



ASRT  
Education and  
Research Foundation

## **CONTRAST ADMINISTRATION SAFETY SURVEY**

**A Nationwide Survey of Registered Radiologic Technologists  
Conducted by the  
American Society of Radiologic Technologists  
Education and Research Foundation**

**January 2006**

©Copyright 2006 by ASRT.  
All rights reserved.

Reproduction in any form is forbidden without written permission from publisher.

# TABLE OF CONTENTS

|   |           |
|---|-----------|
| <b>Executive Summary</b> .....  | <b>3</b>  |
| Characteristics of Sample.....  | 3         |
| <i>Involvement in Contrast Administration</i> .....   | 3         |
| Professional Profile.....   | 3         |
| Personal Profile .....  | 3         |
| Characteristics of Facility.....  | 3         |
| Safety Issues .....   | 3         |
| <i>Workplace Focus on Safety</i> .....  | 4         |
| <i>Frequency of Safety Incidents as a Function of Packaging</i> .....   | 4         |
| <i>Proportion of Safety Incidents Reported</i> .....  | 4         |
| <i>Fate of Contrast Bottles Set Aside Because of Difficulty Opening</i> .....   | 4         |
| Reasons for Not Reporting Safety Incidents .....  | 5         |
| <i>Observation and Reporting of Safety Incidents as a Function of Administration of Contrast Media vs. Supervision of Contrast Administration</i> ..... | 5         |
| <i>Observation and Reporting of Safety Incidents as a Function of Staff vs. Managerial Title</i> .....  | 5         |
| <i>Frequency of Safety Incidents as a Function of Facility's Procedure Volume</i> .....   | 6         |
| Usage of Contrast Media.....  | 6         |
| Reasons for Using Primary Packaging Types.....  | 6         |
| Usage of Plastic/Polymer Bottles .....  | 6         |
| <b>Introduction</b> .....   | <b>7</b>  |
| <b>Methodology</b> .....  | <b>8</b>  |
| Sample Design .....   | 8         |
| Invitations, Reminders, and Incentives.....   | 8         |
| Response Rates .....  | 8         |
| Margin of Error.....  | 8         |
| Definitions of Statistics .....   | 9         |
| <b>Detailed Findings</b> .....  | <b>10</b> |
| Characteristics of Sample.....  | 10        |
| <i>Involvement in Contrast Administration</i> .....   | 10        |
| Professional Profile.....   | 11        |
| Characteristics of Facility.....  | 13        |
| Personal Profile .....  | 15        |
| Safety Issues .....   | 17        |
| <i>Workplace Focus on Safety</i> .....  | 17        |
| <i>Percentage of Various Safety Incidents That Get Reported</i> <sup>a</sup> .....  | 23        |
| <i>Observation and Reporting of Safety Incidents as a Function of Administration Media vs. Supervision of Contrast Administration</i> .....             | 30        |
| <i>Observation and Reporting of Safety Incidents as a Function of Staff vs. Managerial Title</i> .....  | 33        |
| <i>Observation of Safety Incidents as a Function of Staff vs. Managerial Title and Type of Packaging</i> .....  | 35        |
| <i>Estimated Occurrence of Safety Incidents as a Function of Type of Packaging</i> .....  | 36        |
| <i>Frequency of Safety Incidents as a Function of Facility's Procedure Volume</i> .....   | 37        |
| Usage of Contrast Media.....  | 64        |
| Reasons for Using Primary Packaging Types.....  | 66        |
| Usage of Plastic/Polymer Bottles .....  | 71        |
| <b>Appendix a: Cover letter and survey instrument</b> .....   | <b>74</b> |
| <b>Appendix b: Responses to open-ended questions</b> .....  | <b>81</b> |

## EXECUTIVE SUMMARY

A contrast administration safety survey was mailed in late July 2005 to 9,898 ARRT registrants. These included a random sample of all combinations of ARRT registrants who listed staff/senior staff, chief technologist or administrator as their job title, and who identified radiography, computed tomography or an interventional specialty as their primary or secondary discipline and sphere of employment. Each invitee had the option of completing the questionnaire online or mailing the survey back to the ASRT. In mid-August 2005 a reminder invitation to complete the questionnaire online was sent via e-mail to those for whom ASRT had an e-mail address and who had not responded. As of September 20, 2005, 1,550 respondents had completed the survey, resulting in an overall response rate of 15.65%.

### Characteristics of Sample

#### *Involvement in Contrast Administration*

- A total of 1,464 of 1,550 respondents (94.4%) indicated that they are either involved in iodinated contrast media administration or supervise others who administer contrast. Of the 53 who indicated that they are involved neither in administration nor in supervision, 49 were omitted from all subsequent analyses, leaving an effective sample size of 1,501 respondents.
- Respondents reported a mean of 13.8 individuals per work area are involved with contrast media.

#### *Professional Profile*

- Almost 70% of the respondents identified “staff or senior staff technologist” as most descriptive of their job titles, with another 28% choosing “administrative/managerial.”
- About 23% described their sphere of employment as being in “radiography,” with another 38% choosing “computed tomography” and about 22% choosing “interventional radiography.”
- About 18% described their years of service in their area of specialization as between “1-5 years,” with another 20% reporting between “6-10 years.” An additional 31% checked “11-20 years” and about 22% chose “21-30 years.” Only 8% reported “31 or more years” of service. Median years of service approximated 14.1 years.

#### *Personal Profile*

- Of those who responded, 63.8% identified themselves as “female” and 34.4% as “male.”
- All 50 states and Washington, D.C., were represented in the sample.

#### *Characteristics of Facility*

- Facilities vary greatly in the number of procedures requiring iodinated contrast media they perform weekly, from zero (.6% of the reporting facilities) to 5,000, with a mean of 124 and a median of approximately 60 procedures per week.
- When the number of procedures requiring contrast media carried out each week is divided by the number of staff members reported to be involved in contrast administration, the result is a mean of 10.3 procedures per week per involved staff member, with a median of 6.08 and a maximum of 150.
- About 30% of the respondents who answered the question indicated that their facilities are located in an academic/teaching hospital, about 49% in a community hospital, 12% work in a clinic and 9% replied “other.”
- Among those working in a hospital, almost one-half (48.6%) indicated that it had fewer than 300 beds and 31%, 300-500 beds. Another 19% work in a hospital with more than 500 beds. However, this size distribution differed greatly between academic and community hospitals. Almost two-thirds (63%) of community hospitals had less than 300 beds, as compared with 25% of academic/teaching hospitals. And while 38% of academic hospitals had more than 500 beds, only 8% of community hospitals were that large.

### Safety Issues

### **Workplace Focus on Safety**

- When asked their level of agreement or disagreement (-2:Strongly Disagree to 2:Strongly Agree) with six statements about their facility's focus on safety, respondents' highest mean level of agreement (1.78) was with the statement, "Sharps containers are available where and when I need them to dispose of needles and other sharp devices."
- The lowest mean level (1.06) involved the statement, "Safety issues are almost always discussed during staff meetings."
- The first principal component of responses to the six items in Question 1 accounted for 54% of the individual differences in responses to these six items and correlated .999 with the simple average of all six. This simple average is a good measure of overall focus on safety; it ranges from -2 (strongly disagrees with all six statements) to +2 (strongly agrees with all six statements) with a mean of 1.38 and a median of 1.42.

### **Frequency of Safety Incidents as a Function of Packaging**

Mean frequencies (per 12-month period per facility) of the various safety-related incidents were calculated separately as a function of the type of packaging used by the facility. The clearest distinctions were provided when only those facilities that had used a packaging almost exclusively (99% – 100% of the time) over the past three months (referred to as that facility's *main* packaging type) were compared. The two types of prefilled-syringe applications were combined for these comparisons, and comparisons involving media for which incidents were logically zero – such as those from metal crimps for facilities using only polymer bottles – were not examined for statistical significance.

- Facilities using polymer bottles had significantly fewer injuries from sharps and metal crimps, instances of using hemostats to open contrast bottles and breakages of contrast bottles than did facilities using glass bottles. Facilities using polymer bottles also set aside fewer contrast bottles, had fewer injuries due to broken contrast bottles and eye splatter from contrast media than did facilities using glass bottles, though not statistically significantly so.
- Facilities using prefilled syringes had significantly fewer sharps injuries than did facilities using polymer bottles. Those with prefilled syringes also were (nonsignificantly) lower than polymer-bottle facilities in latex sensitivity reactions and eye splatter from contrast media. (There were no incidents of outside-area injuries from breakage of contrast bottles for polymer-bottle facilities.)
- That there were any reports of injuries from metal crimps and/or contrast bottle breakage at facilities using polymer bottles can be attributed to the difference between the reporting period for safety-related incidents (past 12 months) and the three-month reporting period for use of the various packaging types. Facilities that had adopted polymer bottles as their main packaging type within the past year could have had these types of incidents during the period before they switched to polymer bottles.
- Twenty-nine respondents gave semi-quantitative responses (e.g., "every fifth bottle," "daily") to the question about the number of incidents in which hemostats were used to open contrast bottles. Sixteen respondents gave semi-quantitative estimates of the number of times contrast bottles were set aside due to difficulty opening them. The numerical responses that were used to compute the above means and percentages therefore probably underestimate the frequency with which these two types of safety incidents occur.

### **Proportion of Safety Incidents Reported**

- More than two-thirds (69%) of work-area sharps injuries were reported, compared with 46% of latex sensitivity reactions and 25 – 30% of eye-splatter incidents, work-area injuries from broken contrast bottles and injuries to someone outside the work area from broken contrast bottles. About 16% of contrast media bottle breakages, 11% of back-strain injuries and 4 – 5 % of instances when contrast bottles were set aside and in which hemostats were used to open contrast media bottles.
- Several respondents wrote in comments stating that they didn't consider setting aside contrast bottles or the use of hemostats to open contrast media bottles a safety issue.

### **Contrast Bottles Set Aside Because of Difficulty Opening**

- About 82% of the respondents reported having to set aside contrast media bottles because of difficulty opening them stated that bottles were opened and used when time and tools permitted.
- The bottles were reported as discarded by about 18% of respondents.
- About 4% indicated that the unopened contrast media bottles were returned to the vendor for refund or replacement.

### ***Reasons for Not Reporting Safety Incidents***

- “Thought injury was low risk” was the leading reason (not counting “other”) across all categories for not reporting safety incidents (16% to 64% of those providing reasons for not reporting a given type of safety incident), with this percentage being highest for “Injuries from metal crimp”.
- “Did not know reporting procedure/protocol” had the overall lowest percentage responses across all categories (3% to 7.5%), with this percentage being lowest for “work-area injuries from broken contrast bottles” and highest for “outside-area injuries from broken contrast bottles.”
- “Other” was checked by 33% to 57% of the respondents and was the most common response for five of the seven incident types. Of the 293 responses to the request to specify the “other” reason(s) for failure to report any of the incident types, 169 (58%) could be summarized as “Because there were no injuries to report” and 26 (9%) as “because all were reported.” Another 25 (9%) could be summarized as explaining why there were no injuries to report.

### ***Observation and Reporting of Safety Incidents as a Function of Contrast Media Administration vs. Supervision of Contrast Administration***

- Only two of the types of incidents (injuries from sharps and metal crimps) and total incidents observed differed significantly in the frequency with which they were observed as a function of involvement. For all incidents, respondents who both administered contrast and supervised its administration differed significantly from those who did one or the other exclusively. Respondents who administered contrast and supervised its administration reported knowing of more injuries from sharps but fewer injuries from metal crimps and fewer total incidents of all types than those who only administered contrast or supervised its administration.
- The percentage of incidents reported was affected consistently by involvement in contrast administration, supervision or both. For each of the five incident types for which contrast involvement had a significant effect on reporting percentage, respondents who indicated that they both administer contrast and supervise those who administer contrast indicated, on average, that a higher percentage of the incidents observed get reported than did those who only administer contrast or only supervise its administration.

### ***Observation and Reporting of Safety Incidents as a Function of Title***

- Only three incident types (crimp injuries, latex sensitivity reactions and eye splatter) were observed significantly differently in frequency by staff/senior staff technologists and therapists as compared with those holding administrative/managerial titles. In all three cases staff technologist/therapists reported higher incident rates than did administrators/managers.
- For seven of the 10 incident types staff and managers differed significantly in the percentage of incidents they believed were reported. Staff technologists and therapists had a lower reporting percentage in each case.
- Adjusting administrators’ reports of incident frequencies for their facility as a whole for difference between administrators’ and technologists’ incident reporting estimates leads to estimated annual frequencies of about .9 sharps injuries, 2.7 metal crimp injuries, 95 instances in which hemostats are used to open contrast media bottles, 23 instances of contrast bottles being set aside, 2.9 breakages of contrast bottles, .05 injuries due to broken contrast bottles and .45 latex sensitivity reactions per facility that uses glass bottles almost exclusively. Adjusting also leads to estimates of .7 sharps injuries, 30 uses of hemostats to open contrast bottles, 5 setting aside contrast bottle, 1 latex sensitivity reaction per facility that has been using polymer bottles exclusively for at

least the last three months. Results are .2 sharps injuries per year and zero occurrences of any of the other incidents per facility that uses prefilled syringes exclusively.

### ***Frequency of Safety Incidents as a Function of Facility's Procedure Volume***

- For facilities using only glass bottles, polymer bottles, or prefilled syringes, total number of incidents that are logically possible for the type of administration used at the facility, as well as proportion of facilities reporting one or more incidents generally increase with procedure volume. Facilities with the highest volumes are often an exception. However, the slope of the increase is well below 1.0 – i.e., doubling the number of procedures doesn't come close to doubling the reported frequency with which various kinds of incidents occur. As a result, number of incidents per 1,000 procedures generally declines as procedure volume increases.

### ***Use of Contrast Media***

- Three different brands ranked high in the mean total percentage use of contrast media: Isovue (28.53%), Omnipaque (33.56%) and Opitray (19.85%).
- Glass bottles were the most commonly-used packaging type over the past three months (69.5%), followed by polymer bottles at 13.9% and prefilled syringes for power injections (13.7%).
- Similarly, glass bottles were designated by 69.6% of respondents as their work area's main packaging type, followed by prefilled syringes for power injection at 18.1% and polymer bottles at 10.9%.

