	1	.1
A. The radiologist at this facility uses this service at night C. Many of my students (greater percentage) are acquiring employment and imaging/op CE. D. As scan time decreases, you are limited by the patient's ability to move and get on and off the table, especially in CT.	1	.1
A. Use of nighthawk at our facility.	1	.1

	A. Used at my hospital. B. Two of my coworker friends have become radiology assistants at my hospital. Worked well for them. C. IS planned at my hospital. Mammography. Friends of mine will not be with me any longer.	1	.1
	A. Used at my per diem job after 10 p.m. B. Techs are anxious to see how these RA positions shape out. C. All teaching hospitals in area have multiple suburban campuses. D. Major focus of administration causing level of campuses patient care to drop — not popular with techs.	1	.1
	A. We have doctors reading films over the Internet in Australia. C. We have imaging centers where people can have x-rays, mammograms, CTs, etc.	1	.1
	A. We use nighthawk services at our hospital. B. Constant reference discussion on decreasing time in radiology department and getting results in doctors' hands.	1	.1
	A. We use nighthawking at work for CT, in the evening on a regular basis. C. I've just observed more and more medical centers are opening outpatient imaging centers away from actual hospital.	1	.1
	A. Working as an evening x-ray and CT tech, I transfer images to nighthawk radiologists for reading scans.	1	.1
	Absolutely the one most limiting factor in patient throughput is having patients prepared and ready to go into scan room (IV, history, confirming procedure to be done, having supplies ready, patient physically available {as from floor}.) This takes time on the phone, reading the chart, talking to radiologist and/or ordering physician, etc. And this requires personnel, something administrators are reluctant to provide.	1	.1
	Am currently using nighthawk service for modalities after hours.	1	.1
	As a member of a large healthcare organization, it is imperative to analyze cost effective strategies. Outpatient imaging centers are seen as a positive alternative in my organization.	1	.1
	As above, I have attended and graduated from the Weber State University RPA program.	1	.1
	As more and more physicians have their own imaging equipment at their clinics, fewer exams are done at the major hospitals. This is a disadvantage to our students who are not always welcomed to do clinical rotations in those clinics.	1	.1
	At a local hospital all the radiologists left except one. The hospital supplemented him with locums and with remote readings by other radiologists. It was kind of frustrating because you didn't have the personal interaction to tell the radiologist things you may have observed.	1	.1
	At night, our facility sends CT scans to a nighthawk. We also use decreased scanning to lower patient dose and decrease movement.	1	.1
	At our hospital, we have used both a nighthawk type service and teleradiology (to augment daytime reading staff) for many years.	1	.1
	At our institution, we have weekly contact about when our RA program will begin. Interestingly, we don't have an RA program, yet we keep taking names of techs who are waiting. My personal dilemma is, will it be B.S., M.S., Ph.D.?	1	.1
	B. Two coworkers are in rad assist programs. D. Two new ultrafast CT scanners were purchased.	1	.1
	By upgrading to a faster scanner (CT), you can scan four patients in the time it used to take to scan just one. So your patients need to walk faster to the scan room so you can keep up with management's expectations.	1	.1
	C. I work at a center away from medical centers and another doc is opening a similar facility. D. They constantly try to get patients to our scanners (MRI) quicker for increased exams.	1	.1
	C. See diagnostic images coming from many centers.	1	.1
	C. A large increase in outpatient facilities. D. Throughput and numbers seem to be more important than patient care these days.	1	.1
	Currently working with student in a RA program.	1	.1
	D. Increasing the patient throughput by decreasing scanning time is great in theory, but patients still need time spent with them. We don't want them to feel like cattle. You have to treat the whole being; emotional and physical.	1	.1
	D. This trend changes and affects how our procedures are used. B. Have not seen this trend much in Chicago.	1	.1
	Decentralization away from traditional medical centers has been very helpful on a personal level. We can go get imaging studies done without the bureaucracy of medical centers. It's quicker and easier.	1	.1

	Decentralization of medical imaging away from traditional medical centers. This seems to be the case in orthopedic surgery today. Doctors like to know the specific magnification factor that is applied to the images when preparing for surgeries, or at least that is what I was told by the physician for my father's hip revision.	1	.1
	Decentralization of medical imaging away from traditional medical centers has required a whole new market segment for radiology services and products. The equipment we sell is often sold into these sites.	1	.1
	Decentralizing is a definite trend as less imaging is concentrated in hospitals. And being more mobile, time of results to physicians is also important.	1	.1
	Decreasing scan time is always a huge topic. Workflow management is No. 1 for most facilities.	1	.1
	Decreasing scanning time and increasing efficiency seems to be the No. 1 goal of our institution — the more patients we can put through, the greater the profits.	1	.1
	Decreasing scanning time is critical in radiation therapy because patient positioning and immobilization can't be compromised. There are times that you need the doctor as soon as possible, and due to unforeseen circumstances, he/she is not available. Therefore, remote access would be an asset.	1	.1
	Experience with all: good points and bad with each area.	1	.1
	Fears related to Nighthawking have escalated concerns over the RA concept. Some radiologists express fears that Nighthawks in other states or other countries will hire a bunch of RAs, which threatens the future of radiologists' practice. Decentralization also raises concerns over the potential for unsupervised activities in the advanced practice of RAs.	1	.1
	Friends who have been sent to RA school by radiologists. Hospital I used to work for used Nighthawk. I now work in a private clinic.	1	.1
	Have been working with remote readers as long ago as 1990. Current (and former) uses a radiologist group that has a radiology practitioner as a member of the group. Requirements for patient education and consent have required investment in more time educating the patient and less actually performing examinations; i.e., FDA push to provide education to mammography patients.	1	.1
	Have personally attempted to present my chiropractic experience and training with radiologist. Met with apathy.	1	.1
	Hospital I worked in had nighthawk, so doctors didn't have to take call. Looked into radiologist assistant opportunities, I now work in a private imaging office.	1	.1
	How can you be nice to your patients when you do a patient every15 minutes for five days a week. The emphasis in health care is now quantity rather than quality.	1	.1
	Huge untapped market for sales if equipment is sold into physician office space. Loop in law will allow it.	1	.1
	I am a mobile MR tech, so I work at many small clinics and hospitals. Most of these facilities don't have full-time radiologist coverage and, therefore, network to outside radiologists.	1	.1
	I am very interested in the RA program. I just wish there were more colleges that offered that particular course.	1	.1
	I currently reside in Raleigh, N.C. UNC Chapel Hill offers an RA program, which I have looked into. I think it's great.	1	.1
	I don't understand what you mean by Trend D.	1	.1
	I feel that with decreased scan time management wants increased throughput; but in reality each patient still takes the same amount of time and this forced increase decreases patient care. It seems everything is about higher numbers/more revenue!!!	1	.1
	I have been dayhawking and nighthawking from my facility. Have been very positive using this mode of getting a reading of CT, MRI and ultrasound, but the diagnostic basic images (not PACS) are not transferred well.	1	.1
	I have noticed with the new DR x-ray systems that the time it takes to compute a procedure is greatly reduced. Getting the patient in and out of the room takes much longer.	1	.1
	I recently found employment as a radiologic technologist in a rheumatologist's office. This is considered a nontraditional office setting for radiology.	1	.1
	I have trained a radiologic physician assistant on how to view studies on a PACS workstation.	1	.1
	I have used a nighthawk service at one of the hospitals that I work prn on weekends. We also have two technologists there that are pursuing the RPA program. Only one of	1	.1

	the three hospitals where I live support technologists pursuing RPA or RA programs.		
	I have visited numerous small hospitals that use remote reading. I have seen only a few radiologist assistants. I believe most radiologists are reluctant because of malpractice and for fear of further salary reductions. Many hospitals have imaging centers either on or off campus. There is no question; decreased "on-table" time increases the significance of patient management to maintain efficiency.	1	.1
	I have worked at outpatient facilities and have looked into becoming a radiologist assistant myself. I definitely have seen scan times decreasing and our increase in the number of patients we see a day has made it so my job is certainly not any easier. It seems the time it takes to properly screen and prep a patient is not given proper emphasis in many imaging centers. I get many complaints from patients about how they were not prepared at other imaging centers and they appreciate the education we try to give them concerning the scan experience.	1	.1
	I have worked in a department that used telemedicine for the reading of radiographic examinations. This seemed to work well as the patient's exams were read quickly by a qualified professional and the hospital gained services that they could not find locally. Physician extenders such as RA or PA offer one more ladder of professional growth for radiographers/therapists.	1	.1
	I have worked in many imaging centers and private doctor's offices where the decentralization of medical imaging is employed. While the patients appreciate the convenience, they are also wary of the level of ability of the caregiver.	1	.1
	I heard about "nighthawking and dayhawking" from some physicians and some friends (also techs) that have to use radiologists from other countries to "read" in order to "save" money, because local "on-call" radiologists are more expensive. I have a co-worker who went back to school and was going to be a rad assistant; somehow she did not make it because of "stress." Now the hospital did not pursue that idea. I just heard about ultrasound not anymore part of the radiology department, but in my hospital I think it will be costly to separate it. With our new CT machine, scanning time has decreased so much that we can scan more patients.	1	.1
	I heard that California was considering putting breast imaging centers in shopping malls. Is that true?	1	.1
	I now have a co-worker training through Weber State as an RPA. She is one of our full-time school staff. We are just less than positive that our school will be closing (impending retirement of director, no interest in master's degree from other staff for requirements coming) after this new class graduates in 2007. Definite topic of discussion at Indiana Radiologist's Society meetings I have attended.	1	.1
	I often schedule patients for radiology exams at outpatient imaging centers, rarely at hospitals.	1	.1
	I personally had to nighthawk images working second and third shift. I find it to be easy and very convenient for physicians and patients.	1	.1
	I routinely use nighthawk services in Sydney, Australia, for CT scans (other than "routine heads.")	1	.1
	I think imaging is an important modality that requires time spent with the patient and excellent interpretation of the images. Nighthawk can sometimes cause delays in emergent readings due to transmission errors. And decreasing scan time leads to crowded scheduling, which takes away from necessary patient interaction.	1	.1
	I think it is important for hospitals to be very sensitive to the patient's needs and concerns. Just because the scan times are decreasing, doesn't mean patients would be pushed out the door. Oftentimes, our CT department looks like an assembly line. Not very professional.	1	.1
	I used to work for on outpatient MRI facility that was owned partially by a radiologist who had also worked for a hospital full time. When she quit the hospital, the outpatient facility was her main income. She skimmed way down on protocols, not necessarily for the good of the patient, ended up firing me, a well experienced technologist, and now has people scanning MRIs that are not even technologists. They are people "off the street" trained to do MRI!!! Very frustrating!!!! All for money!	1	.1
	I was referring to satellite, CR remote MRIs.	1	.1
	I was with a personal friend at a hospital where his images were read by a radiologist in another country.... Because of patient satisfaction, imaging centers are on the increase to keep each health care organization competitive.	1	.1
	I work at a medical imaging facility.	1	.1

	I work for a mobile service where we take technology as an opportunity for rural communication to keep patients local to the rural hospital and clinical setting. Patients are receptive to this and are more willing to seek treatment once they are diagnosed in larger metro hospitals.	1	.1
	I work for a private OB/GYN practice, ultrasound. I do not feel that any of these will affect me.	1	.1
	I work in a small outpatient facility. Our doctors do a lot of remote reads from many different facilities. They are affected time-wise with all the outside readings and it affects the workflow at our imaging center.	1	.1
	I work in an independent imaging center. Our technologists already perform duties of the physician extender, although we do not have that title.	1	.1
	I work in an off-site clinic, which is leased by the hospital I work for. There is an open MRI and a CT scanner in a physician's clinic, but separate from the clinic.	1	.1
	I work in a clinic that's a satellite site from main campus hospital. In five years, our patient load has increased tremendously.	1	.1
	IGRT is a new concept for radiation therapy professionals to learn. And since many do not embrace the lifelong learning concept, they are reluctant to want to learn.	1	.1
	In my experience, PACS and teleradiology have become huge in the last couple of years.	1	.1
	In other geographical locations, this has occurred but not in my immediate area yet. (Trend C)	1	.1
	In our area we have a multitude of imaging centers as well as a stand-alone heart hospital that does all of its own imaging procedures.	1	.1
	In trauma hospitals, farming out readings helps expedite processes for patients, making diverse perspective.	1	.1
	It's a delicate balancing act to provide rapid service without a patient feeling rushed and difficult to emphasize customer service skills while demanding increased throughput.	1	.1
	It is not "uncommon" for "remote" or small sites with no radiologist coverage to have "nighthawk" services.	1	.1
	It is not uncommon to scan 25-30 patients a day and most all paperwork is computerized.	1	.1
	It sounds like a good idea to do nighthawking, but in all reality it isn't a great idea. My colleague works at a rural hospital that does this, and it is very difficult when you have a major trauma going on.	1	.1
	Just recently started using nighthawks due to physician request. So far hasn't been well received from a tech point of view, generally slows turnaround readings.	1	.1
	Machines can be as fast as possible. Can't remove the human factor — patient or technologist. That is the variable and it's important to the success of the exam.	1	.1
	Management usually lags behind with respect to adding resources to an area in order to increase productivity.	1	.1
	Managing a breast center with the demand for a fellowship-trained radiologist has really put our radiology group in a tough position as our competitors are following suit. Thus, the radiology group feels that decentralizing the interpretive process will lead to increased throughput/productivity of the breast radiologist, but what about quality, hands-on diagnostic skills and personal interaction with patients, colleagues and families? It should increase results and perceptions of quality of care being delivered.	1	.1
	Many coworkers have left to go work at surgical centers and doctors' offices that have x-ray facilities.	1	.1
	Many of my customers use the nighthawk/dayhawk way to get studies reviewed. I have personally seen an increase in outpatient type imaging centers. Some patients prefer this way because hospitals can be intimidating.	1	.1
	Medical imaging outside traditional institutions (mobile PET) is available at several of our affiliates as well as DigiRad.	1	.1
	More and more facilities are using computer technology to track department and individual performance. They are also using this data as a basis for promotions and raises.	1	.1
	More technology needs to work for us, but we cannot let the service side of our work decline. In fact, these tools should enable us to have more time to interact with patients Call-outs with nighthawk.	1	.1
	More imaging in outpatient smaller/modality-specific units and at physicians' offices	1	.1