### ***Reasons for Using Packaging Types***

- Cost-effectiveness was most often cited by facilities using glass and polymer bottles as the main reason that work areas used that type of packaging (35.0% and 37.3% of facilities, respectively). However, 31.7% of facilities using glass bottles but only 7.5% of those whose main packaging was polymer bottles cited cost as the main reason for using that type of packaging.
- Work safety was cited by less than 1% of facilities using glass bottles (.7%) as the main reason for using that type of packaging, as compared with 19.9% of facilities using polymer bottles, 8.8% of those who rely primarily on prefilled syringes for power injection and 35% of the 20 facilities who primarily use prefilled syringes for hand-held injection.
- The most frequently cited reason for using prefilled syringes for power injection as the main packaging was convenience (27.2%). Convenience also was cited by 19.3% of facilities using polymer bottles but only 7.3% of facilities using glass bottles.
- Respondents generally disagreed (-.60 thru -.44 on a -2 to +2 scale) with statements that glass bottles help avoid sharps risks, ergonomic risks or latex allergies or that they help comply with work safety guidelines. They generally agreed (+1.01, +.30, and +.32) that polymer bottles help avoid sharps and ergonomic risks and are an aid in complying with work safety guidelines, but disagreed (-.59) that they help avoid latex allergies.
- On a scale from 1 to 10, when asked about the level of satisfaction with packaging (where "1" is not at all satisfied and "10" is highly satisfied), glass bottles scored a mean of 6.76, and polymer bottles and the two types of prefilled syringe applications scored means of 8.89 to 9.09.
- The percentage of facilities that never discard their main packaging type in a sharps container was 78.3% for facilities using polymer bottles, compared with 52.4% of facilities using glass bottles and 46.8% of facilities using prefilled-syringe power-injection.

### ***Use of Plastic/Polymer Bottles***

- When asked their level of agreement or disagreement (-2, -1, 0, 1, 2) with statements specifically referring to the use of polymer bottles in preventing injury, a mean of 1.05 was scored for "Helps/would help me or my work area with sharps risks," .82 for helping with ergonomic risks, .69 for helping with latex allergies, and .84 for helping with compliance to work safety guidelines.
- Lowest mean agreement was with the statement "I would like to purchase plastic/polymer bottles" at .41.

## INTRODUCTION

Administering iodinated contrast media carries a number of risks for the health care worker(s) involved in the process: potential back strain from lifting cases of contrast media containers, injuries sustained in the process of opening contrast containers, eye splatter, and so forth. The present survey was designed to assess how common such injuries are in the radiologic technologist's workplace while also exploring differences among various delivery systems (glass or polymer contrast media bottles, as well as prefilled syringes for hand or power injection) in adding to or decreasing these risks.

The ASRT Education and Research Foundation's survey of safety issues involved in the administration of iodinated contrast media was made possible by a grant from the Omnipaque™ division of General Electric Healthcare™. All statements of fact and/or opinion in this report are, however, the sole responsibility of the Foundation.

## METHODOLOGY

### Sample Design

The American Registry of Radiologic Technologists (ARRT) provided postal addresses for random samples from each of the subpopulations of ARRT registrants described in the following table:

| Discipline/sphere of employment                                | Management Level*  |                             |       |
|--|--------------------|-----------------------------|-------|
|  | Staff/Senior Staff | Chief Tech or Administrator |       |
| Radiography (primary discipline)                               | 1700               | 1700                        | 3400  |
| CT (primary or secondary)                                      | 1700               | 1700                        | 3400  |
| Interventional (CVIT, CV, CI; primary or secondary discipline) | 1700               | 1398 (all)                  | 3098  |
|  | 5100               | 4798                        | 9,898 |

These were the subpopulations thought most likely to be involved in the administration of iodinated contrast media.

### Invitations, Reminders and Incentives

In late July 2005 a survey packet consisting of a cover letter, a hardcopy of the questionnaire, and a postage-paid return envelope was sent to ASRT's mail house for mailing to each of the ARRT registrants described in the above table. The cover letter included a request that, if possible, the invitee respond to the survey online. The Web site address for the online questionnaire was provided. In addition, those completing the online questionnaire by Aug. 20, 2005, were eligible to enter a drawing for a \$100 gift certificate. This was supplemented by an open invitation in the Aug. 15 *rEsources* newsletter sent by e-mail to ASRT members inviting any member involved in contrast media administration to complete the online questionnaire.

It was subsequently discovered that the mail house did not actually complete the mailing until Aug. 15, 2005, and that only about one-half of the addressees had received their invitations to participate by the drawing entry deadline. A follow-up mailing to the same addressees (minus those known to have responded) offering entry into a second drawing for all who responded online between Aug. 20 and Sept. 10, 2005, was launched as quickly as possible.

### Response Rates

As of Sept. 20, 2005, a total of 1,550 respondents had completed the survey resulting in an overall response rate of 15.65%.

### Margin of Error

The sample size of 1,501 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 2.6%. 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 is plus or minus 10% or less and for a subset of 30 respondents is plus or minus 18.3% or less. (The "or less" is because 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 below 5% or above 95%.)

## Definitions of Statistics

The statistics reported in the question summaries include:

- **Frequency.** The number of responses given to each question or the number of respondents who selected a given response alternative.
- **Percent.** The number of responses divided by the total number of usable surveys, including missing values.
- **Valid Percent.** The number of responses 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 which 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.** Sample statistic whose value is used to test the null hypothesis that the differences between two or 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 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, requires that the 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* will be 1.)

## DETAILED FINDINGS

### Characteristics of Sample

#### *Involvement in Contrast Administration*

|         |   | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|---|-----------|---------|---------------|--------------------|
| Valid   | Neither administer nor supervise              | 4         | .3      | .3            | .3                 |
|         | Involved in administering contrast            | 561       | 37.4    | 38.2          | 38.5               |
|         | Don't administer but supervise contrast admin | 94        | 6.3     | 6.4           | 44.9               |
|         | Both administer and supervise                 | 810       | 54.0    | 55.1          | 100.0              |
|         | Total   | 1469      | 97.9    | 100.0         |                    |
| Missing | Response to admin or superv question missing  | 32        | 2.1     |               |                    |
| Total   |   | 1501      | 100.0   |               |                    |

Note: 53 respondents submitted surveys and indicated that they neither administer nor supervise the administration of iodinated contrast media; 1 answered only question 1 about the extent to which safety is a primary concern at that workplace. Another 48 did not answer any of the questions. These 49 respondents were omitted from all subsequent analyses. Four answered substantial portions of the questionnaire and were retained in the data file.

#### **2k. How many individuals in your work area are involved in any way with contrast media bottles (e.g., administering media or stocking, delivering, disposing of bottles)?**

|                          |         |         |
|--------------------------|---------|---------|
| N                        | Valid   | 1484    |
|                          | Missing | 17      |
| Mean                     |         | 13.836  |
| Median <sup>a</sup>      |         | 9.799   |
| Std. Deviation           |         | 15.5630 |
| Percentiles <sup>a</sup> | 5       | 2.336   |
|                          | 25      | 5.566   |
|                          | 75      | 16.323  |
|                          | 95      | 36.900  |

<sup>a</sup> Calculated from grouped data.

## Professional Profile

### 16. What best describes your position? (Check one.)

|         |                                    | Frequency | Percent | Valid Percent |
|---------|------------------------------------|-----------|---------|---------------|
| Valid   | Staff or senior staff Technologist | 1036      | 69.0    | 69.9          |
|         | Administrative/managerial          | 416       | 27.7    | 28.1          |
|         | Other                              | 31        | 2.1     | 2.1           |
|         | Total                              | 1483      | 98.8    | 100.0         |
| Missing |                                    | 18        | 1.2     |               |
| Total   |                                    | 1501      | 100.0   |               |

### 17. What best describes your primary discipline/sphere of employment?

|         |   | Frequency | Percent | Valid Percent |
|---------|---|-----------|---------|---------------|
| Valid   | Radiography                                     | 346       | 23.1    | 23.7          |
|         | Computed tomography                             | 574       | 38.2    | 39.3          |
|         | Interventional radiography (CVIT, CI, VI, etc.) | 323       | 21.5    | 22.1          |
|         | Other   | 217       | 14.5    | 14.9          |
|         | Total   | 1460      | 97.3    | 100.0         |
| Missing |   | 41        | 2.7     |               |
| Total   |   | 1501      | 100.0   |               |

### 18a. What best describes your health care organization? (check one)

|         |                              | Frequency | Percent | Valid Percent |
|---------|------------------------------|-----------|---------|---------------|
| Valid   | Hospital (Academic/teaching) | 424       | 28.2    | 30.1          |
|         | Hospital (community)         | 692       | 46.1    | 49.2          |
|         | Clinic                       | 167       | 11.1    | 11.9          |
|         | Other                        | 124       | 8.3     | 8.8           |
|         | Total                        | 1407      | 93.7    | 100.0         |
| Missing |                              | 94        | 6.3     |               |
| Total   |                              | 1501      | 100.0   |               |

**18b. What best describes your health care organization? (Check one)**

|         |                     | Frequency | Percent | Valid Percent |
|---------|---------------------|-----------|---------|---------------|
| Valid   | Fewer than 300 beds | 581       | 38.7    | 42.5          |
|         | 300-500 beds        | 383       | 25.5    | 28.0          |
|         | More than 500 beds  | 238       | 15.9    | 17.4          |
|         | Other               | 164       | 10.9    | 12.0          |
|         | Total               | 1366      | 91.0    | 100.0         |
| Missing |                     | 135       | 9.0     |               |
| Total   |                     | 1501      | 100.0   |               |

**Differences Among Facility Types in Number of Beds**

| 18a. What best describes your health care organization? (Check one) |       |       | 18b. What best describes your health care organization? (check one) |              |                    |        | Total |
|---|-------|-------|---|--------------|--------------------|--------|-------|
|   |       |       | Fewer than 300 beds   | 300-500 beds | More than 500 beds | Other  |       |
| Hospital (Academic/teaching)  | Count | 103   | 152   | 158          | 2                  | 415    |       |
|   | %     | 24.8% | 36.6%   | 38.1%        | .5%                | 100.0% |       |
| Hospital (community)  | Count | 426   | 190   | 53           | 4                  | 673    |       |
|   | %     | 63.3% | 28.2%   | 7.9%         | .6%                | 100.0% |       |
| Clinic  | Count | 18    | 5   | 2            | 93                 | 118    |       |
|   | %     | 15.3% | 4.2%  | 1.7%         | 78.8%              | 100.0% |       |
| Other   | Count | 14    | 8   | 4            | 65                 | 91     |       |
|   | %     | 15.4% | 8.8%  | 4.4%         | 71.4%              | 100.0% |       |
| Total   | Count | 561   | 355   | 217          | 164                | 1297   |       |
|   | %     | 43.3% | 27.4%   | 16.7%        | 12.6%              | 100.0% |       |
| Total for hospitals   | Count | 529   | 342   | 211          | 6                  | 1088   |       |
|   | %     | 48.6% | 31.4%   | 19.4%        | .6%                | 100.0% |       |

$\chi^2_1 = 147.762$  for difference between academic and community hospitals in percent with < 300 beds and 146.198 for difference in percent with > 500 beds,  $P < .001$  in each case.

**19. What best describes your years of service in your area of specialization?**

|         |                  | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|------------------|-----------|---------|---------------|--------------------|
| Valid   | 1-5 years        | 274       | 18.3    | 18.5          | 18.5               |
|         | 6-10 years       | 297       | 19.8    | 20.1          | 38.6               |
|         | 11-20 years      | 466       | 31.0    | 31.5          | 70.0               |
|         | 21-30 years      | 325       | 21.7    | 21.9          | 92.0               |
|         | 31 or more years | 119       | 7.9     | 8.0           | 100.0              |
|         | Total            | 1481      | 98.7    | 100.0         |                    |
| Missing |                  | 20        | 1.3     |               |                    |
| Total   |                  | 1501      | 100.0   |               |                    |

## Characteristics of Facility

5. Think of the x-ray/CT procedures that are performed in your work area. How many procedures requiring iodinated contrast media are performed in an average week?

|         |           | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|-----------|-----------|---------|---------------|--------------------|
| Valid   | .00       | 9         | 0.6     | 0.6           | 0.6                |
|         | 1-10      | 112       | 7.5     | 7.9           | 8.5                |
|         | 11-20     | 147       | 9.8     | 10.4          | 18.9               |
|         | 21-30     | 156       | 10.4    | 11.0          | 29.9               |
|         | 31-50     | 245       | 16.3    | 17.3          | 47.2               |
|         | 51-100    | 338       | 22.5    | 23.9          | 71.1               |
|         | 101-200   | 219       | 14.6    | 15.5          | 86.5               |
|         | 201-500   | 146       | 9.7     | 10.3          | 96.9               |
|         | 501-1000  | 31        | 2.1     | 2.2           | 99.0               |
|         | 1001-5000 | 13        | 0.9     | 0.9           | 100.0              |
|         | Total     | 1,416     | 94.3    | 100.0         |                    |
| Missing | System    | 85        | 5.7     |               |                    |
| Total   |           | 1,501     | 100.0   |               |                    |

### No. of procedures involving contrast per week per involved staff member

|                          |         |          |
|--------------------------|---------|----------|
| N                        | Valid   | 1,397    |
|                          | Missing | 104      |
| Mean                     |         | 10.3067  |
| Median <sup>a</sup>      |         | 6.0833   |
| Mode                     |         | 5.00     |
| Std. Deviation           |         | 13.51274 |
| Minimum                  |         | .00      |
| Maximum                  |         | 150.00   |
| Percentiles <sup>a</sup> | 5       | .9932    |
|                          | 95      | 33.2140  |

<sup>a</sup> Calculated from grouped data.