	with poorer quality and over-utilization.		
	More medical imaging clinics being built. Better machines means quicker scanning time.	1	.1
	More radiologists have Internet access to medical radiographic files and info. To aid in difficult reading cases, and that is a good and helpful computer aid for them.	1	.1
	Most of my applications experience has been with satellite and independence imaging/medical facilities. Techs are very stressed because doctors demand high dollar throughput with little time to give patients good quality exams.	1	.1
	My facility has recently acquired a wet reading service from a group of radiologists located miles away to cover the midnight shifts.	1	.1
	My health facility has been using PACS new for about a year and a half. This makes getting reports to hospital floors so much faster. We have a network of four hospitals, with six outpatient facilities all connected to PACS.	1	.1
	My hospital just this year is training a CT technologist as a radiologist assistant through an accredited program. I would be interested in seeing advanced practice roles for specialties.	1	.1
	My husband is in a large radiology group that employs nighthawks. I recently filled out a reference form for one of my graduates who was applying to a radiologist assistant program.	1	.1
	My program has had to add clinical education settings outside of the hospitals.	1	.1
	My sister does medical transcription for an imaging center that sends images via DICOM to India to be read by radiologists there, and then she transcribes the reports.	1	.1
	Needed increased computer knowledge for nighthawking images on weekends. Weekend jobs with new computers digitalizing images. Every one is a little bit different. Sometimes communicating with reading radiologist is difficult language barrier.	1	.1
	New equipment installed to increase throughput to accommodate patient load for treatment planning.	1	.1
	Nighthawk has been a big help. Faster.	1	.1
	Nighthawk implemented to limited degree. Not effective and discontinued in our area.	1	.1
	Nighthawk is wonderful.	1	.1
	Nighthawk was great. Extremely fast results faxed to ER and medical imaging: A+++++. I love the fact that the tech does not have to write down RESU.	1	.1
	Nighthawking: radiologists throughout the night.	1	.1
	Nighthawking has actually made my job as a tech easier when I get called in.	1	.1
	Nighthawking is a very common practice at the hospitals that I visit for applications training.	1	.1
	Nighthawking to Australia, getting better as far as turn around time. From acquisition to reading about 20 mins. Down from about one hour previously.	1	.1
	Nighthawking to far sites has been a problem of personal experience. Phone connections, Dicom connections, so many things can go wrong and images are unable to be read STAT due to this. Decreasing scanning time has been more of a stress factor than not. Managers and physicians seem to be constantly wanting "more," "faster," "hurry"; it burns technologists out having that sense of constant rushing.	1	.1
	Nighthawking works great. You don't have to deal with radiologists in middle of the night.	1	.1
	No.	1	.1
	None.	1	.1
	Nuclear medicine cameras are becoming more advanced and are providing more information. Scan times have increased a lot. Hospital administration complains of decreased volume, but doesn't account for newer modified lengths of common exams.	1	.1
	O. What happens to patient care is the bottom line. More patient throughput more important? Taking time to help patient through their illness is part of healing process. There needs to be a balance. Cannot depersonalize exams.	1	.1
	On midnight shift, CT scans and wet readings are sent to nighthawk.	1	.1
	One of our centers uses nighthawking for reading images. Techs have many concerns: no one to inquire about additional views or relate on-the-spot concerns. Patients called back more frequently and charged for additional studies. Decentralizing imaging is happening everywhere. This drains monies from hospitals and does not, in my opinion, provide a well regulated standard of care. These centers are self-serving	1	.1

	to physicians and cannot provide in-house care for patients when needed. In many cases, the physicians read the images themselves and are at best questionable in skill.		
	Our facility radiologists interpret exams from affiliates on PACS. Dramatic increase in services due to increased imaging speed often creates unpredictable workflow, varying from UCH congestion in department to very slow "low census" conditions, sometimes within the same workday.	1	.1
	Our facility uses a nighthawk group on nights and weekends. The radiologists love it. We have had several students considering the RA programs.	1	.1
	Our facility uses a nighthawk remote read. We have an RPA graduate in our facility. Our hospital has a separate imaging facility. I haven't heard of decreasing scan time, except where software upgrades allow it without a decrease in scan quality.	1	.1
	Our hospital has used a nighthawk service for a couple of years. It works really well.	1	.1
	Our hospital has used nighthawking because of a shortage of radiologists in our area.	1	.1
	Our multi-physician orthopedic practice in the Pacific Northwest owns our MRI scanner. Our scans are currently read on the Eastern seaboard. At my previous place of employment at a 350-bed public hospital, many of our non-emergent swing and graveyard shift scans and studies were read in Europe at a location staffed by members of the radiology group contracted to our hospital.	1	.1
	Our radiologist spends time with each R.T. reading films.	1	.1
	Our radiology practice has a teleradiology center that provides final reports for three major health systems, our own private imaging centers and others, to provide diagnostic information coverage 24 hours/day, seven days/week, 365 days/year. We have been doing this for many years. We have been utilizing physician extenders for many years, now just formalizing the process to meet the new requirements.	1	.1
	Outpatient imaging SI makes diagnostic procedures available to patients in their own neighborhoods. This allows patients to obtain tests without having....	1	.1
	PACS.	1	.1
	PAs and SAs have increased exponentially, RAs are needed.	1	.1
	PAs do not assist technologists, they assist physicians.	1	.1
	Personally, I experienced the reading of images at another site at my local hospital. Went in for an exam and it was sent out to be read. Decreased scanning time is a selling point for our equipment we build, sell and train people to use.	1	.1
	Personally, I would like to see advanced practice roles for stereotactic core biopsies. Currently, I work in a small community hospital where both a surgeon and radiologist work together during stereos. The radiologist targets (color), then stands around until exam is completed. TIM management for radiologist would increase if he could leave the targeting and assistance with surgeon to the stereotactic tech.	1	.1
	Physicians can observe an x-ray just about anywhere throughout the hospital, not just in the x-ray department.	1	.1
	Placing students in imaging centers for clinical experience has increased dramatically over the last five days.	1	.1
	Radiologist uses a nighthawking service for CT/ultrasound on the night shift. Radiologist has less "hands-on" with patients due to the employment of PA and NP. Since my employment is hospital based, "outside" offices have decreased dramatically the outpatient flow in the department; therefore, the number of technologists employed.	1	.1
	Radiologists I know have their own businesses, teleradiology, and build their own clinics to image and perform special procedures and advanced imaging, MR, CT, nuclear medicine and pain management. Physicians are reading their own x-rays rather than sending to radiologists due to the shortage of radiologists or the workflow.	1	.1
	Radiologist worried about nighthawking taking away from his job. Not sure how RA will be accepted by radiologists in my community. Decreasing scan time decreases scan quality and patient care. Period!	1	.1
	Radiology PA is in use in my area.	1	.1
	Radiology practitioner assistant, as well as your version, the RA.	1	.1
	Rather than having radiologists on third shift, nighthawking has become a routine alternative.	1	.1
	Remote reading is efficient if all systems are working, and is better if facilitated by an electronic transfer of images; i.e, PACS.	1	.1
	Satellite sites have been set up to accommodate patients and minimize travel to major	1	.1

	centers for studies. This requires very skilled R.T.s in multiple small centers as opposed to centralized department with varying skill levels of R.T.s. This will raise the educational standards required to function in these centers by new graduates.		
	Seeing all of these with the exception of Trend C. Concerning trends, my institution is currently centralizing rather than decentralizing imaging in order to realize cost savings through maximized utilization of equipment and manpower.	1	.1
	Send images off to another hospital.	1	.1
	Several of our clinical facilities no longer have full-time staff radiologists. These facilities either take their radiographs to other facilities or send them by PACS.	1	.1
	Since I have had several MRIs because of back problems, I have found that I have not been rushed with any of my scans or x -rays taken in the past two years.	1	.1
	Some of our fMRI studies and drug trials have an enormous amount of pre-scan set-up. Time the scanner is not being used to collect images because of this work is very expensive and cannot be billed for and thus the throughput in number of patients and dollars goes down dramatically.	1	.1
	Stated above.	1	.1
	Supervised an employee who attended an institution to become a radiologist assistant.	1	.1
	Technologists are constantly pressed for doing more in less time. So decreasing scanning time is the only alternative sometimes.	1	.1
	The facility I work at uses nighthawking.	1	.1
	The hospital I work in is a trauma level II facility. Radiologists are "nighthawked" at a sister facility between 10 p.m. and 5 a.m. All exams are read immediately via PACS.	1	.1
	The new CT scanners may take away from invasive imaging.	1	.1
	The push to get as many people imaged as possible in a day is hurting the quality of patient care.	1	.1
	There is no patient care. It is all about the money.	1	.1
	They are starting an RA program; therefore, we have firsthand experience.	1	.1
	Trend A: I see it all the time. I experience it in my job. Trend B: I heard about it through journals and it was discussed at school. Trend C: I use it all the time with my job. Trend D: I see it all the time.	1	.1
	Trend A: There is a need to really know your stuff because sometimes you have no physician available to confer with; i.e., nights and weekends. Radiologists are not available 24/7, nor should they be, but that puts more onus on the tech to know what to do.	1	.1
	UAMS started an RA program this year. Our previous clinical coordinator became an RPA. One of our graduates from the radiography program is now attending an RPA program at Weber.	1	.1
	Up until just over a year ago I worked in a hospital as a CT scan technologist. Although I loved my job, I left because I felt like I was working on an assembly line, not with real people. As the scanning times decreased with the new technology, management assumed we could put through many more patients and kept cutting down on scheduling time. They didn't seem to understand that each patient still needed to have their history taken, sign consent forms, have an IV started and drink and have rectal contrast. Then the phones are ringing, doctors need wet readings, the floors are calling with add-on patients and the radiologist needs 3-D images or delayed imaging on that last ER patient. I loved my job, but when some of my patients were waiting three to four hours to be scanned and I would wake up and didn't want to go to work due to the stress level, I decided it was time to leave. I went into this profession to help people, not rush them.	1	.1
	Use nighthawking for call, after-hours situations.	1	.1
	Very close friend of mine recently graduated and passed boards for RPA. Having difficulty in our area finding a job due to lack of knowledge from the physicians in this area on credentialing, etc. ... which leads me away from wanting to advance that far.	1	.1
	Wanted to implement in various facilities so that R.T.s could cut down on paperwork and various jobs that take away focus of the experienced technologist.	1	.1
	We are sandwiched between needs for patient satisfaction and the drive to keep up with a busy schedule. Workflow D.	1	.1
	We have all seen the stress of throughput. Every facility wants more numbers. We need to remember patient care comes first.	1	.1
	We have had remote reads at our facility for some time. It is a reality. I have seen the intro of the radiologist assistant, but not really any advanced practice in specialties. If	1	.1

	you mean more than our advanced level exams. We have medical imaging centers, but the main hospitals still need this in-house, since our centers do not staff 24/7. The specialty hospitals have had a great impact on our area.		
	We have nighthawk B/C. We do not have a radiologist here 24 hours. We have one on call. With our new scanners, we have decreased our scan time to help handle our major workflow.	1	.1
	We pay images over T1 line to another place. I have not had any experience with nighthawking at our site. These trends are vital to stay competitive.	1	.1
	We run 20 minute time slots for patient flow in CT, and we can scan, but with paperwork and patient processing, we don't have staff enough to make it run smoothly.	1	.1
	We send after-hours films to the nighthawks for reading	1	.1
	We use nighthawking, and it works very well. It improves patient care, because we are not waiting for a radiologist. Our hospital has an outpatient facility and it works well. Our inpatients are done much faster.	1	.1
	We use nighthawking. It gives our overworked radiologists an 8-hour break. We have a training program, but not many opportunities for use.	1	.1
	We use nighthawking and dayhawking on a daily basis. Our radiologist loves the system.	1	.1
	We use nighthawking daily in our department.	1	.1
	We use nighthawking for about 50 percent. Scan times have resulted in a bottleneck of getting patients on and off machines. Increased throughput would result in fuller prep area/IU room.	1	.1
	We use nighthawk on nights. We have PAs in our department.	1	.1
	We use nighthawking from a radiologist who works in Spain to handle the night shift readings here in my facility. RAs not yet used here in California as we have no legislation to allow them to work yet. Imaging centers are opening up quite frequently and moving a lot of imaging out of the hospital areas.	1	.1
	We use nighthawking in this hospital	1	.1
	We use nighthawks. Looking into my four-year B.S. or furthering my career. Aware of imaging centers.	1	.1
	With mammography going digital, we see a decrease in the time to complete the exam and the wait time seems to be on the front end.	1	.1
	Worked with a third heart outpatient doctor. Often relied on tech for second opinion. He valued our opinion.	1	.1
	Workflow leading to productivity is leading reason for a purchase of investment.	1	.1
	Working at a larger hospital in a large metropolitan area, all of the criteria are being applied throughout.	1	.1
	Yes, both C and D. We've gone to DR units for optimum throughput. We've also for Trend C. Our institution has built a whole new orthopedic outpatient center outside the hospital to treat returns and new patients.	1	.1
	Total	842	100.0

Standards Area

12. If you have had direct experience with or have been affected by any of these trends (professionally or personally), please describe that experience briefly.

Response	Frequency	Percent
Blank	700	83.1
Institution of national standards for imaging and radiation therapy personnel. I am active in the MSRT and believe that passage of the CARE bill is very important to ensure excellence in patient care. Patients have been looking up information on the Internet since its use became widespread to gain information on their illness or treatments.	1	.1
E. In the age of the internet, who doesn't seek out information about their disease, treatment options, qualifications and experience of their healthcare providers, support groups, etc. Our patients are better educated today than ever, we need to prove to them that we are the best option for them.	1	.1
A few of our graduates have attempted to return to their own countries to practice radiography and have not been permitted to do so. It appears that Ireland, England and Canada require at least three years of education in radiologic technology. Therefore, their education in the U.S. did not help them with a job.	1	.1
A. We have to check and recheck now we code our procedures to be sure we get reimbursed.	1	.1
A. Budgeting. B.ICAVL and ACR accreditations.	1	.1
A. Changing exam routines/charges; i.e., bilateral instead of separate RT and LT. Not charging for portables.	1	.1
A. Hospital reimbursement for mammography is low. E. Patients ask about my education and certification.	1	.1
A. Insurance companies dictating which exams are ordered or paid for. E. I have researched to find the best place for my loved ones to be seen. Also patients coming to ER and telling doctors what tests to order and what treatment they want.	1	.1
A. Live in West Virginia, poor reimbursement. C. Accredited department so observe national standards. E. Asked by many patients.	1	.1
A. Medicare reimbursement is getting less.	1	.1
A. Our department reimbursements have been reduced. C. Our staff is registered and our lab is accredited.	1	.1
A. Over the years large business insurance has negotiated ways to reduce their reimbursements. Sadly, the only person who pays the full fee is someone without insurance.	1	.1
A. Patients may ask me about my experience and schooling once or twice a week.	1	.1
A. Reimbursement is decreasing and most likely will be the driving force for shorter, more focused exams. How will educators be able to teach focused? E. This is not new and continues to influence the profession at a slow rate.	1	.1
A. Reimbursement is down because of DRGS and HMOs. C. Involved in effort of ASRT. E. Patients are better informed and expectations are higher because of the Internet.	1	.1
A. We are always getting updates on what changes are needed so as to get paid by the insurance company. E. More and more patients are asking questions concerning their medical conditions and options.	1	.1
A. We are always hearing about budget cuts. Patients are questioning more and more about why we are using exams.	1	.1
A. We have had to be vigilant for bone densitometry in particular, especially for Medicare patients. E. Many patients ask why the doctor has ordered a particular exam and what he expects to find. They sometimes ask why I have to do so many views, if they are necessary, etc.	1	.1
ACR accreditation for mammography put mammography credentials on the publics radar screen	1	.1
All requisitions for imaging procedures must include a thorough history now to be reimbursed. It is a trend that will continue. Most patients seem much more educated on their health care information and have the background to ask pertinent questions.	1	.1
ARDMS advertising on TV to inform consumers about our competency in ultrasound	1	.1