### Distribution

|       |               | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------|---------------|-----------|---------|---------------|--------------------|
| Valid | .00           | 8         | 0.6     | 0.6           | 0.6                |
|       | .01 – 1.00    | 75        | 5.0     | 5.4           | 5.9                |
|       | 1.01 – 2.00   | 110       | 7.3     | 7.9           | 13.8               |
|       | 2.01 – 3.00   | 147       | 9.8     | 10.5          | 24.3               |
|       | 3.01 – 5.00   | 298       | 19.9    | 21.3          | 45.7               |
|       | 5.01 – 7.00   | 154       | 10.3    | 11.0          | 56.7               |
|       | 7.01 – 10.00  | 199       | 13.3    | 14.2          | 70.9               |
|       | 10.01 – 15.00 | 150       | 10.0    | 10.7          | 81.7               |
|       | 15.01 - 25.00 | 150       | 10.0    | 10.7          | 92.4               |

|         |                |      |      |     |      |
|---------|----------------|------|------|-----|------|
|         | 25.01 – 50.00  | 85   | 5.7  | 6.1 | 98.5 |
|         | 51.01 – 100.00 | 16   | 1.1  | 1.1 | 99.6 |
|         | 108.82         | 2    | 0.1  | 0.1 | 99.7 |
|         | 120.38         | 1    | 0.1  | 0.1 | 99.8 |
|         | 118.75         | 1    | 0.1  | 0.1 | 99.9 |
|         | 150.00         | 1    | 0.1  | 0.1 | 100  |
|         | Total          | 1397 | 93.1 | 100 |      |
| Missing |                | 104  | 6.9  |     |      |
| Total   |                | 815  | 1501 | 100 |      |

**18a. What best describes your health care organization? (Check one)**

|         |                              | Frequency | Percent | Valid Percent |
|---------|------------------------------|-----------|---------|---------------|
| Valid   | Hospital (Academic/Teaching) | 424       | 28.2    | 30.1          |
|         | Hospital (Community)         | 692       | 46.1    | 49.2          |
|         | Clinic                       | 167       | 11.1    | 11.9          |
|         | Other                        | 124       | 8.3     | 8.8           |
|         | Total                        | 1407      | 93.7    | 100.0         |
| Missing |                              | 94        | 6.3     |               |
| Total   |                              | 1501      | 100.0   |               |

**19. What best describes your years of service in your area of specialization?**

|         |                  | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|------------------|-----------|---------|---------------|--------------------|
| Valid   | 1-5 years        | 274       | 18.3    | 18.5          | 18.5               |
|         | 6-10 years       | 297       | 19.8    | 20.1          | 38.6               |
|         | 11-20 years      | 466       | 31.0    | 31.5          | 70.0               |
|         | 21-30 years      | 325       | 21.7    | 21.9          | 92.0               |
|         | 31 or more years | 119       | 7.9     | 8.0           | 100.0              |
|         | Total            | 1481      | 98.7    | 100.0         |                    |
| Missing |                  | 20        | 1.3     |               |                    |
| Total   |                  | 1501      | 100.0   |               |                    |

**Personal Profile**

**20a. In what state is your primary site located? (Two-letter abbreviation.)**

|                 | Frequency |
|-----------------|-----------|
| Blank           | 13        |
| AE <sup>a</sup> | 1         |
| AK              | 4         |
| AL              | 27        |
| AR              | 22        |
| AZ              | 38        |
| CA              | 89        |
| CO              | 24        |
| CT              | 23        |
| DE              | 2         |
| DC              | 4         |
| FL              | 74        |
| GA              | 43        |
| HI              | 6         |
| IA              | 19        |
| ID              | 8         |
| IL              | 57        |
| IN              | 50        |
| KS              | 17        |
| KY              | 18        |
| LA              | 28        |
| MA              | 25        |
| MD              | 32        |
| ME              | 11        |
| MI              | 47        |
| MN              | 37        |
| MO              | 44        |
| MS              | 16        |
| MT              | 8         |
| NC              | 45        |
| ND              | 6         |
| NE              | 24        |
| NH              | 7         |
| NJ              | 29        |
| NM              | 5         |
| NV              | 13        |
| NY              | 73        |
| OH              | 91        |
| OK              | 28        |
| OR              | 15        |

|       |      |
|-------|------|
| PA    | 80   |
| RI    | 11   |
| SC    | 26   |
| SD    | 8    |
| TN    | 43   |
| TX    | 85   |
| UT    | 16   |
| VA    | 37   |
| VT    | 2    |
| WA    | 20   |
| WI    | 33   |
| WV    | 12   |
| WY    | 5    |
| Total | 1501 |

<sup>a</sup> U.S. Military APO for Asia, Europe, Middle East, Canada

### 21. Gender

|         |        | Frequency | Percent | Valid Percent |
|---------|--------|-----------|---------|---------------|
| Valid   | Female | 957       | 63.8    | 64.9          |
|         | Male   | 517       | 34.4    | 35.1          |
|         | Total  | 1474      | 98.2    | 100.0         |
| Missing |        | 27        | 1.8     |               |
| Total   |        | 1501      | 100.0   |               |

## Safety Issues

### Workplace Focus on Safety

|  | Valid N | Strongly Disagree    | Disagree | Neither A nor D | Agree | Strongly Agree | Mean <sup>a</sup> | Median <sup>b</sup> | Std. Dev'n |
|--|---------|----------------------|----------|-----------------|-------|----------------|-------------------|---------------------|------------|
| 1a. The safety of workers is a priority in this health care organization.  | 1494    | .5%                  | .8%      | 6.2%            | 39.0% | 53.5%          | 1.4411            | 1.4971              | .6946      |
| 1b. Safety issues are almost always discussed during staff meetings.   | 1491    | .9%                  | 3.5%     | 18.4%           | 43.1% | 34.1%          | 1.0610            | 1.1468              | .8606      |
| 1c. Personal accountability for safety is assessed during annual performance evaluations.                                    | 1477    | .7%                  | 2.1%     | 13.0%           | 46.5% | 37.7%          | 1.1848            | 1.2605              | .7863      |
| 1d. Sharps containers are available where and when I need them to dispose of needles and other sharp devices.                | 1495    | .4%                  | .1%      | .3%             | 20.2% | 79.0%          | 1.7746            | 1.7891              | .4820      |
| 1e. Employees and management work together to ensure the safest possible health care environment for patients and personnel. | 1491    | .5%                  | 1.2%     | 7.2%            | 41.0% | 50.1%          | 1.3890            | 1.4521              | .7200      |
| 1f. Safety training is part of staff development orientations and programs.  | 1492    | .5%                  | .9%      | 6.8%            | 41.4% | 50.5%          | 1.4062            | 1.4617              | .6968      |
| Average response to all 6 items. <sup>c</sup>  | 1494    | See following table. |          |                 |       |                | 1.3766            | 1.42367             | .5206      |

<sup>a</sup> Scored as -2, -1, 0, 1, 2 for Strongly Disagree, Disagree, Neither Agree nor Disagree, Agree, and Strongly Agree, respectively.

<sup>b</sup> Calculated from grouped data.

<sup>c</sup> The first principal component accounted for 54% of the individual differences in responses to these six items and correlated .999 with the simple average of all six for respondents who answer at least five items.

**Overall Focus on Safety (Average of Responses to Six Items)**

|         |                | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|----------------|-----------|---------|---------------|--------------------|
| Valid   | -2.00          | 4         | 0.3     | 0.3           | 0.9                |
|         | -1.99 to -1.50 | 0         | 0.0     | 0.0           | 0.9                |
|         | -1.49 to -1.00 | 3         | 0.2     | 0.2           | 1.1                |
|         | -.99 to -.50   | 10        | 0.7     | 0.7           | 1.8                |
|         | -.49 to -.01   | 4         | 0.3     | 0.3           | 2.0                |
|         | .00            | 9         | 0.6     | 0.6           | 2.6                |
|         | .01 to .49     | 20        | 1.3     | 1.3           | 4.0                |
|         | .50 to .99     | 167       | 11.1    | 11.2          | 15.2               |
|         | 1.00 to 1.49   | 329       | 21.9    | 22.0          | 37.2               |
|         | 1.50 to 1.99   | 580       | 38.6    | 38.8          | 76.0               |
|         | 2.00           | 243       | 16.2    | 16.3          | 100.0              |
|         | Total          | 1494      | 99.5    | 100.0         |                    |
| Missing | System         | 7         | 0.5     |               |                    |

### Frequency of Safety Incidents as a Function of Main Packaging Type

Since the types of safety incidents that are likely to occur are heavily affected by packaging type and the distinctions among packaging types with respect to frequency of various safety incidents are clouded by the fact that a facility may use other packaging in addition to the type identified as its primary type, the following tables confine the comparisons to facilities that, *during the three months preceding their report* (see question 7 below) used a given type of packaging for 99-100% of their procedures involving iodinated contrast media (termed that facility's *main* packaging type).

#### Frequency of Safety Incidents as a Function of Main Packaging Type<sup>a,b</sup>

| Main Packaging Type<br>(Used for 99-100% of iodinated contrast procedures)                                      | Injuries from Sharps |                                      |            |   | Injuries from Metal Crimps |                                      |            |   | Hemostats Used to Open Contrast Bottles <sup>c</sup> |   |            |  | Bottles Set Aside Because of Difficulty Opening |                          |            |   |
|---|----------------------|--------------------------------------|------------|---|----------------------------|--------------------------------------|------------|---|--|---|------------|--|---|--------------------------|------------|---|
|   | N                    | Mean                                 | Std. Dev'n | Prop. > Zero                              | N                          | Mean                                 | Std. Dev'n | Prop. > Zero                              | N  | Mean                                    | Std. Dev'n | Prop. > Zero                               | N   | Mean                     | Std. Dev'n | Prop > Zero                                 |
| Glass bottles/vials   | 649                  | .7897                                | 1.512      | .4262                                     | 627                        | 1.628                                | 5.313      | .4013                                     | 617  | 25.310                                  | 108.54     | .6908                                      | 602   | 6.950<br>2               | 81.890     | .4040                                       |
| Plastic/polymer bottles   | 49                   | .4898                                | .711       | .3673                                     | 52                         | .7308                                | 1.941      | .2308                                     | 54   | 7.7778                                  | 17.475     | .4727                                      | 49  | 2.306<br>1               | 4.063      | .3673                                       |
| Prefilled syringes (whether used for hand or power injection)   | 31                   | .1935                                | .543       | .1290                                     | 31                         | .0323                                | .180       | .0323                                     | 33   | .5455                                   | 1.938      | .1212                                      | 33  | .4545                    | 2.611      | .0303                                       |
| Statistically significant differences (*, **, ***) for $P < .05$ , $.01$ and $.001$ , respectively <sup>d</sup> |                      | G vs. P*,<br>P vs. S*,<br>G vs. S*** |            | G vs. S***,<br>P vs. S*,<br>G, P vs. S*** |                            | G vs. P*,<br>P vs. S*,<br>G vs. S*** |            | G vs. P**,<br>P vs. S**,<br>G, P vs. S*** |  | G vs. P***,<br>P vs. S**,<br>G vs. S*** |            | G vs. P**,<br>P vs. S***,<br>G, P vs. S*** |   | P vs. S*,<br>G, P vs. S* |            | G vs. S***,<br>P vs. S***,<br>G, P vs. S*** |

<sup>a</sup> Does not include respondents who indicated more incidents were reported than were observed.

<sup>b</sup> Does not include semi-quantitative responses written in on some of the hardcopy questionnaires (see responses beginning page 20 following tables).

<sup>c</sup> Omits one report of 99,999 hemostat uses – an average of 274 incidents a day in a facility that averages fewer than 15 contrast procedures per day. This online response probably resulted from an accidental invocation of the repeat-key function.

<sup>d</sup> Abbreviations in this row are as follows: G stands for facilities using mainly glass bottles; P stands for facilities using mainly polymer bottles; S represents the mean of those using mainly prefilled syringes for hand and power injection. Thus, for instance, "G vs. P\*\*\*" means that the difference between the mean for facilities that predominantly use glass bottles and the mean for facilities that predominantly use plastic/polymer bottles is statistically significant at the .001 level.

### Frequency of Safety Incidents as a Function of Main Packaging Type<sup>a,b</sup>

| Main Packaging Type   | Contrast Media Bottle Dropped and Broken |                                      |            |                                      | Work-area Injuries due to Broken Contrast Bottles |       |            |             | Outside-area Injuries due to Broken Contrast Bottles |       |            |             | Back Strain Carrying Contrast Media Bottles |       |            |             |
|---|--|--------------------------------------|------------|--------------------------------------|---|-------|------------|-------------|--|-------|------------|-------------|---|-------|------------|-------------|
|   | N  | Mean                                 | Std. Dev'n | Prop > Zero                          | N   | Mean  | Std. Dev'n | Prop > Zero | N  | Mean  | Std. Dev'n | Prop > Zero | N   | Mean  | Std. Dev'n | Prop > Zero |
| Glass bottles/vials   | 624                                      | 1.5112                               | 3.000      | .4856                                | 617   | .0470 | .476       | .0261       | 532  | .0169 | .143       | 0.015       | 609   | .0131 | .162       | .0098       |
| Plastic/polymer bottles   | 52                                       | .5577                                | 1.673      | .1923                                | 52  | .0192 | .139       | 0.019       | 48   | .0000 | .000       | .0          | 52  | .2500 | 1.412      | .0577       |
| Prefilled syringes  | 33                                       | .1212                                | .415       | .0909                                | 33  | .0000 | .000       | .0          | 26   | .0000 | .000       | .0          | 31  | .0000 | .000       | .0000       |
| Statistically significant differences (*, **, *** for $P < .05, .01, .001$ , respectively) <sup>c</sup> |  | G vs. P***, G vs. S***, G,P vs. S*** |            | G vs. P***, G vs. S***, G,P vs. S*** |   | None  |            | None        |  | None  |            | None        |   | None  |            | None        |

<sup>a</sup> Does not include respondents who indicated more incidents were reported than were observed.

<sup>b</sup> Does not include semi-quantitative responses written in on some of the hardcopy questionnaires (see responses beginning page 20 following tables).

<sup>c</sup> Abbreviations in this row are as follows: G stands for facilities using mainly glass bottles; P stands for facilities using mainly polymer bottles; S represents the mean of those using mainly prefilled syringes for hand and power injection. Thus, for instance, "G vs. P\*\*\*" means that the difference between the mean for facilities that predominantly use glass bottles and the mean for facilities that predominantly use plastic/polymer bottles is statistically significant at the .001 level.

### Frequency of Safety Incidents as a Function of Main Packaging Type<sup>a,b</sup>

| Main Packaging Type   | Latex Sensitivity Reactions |       |            |             | Eye Splatter From Contrast Media |       |            |             |
|---|-----------------------------|-------|------------|-------------|----------------------------------|-------|------------|-------------|
|   | N                           | Mean  | Std. Dev'n | Prop > Zero | N                                | Mean  | Std. Dev'n | Prop > Zero |
| Glass bottles/vials   | 624                         | .6154 | 1.950      | .2772       | 612                              | .8219 | 2.292      | .2827       |
| Plastic/polymer bottles   | 50                          | .8600 | 2.268      | .2800       | 50                               | .5600 | 1.110      | .2800       |
| Prefilled syringes  | 32                          | .1875 | .397       | .1875       | 29                               | .4138 | 1.211      | .1379       |
| Statistically significant differences (*, **, *** for $P < .05, .01, .001$ , respectively) <sup>c</sup> |                             | None  |            | None        |                                  | None  |            | G v S*      |

<sup>a</sup> Does not include respondents who indicated more incidents were reported than were observed.