	has been discussed in our staff meetings. Adding credentialing of ultrasound by the ARRT has reduced the effectiveness of my credentials and allowed more incompetent sonographers to be working in the field.		
	As an educator and registered x-ray tech, CT tech and radiation therapist, I see the trend toward standards. Also see patients asking many more questions about cost and appropriations.	1	.1
	As I now work in an outpatient facility, I have seen people come in to look at the facility, meet the staff and ask questions as they decide for themselves where they will go for medical care. I think this is wonderful and I hope this will continue. As a facility, we are 100 percent for the patients. We serve drinks and snacks, send out patient surveys and get involved in community events.	1	.1
	Because I'm a mammographer for many years (40), I have seen the increase in mammography lawsuits. It's unfortunate because the young radiologists don't work to get involved in reading mammograms, rather concentrating on CT and MRI for the higher reimbursements and lower malpractice lawsuits.	1	.1
	Being questioned by patients in exam rooms and hallways. Patients asking for advice on which doctor to see, etc.	1	.1
	Budgets are always tight and every expenditure must be justified.	1	.1
	C. As an educator, the JRCERT has had standards for programs to achieve and the ASRT provides a list of competency standards students must achieve prior to graduations.	1	.1
	C. Measurements used in radiation therapy. D. Measurements and weights used in radiation therapy. E. Seeking knowledge in radiation therapy.	1	.1
	C. If this refers to the CARE Bill, I have written to my Congressmen asking for support and have given to the ASRT PACS. I inform my students of this legislation as well. E. As a patient, I seek information about the competence of my healthcare providers and encourage others to do so. I teach students how to be responsive to patients who are more informed consumers.	1	.1
	Capturing the proper charging codes has become a monumental chore in radiation oncology to avoid Medicare reimbursement fraud. Standards need to be established and maintained in order to protect the public from incompetent professionals in the field. Patients are more informed and demand information about their treatment procedures.	1	.1
	Competitors of mine are advertising the Trend E. They will sit and discuss results with patients.	1	.1
	Concerning national standards for imaging — ARRT? I'm not aware of any other national standards group.	1	.1
	Consumerism has ruled my field, chiropractic, long before it was a catchphrase in medicine.	1	.1
	Customers are always complaining about declining reimbursement and how difficult it is to defend sometimes. Patients are becoming more knowledgeable because of easy access to the Internet. Unfortunately, much of this information is misrepresented, misguided or misinterpreted.	1	.1
	Declining reimbursements make the purchase of equipment more difficult. Huge focus with new learning required for manufacturers to understand reimbursement.	1	.1
	Declining/scrutinized reimbursement is significant. I have responsibility for overseeing my group's billing and collection and see this trend firsthand.	1	.1
	Decreased reimbursement had overall effect of budget that affects salaries.	1	.1
	Decreasing reimbursement.	1	.1
	E. Asked by patients where I went to school. Some patients compare tech knowledge with Internet information.	1	.1
	E. Only wishful thinking	1	.1
	E. After having cancer, I question all surgeons and medical personnel for competence and reasons they order exams.	1	.1
	E. Starting in college health in 1992, I have definitely witnessed a change in the attitude of the patient/consumer. In 1992, I was "their mom" when it came to providing patient care and making referrals when necessary. Today, students are more savvy and ask more questions, yet they also take plenty for granted and assume sometimes they know more than the professionals do.	1	.1
	E. Patients frequently ask about our level of education and training.	1	.1
	E. There is more information out there due to the Internet and articles that patients	1	.1

	seem to be more interested and concerned on what is going on with their health.		
	Employer has bi-yearly training on "patient consumerism."	1	.1
	Experience with implementation of MQSH.	1	.1
	First question from a patient is how long have you been doing this? As I am 58 years old, I tell them a long time, which is the truth.	1	.1
	Funding for my position as mammographer is directly affected by the declining/scrutinized reimbursement. Fewer radiologists are interested in reading mammograms due to the malpractice lawsuits. (I have to verify who has the appropriate credentials.) I am responsible for insuring that the equipment in my department meets all applicable standards (national and international), therefore I must know what standards are being instituted and apply them. My patients are encouraged to verify the competency of their health care personnel, it empowers them.	1	.1
	Government hospital, so A-D are not applicable. Increased educated patients result in better care for some patients. They question care and even bring in literature.	1	.1
	Have not heard of any of these. Unable to fill out other questions.	1	.1
	Have read and word of mouth of lawsuits in mammography. More patients are making themselves educated on what is happening to them.	1	.1
	Have supported the standardization of U.S. radiologic technology workers that has been sitting in Congress for years. Have written to state representatives supporting bill. As an administrator, have seen decrease in reimbursement and the direct effect on capital replacement. Patients are more educated and come in with material they acquired from an Internet search. They are also more highly educated, as the baby boomers have hit cancer age and approach the geriatric phase of life.	1	.1
	Husband is radiologist. Malpractice and reimbursement is always in the picture.	1	.1
	I also worked in mammography for several years. Patients are very conscience of the ability of the technologist. The more education you can provide the better they will feel about their examination. The patient is more educated and aware now more than ever and will ask questions. Technologists should be willing to share information with them to comfort them. A good rapport with the patient also tends to decrease the chance of complaints or lawsuits.	1	.1
	I am a member of ASRT grassroots and very active in professional societies.	1	.1
	I am a participant in R.T. in D.C. times three years. I believe in this!! Especially with all the nighthawking, etc. At least the ordering physician can be assured the tech doing the exam should produce a quality study! Now let's worry about the reading of the exam!?	1	.1
	I am always calling the insurance company about payments to the doctor that are affecting my bills.	1	.1
	I am currently certified nationally with the ARRT for x-ray and CT. I think this makes it easier to transfer to another state and is a good way to ensure competence in technologists.	1	.1
	I am the compliance billing coordinator for department.	1	.1
	I believe firmly that the professionalism of this industry must be regulated, and that educational standards as well as governmental regulations should be imposed throughout all of the United States of America. Standards to follow should be mandated for patient safety, caregiver accreditation and environmental standards. Consumers deserve this and I have made it a moral code to be conscious and abide by the standards mandated thus far. HIPAA and Sarbanes-Oxley should begin to drive results of success in all aspects of health care.	1	.1
	I believe it's a good thing to have safety standards that are across the board for all imaging modalities.	1	.1
	I diagnosed my mother's cancer before the doctor did and I did that online.	1	.1
	I do not believe patients are too interested in the competency of the tech. I feel it is understood that if employed by a certain facility the tech must be competent.	1	.1
	I have been deeply involved in all imaging coding/reimbursement for 12 years. The way Medicare and insurance have decreased reimbursement over the years has changed how we care for our patients. Bringing them back for repeats allows an organization to bill again at least partially. Ordering expensive scans as an outpatient instead of during an ER visit increases reimbursement. No consideration for patient convenience or time. Many factors for productivity and cost effectiveness push this trend. I have been on teams to determine data collection for various diseases to be	1	.1

	reported for patient consumerism. This process is still new, but taking off fast. I believe this process needs work. Patient difficulty. Reporting and data.		
	I have experienced patient consumerism personally. Our patients are much better about asking questions and being informal.	1	.1
	I have friends/family members come to me and ask questions about a future procedure. Like what to expect, what it means and should they have it done.	1	.1
	I have personally experienced nurses giving wrong doses of medicines to patients. As a whole, consumer seems to not trust the medical profession. The decline of staff I feel has caused this. Patients don't get the personal care they used to.	1	.1
	I have received questions about what qualifies me to do my job from patients.	1	.1
	I myself ask more questions than ever before, and have compared imaging centers to find the best fit for me, either because of scheduling accommodations or the equipment that is used for diagnostic testing.	1	.1
	I participate in quality improvement activities and have witnessed the difficulties in maintaining staff at comparable salaries due to poor reimbursements. I see patients come into offices with pre-researched information in-hand, ready to make a deal.	1	.1
	I personally encourage my family and friends to find out about certain doctors and/or facilities before making a decision.	1	.1
	I practice evidence-based radiation oncology based not only on research results and their clinical application but on the development and application of national and international standards to best practices. Best practices are being progressively applied to the qualifications of personnel across international boundaries as well as to the quality of the clinical evidence on which we practice.	1	.1
	I recently had a request to participate in a lawsuit involving a mammographer.	1	.1
	I think most people know about the declining reimbursement rates. This impacts everyone who is in the medical profession. I think national standards are a great idea. There are too many practices that use unqualified people for imaging procedures.	1	.1
	I work in mammography. Patients are becoming educated in digital, FDA requirements, etc. CADs.	1	.1
	I worked for several years in a clinic that also handled billing for the radiologists in town. They had increased problems with reimbursement even then, over 20 years ago. I have heard about licensing (state and national) since 1970 when I started my training and I just don't get too excited about it anymore, even though our state finally passed a bill a few years ago.	1	.1
	If one more patient comes in and says, “I heard on Oprah,” or “I read in *Good Housekeeping*,” or “I saw on the news,” I may scream! Not really. I encourage patients to be aware; however, it often puts me on the spot as to how to explain a complicated concept in an accurate and understandable way that patients can relate to.	1	.1
	Imaging centers are finding out that insurance companies are all very different with their acceptance or rejection of imaging done beyond the traditional medical walls. Patients appreciate the convenience of imaging centers and private doctors' offices, but are very wary of the ability of the radiographer.	1	.1
	In a patient care course, we discuss patient consumerism.	1	.1
	In education, reimbursement declines are always a problem of survival of education programs. International standards are now applied in education.	1	.1
	In past years it has been obvious that patients are more and more likely to access information regarding radiation therapy before and during a cancer diagnosis and subsequent treatment.	1	.1
	Item C: Please see comments in the Education section. Item E: Given the impersonal way our fragmented medial "system" treats patients. (Please see comments in the Workflow section.) Can we really blame them for not trusting our competency the way they used to when we treated them as people?	1	.1
	Lawsuits impede some developments and increases cost. It's good to develop products with safety and quality, but too easy to file a lawsuit for any reason.	1	.1
	Makes performing your job a political affair. Constantly afraid of how patients could possibly misconstrue your actions into a lawsuit. Trend E has me considering other options as a career.	1	.1
	Many hospitals in my area have filed for bankruptcy and have closed because of declining reimbursements and many patients have no health insurance.	1	.1
	More and easier access to info on the Internet.	1	.1
	More and more patients are coming in having researched their study on the Internet.	1	.1

	Sometimes the information they have found makes them more comfortable with the exam; sometimes they researched and went off on a tangent and are completely off the mark.		
	My imaging center has changed the process of scheduling due to reimbursement issues. Depending upon the patient's insurance, CT and MRI procedures have to be preauthorized. We must have an authorization number before the patient even gets on the schedule. I do think that patients are becoming better consumers for health care and are asking good questions. They are doing research on the Internet and come in with questions about our level of expertise and accreditation.	1	.1
	My reimbursement continues to decline while my malpractice premiums rise significantly every year.	1	.1
	National standards are a good idea.	1	.1
	Need to be informed. (Especially for patients to feel well taken care of.)	1	.1
	None.	1	.1
	Not-for-profit hospitals, such as the one where I am employed are constantly talking about reimbursement and it seems everything involving financials in some way revolves around reimbursement or the lack of it. Malpractice suits are always in the news, and I'm sure I have known physicians who have quit practicing because of the high cost of insurance to protect themselves from it. I'm not sure I am aware of what you're asking concerning "institutions of national and international standards for imaging personnel." Patients have access to many forms of information and so many ask more questions now than ever before.	1	.1
	On committees to develop national standards for ultrasound.	1	.1
	One of the very first questions that patients ask is "how long did you go to school for this?" or "what do you have to have or be doing this?".	1	.1
	Organization under care of new M.D. redoing protocols to meet national standards. E. Challenge by patients for explanations. Patients have done research online and call ahead for info (patients).	1	.1
	Our facility has made a great effort to work toward having a standardized practice for all imaging personnel.	1	.1
	Our hospital and physicians talk about reimbursement all the time. What codes to use. How much we might miss, etc. Malpractice is always an issue and it is possible to touch the staff. I am not sure an institution will always back you. I have been watching the CARE Bill. Although it seems very late in passing. I am unaware of the international standards. Patients and their families are more aware of medical standards and disease, some due to malpractice.	1	.1
	Our lab is currently accredited for nuclear cardiology by ICANL and I review applications.	1	.1
	Our office has certainly been affected by declining/scrutinized reimbursement. We've added more patients to our schedule to compensate. We also must be aware of the type of insurance our patients have in order to know what imaging will be reimbursed.	1	.1
	Patient consumerism. We offer a discounted ultrasound service through school. Many patients are shopping for medical bargains.	1	.1
	Patient consumerism is a positive thing, it shows how people see their role in their own health, taking responsibility. It always emphasizes the need for well educated R.T.s with up-to-date CEs.	1	.1
	Patient consumerism very evident. Better informed with good questions.	1	.1
	Patients have questioned particular parts of their care, so they may research on the Internet.	1	.1
	Patients are asking more questions pertaining to their health. I don't know if it's because the trust or non-trust of the hospital.	1	.1
	Patients are going online and doing their homework before coming for test.	1	.1
	Patients are more aggressive when it comes to health care and exams. They ask more questions and need more direct answers.	1	.1
	Patients are more informed. We hit hard on the educational arena because a decline in patients at an institution results in a decrease in jobs.	1	.1
	Patients are more informed in areas due to the Internet, etc., specifically in the area that affects them. Therefore, the R.T. has to be knowledgeable in many areas.	1	.1
	Patients are more likely to question a procedure if you engage them in conversation during the procedure. My company stresses the need to talk to and explain to the patient as the exam progresses.	1	.1