<sup>b</sup> Does not include semi-quantitative responses written in on some of the hardcopy questionnaires (see responses below).

<sup>c</sup> Abbreviations in this row are as follows: G stands for facilities using mainly glass bottles; P stands for facilities using mainly polymer bottles; S represents the mean of those using mainly prefilled syringes for hand and power injection. Thus, for instance, "G vs. P\*\*\*" means that the difference between the mean for facilities that predominantly use glass bottles and the mean for facilities that predominantly use plastic/polymer bottles is statistically significant at the .001 level.

Semi-quantitative responses (see footnote "b" from above tables.)

*Work-area sharps injuries observed*

X [Probably intended to indicate that “some” such incidents occurred.]

*Work-area injuries from metal crimp* observed

X

*Used hemostats to open contrast media bottles* -- observed

About every 5th bottle.

Agree?

All the time

Always

At least once/week

Daily (2)

Every day

Hemostats used without incident

Many or Many times (4)

Multiple (3)

Occasionally

Often (2)

Several times (2)

Some

Too many to count

Too numerous to count

X (4)

Yes (2)

Yes, no. unknown

*Contrast bottle(s) set aside due to difficulty opening* – observed

A lot

All the time

Daily (2)

Many

Many times

Multiple (2)

Often (2)

Sometimes

X (2)

Yes

Yes, no. unknown

Yes, multiple

*Contrast media bottle breakages* observed

Many times

Sometimes

X (3)

Yes (2)  
*Work-area injuries from broken contrast bottles* observed  
X (2)  
*Outside-area injuries from broken contrast bottles* observed  
X (2)  
*Back-strain injuries from carrying contrast bottles* observed  
X (2)  
*Latex sensitivity reactions* observed  
Often - 2 persons are sensitive  
X  
*Eye splatter from contrast media* – observed  
Sometimes  
X  
Yes

That there were *any* reports of injuries from metal crimps and/or contrast bottle breakage at facilities using polymer bottles is attributable to the difference between the reporting period for safety-related incidents (past 12 months) vs. the three-month period over which the frequency of use of the various packaging types was reported. Facilities that had adopted polymer bottles as their main packaging type within the past year could have had these types of incidents during the period before they switched to polymer bottles.

**Percentage of Various Safety Incidents Reported <sup>a</sup>**

| Type of Incident                                     | Blank for No. Reported = Missing |                   |                   |                  | Blank for No. Reported = 0 <sup>b</sup> |                   |                   |                  |
|--|----------------------------------|-------------------|-------------------|------------------|---|-------------------|-------------------|------------------|
|  | N                                | Mean No. Observed | Mean No. Reported | Percent Reported | N                                       | Mean No. Observed | Mean No. Reported | Percent Reported |
| Work-area sharps injuries                            | 685                              | 1.1818            | .9358             | 78.7%            | 1208                                    | 0.764073          | 0.530629          | 69.4%            |
| Work-area injuries from metal crimp                  | 607                              | 1.9522            | .1977             | 7.8%             | 1169                                    | 1.35586           | 0.102652          | 7.6%             |
| Used hemostats to open contrast media bottles        | 572                              | 23.8680           | 1.8872            | 9.1%             | 1147                                    | 20.1055           | 0.9412            | 4.7%             |
| Contrast bottle set-asides due to difficulty opening | 508                              | 4.7736            | .5502             | 9.0%             | 1121                                    | 6.304193          | 0.249331          | 4.0%             |
| Contrast media bottle breakages                      | 552                              | 1.3986            | .4475             | 34.0%            | 1175                                    | 1.290213          | 0.210213          | 16.3%            |
| Work-area injuries from broken contrast bottles      | 499                              | .0341             | .0220             | 77.9%            | 1163                                    | 0.037833          | 0.009458          | 25.0%            |
| Outside-area injuries from broken contrast bottles   | 419                              | .0167             | .0095             | 40.1%            | 994                                     | 0.014085          | 0.004024          | 28.6%            |
| Back-strain injuries from carrying contrast bottles  | 491                              | .1843             | .0224             | 8.6%             | 1145                                    | 0.086026          | 0.009607          | 11.2%            |
| Latex sensitivity reactions                          | 580                              | .8578             | .5586             | 65.3%            | 1167                                    | 0.606255          | 0.277635          | 45.8%            |
| Eye splatter from contrast media                     | 567                              | .9559             | .4092             | 41.3%            | 1143                                    | 0.681102          | 0.202975          | 29.8%            |

<sup>a</sup>Does not include semiquantitative responses written in on some of the hardcopy questionnaires. (see below)

<sup>b</sup>Treated blank in number-reported field as zero if incident frequency was not also left blank.

Semiquantitative responses (see table footnote “a” above.)

*Work-area sharps injuries reported*

X

*Injuries from metal crimps reported*

X

*Used hemostats to open contrast media bottles – reported*

Frequently

X

*Contrast bottle(s) set aside due to difficulty opening -- reported*

Frequently

X (2)

*Contrast media bottle breakages reported*

X

- Work-area injuries from broken contrast bottles reported  
X (1)
- Outside-area injuries from broken contrast bottles reported  
X
- Back-strain injuries from carrying contrast bottles reported  
X
- Latex sensitivity reactions reported  
X (2)
- Eye splatter from contrast media – reported  
X

**Safety Incident Rates per Involved Person per Year  
(Not Considering Semiquantitative Responses)**

| Type of Incident                                     | N   | Mean No. Observed | Mean No. Involved | No. per Person per Year |
|--|-----|-------------------|-------------------|-------------------------|
| Work-area sharps injuries                            | 373 | .8110             | 17.44             | 0.0465                  |
| Work-area injuries from metal crimp                  | 341 | .8519             | 16.91             | .0694                   |
| Hemostats used to open contrast media bottles        | 291 | 23.5034           | 15.98             | 1.4712                  |
| Contrast bottles set aside due to difficulty opening | 303 | 12.1551           | 16.72             | .7270                   |
| Contrast media bottle breakages                      | 331 | 1.0554            | 16.44             | .0642                   |
| Work-area injuries from broken contrast bottles      | 351 | .0456             | 17.20             | .0027                   |
| Outside-area injuries from broken contrast bottles   | 310 | .0129             | 17.22             | .0007                   |
| Back-strain injuries from carrying contrast bottles  | 351 | .0114             | 17.06             | .0007                   |
| Latex sensitivity reactions                          | 348 | .4052             | 16.86             | .0240                   |
| Eye splatter from contrast media                     | 339 | .4926             | 16.68             | .0295                   |

Note: Includes all nonmissing frequency-of-incident reports from administrators/managers unless “don’t know” checked or number of incidents < number of those incidents reported. Technologists were asked to report incidents based on their own experience but to report number of contrast-involved persons for the entire facility (and all shifts).

***Disposition of Contrast Bottles Set Aside Because of Difficulty Opening***

**2L. If there were any incidents in which contrast media bottles were set aside because of difficulty opening them, what ultimately happened to these bottles?**

| Disposition   | Responses |         | Percent of Dispositions |
|---|-----------|---------|-------------------------|
|   | N         | Percent |                         |
| Discarded.  | 155       | 21.6%   | 22.7%                   |
| Opened and used when time and tools permitted.  | 510       | 71.0%   | 74.7%                   |
| Returned to the vendor for refund or replacement.   | 36        | 5.0%    | 5.3%                    |
| Other disposition (Please specify below.)   | 17        | 2.4%    | 2.5%                    |
| Total reports of dispositions   | 718       | 100%    | 105.1%                  |
| N/A; Contrast media bottles never had to be set aside because of difficulty opening them. | 720       | 50.1%   | 51.4%                   |
| Total   | 1438      | 100.0%  | 102.7%                  |

Total no. of respondents reporting dispositions = 683

**Disposition Frequencies for Those Reporting One or More Bottles Set Aside**

| Disposition                                       | Responses |         | Percent of Cases |
|---|-----------|---------|------------------|
|   | N         | Percent |                  |
| Discarded.  | 77        | 17.2%   | 18.2%            |
| Opened and used when time and tools permitted.    | 349       | 78.1%   | 82.5%            |
| Returned to the vendor for refund or replacement. | 17        | 3.8%    | 4.0%             |
| Other disposition (Please specify below.)         | 4         | .9%     | .9%              |
| Total   | 447       | 100.0%  | 105.7%           |

Total no. of respondents = 423.

**2m. On average, approximately how much time (in minutes) is required to clean up when a bottle is dropped and broken?**

Zero minutes' average cleanup time was reported by 131 respondents. However, 125 of those so reporting had either indicated that their facility had zero breakage incidents in the past 12 months or didn't indicate the frequency of breakages. Therefore, clean-up time statistics are included only for respondents who reported a frequency of contrast-media-bottle breakage of greater than zero.

|                        |                          |         |           |
|------------------------|--------------------------|---------|-----------|
| Breakage frequency > 0 | N                        | Valid   | 492       |
|                        |                          | Missing | 15        |
|                        | Mean                     |         | 11.363    |
|                        | Median <sup>a</sup>      |         | 10.166(a) |
|                        | Std. Deviation           |         | 7.3061    |
|                        | Minimum                  |         | .0        |
|                        | Maximum                  |         | 60.0      |
|                        | Percentiles <sup>a</sup> | 5       | 3.456     |
|                        |                          | 95      | 24.667    |

<sup>a</sup> Calculated from grouped data.

**Frequency Distribution**

|         | Cleanup time (minutes) | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|------------------------|-----------|---------|---------------|--------------------|
| Valid   | 0                      | 6         | 1.2     | 1.2           | 1.2                |
|         | 1-5                    | 138       | 27.3    | 28            | 29.2               |
|         | 6-10                   | 172       | 34      | 34.9          | 64.1               |
|         | 11-15                  | 106       | 20.9    | 21.5          | 85.6               |
|         | 16-30                  | 66        | 13.1    | 13.4          | 99.0               |
|         | 45.0                   | 2         | 0.4     | 0.4           | 99.4               |
|         | 60.0                   | 2         | 0.4     | 0.4           | 100                |
|         | Total                  | 492       | 97.3    | 100           |                    |
| Missing |                        | 15        | 100     |               |                    |
| Total   |                        | 507       |         |               |                    |

**Reasons for Not Reporting Safety Incidents**

3. If any of the injuries which occurred in the past 12 months were not reported, please indicate the reason(s) for not reporting. (Check all that apply.) For technologists, please respond based on your own experience. For administrators, please respond based on the experience of your work area.

| Reason Incident(s) Not Reported           | Injuries from Sharp Objects |         |                  | Injuries from Metal Crimps |         |                  | Work-area Injuries from Broken Contrast Bottles |         |                  | Outside-area Injuries from Broken Contrast Bottles |         |                  |
|---|-----------------------------|---------|------------------|----------------------------|---------|------------------|---|---------|------------------|--|---------|------------------|
|   | Responses                   |         | Percent of Cases | Responses                  |         | Percent of Cases | Responses                                       |         | Percent of Cases | Responses  |         | Percent of Cases |
|   | N                           | Percent |                  | N                          | Percent |                  | N   | Percent |                  | N  | Percent |                  |
| Did not have time to report               | 63                          | 12.5%   | 13.4%            | 51                         | 7.8%    | 8.6%             | 33  | 7.8%    | 8.2%             | 34   | 8.0%    | 9.2%             |
| Thought of negative repercussions         | 36                          | 7.1%    | 7.7%             | 18                         | 2.8%    | 3.0%             | 23  | 5.4%    | 5.7%             | 20   | 4.7%    | 5.4%             |
| Thought injury was low risk               | 197                         | 38.9%   | 41.9%            | 380                        | 58.2%   | 63.8%            | 142   | 33.4%   | 35.4%            | 68   | 16.1%   | 18.3%            |
| Did not know reporting procedure/protocol | 17                          | 3.4%    | 3.6%             | 21                         | 3.2%    | 3.5%             | 11  | 2.6%    | 2.7%             | 28   | 6.6%    | 7.5%             |
| Did not have reporting procedure/protocol | 23                          | 4.5%    | 4.9%             | 26                         | 4.0%    | 4.4%             | 20  | 4.7%    | 5.0%             | 62   | 14.7%   | 16.7%            |
| Other                                     | 170                         | 33.6%   | 36.2%            | 157                        | 24.0%   | 26.3%            | 196   | 46.1%   | 48.9%            | 211  | 49.9%   | 56.9%            |
| Total                                     | 506                         | 100.0%  | 107.7%           | 653                        | 100.0%  | 109.6%           | 425   | 100.0%  | 106.0%           | 423  | 100.0%  | 114.0%           |

| Reason Incident(s) Not Reported            | Back Strain from Carrying Contrast Media Bottles |         |                  | Latex Sensitivities |         |                  | Eye Splatter from Contrast Media |         |                  |
|--|--|---------|------------------|---------------------|---------|------------------|----------------------------------|---------|------------------|
|  | Responses  |         | Percent of Cases | Responses           |         | Percent of Cases | Responses                        |         | Percent of Cases |
|  | N  | Percent |                  | N                   | Percent |                  | N                                | Percent |                  |
| Did not have time to report                | 27   | 7.7%    | 7.9%             | 58                  | 13.0%   | 14.0%            | 38                               | 8.1%    | 8.7%             |
| Thought of negative repercussions          | 25   | 7.1%    | 7.4%             | 16                  | 3.6%    | 3.9%             | 13                               | 2.8%    | 3.0%             |
| Thought injury was low risk                | 71   | 20.2%   | 20.9%            | 101                 | 22.6%   | 24.4%            | 161                              | 34.3%   | 36.9%            |
| Did not know reporting procedure/ protocol | 12   | 3.4%    | 3.5%             | 19                  | 4.3%    | 4.6%             | 25                               | 5.3%    | 5.7%             |
| Did not have reporting procedure/ protocol | 14   | 4.0%    | 4.1%             | 36                  | 8.1%    | 8.7%             | 27                               | 5.7%    | 6.2%             |
| Other                                      | 203  | 57.7%   | 59.7%            | 216                 | 48.4%   | 52.2%            | 206                              | 43.8%   | 47.2%            |
| Total                                      | 352  | 100.0%  | 103.5%           | 446                 | 100.0%  | 107.7%           | 470                              | 100.0%  | 107.8%           |

Among the explicit reasons on the checklist, “Thought injury was low risk” was chosen by more respondents (16% to 58% of those providing reasons for not reporting a given type of safety incident) than any other reason. However, “Other” was checked by 24% to 58% of the respondents and was the most common response for five of the seven incident types.