	Patients are much more educated these days, generally due to the immediate access to information via the Web. Patients have come for treatment well-versed on their type of cancer, treatment options and prognosis.	1	.1
	Patients are now called customers, and come with the attitude that the customer is always right. I now tell the patient he/she has the final say. If you don't want the procedure, say so. I no longer will try to persuade a necessary procedure.	1	.1
	Patients are now considered consumers and they are not afraid to question competency in the person who is about to do a procedure on them. I am asked frequently as to how long I have been doing radiology and what my training consisted of. I have found the patient is well read and more informed of new modalities and treatments available to them.	1	.1
	Patients are questioning more and more about the effects of radiation. As a supervisor, I am aware of standards.	1	.1
	Patients are using the Web site to look at HC4 data, etc., for facilities and physicians.	1	.1
	Patients ask a lot of questions. Many are demanding. Many are also health care workers or have been.	1	.1
	Patients ask more questions and seem to have more knowledge of the exams.	1	.1
	Patients bring Internet info to consults — often not applicable to them.	1	.1
	Patients come to clinic having read on the Internet how they want to be treated.	1	.1
	Patients do more questioning of radiation exposure to themselves, ask why an exam is necessary.	1	.1
	Patients have asked for my credentials and how long I have been doing my job as a nuclear med tech.	1	.1
	Patients have cancelled many necessary exams because insurance wouldn't pay for it. Many patients now question how much training x-ray techs have or get.	1	.1
	Personal health care. Augment information from health care providers by researching the Web.	1	.1
	Patient use of e-mail.	1	.1
	Patients come to me with more misinformation than before. International standards are unable to be met due to varying legal systems and care costs. C. Should already be in place due to the ARRT.	1	.1
	Reimbursement continues to decline. Litigation and regulatory requirements for R.T. and radiologist increase while non-radiologic providers or imaging services are able to increase revenue and escape. Makes no sense.	1	.1
	Reimbursement is a huge issue. Many charges are sent back for justification. Overall, the patient is a much more educated consumer. The patient has more information and asks many questions.	1	.1
	Reimbursement is a big issue. We work carefully regarding mammography patients. Try to supply patients with as much info pertaining to exam: reports, insurance needs, etc. It makes them more at ease and confident with personnel.	1	.1
	Sometimes I wonder about the physician community, they don't want to spend time with you about your medical problems — in and out within 10 minutes. Make another appointment to discuss issues.	1	.1
	Techs do as ordered. They are not professionals, none of these things matter.	1	.1
	The addition of radiography to the cancer cause list has increased the number of questions our technologists receive about dose, shielding, necessity, what will plain film show that MRI, CT don't, etc.	1	.1
	The patient should know more about procedures they are experiencing. I encourage the patient's questions.	1	.1
	Today, patients ask more questions than years ago. They are demanding, wanting things done quickly, without waiting.	1	.1
	Trend A: With my job. With my personal life. Trend B: Hear a lot about this trend. C. Hear a lot about this trend. D. Hear a lot about this.	1	.1
	Using Internet, people search for info when they have to do a specific procedure.	1	.1
	Very high prices for scanning exams.	1	.1
	We've all had to be much more diligent with regard to inquiries and explaining exams and outcomes to our patients.	1	.1
	We have quarterly billing meetings to make sure we are charging correctly for treatments, simulations, treatment aids and IMRT. Reimbursements change quite frequently with the new technologies; i.e., IMRT charges were recently increased to allow for a special procedure charge 77470.	1	.1

	We see at our site how little Medicare/Medicaid and worker's comp reimburses for MRI. I would say half our patients are under these circumstances.	1	.1
	Worked in breast center. Witnessed malpractice lawsuits.	1	.1
	Working on the grass-roots effort to bring a national minimum standard for the radiation imaging field in the USA. Reimbursements are always an issue in the workplace. Lawsuits for mammography are known if one is in the world of mammography, such as I. Patients are increasingly becoming more knowledgeable about their health care due to Internet sources being more accessible. It helps to be knowledgeable for them to be prepared when the questions are asked. I try to live up to the R.T. standard that is expected.	1	.1
	You don't have to be licensed to practice sonography in my state. All in my situation would like to see that change.	1	.1
	Total	842	100.0

Supply-Demand Area

17. If you have had direct experience with or have been affected by any of these trends (professionally or personally), please describe that experience briefly.

Response	Frequency	Percent
Blank	738	87.6
1. We need locums for two years before hiring a radiation therapist. The new requirements of having to have a certified CT tech to run a CT sim or a bone densitometry scanner caused a shortage of personnel in our community.	1	.1
A. Already have screening mammograms scheduled every 20 minutes and going to every 15 minutes with digital equipment. C. Facility already uses CAD readings for screening mammograms.	1	.1
A. increase in the number of CT exams scheduled. C. Used by radiologists in mammo. D. Lack of time to train staff well in post-processing techniques.	1	.1
A. Number of patients. C. In mammo center. D. Very difficult to find qualified employees.	1	.1
A. Our numbers continue to rise every year.	1	.1
A. Patients read about a new procedure for radiation therapy, they want it and we try to provide it. C. Work with digital x-ray, PACS and computer-generated reports.	1	.1
A. The increased demand for imaging procedures spurred the creation of our program and will direct our future focus. B. The increased use of computerization in diagnostic radiography equipment has allowed less proficient radiographers to stay employed in the profession.	1	.1
A. The more technology advances, the more diagnostic procedures we will be doing.	1	.1
A. We are offering new services. B. Push-button technology. C. CAD added to mammography. D. New ultrasound programs are opening.	1	.1
After equipment sale of PET/CT, the training of equipment operators is confusing because of the separated nature of nuc med and x-ray disciplines.	1	.1
All of our PACS archives in our customer sites are filling up with imaging studies faster than the customer forecasted when sizing their PACS archives. In several sites I have been to, I see intensive training being given to R.T.s to perform postimage processing in the CT and MRI areas. Also, for PACS implementations, skilled R.T.s familiar with all modalities, department workflow and good communication skills are hard to find. R.T.s to serve as PACS administrators are also hard to find.	1	.1
As a former CT supervisor, I saw the PR ordering CT studies as first choice procedures more often.	1	.1
As an imaging/treament planning systems provider and trainer, I have experienced all of the above.	1	.1
As an educator, I receive regular requests to post job opportunities. Personally recruited for jobs in education as well.	1	.1
As an individual responsible for developing new imaging equipment, we are being asked by our customers to reduce the amount of time the user spends interacting with the equipment. Examples of this are automatic positioning, automatic centering to the Bucky, automatic tracking of the tube to the Bucky. Other features are automatic filtration preprogrammed to the body part and projections selected by the HIS/RIS.	1	.1
At my previous workplace, we used CAD for mammo.	1	.1
At our institution we have seen a demand for specialties. The great shortage of diagnostic R.T.s has been better. The reduction in operator need hasn't been a problem yet. We still can't leave our patient entirely. Computer assisted detection is an enhancement of what we or the doctor does, but should increase in the future.	1	.1
Baby boomer generation coming through now!	1	.1
Because of the increased need for more radiologic techs, our management has asked us to train more individuals. Thus, we increased our numbers	1	.1
Before my current position, I worked at a breast center that averaged 200 patients a day. Three screening sites, one diagnostic mammography. We were never at full staff.	1	.1
C. The purpose is mental and financial. It really doesn't change anything. But we can charge more and the patients get a false sense of security.	1	.1

	C. New technologies and equipment are more computer oriented. D. Experienced staffing shortages.	1	.1
	C. Daily.	1	.1
	Cardiovascular imaging and multimodality approach. New center will have modalities together. Imaging will be determined with a team concept. Imagers will be part of a team determining best avenue of treatment and procedures to image patient. Diagnostic departments getting smaller. My experience, have gone from a 15 room diagnostic department to five rooms. Other modalities expand: CT, MRI, nuclear medicine.	1	.1
	Computerized and digital imaging are the future and skilled personnel are needed. However, we aren't always offered the opportunity to train in other areas.	1	.1
	Computerized assisted readings for mammography studies.	1	.1
	Computers have changed the field dramatically and students are not experiencing what they are taught in the classroom. (Classroom still very old and traditional and clinical setting highly computerized.) This questions the relevance of the required (ARRT) education.	1	.1
	CR doesn't take much skill. DR not as much time.	1	.1
	D: I live in a small town and have been a traveler in x-ray and mamms. There are shortages of MRI, x-ray and mammographers in my experience. Most of all, there's a shortage of good managers in radiology.	1	.1
	Decrease in department staff due to increase in work efficiency due to being paperless and filmless.	1	.1
	Dramatic increase in services, especially outpatient. Our department is now entirely PACS and 100 percent filmless.	1	.1
	Even though new technology is here, staffing is a very major problem.	1	.1
	For quite some time we had difficulties recruiting R.T.(T)s due to the shortage.	1	.1
	From the time I started training in x-ray school until now, I have seen a dramatic increase in the use of computers in the diagnostic aspect of the medical field.	1	.1
	Good mammography techs are becoming fewer. We must offer more continuing education and introductory courses in all aspects of the radiology field.	1	.1
	Hard to find x-ray diagnostic techs. Implementing computer entry for orders. etc.	1	.1
	Have seen all but Trend B! In CT, as protocols become more complicated and involved, operators are more involved in image acquisition!	1	.1
	I believe with all of the new technology, medical imaging will advance significantly with a need for trained personnel. I also believe there will be a lot of assistance in interpretation of images by computers.	1	.1
	I don't think B12 is accurate. I don't think there is a reduced involvement.	1	.1
	I have been approached to develop online coursework for PET/CT technologists.	1	.1
	I have been doing this for almost 15 years. I have seen the shifts of studies from x-ray, to mri, etc., etc., etc. I don't see overall decreases, but I have seen cycles of popularity in imaging modalities.	1	.1
	I have experienced delays in obtaining results of tests performed at tertiary referral centers due to personnel shortages.	1	.1
	I have heard most of clinical hospitals going digital, and more use of computers.	1	.1
	I have seen mammo readers in the physicians' offices at many of the sites that I visit.	1	.1
	I have seen the need to be less involved with technique as the technology increases. I've also worked very hard because of shortages and I see departments needing help all the time.	1	.1
	I have seen the increased use of computer-assisted detection because of the increase of PACS and computed radiography.	1	.1
	I run a C-arm for a pain management room doing epidural steroid injections. I've seen an increase in the need for these procedures.	1	.1
	Imaging services are always growing. As time goes on, it seems there is always an increase in health care procedures.	1	.1
	In fluoroscopy, there is a reduction in colon studies and UGI; but a BIG increase in special procedures and ESI back injury.	1	.1
	In mammo, there are no new imaging techs. There will be a great demand for mammos in the future when all of the experienced techs have retired.	1	.1

	In one hospital where I worked, they had nine first shift techs, two second shift techs and only one third shift tech. Patient volume was such that hiring additional techs on each shift would have been justified. Instead, we had at least two and sometimes three techs on call every day, and I still have my paystub for the week where I worked 40 hours straight time, plus a scheduled Saturday shift — and 29 additional hours of call! A co-worker who worked call from 10 p.m. until 3 a.m. received a formal reprimand for being five minutes late reporting for her regular 7 a.m. shift later the same morning.	1	.1
	In working with mammography, we have added CAD. We still allow the patient to decide whether they want this with their mammogram. About half of our patients elect to have the CAD reading also.	1	.1
	Increased demand on radiation therapists to perform radiosurgery, IMRT and IGRT. This requires substantially more problem solving, critical thinking and geometric capabilities, OAR and multiple other factors to deliver treatment.	1	.1
	Increased volume of imaging procedures.	1	.1
	It seems that as imaging becomes more computerized, the need for operator involvement has declined. There is a shortage of nuclear medicine technologists and sonographers in my area. PET/CT techs are even harder to come by.	1	.1
	It's seen especially in CT. The scanner can almost operate itself. The technologist has less responsibility since the scanner has solved tracking.	1	.1
	I've worked with a computer aided device, RA and mammography.	1	.1
	Lot of cross-training is happening in order to alleviate shortages in other fields	1	.1
	More aggressive medical care/screening and increased age of boomers increases procedures required.	1	.1
	More doctors utilized two or more modalities for certain diseases. This trend will most likely continue. I don't think there will be a reduction for techs due to an increase in modern modalities. I think the opposite will be true. More techs are needed because equipment is getting better; therefore, more patients can be done, hence more techs needed. Increase of computer assisted detection is already a trend. Shortage in personnel skilled in particular areas is true.	1	.1
	Most shortages are due to hospital budgets.	1	.1
	My area's workload has been increasing with the introduction of PACS.	2	.2
	My patient load has increased dramatically over the past five years. Staffing, however, has decreased. I do more, not less. This seems to be the trend.	1	.1
	My students getting/not getting jobs tells what's available. The use of CR/DR imaging decreases patient involvement and increases technical involvement. Everyone is looking at screens, not patients! Getting a little too techo and not enough personal interaction.	1	.1
	Need for more radiation therapists with higher and more flexible skills.	1	.1
	New DDR equipment that automatically collimates and sets an average technique.	1	.1
	No.	1	.1
	None.	1	.1
	Our aging population insures increased demand for imaging and therapeutic services for the foreseeable future.	1	.1
	Our department has been running on a shortage of personnel for at least the last five years.	1	.1
	Our department has had a session dedicated to the future trends and needs for rad department.	1	.1
	Our facilities are going digital. New technology and quality imagees. Still allowing good patient/tech contact. Still needing skill to do my job, not just pushing buttons.	1	.1
	Patients demanding newest technology before its efficacy is proven.	1	.1
	Personnel demand is growing. Most techs work long hours or at several locations.	1	.1
	Radiation therapists are not in demand at this time, which is problematic for schools that keep graduating students from their programs.	1	.1
	Reduction in need for operator involvement in image acquisition and therapy delivery. In therapy there has been many technological advances that have made our jobs less physically demanding. However, mentally we have much to do, including verification of all the computers do.	1	.1

	Reduction in personnel can only put patients at risk. A well staffed and educated facility can only deliver the most dedicated and professional care to each and every patient. Expecting employees to ensure tasks done by a full-time employee position that's not filled can cause burnout and unhappy employees.	1	.1
	Repeat visits and exams.	1	.1
	Radiation therapy is changing so rapidly, it's hard to keep up with the special equipment.	1	.1
	Salaries have increased due to tech shortages. Techs now have the ability to decide between job location and salaries. Techs can be more choosy about where they work and demand higher salaries.	1	.1
	See above.	1	.1
	Shortage in technologists in general and those that are properly trained and educated. Highly skilled and trained are in short supply. Shortages tend to create a drop in entrance requirements so that the pool of applicants from which to choose drops in quality, I think.	1	.1
	Some new graduates are now having a little difficulty in finding a job.	1	.1
	Statistics at my facility show steadily increasing demand for imaging procedures.	1	.1
	Still experience chronic staff shortages, especially in skilled specialties. The situation creates job stresses.	1	.1
	The increase I know. Film and computers take away some of the technical skill a technologist must have.	1	.1
	The increase in demand for imaging and R.T. procedures have been relevant to me for several years. We have been aware that our population is getting older and will need more care.	1	.1
	The job I left over one year ago is still open. The facility has had Temp Techs for years now and could not operate without them due to a staffing shortage.	1	.1
	The new registered CT techs have no concept of what to do for different situations.	1	.1
	The physicians for whom I work are ordering many more MRIs and CTs than they used to, often in response to patient demand and even when they may be unnecessary.	1	.1
	The pool of talent required to fill needs on the clinical side and the industry side of diagnostic imaging is shrinking. Most of us who have been in imaging for 20 to 30 years are in management or have moved into corporate roles. The newer graduates don't necessarily possess the background many radiologists are looking for (multimodality, "expert" user.)	1	.1
	Therapy free-standing facilities are opening regularly in our area. I continue to get calls regarding staffing these facilities despite the pace at which our area has been able to supply the market with graduates.	1	.1
	There are always positions open locally and online.	1	.1
	There are several imaging centers in our area that are having trouble filling positions with qualified technologists.	1	.1
	There are times all a tech needs to do is click a button and everything else happens quickly.	1	.1
	There have been cyclical shortages of radiation therapists, dosimetrists and MPs over the years that have impacted on my RO department.	1	.1
	Volume in my facility has grown 25 percent a year for the past three years. I use locums and contracts for about 20 percent of my workforce, which results in increased costs.	1	.1
	We are having trouble finding R.T.s to work in the cath lab. We have started taking fresh students right out of school to train. They aren't ready for the pace the job demands and most are not mature enough.	1	.1
	We experience a shortage in the specialized areas only. Our institution has a radiography school and a ready supply of radiographers for the department.	1	.1
	We in CT are horribly understaffed with full-time employees and have been for three years.	1	.1
	We recently implemented PACS to accommodate patients' needs. It will result in reduction of clerical staff.	1	.1
	When undergoing my last mammogram, I specifically asked whether or not CAD would be used when interpreting my exam.	1	.1
	Worked in breast center with CAD unit.	1	.1
	Total	842	100.0

Other Comments on Trends in Particular Areas

Education Area

5. Are there any other comments you would like to share with respect to any of these trends in R.T. education?

	Response	Frequency	Percent
	Blank	758	90.0
	A lot of the new technology that is occurring takes time to learn, but a lot of the time it is not explained why we're learning these new technologies. We don't know the reasons why the times are changing.	1	.1
	A. Yes, even though the online trend will continue for years, it will impact us negatively as the quality continues to decrease. You can't learn patient care without seeing a patient. You can't practice taking an x-ray without a lab/clinic. Online is a data dump and the student takes the exam with the book in front of them – not a way to measure learning! The decrease in clinical hours has harmed health care and will continue to do so. B. Job/career path is better served multidisciplinary, but truth is that each place is so busy there is little cross-modality happening.	1	.1
	Access to other modalities such as nuc med, would be nice if classes were offered online at night for those who cannot stop working to go to school. Then maybe the home facility would offer "clinic" time before exam was taken – it's hard to "cross-train" or go into other modalities if only offered through daytime schooling.	1	.1
	After I finished my degree, I immediately started interviewing and now have a corporate job with J and J managing inventory for drug eluding stents.	1	.1
	Again I think most programs are just trying to survive. Most of the questions and answers can be related to money. How to reach more students and impact the bottom line. Unfortunately, the questions still remain for the last couple of years regarding the shortage of educators and the main reasoning being salary and degrees. If education is to keep up with technology and expectation of administration, someone needs to take a hard look at improving the operational bottom line and increasing budgets to programs and not just the bottom line that the program makes.	1	.1
	Am semi-retired as of Sept. 1, 2005. Work one day a week for ortho surgeon.	1	.1
	As a CI, I believe the strong academics prior to the meat of our job description do help improve the intense ability to deal with the course loads that are expected.	1	.1
	As a whole, imaging is lagging in its education of the techs working in the different modalities. A more rigorous testing of techs either annually or biannually to ensure proficiency is needed. Just because you hold a registration in a particular modality doesn't mean you can actually perform exams proficiently.	1	.1
	As the dynamics of radiology change and become more computer based, I think we will find more of the "seasoned" techs being phased out due to their inability or refusal to learn the necessary computer skills.	1	.1
	B. I currently perform radiography, limited sonography exams and bone densitometry. When I first started my current position, there was neither a sonography machine nor a DEXA machine.	1	.1
	Cardiovascular technologist (RCIS, RCVT) will do even more "special procedures/interventional radiology procedures."	1	.1
	CE is something we know we all need. How you get the points is relevant. It should be important to your job, not copying someone else's answer sheet.	1	.1
	Comments stated in Question 2 above.	1	.1

	Computers and the technology that goes with them are not going to go away. Technology will continue to evolve and improve all aspects of education. It is imperative that people who are considering studying radiology, already enrolled in a RT program, or working in the field become familiar with the new technology. Don't fear it, embrace learning.	1	.1
	Concerning Trend B, my observation is that as each modality becomes more complicated, there has been less cross-training, not more. The feeling in my institution is that each modality (CT, ultrasound, x-ray) has become a specialty in itself and is too complicated. Exam quality suffered because cross-trained techs were not as proficient in each modality as dedicated techs in that modality.	1	.1
	Continuing education as of now is online and that most likely will continue to be the trend. Learning new modalities is also a new trend. Right now in my hospital, most techs that work in the evening, night and weekend know how to do CT scans. Of course, the hospital has to raise your income. Some techs that don't want to learn are not forced to do it, but most of us want that "extra" salary, so we also do CT.	1	.1
	Curricula must keep pace with technology!	1	.1
	Depends if one or a few modalities take a predominant role as the primary imaging modality. If so, a large shift of R.T.s to those few modalities.	1	.1
	Don't like the multiple tasking/cross-training modalities. Need more regular techs.	1	.1
	During the training for medical technologists, more emphasis should be placed on patient care relevant to their specific conditions.	1	.1
	Education and training to be more innovative too long to get into here.	1	.1
	Educators come from an older paradigm that is quickly shifting, coupled with a shortage of educators. This could be a major stumbling block for the profession. How do we get older educators ready to meet the challenges and opportunities of this new paradigmatic shift?	1	.1
	Everybody should always be ready to learn something new. No one will ever be too smart in any area of the radiology field.	1	.1
	Everything is changing so fast, education has to keep improving. You learn something new every day!!! I started radiologic technology school in 1987 and I am still learning today!!! I feel as a radiologic technologist it is my responsibility to keep up to date on everything. I consider that part of my job. The other part is taking care of my patients!! We owe it to our patients to know what we are doing at all times!!!!	1	.1
	F. More need to understand and apply reports of research results. This is something I'm not sure I have heard of before. Part of the code of ethics is that we should adhere to proven, approved principles and not experiment on our patients. Would this not tend to violate that particular ethic? I know that we are also supposed to do research and advance the profession, so maybe this applies more?	1	.1
	From an imaging standpoint, I shy away from hiring anyone with limited clinical experience. They also tend to have poor people skills.	1	.1
	I believe there is a dumbing down of education. Instead of new graduates knowing the latest trends, they are less competent to practice their skills.	1	.1
	I feel as a profession that we need to be care of multidisciplined situations. There is a demand for high skill in all aspects of our profession. Increasing modalities can decrease proficiency. Beware of the “jack of all trades, master of none.”	1	.1
	I feel impact on me is minor. I am near retirement. However, training and continuing education will affect radiologists because of new technology.	1	.1
	I find that some of the things the students are studying have little or nothing to do with performing their jobs. Our hospital doesn't require film review with a radiologist while they are reading. The students are highly educated and routinely think the "hard diagnostic" work is beneath them.	1	.1
	I hope for the sake of the profession that standards of education are never lowered. I hope that licensure and certification will ALWAYS be of utmost importance to our field.	1	.1
	I just think that the people who provide education (the owners of schools) need to place a greater value on people and their abilities before purchasing technology that requires extended learning.	1	.1
	I think education is very important. We need to keep up on changing technology. However, someone is making way too much money on certificates and licensing.	1	.1
	I would like to see everyone who is taking x-rays have a two-year degree. I think we as technologists would receive more respect if everyone had to be licensed.	1	.1

	I would like to see more articles related to nuc med, including cardiac imaging, general nuclear medicine, therapy updates and PET in the ASRT magazines.	1	.1
	I would like to see more focus on research skills incorporated into the ASRT curriculum. With the recent inclusion of diagnostic imaging equipment/practices/procedures in clinical trials being conducted worldwide, we need to introduce this into the curriculum and continuing education areas. As a new employee of the ACR as a clinical trials trainer, I hope to effect some changes in this area.	1	.1
	If asked about multidisciplinary technologists 10 years ago, I would have rated very likely. However, as I watch the ARRT dismantle the career ladders in imaging, there is a low probability for the need of multidisciplinary techs. MRI programs will begin to develop. It will impact enrollment in the radiography programs. They have tried to get into sonography unsuccessfully but are still trying. The ARRT has become too involved in education for the wrong reasons – money and not for their mission, which is to improve patient care. The registry is too easy and we are putting out poor techs. I actually had students tell me they sat and laughed at some of the questions on the exam because they were so easy and could not believe it was a question on a certification exam. The profession will suffer by pushing out poor techs. Patient care in imaging will be poor.	1	.1
	If more online education and research are required, some organizations need to allow for more PCs/Internet access and on-the-job time and computer education to reasonably achieve this goal.	1	.1
	If you actively pursue change to be cutting edge and progressive, the impact is very minor. If you resist, it will be major.	1	.1
	In New York State, the major problem I see is that fusion technology is not allowed because of our restricted licenses. What will have to happen is that the four year colleges with radiography, radiation therapy and nuc med programs could combine into a fusion schedule. That is what I would like to happen here at ___ College. If we implement an x-ray program, then we could have all the students take cross-sectional anatomy class, plus PET along with CT/MR that we have currently in our programs. Eventually, just as simulators, whether conventional or CT, fusion will come under the jurisdiction of the radiation oncologist, just as the PET CT will, and our therapists will be trained to execute.	1	.1
	In our area I don't see much need for multidisciplinary techs, except in CT/PET. They don't rotate techs through all the areas in the big hospitals, they do somewhat in rural, but they don't have all the modalities in the small places. The big hospitals want to keep the techs in their own area, they don't rotate them, and managers have not indicated they are going to change it here.	1	.1
	It frightens me that with some of the advances in the diagnostic imaging field there could be a trend of looking at non-licensed people to run the equipment since the computers will either store exam protocols (i.e., CT) and almost run themselves, or virtually fix any error in exposure (i.e., CR). I live in Nevada and we do not require people to be licensed. If employers go with non-licensed, they can pay less and raise the profit margins. This will effectively put people who have studied this profession and educated themselves out of work here. It could lead to other states trying to push to amend their laws.	1	.1
	It is a Herculean challenge to implement these trends in developing and underdeveloped countries, as my own country Nepal and other countries of South Asia, Africa, etc. Our objective should be to set the modern standards of medical imaging in these areas for the betterment of R.T. education.	1	.1
	Keep up with education and technology to upgrade your skills.	1	.1
	Most techs I have spoken with agree that the CE requirements are overrated! Also, that we often do educational materials that do not correspond to our work; e.g., nuc med/ultrasound/therapy, etc., when I am an ER/trauma rad tech. Also, many feel it's just a way to make money! (Charging techs for seminars/ education materials, etc.)	1	.1
	Multitasking is the future; where to find this is the question. Who teaches these courses? Who qualifies to take them?	1	.1

	My personal thoughts are that electronic sharing of information is a good thing. The system must set up correctly (not dictated by cost and whoever takes the decision maker out to dinner and golf games). The users need to be active in the decision. The patient treatment time and sometimes their life depends on the IS. You need a strong IS department. I go with the flow, but I still think you could get faster results if you took the portable, the surgeon followed you to the department and looked at the film, then immediately inserted the chest tube! Those days are gone. P.S. I am computer knowledgeable. But I prefer the old way.	1	.1
	No.	1	.1
	No thank you.	1	.1
	None.	1	.1
	Not about any of the above, but I feel ASRT and/or ARRT should survey graduates of radiography programs a year after graduation about the quality of their program. I, for one, was assigned for my entire two years in a community college-based radiography program to a clinical training site that was completely CR and almost always phototimed. Yet my first job was in a hospital that was still all film. I was clueless about techniques and how to critique films, and that should not have happened!! I still see those same deficiencies in recent graduates of the same program, so evidently nothing much has changed.	1	.1
	Online education may be good in some ways, but not good in others. The minuses are lack of hands-on training and interaction with patients. If online education is to be effective, it has to be combined with hands-on clinical training.	1	.1
	Online schools can't teach you patient skills. It seems to me, we are getting away from taking care of people. It seems that the trend is to move them in and get them done!	1	.1
	Personally, I listed the impact on myself as very minor because I have already experienced the changes. I do believe the impact on other rad techs might be greater, as many have not experienced the trends yet.	1	.1
	Providing electronic means of education for R.T.s is a very cost effective, employee satisfier and organizations should work to offer this for all persons needing the credits. This would also flush out the organizations that made money off of the folks when the professional credits were deemed necessary by law.	1	.1
	Regardless of the push to Web-based components of the curriculum, hands-on reinforcement of skills will remain a critical component of a quality education in imaging. The answer does not lie in longer programs, but in more effective teaching and more frequent outcomes assessment.	1	.1
	Retirement will probably be in 2006.	1	.1
	Some CE credits don't pertain to my use. For example, a male tech doing CEs on mammography - tailor the CEs more to techs' needs. Make them less expensive, especially when purchased from companies (CE credit books and home tests).	1	.1
	Support both the RPA and your own RA, both are going to be invaluable to the profession it the future.	1	.1
	Techs need to learn how to use digital radiography systems and have an understanding of computer networks. We need more IT or IS education.	1	.1
	The "old-timers"(staff radiographers) need to recognize and support these upcoming trends in education.	1	.1
	The independent clinic and hospital are decreasing in number. Several clinics are combined because of HMOs. Increases staff and makes communication/management difficult and not as efficient.	1	.1
	The more literate, business oriented and administrative skill sets an individual has, the more secure the job and job growth.	1	.1
	The radiology administration practicing today is not as comfortable with change/technology advancements as the next generation will be. The major impact won't be felt until this generation retires.	1	.1
	The rapid change in education and technology has caused my colleagues to consider retiring early. It is too much information to teach and learn in a traditional program format. Our graduates are making decent salaries and do not want to be educators. They consider teaching as "too much of a problem for too few rewards." I now agree!	1	.1

	The rapidly changing trends are having a drastic impact on our radiation therapy program. There is so much more for our students to know that we are trying to change our 1-year program to a two-year format offering a Bachelor of Science degree upon completion of the program. We are also looking for new clinical which embrace the new technology.	1	.1
	The technologist with multidisciplinary skills is not likely since the ARRT is ruining the profession by getting involved with competency requirements for students and tests for modalities where once you had to be an R.T., now you don't – ex-MRI. The ARRT is ruining the profession and is all about more registrations that give them more money Shame on the ARRT board for doing this.	1	.1
	There needs to be more opportunity to learn modalities online or teaching colleges, especially in more rural communities such as Hot Springs, Ark., where I live.	1	.1
	There should be more emphasis in teaching the new technologist about human relationships (communications, patient care, sociology and human behavior) logic and ethics, better understanding of the principles and science of radiology, and focus on mathematics and physics.	1	.1
	They have not changed the topics at education opportunities in years, even through technology has changed.	1	.1
	Trend F is not clear in regard to what reports to understand and apply results from.	1	.1
	Washington University, online in11 months. Started clinical at 32. Class tech for two years.	1	.1
	We desperately need to attract young R.T.s to education as a career option. The graying of educators has the potential to adversely affect the future of our profession. If we do not fill the needs, others will.	1	.1
	We need the B.S. degree as entry level in order to be competitive and attractive to prospective students.	1	.1
	We've been through this trend multidiscipline before. It is circular!	1	.1
	What on Earth is a nontraditional student?	1	.1
	WHILE INCREASING TECHNICAL SKILLS WE SHOULD NOT FORGET ABOUT HUMANISTIC APPROACH TO PATIENT CARE. EMPHASIS ON COMPASSIONATE CARE IS ALSO IMPORTANT.	1	.1
	While these are all modern trends, not all of them are positive changes. Much of the new education emphasis is time consuming, expensive and of no direct benefit to the "average" working tech.	1	.1
	Will these possible trends affect the number of people in the workforce? Younger people entering the field have grown up with computer skills.	1	.1
	With increasing technology I expect fewer students directly from high school. Especially in rad one, the "people skills" needed for cancer work require more life experience prior to making that commitment.	1	.1
	With technology advancing so rapidly, it is so important for techs to keep up. The online programs are a great way to get information accordingly as per the individual's personal schedule. I hope techs realize how important it is to keep up with current technology and rapidly changing advances in the radiology world.	1	.1
	With the use of digital imaging, I think it is vital that students come out with strong computer skills. Extremely important to be multidisciplinary so that they are valuable to their employer.	1	.1
	With work schedules, it is important to have flexible ways to train, CE access.	1	.1
	Would like to see more schools for second training (CT, MRI, nuc med, radiation therapy),	1	.1
	Total	842	100.0

Workflow Area

10. Are there any other comments you would like to share with respect to any of these trends in imaging/radiation therapy workflow?