**4. If you checked “Other” for any of the injuries in question 3, please indicate the other reason(s) for not reporting injuries.**

Of the 293 responses to this question, 169 (58%) could be summarized as “Because there were no injuries to report” and 26 (9%), as “Because all were reported.” Another 25 (9%) could be summarized as explaining why there were no injuries to report and 26 (9%) as an elaboration of why the respondent thought the injury was low risk.

**Observation and Reporting of Safety Incidents as a Function of Contrast Media Administration vs. Supervision of Contrast Administration**

Only two of the types of incidents (injuries from sharps and metal crimps) and total incidents observed differed significantly in the frequency with which they were observed as a function of involvement, and in all incidents, respondents who both administered contrast and supervised its administration differed significantly from those who performed one of these tasks exclusively:

**Observed Incidents**

| Contrast Involvement                               | Injuries From Sharps   |        |                | Injuries From Metal Crimps  |        |                | Hemostat Used to Open Contrast Media Bottle(s) |         |                | Contrast Bottles Set Aside |        |                |
|--|--|--------|----------------|---|--------|----------------|--|---------|----------------|----------------------------|--------|----------------|
|  | N  | Mean   | Std. Deviation | N   | Mean   | Std. Deviation | N  | Mean    | Std. Deviation | N                          | Mean   | Std. Deviation |
| Administer only                                    | 430  | .6709  | 1.402          | 426   | 1.4484 | 3.810          | 449  | 17.2528 | 66.529         | 417                        | 3.7230 | 15.938         |
| Both administer and supervise                      | 81   | 1.3148 | 3.123          | 75  | .1867  | .586           | 48   | 2.9792  | 8.309          | 57                         | .7895  | 2.664          |
| Supervise only                                     | 689  | .7896  | 1.796          | 668   | 1.5576 | 5.468          | 657  | 24.8364 | 108.763        | 641                        | 8.6654 | 89.067         |
| Statistically significant differences <sup>a</sup> | Both vs. admin only, superv only**, accounting for 97% of the variation among the three means. |        |                | Both vs. admin only, superv only***, accounting for 99% of the variation among the three means. |        |                | None   |         |                | None                       |        |                |

<sup>a</sup> \*, \*\*, \*\*\* P < .05, .01, .001, respectively.

| Contrast Involvement                               | Broken Contrast Bottle(s) |        |                | Work-area Injuries Due to Broken Contrast Bottles |       |                | Outside-area Injuries Due to Broken Contrast Bottles |       |                | Back Strain Injuries |       |                |
|--|---------------------------|--------|----------------|---|-------|----------------|--|-------|----------------|----------------------|-------|----------------|
|  | N                         | Mean   | Std. Deviation | N   | Mean  | Std. Deviation | N  | Mean  | Std. Deviation | N                    | Mean  | Std. Deviation |
| Administer only                                    | 437                       | 1.1327 | 2.252          | 409   | .0269 | .202           | 339  | .0059 | .077           | 401                  | .0349 | .322           |
| Both administer and supervise                      | 68                        | .7206  | 2.150          | 78  | .0256 | .159           | 62   | .0161 | .127           | 76                   | .0132 | .115           |
| Supervise only                                     | 658                       | 1.4985 | 4.774          | 657   | .0441 | .462           | 579  | .0225 | .198           | 650                  | .1254 | 2.020          |
| Statistically significant differences <sup>a</sup> | None                      |        |                | None  |       |                | None   |       |                | None                 |       |                |

<sup>a</sup> \*, \*\*, \*\*\* P < .05, .01, .001, respectively.

| Contrast Involvement                               | Latex Sensitivity Reactions |       |                | Splatter from Contrast Media |       |                | Total Incident Frequency  |         |                |
|--|-----------------------------|-------|----------------|------------------------------|-------|----------------|---|---------|----------------|
|  | N                           | Mean  | Std. Deviation | N                            | Mean  | Std. Deviation | N   | Mean    | Std. Deviation |
| Administer only                                    | 421                         | .6556 | 2.085          | 409                          | .7054 | 2.310          | 448   | 24.5815 | 76.562         |
| Both administer and supervise                      | 70                          | .5000 | 1.359          | 72                           | .3333 | .769           | 49  | 5.9796  | 11.148         |
| Supervise only                                     | 661                         | .5983 | 1.736          | 654                          | .7691 | 2.262          | 662   | 42.6850 | 223.623        |
| Statistically significant differences <sup>a</sup> | None                        |       |                | None                         |       |                | Both vs. admin only, superv only***, accounting for 76% of the variation among the groups |         |                |

<sup>a</sup> \*, \*\*, \*\*\* P < .05, .01, .001, respectively.

The percentage of incidents of a given type that were reported was affected consistently by involvement in contrast administration, supervision or both. Respondents who indicated that they both administer contrast and supervise others who administer contrast indicated, on average, that a higher percentage of the incidents observed get reported than did those who only administer contrast or only supervise its administration.

**Proportion of Incidents Reported**

|  | Injuries From Sharps                     |                          |            | Injuries From Metal Crimps  |                          |            | Hemostat Used to Open Contrast Bottle(s)                        |                          |            | Contrast Bottles Set Aside Due to Difficulty Opening |                          |            | Broken Contrast Bottle(s)  |                          |            |
|--|--|--------------------------|------------|---|--------------------------|------------|---|--------------------------|------------|--|--------------------------|------------|--|--------------------------|------------|
|  | N  | Mean Proportion Reported | Std. Dev'n | N   | Mean Proportion Reported | Std. Dev'n | N   | Mean Proportion Reported | Std. Dev'n | N  | Mean Proportion Reported | Std. Dev'n | N  | Mean Proportion Reported | Std. Dev'n |
| Involvement with contrast administration           |  |                          |            |   |                          |            |   |                          |            |  |                          |            |  |                          |            |
| Administer only                                    | 150                                      | .7138                    | .4343      | 157   | .0862                    | .2783      | 298   | .0430                    | .2018      | 153  | .0984                    | .2983      | 183  | .1557                    | .3617      |
| Both administer and supervise                      | 42                                       | .8548                    | .3394      | 10  | .5000                    | .5270      | 15  | .2467                    | .4291      | 9  | .1111                    | .3333      | 20   | .4750                    | .4993      |
| Supervise only                                     | 273                                      | .7797                    | .4015      | 230   | .2187                    | .4100      | 409   | .1423                    | .3675      | 247  | .1475                    | .3497      | 274  | .2809                    | .4482      |
| Statistically significant differences <sup>a</sup> | Admin vs. both*, Admin vs. both, superv* |                          |            | Both vs. admin, superv** (90% of variation among groups), Admin vs. superv*** |                          |            | Admin vs. both*, Admin vs. superv***, Admin vs. both, superv*** |                          |            | None   |                          |            | Both vs. admin, superv** (85% of variation among groups), Admin vs. superv** |                          |            |

|  | Work-Area Injuries From Broken Bottles |                      |           | Outside-Work-Area Injuries From Broken Bottles |                      |           | Back Strain Due to Lifting Contrast Bottles |                      |           | Latex Reactions |                      |           | Eye Splatter from Contrast Medium                               |                      |           | Total Incidents, All Types |                      |           |
|--|--|----------------------|-----------|--|----------------------|-----------|---|----------------------|-----------|-----------------|----------------------|-----------|---|----------------------|-----------|----------------------------|----------------------|-----------|
|  | N                                      | Mean Prop'n Reported | Std. Dev. | N  | Mean Prop'n Reported | Std. Dev. | N   | Mean Prop'n Reported | Std. Dev. | N               | Mean Prop'n Reported | Std. Dev. | N   | Mean Prop'n Reported | Std. Dev. | N                          | Mean Prop'n Reported | Std. Dev. |
| Involvement with contrast administration           |  |                      |           |  |                      |           |   |                      |           |                 |                      |           |   |                      |           |                            |                      |           |
| Administer only                                    | 9                                      | .1111                | .333      | 2  | .5000                | .707      | 6   | .29                  | .40       | 119             | .5168                | .496      | 92  | .2239                | .409      | 370                        | .1641                | .312      |
| Both administer and supervise                      | 2                                      | .5000                | .707      | 1  | .0000                | ---       | 1   | 1.00                 | ---       | 18              | .7500                | .429      | 13  | .5385                | .482      | 33                         | .6062                | .430      |
| Supervise only                                     | 15                                     | .3333                | .488      | 8  | .2917                | .452      | 13  | .31                  | .48       | 173             | .5345                | .490      | 182   | .4685                | .495      | 546                        | .2748                | .401      |
| Statistically significant differences <sup>a</sup> | None                                   |                      |           | None   |                      |           | None  |                      |           | None            |                      |           | Admin vs. both*, Admin vs. superv***, Admin vs. both, Superv*** |                      |           | None                       |                      |           |

<sup>a</sup> \*, \*\*, \*\*\* P < .05, .01, .001, respectively.

### Observation and Reporting of Safety Incidents as a Function of Title

Only three incident types (injuries from metal crimps, latex sensitivity reactions and eye splatter) were observed significantly differently often by staff/senior staff technologists and therapists as compared to those holding administrative/managerial titles.

| Job Title/description                                 | Injuries From Metal Crimps |      |                | Latex Sensitivity Reactions |      |                | Eye Splatter from Contrast Media |      |                |
|---|----------------------------|------|----------------|-----------------------------|------|----------------|----------------------------------|------|----------------|
|   | N                          | Mean | Std. Deviation | N                           | Mean | Std. Deviation | N                                | Mean | Std. Deviation |
| Staff or senior staff technologist/therapist          | 815                        | 1.64 | 4.26           | 793                         | .69  | 2.09           | 786                              | .82  | 2.50           |
| Administrative/managerial                             | 347                        | .86  | 5.65           | 351                         | .41  | .99            | 342                              | .49  | 1.45           |
| $F_{1,N-2}$ for difference between means <sup>a</sup> | 6.698, $P = .01$           |      |                | 5.784*                      |      |                | 5.028*                           |      |                |

<sup>a</sup> \*, \*\*, \*\*\*  $P < .05, .01, .001$ , respectively.

In all three cases staff technologist/therapists reported higher incident rates than did administrators/managers.

For most of the incident types staff and managers differed significantly in the percentage of incidents they believed were reported. Staff technologist/therapist responses, on average, showed a lower reporting percentage.

| Job title/description                                 | Injuries From Sharps |                          |            | Injuries From Metal Crimps |                          |            | Hemostat Used to Open Contrast Bottle(s) |                          |            | Contrast Bottles Set Aside Due to Difficulty Opening |                          |            | Broken Contrast Bottle(s) |                          |            |
|---|----------------------|--------------------------|------------|----------------------------|--------------------------|------------|--|--------------------------|------------|--|--------------------------|------------|---------------------------|--------------------------|------------|
|   | N                    | Mean Proportion Reported | Std. Dev'n | N                          | Mean Proportion Reported | Std. Dev'n | N  | Mean Proportion Reported | Std. Dev'n | N  | Mean Proportion Reported | Std. Dev'n | N                         | Mean Proportion Reported | Std. Dev'n |
| Staff or senior staff technologist/therapist          | 300                  | .7211                    | .4327      | 321                        | .1423                    | .3481      | 567                                      | .0782                    | .2672      | 320  | .1148                    | .3179      | 359                       | .1880                    | .3904      |
| Administrative/managerial                             | 161                  | .8547                    | .3380      | 72                         | .3218                    | .4599      | 144                                      | .1676                    | .3646      | 84   | .1798                    | .3779      | 117                       | .4313                    | .4909      |
| $F_{1,N-2}$ for difference between means <sup>a</sup> | 11.551***            |                          |            | 13.770***                  |                          |            | 10.947***                                |                          |            | 2.563, ns  |                          |            | 30.012***                 |                          |            |

<sup>a</sup> \*, \*\*, \*\*\*  $P < .05, .01, .001$ , respectively. ns = not statistically significant at even the .05 level.

| Job Title/Description                                 | Work-area Injuries From Broken Contrast Bottles |                          |            | Out-of-area Injuries From Broken Bottles and Back Strain Injuries    |                          |            | Latex Reactions |                          |            | Eye Splatter from Contrast Media |                          |            | Average Across All Incident types |                          |            |
|---|---|--------------------------|------------|--|--------------------------|------------|-----------------|--------------------------|------------|----------------------------------|--------------------------|------------|-----------------------------------|--------------------------|------------|
|   | N   | Mean Proportion Reported | Std. Dev'n | N  | Mean Proportion Reported | Std. Dev'n | N               | Mean Proportion Reported | Std. Dev'n | N                                | Mean Proportion Reported | Std. Dev'n | N                                 | Mean Proportion Reported | Std. Dev'n |
| Staff or Senior Staff Technologist/Therapist          | 20  | .3000                    | .4702      | Too few incidents for meaningful comparison of reporting percentage. |                          |            | 221             | .4945                    | .4938      | 204                              | .2812                    | .4424      | 711                               | .1880                    | .3360      |
| Administrative/Managerial                             | 7   | .1429                    | .3780      |  |                          |            | 83              | .6651                    | .4663      | 77                               | .6602                    | .4702      | 227                               | .4186                    | .4472      |
| $F_{1,N-2}$ for difference between means <sup>a</sup> | .633, ns  |                          |            | ---  |                          |            | 7.421**         |                          |            | 39.615***                        |                          |            | 68.284***                         |                          |            |

<sup>a</sup> \*, \*\*, \*\*\* P < .05, .01, .001, respectively. ns = not statistically significant at even the .05 level.