	Response	Frequency	Percent
	Blank	803	95.4
	Already using nighthawk and decentralizing imaging.	1	.1
	D. It will take some creativity as well as physician impact to decide how exams will be altered and taught, if focused exams become reality.	1	.1
	D. Major cause of burnout.	1	.1
	Decentralization has and will impact education. The JRC is a stumbling block for programs. The Standards are contradictory. Requirements for JRC recognition of affiliates and instructors interfere with programs delivering quality education. The process for JRC approval of a clinical site is costly. The JRC takes a long time to grant approval and receive a response back from them. We are the only profession that has such requirements. If the JRC requires outcomes assessment, then the assessment will tell you if an affiliation/instructor is working and the program should have that latitude. Like the ARRT, the JRC is ruining education by creating such obstacles and interference. The JRC & ARRT require such policies for the money and not based on their mission. The emperor has no clothes!	1	.1
	Given the advancing nature of radiology, the time we spend with each patient will continue to decrease as demand increases. Also, with machines and computers doing more of the computations, facilities will expect a higher turnover to satisfy the ever increasing pace of our clients' lifestyles.	1	.1
	Greed. Do more with less. It's all about the money. Patient care is taking a backseat.	1	.1
	Health care costs come, at times, before the actual needs of the patients. Care us becoming lax, in my opinion. The exposure to patients is still secondary to results, and expediting answers to expedite care and or relapse from care to – fill that spot with a $$ making individual. The bottom line [is] still money.	1	.1
	I am in radiation oncology. These comments are more pertinent to imaging.	1	.1
	I believe that quality will decrease significantly. As more free-standing imaging (mills) centers pop-up, the emphasis is on the "numbers." Qualified personnel will be replaced by "button-pushers." With more RAs, and by using teleradiology, the technologist misses out on important feedback from the radiologist. I used to believe radiology was an art form, but now with the cookie-cutter mentality it has gone downhill.	1	.1
	I don't thing outsourcing or distance reading should be a solution to the radiologist shortage. It is too impersonal, and diagnostic imaging should stay "personal." This takes away from any radiologist/patient interaction.	1	.1
	I don't understand how decreasing scan time can limit throughput. If anything, I would think it would increase throughput.	1	.1
	I longed for a position similar to a PA or RA, but it is likely too late arriving for me.	1	.1
	I think more hospitals going to the computer filmless (PACS) systems will result in significant changes for the medical field.	1	.1
	I think more of the concentration should be on quality patient care, not making the job of the radiologist easier. Some of the things take time away from the patient!	1	.1
	I would like some information sent to me on the radiologist assistant. [Respondent's name and address,]	1	.1
	I would like to be in a radiologist group practice and read ultrasounds on some level.	1	.1
	Impact on you and your specific job may not reflect the trend on the area as a whole. Duties are at times job specific.	1	.1
	Inability to get accredited courses to update skills without having to give up job.	1	.1
	Limiting time patient more so than already enforced would cause a negative outcome and possibly lower quality of work. I already see it in my workplace.	1	.1
	My concern is for patients being rushed through exams.	1	.1

	New career level opportunities will be a plus, but instead of requiring technologists to be certified in each modality, there should be more advanced practice roles such as radiologist assistant for experienced technologists or those that want more of a challenge.	1	.1
	New Highmark regulations in central Pennsylvania will have specific guidelines about the on-site radiologist or credentialed physician while performing certain exams/times.	1	.1
	Nighthawk radiologists are nicer to work with.	1	.1
	Nighthawking would affect us greatly. We do not have a radiologist on-site, but he is local and we work closely with him.	1	.1
	Patient management will become an increasing role of the R.T. Again, this requires more education prior to graduation so the practitioner is qualified to perform the specialized tasks related to patient management, education and a more advanced role in health promotion/disease prevention, and a substantial increase in geriatric patient management.	1	.1
	Patients seem to prefer larger, newer, perceived-to-be-safer, offers-free-parking suburban imaging centers over traditional (often inner city) medical centers. So do I. Of course, this means the only population using the inner city sites are those who live there, typically the poor and uninsured. This trend can only hurt those facilities.	1	.1
	Radiologist Assistant: We need to make sure these individuals are well educated in clinical patient care skills and patho-physiology. That they are trained to have a professional "bedside manner." We don't want advanced button pushers who are not respected by their collegues. We also need to upgrade the basic training for radiologic technology to include more specific clinical skills and how to act as a professional. Students should be shown what their responsibilities are to the patient. Many of the students I see coming out of school today act as if their only responsibility is pushing the button. Just responsible for the image, not the patient or their safety. We should stop relying on nurses in our departments to hold our hands. More and more I see our scope of practice being limited by the nurse. If this trend continues we really will be “button pushers." Nurses today are, in many hospitals, the only ones allowed to push contrast, start IVs and put oxygen on a patient.	1	.1
	Reduced scan time and remote reading capabilities would greatly benefit patients overall.	1	.1
	Respect and knowledge received by the public concerning how we radiologists play a tremendous and significant role to patients’ health.	1	.1
	Rural hospitals have capitalized on mobile imaging to provide services and augment radiologic department budgets. Trend to transfer images to major medical centers through the use of dicom enables rural hospitals to utilize remote reads.	1	.1
	See No. 7.	1	.1
	The number of students that we can filter to a clinical site is diminishing rapidly due to decentralization of medical imaging. It is too costly for the program to place our students at these places and besides they do not want to be bothered with students!	1	.1
	The shortage of radiologists will cause major changes. Will affect A and could cause more responsibilities on Techs, B.	1	.1
	There is still not a strong understanding of what the RA is.	1	.1
	Unless medicine begins to address quality issues with nighthawking exam readings, we may see the trend in the other direction.	1	.1
	Unless the R.T./PA has license from the board, it means nothing.	1	.1
	We need to start thinking about quality care again instead of more numbers and trying to keep up with the Joneses. Patient care No. 1 priority.	1	.1
	With increased use of imaging modalities by nonradiologists, the need for hospital services and staff will be diminished, creating a problem for hospitals to staff and address imaging needs.	1	.1
	Yes, we have to push patients through their MRIs so faxt, it’s inhuman and undignified and very stressful at times.	1	.1
	Total	842	100.0

Standards Area

15. Are there any other comments you would like to share with respect to any of these trends in R.T. education?

Response	Frequency	Percent
Blank	806	95.7
A. Will affect number of jobs.	1	.1
Again, I listed my personal impact as quite low as I believe I have already adjusted the trend.	1	.1
All of this is of no significance with nine states with no way to assure competence to the public.	1	.1
Already require R.T. for staff positions.	1	.1
As long as schools balance both academic and clinical training, not relying on classroom grades alone, the high level of competency will be maintained.	1	.1
As reimbursements decline, there will be a trend toward pushing imaging personnel to work even harder, leading to decreased exam quality, greater number of mistakes and repeat exams and increased risk of harm to patients. There is a "break point" where personnel are working beyond an efficient pace. I believe we are well past that point, now. This leads not only to mistakes, but lack of concern for patients in general.	1	.1
As the educator, I need to be in tune with the outside world and what is currently going on. I may not be practicing, but my students are.	1	.1
E. Sometimes patients are ill informed or misinformed. Sometimes they are skeptical when I try to tell them differently about something they think they know.	1	.1
Education is paramount to the health of our profession and must be held up to a high standard and be maintained at a high level.	1	.1
Having national/international standards would affect a lot of people	1	.1
I believe patients are seeking more information. With high-tech equipment, more shopping around for health services.	1	.1
I feel that requiring board certification in specialties like CT and MR is the best thing that could happen to us. My OJT in CT, for example, was to sit with another (also non-certified) tech for two weeks, learning that if I pushed these buttons in that order, good things would happen. Everything else (including dealing with adverse reactions to contrast), I had to learn the hard way, on my own.	1	.1
I hope patient consumerism does seek information on competence of the worker. Then maybe we will see appropriate changes in the profession and education. Maybe then the ARRT will get out of the education business and the JRC will develop policies to enhance education and not obstruct it.	1	.1
I think it totally depends on the place of education. The exposure of positive guidance, not consistent employee treatment, needs to be turned around. Negativity is rampant, and I find that I am a buffer in my hospital between staff and students. Students are malleable and need not feel like objects.	1	.1
If reimbursement is declined/scrutinized, hospital will be forced to not buy or use that particular machine or physicians will not order such an examination. Therefore, this will be a disservice to the patient because we did not use the best possible modality for this particular disease. It will be hard on the radiologist's side who reads mammography all the time and might have to abandon the idea of using mammography and use a more expensive modality like MRI. Sometimes "standards" to some is not the same to others, which would be hard to change just to be standard. If "patient consumerism" will rise, so will the insurance premium, then more problems with health care affordability.	1	.1
I'm finding this question very difficult to follow. It keeps jumping around between education and standards. In the future, make questionnaire easier.	1	.1
Institution or national standards is inappropriate, as the Registry and/or states do an acceptable job. Additional standards will be counterproductive.	1	.1

	It would affect me more if I worked in a different setting. I work in a county hospital satellite clinic working with few people with insurance and many indigent people who are very happy just to have a very basic clinic within walking distance that is open so late at night.	1	.1
	It's weak and ineffective where I work.	1	.1
	I've heard of a lot of mammography centers closing due to malpractice. A lot of female techs don't do, or drop, their mammo license because of issues.	1	.1
	Many patients already question the testing they receive and many are well informed of the procedure.	1	.1
	More patient awareness and techs as well given to and received by treatments and procedures.	1	.1
	Needs to expand to multitask.	1	.1
	No standard for "F" and "G". Is this an error or oversight on my part?	1	.1
	Not sure what you are asking about C and D in the last two questions.	1	.1
	Patients should question all tests ordered on them. We have patients all the time who have not been informed of the type of test they are having done.	1	.1
	Reimbursement issues will affect techs' job security. If hospitals and clinics have to cut back on costs because of declining reimbursements, jobs may…	1	.1
	Standards will have less of an impact on me because I am already very involved with that trend. My research suggests that patients cite health care personnel competence as important, but rarely validate the provider's qualifications. They assume competence in the high-tech environment.	1	.1
	Taking the registry online is much more convenient. Is it supervised?	1	.1
	The trend will increase and impact practice in five to 10 years considerably, but not yet.	1	.1
	There are many imaging facilities who have discontinued performing mammos due to low reimbursement and increased lawsuits. There has to be some protection put into effect in order to promote desire for radiologists to continue to perform and diagnose mammos.	1	.1
	Those who practice should have graduated from a radiology program – college.	1	.1
	Too many techs coming out of school are too casual about continuing their "education." I have stressed to graduating nuc med students that they should review their material six-12 months after graduation. After working independently for a short time, then reviewing, they will actually understand the study and not have just memorized it for the boards.	1	.1
	We are a very insular society and feel our form of medicine is the best. Therefore, international standards are completely outside our psyche to our detriment!	1	.1
	We must improve our training programs. The graduates need to have knowledge beyond just what it takes to obtain an image. They must understand how they fit into the whole picture of medicine. The graduates need to feel a responsibility to the patient. The new graduates don't even know that they should ask the patient for a history, much less take a history. They have literally told me that they don't know how to take vital signs because that is the nurses' job. We must improve, because right now we are graduating button pushers.	1	.1
	Why do we allow insurance companies to tell us what we can charge our patients. Who put them in charge of medicine?	1	.1
	Total	842	100.0

Supply-Demand Area

20. Are there any other comments you would like to share with respect to any of these trends in imaging/radiation therapy personnel supply and demand?