**Observation of Safety Incidents as a Function of Title and Packaging Type**

| 16. What best describes your position?<br>(Check one.) | Primary Packaging Type | Statistic      | Sharps injuries | Metal crimp injuries | Hemostats used to open contrast media bottles | Contrast media bottles set aside because of difficulties with opening | Broken contrast media bottles | Within-area injuries due to broken contrast media bottles | Outside-area injuries due to broken contrast media bottles | Injuries from carrying contrast media bottles | Latex sensitivity reactions | Eye splatter from contrast media |
|--|------------------------|----------------|-----------------|----------------------|---|---|-------------------------------|---|--|---|-----------------------------|----------------------------------|
| Staff or senior staff technologist                     | Glass bottles          | Mean           | .8487           | 1.8589               | 252.7603                                      | 3.9163  | 1.6265                        | .0397   | .0176  | .0204   | .7241                       | .4118                            |
|  |                        | N              | 423             | 418                  | 438   | 418   | 423                           | 403   | 341  | 393   | 406                         | 204                              |
|  |                        | Std. Deviation | 1.63371         | 4.02709              | 4777.6387                                     | 9.12563   | 3.08758                       | .30487  | .15238   | .20100  | 2.27661                     | 1.33799                          |
|  | Polymer bottles        | Mean           | .4375           | .7500                | 5.1538  | 1.9714  | .6389                         | .0286   | .0000  | .3714   | .9118                       | .1333                            |
|  |                        | N              | 32              | 36                   | 39  | 35  | 36                            | 35  | 33   | 35  | 34                          | 15                               |
|  |                        | Std. Deviation | .66901          | 2.15639              | 9.82354                                       | 3.62577   | 1.92951                       | .16903  | .00000   | 1.71646                                       | 2.40413                     | .35187                           |
|  | Prefilled syringes     | Mean           | .0833           | .0417                | .6667   | .6000   | .1600                         | .0000   | .0000  | .0000   | .1667                       | 1.1000                           |
|  |                        | N              | 24              | 24                   | 27  | 25  | 25                            | 25  | 20   | 23  | 24                          | 10                               |
|  |                        | Std. Deviation | .40825          | .20412               | 2.13037                                       | 3.00000   | .47258                        | .00000  | .00000   | .00000  | .38069                      | 1.85293                          |
| Administrative/managerial                              | Glass bottles          | Mean           | .7207           | 1.2100               | 44.2047                                       | 14.5486   | 1.2718                        | .0693   | .0166  | .0050   | .3317                       | .5581                            |
|  |                        | N              | 213             | 200                  | 171   | 175   | 195                           | 202   | 181  | 202   | 202                         | 129                              |
|  |                        | Std. Deviation | 1.30425         | 7.35776              | 278.60951                                     | 151.26340   | 2.82897                       | .71595  | .12803   | .07036  | .78790                      | 1.76293                          |
|  | Polymer bottles        | Mean           | .5882           | .6875                | 13.7500                                       | 3.1429  | .3750                         | .0000   | .0000  | .0000   | .7500                       | .8182                            |
|  |                        | N              | 17              | 16                   | 16  | 14  | 16                            | 17  | 15   | 17  | 16                          | 11                               |
|  |                        | Std. Deviation | .79521          | 1.40089              | 27.95830                                      | 5.05138   | .88506                        | .00000  | .00000   | .00000  | 2.01660                     | .87386                           |
|  | Prefilled syringes     | Mean           | .1667           | .0000                | .0000   | .0000   | .0000                         | .0000   | .0000  | .0000   | .0000                       | .0000                            |
|  |                        | N              | 6               | 6                    | 5   | 6   | 6                             | 6   | 5  | 6   | 6                           | 2                                |
|  |                        | Std. Deviation | .40825          | .00000               | .00000  | .00000  | .00000                        | .00000  | .00000   | .00000  | .00000                      | .00000                           |

### Estimated Occurrence of Safety Incidents as a Function of Packaging Type

The most accurate estimate of the frequency with which a given type of incident occurs in the “typical” facility administering contrast is probably provided by adjusting the average frequency of occurrence reported by administrators (who were asked to respond for their facility as a whole, as compared with technologists’ reports of their own experience) to consider the difference between the manager’s estimate of the percentage of incidents of each type that get reported and the percentage that technologists believe get reported. This leads to the following “best estimates:”

| Main Packaging Type | Statistic                                     | Injuries From Sharps | Injuries From Metal Crimps | Hemostats Used to Open Contrast Media Bottles | Contrast Media Bottles Set Aside Because of Difficulties Opening | Broken Contrast Media Bottles | Within-area Injuries Due to Broken Contrast Media Bottles | Outside-area Injuries Due to Broken Contrast Media Bottles          | Injuries From Carrying Contrast Media Bottles | Latex Sensitivity Reactions | Eye Splatter From Contrast Media |
|---------------------|---|----------------------|----------------------------|---|--|-------------------------------|---|---|---|-----------------------------|----------------------------------|
| Glass bottles       | Mean annual frequency as reported by managers | .7207                | 1.2100                     | 44.2047                                       | 14.5486  | 1.2718                        | .0693   | .0166   | .0050   | .3317                       | .5581                            |
|                     | Proportion reported as estimated by R.T.s     | .7211                | .1423                      | .0782   | .1148  | .1880                         | .3000   | Too few incidents for meaningful comparison of reporting percentage |   | .4945                       | .2812                            |
|                     | Proportion reported as estimated by managers  | .8547                | .3218                      | .1676   | .1798  | .4313                         | .1429   |   |   | .6651                       | .6602                            |
|                     | Estimated actual annual frequency             | 0.8542               | 2.7363                     | 94.7405                                       | 22.7860  | 2.9177                        | 0.0330  | ---   | ---   | 0.4461                      | 1.3103                           |
| Polymer bottles     | Mean annual frequency as reported by managers | .5882                | .6875                      | 13.7500                                       | 3.1429   | .3750                         | .0000   | .0000   | .0000   | .7500                       | .8182                            |
|                     | Proportion reported as estimated by R.T.s     | .7211                | .1423                      | .0782   | .1148  | .1880                         | .3000   | Too few incidents for meaningful comparison of reporting percentage |   | .4945                       | .2812                            |
|                     | Proportion reported as estimated by managers  | .8547                | .3218                      | .1676   | .1798  | .4313                         | .1429   |   |   | .6651                       | .6602                            |
|                     | Estimated actual annual frequency             | 0.6972               | 1.5547                     | 29.4693                                       | 4.9224   | 0.8603                        | 0.0000  | 0   | 0   | 1.0087                      | 1.9210                           |
| Prefilled syringes  | Mean annual frequency as reported by managers | .1667                | .0000                      | .0000   | .0000  | .0000                         | .0000   | .0000   | .0000   | .0000                       | .0000                            |
|                     | Proportion reported as estimated by R.T.s     | .7211                | .1423                      | .0782   | .1148  | .1880                         | .3000   | Too few incidents for meaningful comparison of reporting percentage |   | .4945                       | .2812                            |
|                     | Proportion reported as estimated by managers  | .8547                | .3218                      | .1676   | .1798  | .4313                         | .1429   |   |   | .6651                       | .6602                            |
|                     | Estimated actual annual frequency             | 0.1976               | 0.0000                     | 0.0000  | 0.0000   | 0.0000                        | 0.0000  | 0   | 0   | 0.0000                      | 0.0000                           |

### Frequency of Safety Incidents as a Function of Facility's Procedure Volume

This relationship was examined for “raw” number of incidents, for proportion of facilities reporting one or more incidents and for two newly derived dependent variables that take procedure volume into account: (1) average number of procedures between incidents and (2) frequency of that type of incident per 1,000 procedures performed. The average number of procedures between incidents could only be computed for those facilities that had one or more such incidents, so the totals for those analyses are relatively low.

Overall, logically possible incident types for facilities using only glass bottles, polymer bottles or prefilled syringes show that total number of incidents and proportion of facilities with one or more incidents generally increase with procedure volume – except in large volume facilities. However, the slope of the increase is well below 1.0 – i.e., doubling the number of procedures doesn't come close to doubling the reported frequency with which various kinds of incidents occur. As a result, number of incidents per 1,000 procedures generally declines as procedure volume increases.

### Sharps Injuries

| Main Packaging Type | Dependent Variable                        | No. Contrast Procedures per Week | N   | Mean      | Std. Deviation | Maximum  | F <sub>overall</sub> with 4, N-5 df |
|---------------------|---|----------------------------------|-----|-----------|----------------|----------|-------------------------------------|
| Glass bottles       | No. of sharps Incidents, past 12 months   | 1-28                             | 188 | .5319     | .95012         | 6.00     | 3.081*                              |
|                     |   | 29 - 70                          | 191 | .7330     | 1.33255        | 12.00    |                                     |
|                     |   | 71-175                           | 162 | .9753     | 1.74082        | 12.00    |                                     |
|                     |   | 176 - 700                        | 63  | 1.1270    | 2.14395        | 15.00    |                                     |
|                     |   | > 700 per wk                     | 14  | .8929     | .92359         | 2.50     |                                     |
|                     |   | Total                            | 618 | .7791     | 1.46050        | 15.00    |                                     |
|                     | Proportion reporting sharps injuries > 0  | 1-28                             | 188 | .3298     | .47139         | 1.00     | 3.624**                             |
|                     |   | 29 - 70                          | 191 | .4241     | .49550         | 1.00     |                                     |
|                     |   | 71-175                           | 162 | .5062     | .50151         | 1.00     |                                     |
|                     |   | 176 - 700                        | 63  | .5079     | .50395         | 1.00     |                                     |
|                     |   | > 700 per wk                     | 14  | .5714     | .51355         | 1.00     |                                     |
|                     |   | Total                            | 618 | .4288     | .49531         | 1.00     |                                     |
|                     | No. of procedures between sharps injuries | 1-28                             | 62  | 626.2     | 412.54603      | 1300.00  | 131.178***                          |
|                     |   | 29 - 70                          | 81  | 1798.9    | 782.89177      | 3380.00  |                                     |
|                     |   | 71-175                           | 82  | 4230.4    | 1989.57382     | 7800.00  |                                     |
|                     |   | 176 - 700                        | 32  | 10361.4   | 6727.67751     | 31200.00 |                                     |
|                     |   | > 700 per wk                     | 8   | 47612.5   | 31353.89871    | 96200.00 |                                     |
|                     |   | Total                            | 265 | 4693.9410 | 9952.70508     | 96200.00 |                                     |

| Main Packaging Type | Dependent Variable                          | No. Contrast Procedures per Week | N   | Mean   | Std. Deviation | Maximum | F <sub>overall</sub> with 4, N-5 df |
|---------------------|---|----------------------------------|-----|--------|----------------|---------|-------------------------------------|
|                     | No. of sharps injuries per 1,000 procedures | 1-28                             | 188 | 1.1007 | 2.73080        | 19.23   | 10.786***                           |
|                     |   | 29 - 70                          | 191 | .3243  | .55695         | 3.85    |                                     |
|                     |   | 71-175                           | 162 | .1887  | .36139         | 2.88    |                                     |
|                     |   | 176 - 700                        | 63  | .0784  | .14049         | .96     |                                     |
|                     |   | > 700 per wk                     | 14  | .0166  | .01870         | .05     |                                     |
|                     |   | Total                            | 618 | .4929  | 1.60003        | 19.23   |                                     |
| Polymer bottles     | No. of sharps Incidents, Past 12 months     | 1-28                             | 5   | .2000  | .44721         | 1.00    | .341, ns                            |
|                     |   | 29 - 70                          | 10  | .4000  | .69921         | 2.00    |                                     |
|                     |   | 71-175                           | 14  | .4286  | .64621         | 2.00    |                                     |
|                     |   | 176 - 700                        | 12  | .4167  | .66856         | 2.00    |                                     |
|                     |   | > 700 per wk                     | 1   | 1.0000 | .              | 1.00    |                                     |
|                     |   | Total                            | 42  | .4048  | .62701         | 2.00    |                                     |
|                     | Proportion reporting sharps injuries > 0    | 1-28                             | 5   | .2000  | .44721         | 1.00    | .678, ns                            |
|                     |   | 29 - 70                          | 10  | .3000  | .48305         | 1.00    |                                     |
|                     |   | 71-175                           | 14  | .3571  | .49725         | 1.00    |                                     |
|                     |   | 176 - 700                        | 12  | .3333  | .49237         | 1.00    |                                     |
|                     |   | > 700 per wk                     | 1   | 1.0000 | .              | 1.00    |                                     |
|                     |   | Total                            | 42  | .3333  | .47712         | 1.00    |                                     |

\*, \*\*, \*\*\* P < .05, .01, .001, respectively. ns = not statistically significant at even the .05 level.

| Main Packaging Type (99-100% of time) | Dependent Variable                          | # Contrast Procedures per Week | N  | Mean     | Std. Deviation | Maximum  | F <sub>overall</sub> with 4, N-5 df |
|---------------------------------------|---|--------------------------------|----|----------|----------------|----------|-------------------------------------|
| Polymer bottles (cont'd)              | No. of procedures between sharps injuries   | 1-28                           | 1  | 780.0000 | .              | 780.00   | 19.123***                           |
|                                       |   | 29 - 70                        | 3  | 2080.0   | 687.89534      | 2600.00  |                                     |
|                                       |   | 71-175                         | 5  | 4680.0   | 1482.22805     | 6500.00  |                                     |
|                                       |   | 176 - 700                      | 4  | 19825.0  | 9807.60759     | 31200.00 |                                     |
|                                       |   | > 700 per wk                   | 1  | 52052.0  | .              | 52052.00 |                                     |
|                                       |   | Total                          | 14 | 11555.1  | 14763.87518    | 52052.00 |                                     |
|                                       | No. of sharps injuries per 1,000 procedures | 1-28                           | 5  | .2564    | .57335         | 1.28     | 1.011, ns                           |
|                                       |   | 29 - 70                        | 10 | .1581    | .27330         | .77      |                                     |
|                                       |   | 71-175                         | 14 | .0842    | .12768         | .38      |                                     |
|                                       |   | 176 - 700                      | 12 | .0205    | .03411         | .10      |                                     |
|                                       |   | > 700 per wk                   | 1  | .0192    | .              | .02      |                                     |
|                                       |   | Total                          | 42 | .1026    | .24463         | 1.28     |                                     |
| Prefilled syringes                    | No. of sharps incidents, past 12 months     | 1-28                           | 11 | .0909    | .30151         | 1.00     | .609, ns                            |
|                                       |   | 29 - 70                        | 7  | .2857    | .75593         | 2.00     |                                     |
|                                       |   | 71-175                         | 7  | .1429    | .37796         | 1.00     |                                     |
|                                       |   | 176 - 700                      | 3  | .6667    | 1.15470        | 2.00     |                                     |
|                                       |   | > 700 per wk                   | 1  | .0000    | .              | .00      |                                     |
|                                       |   | Total                          | 29 | .2069    | .55929         | 2.00     |                                     |
|                                       | Proportion reporting sharps injuries > 0    | 1-28                           | 11 | .0909    | .30151         | 1.00     | .882, ns                            |
|                                       |   | 29 - 70                        | 7  | .1429    | .37796         | 1.00     |                                     |
|                                       |   | 71-175                         | 7  | .1429    | .37796         | 1.00     |                                     |
|                                       |   | 176 - 700                      | 3  | .3333    | .57735         | 1.00     |                                     |
|                                       |   | > 700 per wk                   | 1  | .0000    | .              | .00      |                                     |
|                                       |   | Total                          | 29 | .1379    | .35093         | 1.00     |                                     |
|                                       | No. of procedures between sharps injuries   | 1-28                           | 1  | 260.0    | .              | 260.00   | ---                                 |
|                                       |   | 29 - 70                        | 1  | 1820.0   | .              | 1820.00  |                                     |
|                                       |   | 71-175                         | 1  | 5200.0   | .              | 5200.00  |                                     |
|                                       |   | 176 - 700                      | 1  | 5850.0   | .              | 5850.00  |                                     |
|                                       |   | > 700 per wk                   | 0  | .        | .              | .        |                                     |

|  |   |              |    |           |            |         |          |
|--|---|--------------|----|-----------|------------|---------|----------|
|  |   | Total        | 4  | 3282.5000 | 2679.75590 | 5850.00 |          |
|  | No. of sharps injuries per 1,000 procedures | 1-28         | 11 | .3497     | 1.15966    | 3.85    | .894, ns |
|  |   | 29 - 70      | 7  | .0785     | .20767     | .55     |          |
|  |   | 71-175       | 7  | .0275     | .07269     | .19     |          |
|  |   | 176 - 700    | 3  | .0570     | .09869     | .17     |          |
|  |   | > 700 per wk | 1  | .0000     | .          | .00     |          |
|  |   | Total        | 29 | .1641     | .71664     | 3.85    |          |

\*, \*\*, \*\*\* P < .05, .01, .001, respectively. ns = not statistically significant at even the .05 level.

## Injuries From Metal Crimps

| Main Packaging Type<br>(99-100% of time) | Dependent Variable  | No. Contrast Procedures per Week | N   | Mean      | Std. Deviation | Maximum  | F <sub>overall</sub> with 4, N-5 df |
|--|---|----------------------------------|-----|-----------|----------------|----------|-------------------------------------|
| Glass bottles                            | Number of incidents involving metal crimps, past 12 months) | 1-28                             | 181 | .6796     | 1.34043        | 6.00     | 3.066*                              |
|  |   | 29 - 70                          | 188 | 1.8883    | 4.72034        | 48.00    |                                     |
|  |   | 71-175                           | 158 | 2.1076    | 8.36095        | 100.00   |                                     |
|  |   | 176 - 700                        | 61  | 3.0000    | 5.40062        | 25.00    |                                     |
|  |   | > 700 per wk                     | 12  | .0833     | .28868         | 1.00     |                                     |
|  |   | Total                            | 600 | 1.6583    | 5.41607        | 100.00   |                                     |
|  | Injuries from metal crimps reported > 0                     | 1-28                             | 181 | .2873     | .45375         | 1.00     | 5.807***                            |
|  |   | 29 - 70                          | 188 | .4628     | .49994         | 1.00     |                                     |
|  |   | 71-175                           | 158 | .4557     | .49962         | 1.00     |                                     |
|  |   | 176 - 700                        | 61  | .5082     | .50408         | 1.00     |                                     |
|  |   | > 700 per wk                     | 12  | .0833     | .28868         | 1.00     |                                     |
|  |   | Total                            | 600 | .4050     | .49130         | 1.00     |                                     |
|  | No. of procedures between metal-crimp injuries              | 1-28                             | 52  | 497.8     | 336.94351      | 1300.00  | 108.356***                          |
|  |   | 29 - 70                          | 87  | 1154.0    | 793.39426      | 3640.00  |                                     |
|  |   | 71-175                           | 72  | 3100.4    | 2059.01816     | 7800.00  |                                     |
|  |   | 176 - 700                        | 31  | 6310.5    | 5597.66921     | 20800.00 |                                     |
|  |   | > 700 per wk                     | 1   | 41600.0   | .              | 41600.00 |                                     |
|  |   | Total                            | 243 | 2414.5824 | 3894.32534     | 41600.00 |                                     |
|  | No. of injuries from metal crimps per 1,000 procedures      | 1-28                             | 181 | .8975     | 1.83781        | 11.54    | 2.874*                              |
|  |   | 29 - 70                          | 188 | .7997     | 2.02218        | 22.51    |                                     |
|  |   | 71-175                           | 158 | .4265     | 1.97552        | 24.04    |                                     |
|  |   | 176 - 700                        | 61  | .2370     | .46372         | 2.14     |                                     |
|  |   | > 700 per wk                     | 12  | .0020     | .00694         | .02      |                                     |
|  |   | Total                            | 600 | .6577     | 1.84403        | 24.04    |                                     |
| Polymer bottles                          | No. of metal-crimp Incidents, past 12 months)               | 1-28                             | 5   | .4000     | .89443         | 2.00     | .344                                |
|  |   | 29 - 70                          | 13  | 1.4615    | 3.38170        | 12.00    |                                     |
|  |   | 71-175                           | 13  | .0769     | .27735         | 1.00     |                                     |

| Main Packaging Type<br>(99-100% of time) | Dependent Variable                                     | No. Contrast Procedures per Week              | N       | Mean      | Std. Deviation | Maximum  | F <sub>overall</sub> with 4, N-5 df |      |
|--|--|---|---------|-----------|----------------|----------|-------------------------------------|------|
|  |  | 176 - 700                                     | 14      | .6429     | 1.08182        | 3.00     |                                     |      |
|  |  | Total   | 45      | .6889     | 1.96356        | 12.00    |                                     |      |
|  | Injuries from metal crimps reported                    | 1-28  | 5       | .2000     | .44721         | 1.00     | .796                                |      |
|  |  | 29 - 70                                       | 13      | .3077     | .48038         | 1.00     |                                     |      |
|  |  | 71-175  | 13      | .0769     | .27735         | 1.00     |                                     |      |
|  |  | 176 - 700                                     | 14      | .2857     | .46881         | 1.00     |                                     |      |
|  |  | Total   | 45      | .2222     | .42044         | 1.00     |                                     |      |
|  | No. of procedures between injuries from metal crimps   | 1-28  | 1       | 650.0000  | .              | 650.00   | 6.147*                              |      |
|  |  | 29 - 70                                       | 4       | 1007.5000 | 851.64057      | 2080.00  |                                     |      |
|  |  | 71-175  | 1       | 6500.0000 | .              | 6500.00  |                                     |      |
|  |  | 176 - 700                                     | 4       | 7995.0000 | 3445.20440     | 13000.00 |                                     |      |
|  |  | Total   | 10      | 4316.0000 | 4135.46235     | 13000.00 |                                     |      |
|  | No. of injuries from metal crimps per 1,000 procedures | 1-28  | 5       | .3077     | .68802         | 1.54     | 1.966                               |      |
|  |  | 29 - 70                                       | 13      | .5893     | 1.21369        | 3.85     |                                     |      |
|  |  | 71-175  | 13      | .0118     | .04267         | .15      |                                     |      |
|  |  | 176 - 700                                     | 14      | .0400     | .06962         | .19      |                                     |      |
|  |  | Total   | 45      | .2203     | .71482         | 3.85     |                                     |      |
|  | Prefilled syringes                                     | No. of metal-crimp incidents, past 12 months) | 1-28    | 9         | .0000          | .00000   | .00                                 | .621 |
|  |  |   | 29 - 70 | 8         | .1250          | .35355   | 1.00                                |      |
|  |  |   | 71-175  | 7         | .0000          | .00000   | .00                                 |      |
| 176 - 700                                |  |   | 4       | .0000     | .00000         | .00      |                                     |      |
| > 700 per wk                             |  |   | 1       | .0000     | .              | .00      |                                     |      |
| Total                                    |  |   | 29      | .0345     | .18570         | 1.00     |                                     |      |
| Injuries from metal crimps reported >0   |  | 1-28  | 9       | .0000     | .00000         | .00      | .621                                |      |
|  |  | 29 - 70                                       | 8       | .1250     | .35355         | 1.00     |                                     |      |
|  |  | 71-175  | 7       | .0000     | .00000         | .00      |                                     |      |
|  |  | 176 - 700                                     | 4       | .0000     | .00000         | .00      |                                     |      |
|  |  | > 700 per wk                                  | 1       | .0000     | .              | .00      |                                     |      |

| Main Packaging Type<br>(99-100% of time) | Dependent Variable                                     | No. Contrast Procedures per Week | N  | Mean  | Std. Deviation | Maximum | F <sub>overall</sub> with 4, N-5 df |
|--|--|----------------------------------|----|-------|----------------|---------|-------------------------------------|
|  |  | Total                            | 29 | .0345 | .18570         | 1.00    |                                     |
|  | No. of injuries from metal crimps per 1,000 procedures | 1-28                             | 9  | .0000 | .00000         | .00     | .652                                |
|  |  | 29 - 70                          | 8  | .0343 | .09713         | .27     |                                     |
|  |  | 71-175                           | 7  | .0000 | .00000         | .00     |                                     |
|  |  | 176 - 700                        | 4  | .0000 | .00000         | .00     |                                     |
|  |  | > 700 per wk                     | 1  | .0000 | .              | .00     |                                     |
|  |  | Total                            | 29 | .0095 | .05102         | .27     |                                     |

\*, \*\*, \*\*\* P < .05, .01, .001, respectively.

### Using Hemostat to Open Contrast Media Bottles

| Main Packaging Type (99-100% of time) | Dependent Variable  | No. of Contrast Procedures per Week | N   | Mean       | Std. Deviation | Maximum  | F <sub>overall with 4, N-5 df</sub> |
|---------------------------------------|---|-------------------------------------|-----|------------|----------------|----------|-------------------------------------|
| Glass bottles                         | Number of Incidents in which hemostat used to open contrast bottles, past 12 months | 1-28                                | 176 | 7.6591     | 15.62563       | 100.00   | 2.084r                              |
|                                       |   | 29 - 70                             | 191 | 27.3848    | 90.92246       | 1000.00  |                                     |
|                                       |   | 71-175                              | 159 | 41.5755    | 183.16432      | 2000.00  |                                     |
|                                       |   | 176 - 700                           | 59  | 31.4576    | 60.41989       | 300.00   |                                     |
|                                       |   | > 700 per wk                        | 10  | 15.8000    | 33.72042       | 100.00   |                                     |
|                                       |   | Total                               | 595 | 25.5513    | 110.37886      | 2000.00  |                                     |
|                                       | Reports of hemostat used to open bottle   | 1-28                                | 176 | .5795      | .49504         | 1.00     | 5.094***                            |
|                                       |   | 29 - 70                             | 191 | .7435      | .43787         | 1.00     |                                     |
|                                       |   | 71-175                              | 160 | .7125      | .45402         | 1.00     |                                     |
|                                       |   | 176 - 700                           | 59  | .7966      | .40598         | 1.00     |                                     |
|                                       |   | > 700 per wk                        | 10  | .4000      | .51640         | 1.00     |                                     |
|                                       |   | Total                               | 596 | .6862      | .46441         | 1.00     |                                     |
|                                       | No. of procedures between uses of hemostat to open bottle                           | 1-28                                | 102 | 197.5897   | 233.31174      | 1456.00  | 38.708***                           |
|                                       |   | 29 - 70                             | 142 | 456.3966   | 599.61208      | 3640.00  |                                     |
|                                       |   | 71-175                              | 113 | 1096.4468  | 1482.39821     | 7800.00  |                                     |
|                                       |   | 176 - 700                           | 47  | 2545.7230  | 3535.18778     | 15600.00 |                                     |
|                                       |   | > 700 per wk                        | 4   | 42190.0000 | 75962.76544    | 156000.0 |                                     |
|                                       |   | Total                               | 408 | 1218.7989  | 7864.97532     | 156000.0 |                                     |
|                                       | No. of uses of hemostat to open bottle per 1,000 procedures                         | 1-28                                | 176 | 11.3460    | 22.31261       | 128.21   | 1.290                               |
|                                       |   | 29 - 70                             | 191 | 11.2455    | 34.42241       | 384.62   |                                     |
|                                       |   | 71-175                              | 159 | 8.6474     | 42.08770       | 480.77   |                                     |
|                                       |   | 176 - 700                           | 59  | 2.3402     | 4.67019        | 25.00    |                                     |
|                                       |   | > 700 per wk                        | 10  | .1748      | .39671         | 1.25     |                                     |
|                                       |   | Total                               | 595 | 9.5118     | 31.74473       | 480.77   |                                     |

|                    |  |              |    |            |             |          |           |
|--------------------|--|--------------|----|------------|-------------|----------|-----------|
| Polymer bottles    | No. of Incidents in which hemostat used to open contrast bottles, past 12 months | 1-28         | 5  | 2.4000     | 2.30217     | 5.00     | 1.389     |
|                    |  | 29 - 70      | 14 | 6.8571     | 13.89996    | 50.00    |           |
|                    |  | 71-175       | 14 | 1.8571     | 5.33288     | 20.00    |           |
|                    |  | 176 - 700    | 14 | 16.6429    | 29.05858    | 100.00   |           |
|                    |  | > 700 per wk | 1  | 1.0000     | .           | 1.00     |           |
|                    |  | Total        | 48 | 7.6667     | 18.26091    | 100.00   |           |
|                    | Reports of hemostat to open bottles > 0  | 1-28         | 5  | .6000      | .54772      | 1.00     | .987      |
|                    |  | 29 - 70      | 14 | .4286      | .51355      | 1.00     |           |
|                    |  | 71-175       | 14 | .2857      | .46881      | 1.00     |           |
|                    |  | 176 - 700    | 14 | .5714      | .51355      | 1.00     |           |
|                    |  | > 700 per wk | 1  | 1.0000     | .           | 1.00     |           |
|                    |  | Total        | 48 | .4583      | .50353      | 1.00     |           |
|                    | No. of procedures between uses of hemostat to open bottle                        | 1-28         | 3  | 260.       | .00000      | 260.00   | 19.503*** |
|                    |  | 29 - 70      | 6  | 436.5      | 411.42545   | 1040.00  |           |
|                    |  | 71-175       | 4  | 3708.2     | 3442.83879  | 7800.00  |           |
|                    |  | 176 - 700    | 8  | 4699.5000  | 8353.45128  | 24700.00 |           |
|                    |  | > 700 per wk | 1  | 52000.0000 | .           | 52000.00 |           |
|                    |  | Total        | 22 | 4901.2758  | 11818.88047 | 52000.00 |           |
|                    | No. of uses of hemostat to open bottle per 1,000 procedures                      | 1-28         | 5  | 2.3077     | 2.10663     | 3.85     | 1.362     |
|                    |  | 29 - 70      | 14 | 2.8732     | 5.29069     | 16.03    |           |
|                    |  | 71-175       | 14 | .4103      | 1.27670     | 4.81     |           |
|                    |  | 176 - 700    | 14 | .8603      | 1.35578     | 3.85     |           |
|                    |  | > 700 per wk | 1  | .0192      | .           | .02      |           |
|                    |  | Total        | 48 | 1.4494     | 3.19844     | 16.03    |           |
| Prefilled syringes | No. of incidents in which hemostat used to open contrast bottles, past 12 months | 1-28         | 10 | .2000      | .63246      | 2.00     | .333      |
|                    |  | 29 - 70      | 8  | .6250      | 1.76777     | 5.00     |           |
|                    |  | 71-175       | 8  | 1.2500     | 3.53553     | 10.00    |           |
|                    |  | 176 - 700    | 4  | .2500      | .50000      | 1.00     |           |
|                    |  | > 700 per wk | 1  | .0000      | .           | .00      |           |
|                    |  | Total        | 31 | .5806      | 1.99623     | 10.00    |           |