Response	Frequency	Percent
Blank	799	94.9
1. Dramatic change to PACS. 2. All film-less radiology. 3. Increased efficiency/speed. 4. Reduction in cost; i.e., reimbursement.	1	.1
All the restrictions/requirements placed on R.T.s by the ARRT has done nothing to benefit the profession as a whole. It has increased the expense of maintaining a tech's career with no gain in income, competency or prestige. It has made many good techs leave the field for more lucrative endeavors.	1	.1
All radiology tech positions should be filled by licensed personnel. With MQSA standards for mammography (and such certifications), how can any employer hire someone off the street, train them and expect them to administer ionizing radiation with expertise and knowledge and responsibility that well-schooled techs provide?	1	.1
As an older educator without direct experience using computer assisted wage acquisition makes it difficult to effectively teach/demonstrate this information.	1	.1
As CT scanners become more advanced, the more I feel that if you operate a scanner, you should be certified.	1	.1
Being a mammographer/supervisor, I do not see young techs wanting to train in mammos. Low pay and consider it low as compared to MRI, PET, CT and ultrasound.	1	.1
Dire need for educators with appropriate credentials (B.S., M.S. and Ph.D.Ed.D.).	1	.1
I believe there will be plenty of R.T.s, just not enough of the specialty techs, due mainly to low number of training slots.	1	.1
I don't believe we have a shortage of skilled workers in specialties; perhaps in general radiography.	1	.1
I don't see a reduction in the need for operator involvement. Increases in technology will need an increase in training and education of the operators.	1	.1
I personally do not believe there is going to be a shortage of staffing based on corporate attempts to minimize staffing, merging tasks, reimbursement concerns, technology advancements and the outsourcing of tasks.	1	.1
I think it is detrimental to patient care when facilities decrease the number of techs per machine. Facilities are cutting back on techs due to reduced reimbursement rates.	1	.1
I think we will have a higher number of patients in the future. Lots of people get more sick at a younger age than many years back. More junk food for less price means more problems.	1	.1
If the need for operator involvement is decreasing and the nurses are taking over our patient care responsibilities, then what are we going to do as technologists? Could it be that we just won't have technologists at all and just staff the radiology department with nurses?	1	.1
If these trends do continue, then education will be a major factor. Many of these trends depend on higher education, not just "on-the-job training." It takes many years to become an x-ray tech, then transfer into an imaging modality, and then advance in the specific modality. Many of these highly skilled techs (who have worked their way up the ladder) do not want to learn another modality or specialize again in their specialty.	1	.1
I'll be retired or dead in 10 years.	1	.1
I'm getting out of this business. I don't care for radiology managers and can't find a good one.	1	.1
In our area there are students to hire, so we don't feel the shortage. Small isolated towns have problems hiring.	1	.1
Increasing the number of students allowed to enter R.T. programs is a short-term fix that will cause an oversaturated field with individuals who many not have truly wanted to become an R.T., but were accepted as a second or third option.	1	.1
Increasingly complex technology requires more training for R.T.(R)/R.T.(T) staffs. Latest (proven?) technology not affordable by health care budget.	1	.1
It depends on area. High population with rad tech schools vs. low population and few health care workers.	1	.1
It seems to be leveling off now. But what will happen in the next two decades with	1	.1

	baby boomers retiring, especially in education?		
	It would be nice to see more publicity for careers in radiologic technology.	1	.1
	It would be nice to see some type of training for PET/CT for the CT technologist. I have heard of nuclear medicine technologists enrolled in CT courses. It would be nice to have a course for the CT technologist (without doing the entire nuclear medicine curriculum. They do it for MRI techs.)	1	.1
	Lack of instructors, although we are now requiring degrees for coordinators and program directors. I, along with others in the education field, feel that we are being railroaded out of the field if we do not go back and obtain our degree. Cost of optaining a degree is also a major problem as well.	1	.1
	None.	1	.1
	Nevada.	1	.1
	People entering and staying in the field need to be more dynamic in their education. Good knowledge of anatomy: functional MRI.	1	.1
	Radiation oncology. Higher advances require even more flexibility in skilled training than ever before. Online OK.	1	.1
	Re: Reduction in need for operator involvement in image acquisition and therapy delivery. Vendors are driving this trend, but I think it is bad for patient care and radiation protection.	1	.1
	Re: The reduction of operator involvement in procedures. I don't see how this can be accomplished without sacrificing patient care quality.	1	.1
	Schools do not have enough slots to keep up with demand. An increase in instructors and class slots would need to be resolved in order to meet increasing needs.	1	.1
	See above comments.	1	.1
	Since I plan to retire in 13 months, this will not impact me.	1	.1
	Supply and demand will be affected by the economy in the area where people are likely or unlikely to live, which can continually change in status. If patients live there, demand is there.	1	.1
	Technologists allowed to inform patients of results of DEXA scans. Techs being allowed time to educate the patient in bone density health and mammo issues.	1	.1
	The ASRT Professional Curriculum has expanded and therefore requires more of those who graduate from these programs. It is going to be a challenge to teach all of that information; therefore, the ASRT should provide more educational materials to facilitate this process. Educational materials in the form of videotapes or DVDs for total body irradiation and craniospinal treatment procedures, as well as materials specific to neoplastic diseases would be an asset.	1	.1
	The shift in care becoming digital just shifts the type of skills and when and how they are used, not totally diminishing our abilities or tasks. However, HR and staffing will feel necessary to still cut back.	1	.1
	The students today are not learning the basics as well. The camera vendors are now installing many of the once necessary adjustments to be done automatically on their systems. If the computer goes down, all the students, now techs, don't know how to manually acquire a study.	1	.1
	Too many questions. I'm bored and unconcerned. Where's my ECE credits?	1	.1
	We are not producing quality techs.	1	.1
	When the baby boomers retire, there will never be as much interest in x-ray as there used to be. It will be hard to find good techs.	1	.1
	Where will we find educators?	1	.1
	With the increase of some computer-assisted detectors, it may put some technologists out of their jobs. We do not want to rely too much on computers.	1	.1
	Total	842	100.0

Comments Not Restricted to Particular Areas

Specialties, Techniques Apt to Be in Short Supply

21. If there are particular specialties or techniques you feel are apt to be or become in short supply over the next five-10 years, even if there is no overall shortage of radiologic technologists, please briefly describe those specialties or techniques here

Response	Frequency	Percent
Blank	753	89.4
1. CT/PET. 2. MRI tech. 3. CT tech.	1	.1
A geriatric focus on the delivery of health care.	1	.1
All work in radiology, most special procedures and maybe heart caths. A lot of nuc med.	1	.1
Any positions that require taking call. Jobs such as this should get paid a considerable amount more.	1	.1
As an educator, I do not see many new female technologists showing interest in mammography. In the area that I live in, all the mammo techs are middle aged or older. I wonder who will do mammograms when we all retire? Also, CT is taking over a lot of procedures from regular radiology and I see a trend of cross-training night techs who work in radiology in CT also.	1	.1
As CT is taking back many of the angiogram exams and cardiac imaging, MRI techs might lose their skills, or at least their edge. Those patients who cannot have CT contrast because of allergies or kidney compromise or pheochromocytomas do still need to be imaged in MRI. If we don't do a certain number every year, I believe our image quality suffers.	1	.1
Baby boomers are aging and may require more imaging procedures. I wonder what effect baby boomers retiring will have on health care system.	1	.1
Basic radiological techs.	1	.1
Cardiac cath lab technologist. Interventional radiology tech.	1	.1
CT specialty.	1	.1
CT, MRI, PET.	1	.1
Diagnostic radiology, if average age of rad tech is about 48, we are going to be in trouble in about 15 years. Diagnostic needs to be recognized as a SP.	1	.1
Education.	1	.1
Educator shortage.	1	.1
Educators in the field of radiologic technology are in short supply. Universities and community college based programs are not keeping the pay scale on par with the money that is made by the graduating student. The educational demands placed upon educators are another factor in the shortage. Some colleges provide no tuition reimbursement for educators seeking advanced level degrees.	1	.1
Educators, mammo techs.	1	.1
Gallbladder x-rays, IVPs, now there's ultrasound.	1	.1
General radiographers: 75 percent of all studies ordered are vanilla x-rays, couple this with the incentive to go to advance imaging. More pay per…	1	.1
Generalized nuc med exams, but an increase in PET.	1	.1
Geriatric care.	1	.1
Geriatric health care, veterinary oncology. Insufficient knowledge of use of new fusion technologies when the specialty is not the primary area of certification (ultrasound, MRI, CT, etc.).	1	.1
GI fluoroscopy, mammographers - lower reimbursement, higher malpractice.	1	.1
I believe nuc med and MRI are the places to go with new educations, by radiation topping it all.	1	.1
I feel all modalities will suffer. There will be a need for cross-training.	1	.1
I feel all of the other imaging-related modalities will continue to exhibit shortage of workers.	1	.1
I feel that the post-processing of cardiac CT images will become a specialty in itself.	1	.1
I feel there will always be a tech interested in a new modality or change just to learn something new.	1	.1

	I feel there will be a continuing shortage of radiologists.	1	.1
	I think general x-ray techs will be in high demand because most techs move to a specialty area fairly quickly.	1	.1
	I think IVPS will no longer be used as much because of CAT scans.	1	.1
	I think that diagnostic radiographers will be in shorter supply as many want to become MRI, CT or other specialty technologists. The perception is that these "advanced" modalities are more prestigious and pay a higher wage. Students coming into programs now are looking beyond diagnostic radiology and thinking about how they will specialize. I think history has shown a parallel in medical education. Now there is a shortage of general practitioners, especially in rural areas.	1	.1
	I'm not sure which ones.	1	.1
	In my hospital, there is an overall shortage of R.T.s. Granted, technology is moving forward, but what good is it if there is nobody to perform the procedures.	1	.1
	Increasing use of MR, ultrasound, PET, flat use of x-ray.	1	.1
	Interventional radiology/special procedures.	1	.1
	IVPs due to CAT scan stone protocols.	1	.1
	Mammo	1	.1
	Mammo reimbursements are too low.	1	.1
	Mammography is seeing more and more centers closed. The wait time for mammography is also increasing as well as the need for mammography techs.	1	.1
	Mammography may become harder to get in a timely manner due to severe restrictions on facilities and techs coupled with decreasing reimbursement.	1	.1
	Mammography techs. Shortage due to salary, verbal abuse by patients, low reimbursement from insurance.	1	.1
	Mammography will decline because of combination of increasing regulation, litigation and declining reimbursements.	1	.1
	Management positions seem to be less desirable in our organization — especially directors.	1	.1
	MRI and ultrasound non-radiation procedures. PET still evolving.	1	.1
	MRI technologists who are mammographers as well are in demand — and short supply. With MRI of the breast becoming an important diagnostic tool, it's important that the MR techs also have a background in mammography (and ultrasound). IT is a rapidly growing area of radiologic technology. With many hospitals going "digital," it would be great if radiography programs offered a health care informatics path for those who wish to pursue such a career. Often the PACS administrator or IT contact at a hospital is a "computer person" rather than a medical imager, and I think that is a measurable disadvantage.	1	.1
	MRI, ultrasound, PET/CT, interventional.	1	.1
	Need more CT training for specialty procedures also more cath lab training facilities.	1	.1
	Need more regular technologists.	1	.1
	Nuc med.	1	.1
	Nuc med tech.	1	.1
	Nuclear and PET. Ultrasound. Invasive imaging. (Depends on how good the 3-D imaging becomes and can be accurate enough for measurements.)	1	.1
	Nuclear medicine with the exception of SPECT scanning and PET imaging.	1	.1
	Our area seems to be more nurse oriented, even nurse managed. Seems like respect for technologists has been lost. Our abilities and our knowledge still outweigh any nurse. Our physicians still prefer techs over nurses, but our hospital does not. I feel as though, if we as a radiologic society do not start educating our hospitals and clinics on all that we can do, I'm afraid in Georgia all that they are going to start requiring is the basic six-hour training. Some hospitals in our area are already staffing "techs" who have not even finished school and taken a registry. This really bothers me and my co-workers. Thank you.	1	.1
	PACS administrators. Clinical PACS implementers and trainers. CT and MRI post-image processors Geriatric health care (for the aging baby boomers).	1	.1
	Part of my frustration is that there is often a standard technique for an exam. We work with 15 doctors. Keeping up with technology and computers.	1	.1
	Pediatric rad techs. Ultrasound techs. Interventional techs.	1	.1
	Personal versed in two specialties. PET/CT, angio/MR, etc.	1	.1
	PET, PET/CT, nuc med.	1	.1
	PET/CT. Other cutting-edge procedures.	1	.1

	Possibly radiation techs, because of the increased demand to the aging population needing these services.	1	.1
	Quality positioning. Skilled technologists will diminish due to attention to throughput and CR and DR equipment. Proper positioning and technique have already…	1	.1
	Rad tech. It seems as if a lot of rad techs are moving on to different modalities.	1	.1
	Radiation therapy. Not enough schools.	1	.1
	Radiation therapy, Nuc med.	1	.1
	Radiation therapists/dosimetry.	1	.1
	Radiation therapy is chronically afflicted by a chronic shortfall of technologists. The need for cross-over skills with imaging/fusion technologies and subspecialized skills within radiation therapy will intensify this shortfall. The shortfall has a major impact on ability to meet increased caseload and procedure demands and will require increased reliance on computerized technologies as a surrogate for skilled personnel.	1	.1
	RT, CT, NM. Especially PET.	1	.1
	Radiation therapists remain in short supply as well as CT and MRI rad techs. Recruiting for these positions can be difficult.	1	.1
	Shortage of teachers where I trained most are going to retire in five to 10 years. Who will replace them?	1	.1
	Some concern for use of manual technique by younger techs due to overdependence on automatic systems. These are not fail-safe and we can't afford…	1	.1
	Sonographers. Nuclear medicine technologists. PET/CT technologists. Dosimetrists.	1	.1
	Sonographers that take call.	1	.1
	Sonograpy.	1	.1
	Special modalities and computerized techniques — but the opportunity to train w/o experience has to also be there. Many offers require experience.	1	.1
	Special procedures are being utilized more and more because surgical reimbursements are dropping and the procedures are less invasive for the patients. This area and MRI may experience shortages of personnel and funding if not supported by the medical establishment.	1	.1
	Techs that do regular x-rays. Everyone is being recruited to different modalities like ultrasound, CT MRI, etc.	1	.1
	The diagnostic field is losing good techs due to the incentives to specialize. The modalities are becoming so specialized that it is easy to lose those skills.	1	.1
	The general x-ray tech and advanced imaging tech with a good understanding of anatomy/physiology.	1	.1
	The radiologic technology fields are becoming more and more advanced with computers and new imaging/therapeutic techniques. The schools have pushed students through fast because of staff shortages through the years. This has caused many hospitals to have inexperienced poorly trained individuals, and decreased wages of those more knowledgeable, yet are the ones who can handle it all. This field is becoming more full of students/techs who are "certified" but still struggle with basic studies, yet they are making wages that years ago I was striving for.	1	.1
	The short supply, in my opinion, are R.T.s who are dedicated to hands-on physical care of patient, not just the "computer" aspects of the job.	1	.1
	There is a large number of sonographers who have been in the field for a long time and will be retiring in the next five to 10 years. This could cause a…	1	.1
	Ultrasound technologists. Poor school and low wages.	1	.1
	Ultrasound, MRI, mammographers and CT are in short supply now and I feel the trend will continue in the future.	1	.1
	Ultrasound, nuclear medicine.	1	.1
	We are all turning into button pushers. (Our worst nightmare.) There is no longer an art to taking x-rays.	1	.1
	We are always short of MRI, nuclear and RT techs.	1	.1
	We have more radiation therapy students with no x-ray background and more dosimetrists/dosimetrists-in-training with no therapy background.	1	.1
	With fusion imaging and CT, entry-level programs will most likely have to teach CT. Something will have to come out of the curriculum to allow time for this or expand to a B.S. degree. Problem will also arise in finding enough CT scanners initially for clinical space.	1	.1
	X-ray techs. There could be a possible shortage because everyone wants to go further and make more money.	1	.1

	Total	842	100.0

Other Trends Likely to Have Major Impact(s)

22. If there are other trends that you believe are likely to have a major impact(s) on the profession over the next five-10 years but that you don't believe fit into any of the above four categories, please specify those other trends below. Please also briefly describe what you believe the likely impacts of that trend will be.

	Response	Frequency	Percent
	Blank	774	91.9
	1. Cost-effectiveness. 2. Better management practices, better employee relations, job satisfaction, to keep employees.	1	.1
	Allowing "operators" to take x-rays undermines our whole profession negatively!! I think we'll see more of that as a whole with more "untrained" people doing more of our work.	1	.1
	As I mentioned earlier, more clinical trials utilizing diagnostic therapeutic and interventional modalities requiring education and training. Right now, many nurses and other allied health personnel perform these functions, but I see it as an alternative career path for imaging specialists (radiographers).	1	.1
	As we live longer, more and more people will be sick and need some form of treatment. Can we meet the needs of professions with substantially trained techs or support people? I think not. So get on the ball, get more training centers, get more standards and higher standards. Include the tech as part of the big picture. We usually have vast knowledge and a lot of experience and are overlooked often.	1	.1
	Billing and coding insurance reimbursement.	1	.1
	Burnout from overwork, inability to obtain cross-training owing to employers' scheduling demands, a lack of appreciation and, even more importantly, a fundamental lack of respect. I once asked a radiologist (on a slow day) about some pathology visualized on a film I had taken. His response was that "techs don't need to know that." To me, that is the intellectual equivalent of being kept barefoot and pregnant. As long as radiologists see us techs as nothing more than "button-pushing monkeys," this field will continue to be troubled by morale problems and burnout. As a motivator for us to unionize; however, their attitude can't be beat. I'd really like to see more articles about unionized techs and how being in a union changed the quality of their workplaces.	1	.1
	Cardiologist taking business away from radiology.	1	.1
	Concern. Current trend. Less importance on radiography and more importance on other modalities; i.e., CT, MRI, PET scans. Impact: reduced need for experienced radiographers.	1	.1
	CT, CT/PET, molecular imaging, molecular treatment.	1	.1
	Cultural competence: The changing population of USA being the major factor. In a few years, most Americans will be immigrants, etc. Management issues: more about billing, employment relations, regulations and rules of business operations...	1	.1
	Data management.	1	.1
	Degree creep; i.e., I think that, ultimately a B.S. degree will be the entry-level educational level for R.T.s, particularly nuc med/radiation therapy.	1	.1
	Digital radiography, PACS, RIS.	1	.1
	Education of the specialty areas will increase, challenging schools to offer the courses/programs. Careers will branch off in other specialized areas with IT/computers/processing/	1	.1
	Educators being left out of the loop. Oftentimes when a clinical site gets new equipment, they train the staff and then maybe the educator who has students there. AVs need to be developed for imaging professions. We currently use the abundance of NURSING media. We need to promote our professions better in TV and national print media.	1	.1
	Electronic medical records for radiation therapy - why? The number of patients being treated, the disasters that we have encountered and the need for continuity of care.	1	.1
	Entry-level education for radiologic science will increase to a bachelor's level. I believe	1	.1

	graduates will possess more skill/knowledge than diagnostic imaging, such as CT or MRI.		
	Flooding the market with technology schools.	1	.1
	Forcing quality people out of the field because they do not have a degree. Some of us in our 50s and who do not which to spend the money must now fin…	1	.1
	Hospitals with PACS – film-less. Because of the exposure to patients extremely high, that I feel it's not in the patient's best safety.	1	.1
	I am leaving education. (I love to teach!) I have been working for a proprietary school and find that the education practices are based on the amount of money that the student pays for the education. The student to instructor ratios are high and the program director, if he/she cannot find qualified instructors or clinical coordinators, has to do it all. The school where I am employed now has 75 radiology students to three instructors. If the trends in radiology continue at the pace it has taken in the past 10 years, education has a giant leap ahead in order to produce technologists who are prepared for the future. I see a trend of education lagging behind the profession and not enough money to keep up with it. Also, with a national standard there would not be states like Nevada that has no licensure of technologists or standards by which they are employed. It is amazing that everywhere you look in this state there are uncertified technologists working with very complicated equipment and patients without any training. I didn't think it existed anymore but it does.	1	.1
	I am seeing fewer job openings in our state and am hearing the same thing from R.T.s in other states. I do not believe there is a shortage of technologists any longer because more programs are being created and current programs have expanded enrollment.	1	.1
	I believe NM will see a sharp decrease in use once PT takes a forefront. Acme's could offer opportunities in computer training.	1	.1
	I believe portability will increase considerably as America ages. Techs need to be mobile!	1	.1
	I believe that a shortage of radiologic science faculty is going to negatively impact our profession. I also believe that the professional curriculum can never keep up with the rapidly changing clinical environment.	1	.1
	I believe that the increased use of CR and DR in radiology departments is increasing the radiation exposure to patients. It is difficult for radiographers and students to recognize overexposure on digital images. The exposure parameters given by equipment manufactures are too wide and not accurate if patient positioning is not precise. The impact on our profession is high. We fought for years to not be thought of as "button pushers" and now I see many R.T.(R) s becoming just that. Another trend in our area is for radiologists to read substandard images. Few of the newer radiologists are demanding suboptimal images be repeated. Also, more radiologists don't want to be bothered reading diagnostic exams but prefer CT, MRI, ultrasound and PET.	1	.1
	I believe the RA role will grow and expose the shortage of radiologists and the need fo radiographers to be able to advance.	1	.1
	I believe your survey is too complicated. Asking too many questions. There will be a good job market for the next 10 years. We shouldn't rely on online learning. Students should go through present methods of education. More departments will be paperless in the near future. Training and CMEs after graduation will be increasingly important. Thank you -- [respondent's name].	1	.1
	I can't think of any.	1	.1
	I expect Labor Department to classify radiologic technologists as professionals in next five to 10 years. We must continue to educate our colleagues and government representatives on this very important issue. It is as important as the success of the nursing profession and issues.	1	.1
	I feel the international aspect of our profession will have a much greater impact as our mobile society becomes more globalized. I envision nationally available distance education opportunities being embraced around the world. The emphasis on where you live will become less relevant than the source of your educational experience.	1	.1
	I see trends of unqualified personnel operating equipment and helping with patient preparation. I can see the radiation dose increasing with more imaging and less qualified personnel. I see more MRI accidents without technical knowledge to safeguard the environment. I see missed diagnosis because instead of skilled technologist who can bring potential issues up to radiologists while the patient is in the facility, things get skipped and missed. I also see less accountability for problems related to the above issues. With the growing aged population, patient care will be impacted to the extent seen in other countries where it is inaccessible, or at the very least demoralized into just a	1	.1

	number, a body with which an allotted amount of time is given — no matter what the problem.		
	I think the "profession" of radiology may be headed the wrong way. With national efforts to "cut costs" and decrease unnecessary medical procedures, the radiography profession is pushing toward MORE education and specialization. With the advent of "limited radiography" in over 30 states and, in Texas, the acceptance of Non-Certified Technicians (NCT), and in the acceptance of free-standing "NCT" training facilities - the real-world application of less certification and training seems to be moving in the opposite direction from which we aspire. The equipment is MORE automated and is usually maintained and repaired by "bio-med" department and/or vendors. There is little need for radiographers to "learn" about transformers, generators, film quality measures and developing/processing chemistry. I believe any national standards will identify the LOWEST level of education as acceptable. That would fall in line with NCT training. Mammography, CT, MRI, PET and interventional procedures will require specialized training. But entry-level, screening type imaging can be provided by NCTs or nurses with NCT training. It will always boil down to cost-effective. It is NOT cost-effective to pay a B.S.R.T. to work in an out-patient or free-standing facility to do routine chest x-rays and minor trauma. Third party-payers are not going to reimburse cardiologists, nurse practitioners, orthropods, family practitioners and radiologists, too. I think radiologists are losing ground. And I believe the nation's managed care efforts will lower the minimum standards for basic education. And information techs will become more involved with medical imaging.	1	.1
	I worry that declining reimbursements coupled with large malpractice insurance will reduce the number of imaging centers. What will be left are mega imag…	1	.1
	I would like to reiterate the shortage of educators and the growing concern over the degree requirements that the JRCERT has placed on programs, along with the apparent inequity in pay for educators as compared to clinical technologists. A shortage of advanced skilled technologists will be good for the advanced skilled technologist, but I shudder to think what it will do to the general population of technologists and educators.	1	.1
	If opportunities become available for technologists to cross-train or seek opportunities for advanced level programs there will never be a shortage of radiologic technologists in any modality.	1	.1
	In the emergency room where I work, I believe a lot of x-rays are done more for legal than medical reasons. I think it may be possible that insurance…	1	.1
	Increase in salaries for instructors would need to be addressed to encourage more individuals to go into education, before class slots could be increased to meet increasing demands. Or software for interactive training for online courses developed to reduce one on one time for instructors and students.	1	.1
	Increasing need to document adherence for imaging and therapy algorithms.	1	.1
	Interference by the ARRT in student education, as well as the interference in programs by the accreditors, continue to hurt education of new students. Time for these agencies to look at the real world of imaging and how to best serve it, not best serve themselves. ARRT and JRC are out of touch with education. ASRT professional curriculum is outdated. Until education is improved, the profession will not.	1	.1
	Just as reimbursement rates continue to dwindle and increasing technology costs more, I see a major work impact on therapists. They will be required to do more in less time, thereby increasing burnout, as seen in the past.	1	.1
	Lack of education/clinical ability of graduating students — "fly by night" programs popping up in schools; schools graduating students who aren't prepared for the "real world" of radiology; graduates from non-accredited schools flooding the market. Impacts: lack of patient care; lack of quality images; unskilled staff making unfavorable impressions on the public and other health care fields.	1	.1
	Money is always a consideration. If salaries don't keep up with the times, and the rising cost of living, I believe fewer and fewer individuals will want to go into health care and/or remain in health care.	1	.1
	Moving away from CT biopsy to guided biopsy. Moving from mammo biopsy to ultrasound-guided biopsy.	1	.1
	Need for qualified educators.	1	.1
	Non-professionals will seep into our profession. I've already seen it.	1	.1
	PACS inter-nation nighthawk.	1	.1
	PACS will continue to impact our profession. Electronic environment.	1	.1
	Possible more people needing health care services.	1	.1

	Quality of care initiatives and payment for performance could both have a significant impact.	1	.1
	Stem cell research will have a direct effect on the practice of radiation oncology by curing some cancers that are currently treated with radiation	1	.1
	Students graduating and moving directly into a scan modality — for more money and less physical demands — hurts the backbone of imaging and produces a less skilled tech.	1	.1
	Thank you for including me in this survey. However, I'm retired after 35 years. Most of the questions do not apply.	1	.1
	The advancement of a person's education (A.A. to B.A. degrees, etc.) is very hard to do. Especially if married and have a family to support.	2	.2
	The bachelor's as an entry-level requirement for radiation therapists. The cancer patients in non-licensure states will pay the price for this action because they will be the ones who are receiving care from non-therapists (individuals with no training in ionizing radiation); because someone with a bachelor's degree is not going to work for a small center in another state in a rural area.This type of center is on the rise in radiation oncology, and someone from a large metropolitan university is not going to leave their state to work in a small town far away. Looking at health care delivery in Canada, England or Australia is not beneficial for the needs of the patients in the USA because our health care delivery mechanism is radically different from the above mentioned countries!	1	.1
	The likely approval of MR contrast agents for broader applications in vascular and body imaging will impact the workflow of the radiology department, diverting some cases from angio, ultrasound and/or mammography. These imaging studies performed in MR will be very large datasets requiring post-processing and archiving. The expertise of the users needs to grow with the potential of the diagnostic tool. I see a lot of young technologists performing very advanced exams with little training and I think this is a huge area of concern.	1	.1
	The need for all to have at least an associate degree in radiology.	1	.1
	The need for baccalaureate degrees instead of just certificates.	1	.1
	The salary differential between radiation therapists and program directors needs to be adjusted. The educators should make as much, if not more, than the therapists. We have more experience in the field and are required to have a higher degree — yet many of us make less than low and entry-level therapists are making. Who will replace us when we retire? I would not have taken this position if I had been told up front that I would end up making less than I would have if I had remained in the clinic; and I have finished my undergrad and am working on a M.S. degree.	1	.1
	The trend of many baby boomers who will be retiring soon. There sure are a lot of them in the radiology field, I believe.	1	.1
	The trinity of radiology organizations has a major impact on the profession. Unfortunately I see the impact as negative since it is self serving to the organizations and not the patients or profession. Board members serve to push their own agendas w/o looking at the profession as a whole. Decisions made on very poor data or poorly written survey questions. The ARRT and the sonography exam is a classic example. Another is B.S. program directors push for B.S. as entry level. We cannot be B.S. as entry if the ARRT is dismantling the career ladders. The profession needs to collect appropriate data on issues before making changes and STOP making self-serving decisions. Graduates of programs see this. This affects involvement in the profession. We are teaching students outdated curriculum and testing them on procedures that are not even done: skull and BaE, to name a few. Mandatory competencies have not changed testing results as we were told it would. Procedure exam results on the Registry are dismal, indicating we are pushing out poorly prepared technologists. Clinical faculty do competencies all day and have no time to give students quality instruction on procedures or fine-tune their skills. Our educational process/delivery/accreditation was once way ahead of most allied health professions, but has now fallen way behind the others. The survey questions asked here, while important, are useless if we continue down the path we are heading. The most important step is education. The above questions are moot w/o strong educational programs. These organizations/boards are run by technologists who probably have not done an imaging case in years. The ASRT and ARRT CEOs are not even registered technologists. We are looking at an educator shortage. These mandates are seen by graduates. They felt the lack of time by clinical faculty and were tested on outdated material/procedures. Why would they come into education? We are hurting ourselves and no one will do a thing about it.	1	.1

	Trend of managers of radiology departments to come from background other than rad tech. Trend due to business needs o hospital organization and profit cen…	1	.1
	Trend towards private, for-profit imaging centers. Commercialism.	1	.1
	Unemployment for many technologists with all the new high-tech computers they are trying to bring in.	1	.1
	Unqualified persons running x-ray machines.	1	.1
	We as a medical community are relying more and more on computers. It will be where no experience will be needed in the field. We are helping to eliminate the need for trained professionals. I see it starting in my facility. We have more “non-licensed” people than in the past working in our outside clinic settings.	1	.1
	Would like to see resurgence of hospital-based education programs, or at least greater involvement by hospital personnel in student training. In my experience, college-based students are left to their own devices when in the clinical setting because the staff are shorthanded and pushed to complete exams. There is precious little time/interest in working with someone who just "gets in the way." This is a very "hands-on" profession and the learning curve is significant. I have personal experience in new hires from university-based graduates in more than one institution and have found them to be sorely lacking in performance. They have a lot of background knowledge but lack actual procedural skills; i.e. positioning and equipment operation. This only contributes to increased workload on their co-workers and decreases patient care even further. Trying to explain this to administrative "bean counters” proves futile. They argue that these are graduates of an accredited radiology program and should count as fully-productive staff members when anyone who has ever worked in the field knows it takes time to become fast and efficient.	1	.1
	Total	842	100.0