|  |   |              |    |            |            |          |                                      |
|--|---|--------------|----|------------|------------|----------|--------------------------------------|
|  | Reports of hemostat to open > 0                             | 1-28         | 10 | .1000      | .31623     | 1.00     | .160                                 |
|  |   | 29 - 70      | 8  | .1250      | .35355     | 1.00     |                                      |
|  |   | 71-175       | 8  | .1250      | .35355     | 1.00     |                                      |
|  |   | 176 - 700    | 4  | .2500      | .50000     | 1.00     |                                      |
|  |   | > 700 per wk | 1  | .0000      | .          | .00      |                                      |
|  |   | Total        | 31 | .1290      | .34078     | 1.00     |                                      |
|  | No. of procedures between uses of hemostat to open bottle   | 1-28         | 1  | 130.0000   | .          | 130.00   | Too few facilities with incidents >0 |
|  |   | 29 - 70      | 1  | 728.0000   | .          | 728.00   |                                      |
|  |   | 71-175       | 1  | 520.0000   | .          | 520.00   |                                      |
|  |   | 176 - 700    | 1  | 10920.0000 | .          | 10920.00 |                                      |
|  |   | > 700 per wk | 0  | .          | .          | .        |                                      |
|  |   | Total        | 4  | 3074.5000  | 5236.20355 | 10920.00 |                                      |
|  | No. of uses of hemostat to open bottle per 1,000 procedures | 1-28         | 10 | .7692      | 2.43252    | 7.69     | .297                                 |
|  |   | 29 - 70      | 8  | .1717      | .48565     | 1.37     |                                      |
|  |   | 71-175       | 8  | .2404      | .67991     | 1.92     |                                      |
|  |   | 176 - 700    | 4  | .0229      | .04579     | .09      |                                      |
|  |   | > 700 per wk | 1  | .0000      | .          | .00      |                                      |
|  |   | Total        | 31 | .3574      | 1.42366    | 7.69     |                                      |

\*, \*\*, \*\*\* P < .05, .01, .001, respectively.

**Contrast Bottles Set Aside (Because of Difficulty Opening)**

| Main Packaging Type (99-100% of time) | Dependent Variable  | No. Contrast Procedures per Week  | N      | Mean    | Std. Deviation | Maximum   | F <sub>overall</sub> with 4, N-5 df |
|---------------------------------------|---|---|--------|---------|----------------|-----------|-------------------------------------|
| Glass bottles                         | Number of contrast bottles set aside (incidents), past 12 months    | 1-28  | 176    | 1.3324  | 4.39533        | 50.00     | .999                                |
|                                       |   | 29 - 70   | 183    | 3.8115  | 7.67712        | 52.00     |                                     |
|                                       |   | 71-175  | 149    | 18.5839 | 163.85537      | 2000.00   |                                     |
|                                       |   | 176 - 700   | 58     | 6.2931  | 15.04031       | 100.00    |                                     |
|                                       |   | > 700 per wk  | 11     | .8182   | 1.83402        | 5.00      |                                     |
|                                       |   | Total   | 577    | 7.0624  | 83.63051       | 2000.00   |                                     |
|                                       |   | Reported instances set aside > 0  | 1-28   | 176     | .2670          | .44368    |                                     |
|                                       | 29 - 70   |   | 183    | .4317   | .49667         | 1.00      |                                     |
|                                       | 71-175  |   | 149    | .4966   | .50168         | 1.00      |                                     |
|                                       | 176 - 700   |   | 58     | .5172   | .50407         | 1.00      |                                     |
|                                       | > 700 per wk  |   | 11     | .1818   | .40452         | 1.00      |                                     |
|                                       | Total   |   | 577    | .4021   | .49074         | 1.00      |                                     |
|                                       | No. of procedures between times set aside due to difficulty opening |   | 1-28   | 47      | 298.5          | 265.72196 | 1040.00                             |
|                                       |   | 29 - 70   | 79     | 681.2   | 656.84482      | 2600.00   |                                     |
|                                       |   | 71-175  | 74     | 1858.3  | 1869.75772     | 7800.00   |                                     |
|                                       |   | 176 - 700   | 30     | 4396.2  | 4649.24062     | 15600.00  |                                     |
|                                       |   | > 700 per wk  | 2      | 31200.0 | 29415.64210    | 52000.00  |                                     |
|                                       |   | Total   | 232    | 1722.6  | 4118.83598     | 52000.00  |                                     |
|                                       |   | No. of times bottles set aside due to difficulty opening per 1,000 procedures | 1-28   | 176     | 1.9726         | 4.98614   | 38.46                               |
|                                       | 29 - 70   |   | 183    | 1.7143  | 3.36574        | 16.48     |                                     |
|                                       | 71-175  |   | 149    | 4.2048  | 39.38638       | 480.77    |                                     |
| 176 - 700                             | 58  |   | .4475  | 1.04927 | 6.41           |           |                                     |
| > 700 per wk                          | 11  |   | .0105  | .02899  | .10            |           |                                     |
| Total                                 | 577   |   | 1.8419 | 10.8073 | 520.00         |           |                                     |

| Main Packaging Type (99-100% of time) | Dependent Variable   | No. Contrast Procedures per Week | N   | Mean      | Std. Deviation | Maximum | F <sub>overall</sub> with 4, N-5 <i>df</i> |
|---------------------------------------|--|----------------------------------|-----|-----------|----------------|---------|--|
|                                       |  | Total                            | 577 | 2.2764    | 20.28205       | 480.77  |  |
| Polymer bottles                       | Number of contrast bottles set aside (incidents), past 12 Months                 | 1-28                             | 5   | .0000     | .00000         | .00     | 1.296                                      |
|                                       |  | 29 - 70                          | 13  | 2.8462    | 3.86967        | 10.00   |  |
|                                       |  | 71-175                           | 12  | 1.0833    | 1.67649        | 5.00    |  |
|                                       |  | 176 - 700                        | 11  | 2.9091    | 5.00908        | 12.00   |  |
|                                       |  | Total                            | 41  | 2.0000    | 3.57071        | 12.00   |  |
|                                       | Reported instances set aside > 0   | 1-28                             | 5   | .0000     | .00000         | .00     | 1.318                                      |
|                                       |  | 29 - 70                          | 13  | .4615     | .51887         | 1.00    |  |
|                                       |  | 71-175                           | 12  | .4167     | .51493         | 1.00    |  |
|                                       |  | 176 - 700                        | 11  | .2727     | .46710         | 1.00    |  |
|                                       |  | Total                            | 41  | .3415     | .48009         | 1.00    |  |
|                                       | No. of procedures between times set aside due to difficulty opening              | 1-28                             | 0   | .         | .              | .       | 3.294                                      |
|                                       |  | 29 - 70                          | 6   | 525.7778  | 347.47461      | 1040.00 |  |
|                                       |  | 71-175                           | 5   | 3085.3333 | 2568.46431     | 6500.00 |  |
|                                       |  | 176 - 700                        | 3   | 1762.2222 | 1195.66501     | 3120.00 |  |
|                                       |  | Total                            | 14  | 1704.8571 | 1916.14139     | 6500.00 |  |
|                                       | No. of contrast bottles set aside due to difficulty opening per 1,000 procedures | 1-28                             | 5   | .0000     | .00000         | .00     | 2.907*                                     |
|                                       |  | 29 - 70                          | 13  | 1.3018    | 1.94157        | 6.41    |  |
|                                       |  | 71-175                           | 12  | .2332     | .36238         | .96     |  |
|                                       |  | 176 - 700                        | 11  | .2040     | .39600         | 1.15    |  |
|                                       |  | Total                            | 41  | .5357     | 1.22088        | 6.41    |  |

|                    |   |                                  |   |        |         |        |      |
|--------------------|---|----------------------------------|---|--------|---------|--------|------|
| Prefilled syringes | No. of contrast bottles set aside (incidents), past 12 months | 1-28                             | 12  | .0000  | .00000  | .00    | .689 |
|                    |   | 29 - 70                          | 7   | .0000  | .00000  | .00    |      |
|                    |   | 71-175                           | 8   | 1.8750 | 5.30330 | 15.00  |      |
|                    |   | 176 - 700                        | 3   | .0000  | .00000  | .00    |      |
|                    |   | > 700 per wk                     | 1   | .0000  | .       | .00    |      |
|                    |   | Total                            | 31  | .4839  | 2.69408 | 15.00  |      |
|                    |   | Reported instances set aside > 0 | 1-28  | 12     | .0000   | .00000 |      |
|                    | 29 - 70   |                                  | 7   | .0000  | .00000  | .00    |      |
|                    | 71-175  |                                  | 8   | .1250  | .35355  | 1.00   |      |
|                    | 176 - 700   |                                  | 3   | .0000  | .00000  | .00    |      |
|                    | > 700 per wk  |                                  | 1   | .0000  | .       | .00    |      |
|                    | Total   |                                  | 31  | .0323  | .17961  | 1.00   |      |
|                    | No. of procedures between times set aside                     |                                  | Only one facility using only prefilled syringes reported > 0 set aside. |        |         |        |      |
|                    |   | Total                            | 1   | 346.7  | ---     |        |      |
|                    | No. set aside due to difficulty opening per 1,000 procedures  | 1-28                             | 12  | .0000  | .00000  | .00    | .689 |
|                    |   | 29 - 70                          | 7   | .0000  | .00000  | .00    |      |
|                    |   | 71-175                           | 8   | .3606  | 1.01987 | 2.88   |      |
|                    |   | 176 - 700                        | 3   | .0000  | .00000  | .00    |      |
|                    |   | > 700 per wk                     | 1   | .0000  | .       | .00    |      |
|                    |   | Total                            | 31  | .0931  | .51809  | 2.88   |      |

\*, \*\*, \*\*\* P < .05, .01, .001, respectively.

### Contrast Media Bottle Breakages

| Main Packaging Type<br>(99-100% of time) | Dependent Variable   | No. of Contrast Procedures per Week | N   | Mean       | Std. Deviation | Maximum  | F <sub>overall</sub> with 4, N-5 df |
|--|--|-------------------------------------|-----|------------|----------------|----------|-------------------------------------|
| Glass bottles                            | No. of broken-contrast-bottle incidents, past 12 months            | 1-28                                | 177 | .5198      | 1.12356        | 6.00     | 7.940***                            |
|  |  | 29 - 70                             | 190 | 1.7421     | 3.14244        | 25.00    |                                     |
|  |  | 71-175                              | 160 | 2.1313     | 3.92239        | 24.00    |                                     |
|  |  | 176 - 700                           | 59  | 2.3220     | 3.36534        | 16.00    |                                     |
|  |  | > 700 per wk                        | 9   | 1.5556     | 3.24465        | 10.00    |                                     |
|  |  | Total                               | 595 | 1.5378     | 3.05943        | 25.00    |                                     |
|  | Proportion reporting incidents of broken contrast bottles >0       | 1-28                                | 177 | .2712      | .44583         | 1.00     | 12.920***                           |
|  |  | 29 - 70                             | 190 | .5474      | .49907         | 1.00     |                                     |
|  |  | 71-175                              | 160 | .5750      | .49590         | 1.00     |                                     |
|  |  | 176 - 700                           | 59  | .6610      | .47743         | 1.00     |                                     |
|  |  | > 700 per wk                        | 9   | .4444      | .52705         | 1.00     |                                     |
|  |  | Total                               | 595 | .4824      | .50011         | 1.00     |                                     |
|  | No. of procedures between contrast bottle breakages                | 1-28                                | 48  | 574.1667   | 323.14397      | 1300.00  | 120.028***                          |
|  |  | 29 - 70                             | 104 | 1503.6333  | 1025.88129     | 3640.00  |                                     |
|  |  | 71-175                              | 92  | 3151.9852  | 2081.52301     | 9100.00  |                                     |
|  |  | 176 - 700                           | 39  | 8426.3333  | 6633.47923     | 31200.00 |                                     |
|  |  | > 700 per wk                        | 4   | 43225.0000 | 29288.49319    | 78000.00 |                                     |
|  |  | Total                               | 287 | 3398.7718  | 6701.82380     | 78000.00 |                                     |
|  | No. of contrast bottle breakages per 1,000 procedures              | 1-28                                | 177 | .7119      | 1.56190        | 9.62     | 4.347**                             |
|  |  | 29 - 70                             | 190 | .7861      | 1.47201        | 12.02    |                                     |
|  |  | 71-175                              | 160 | .4173      | .87068         | 6.15     |                                     |
|  |  | 176 - 700                           | 59  | .1626      | .23686         | 1.28     |                                     |
|  |  | > 700 per wk                        | 9   | .0236      | .04984         | .15      |                                     |
|  |  | Total                               | 595 | .5915      | 1.29169        | 12.02    |                                     |
| Polymer bottles                          | No. of incidents involving broken contrast bottles, past 12 months | 1-28                                | 5   | .4000      | .54772         | 1.00     | .588                                |
|  |  | 29 - 70                             | 11  | 1.0909     | 2.98176        | 10.00    |                                     |
|  |  | 71-175                              | 14  | .2143      | .80178         | 3.00     |                                     |

| Main Packaging Type<br>(99-100% of time) | Dependent Variable   | No. of Contrast Procedures per Week | N     | Mean    | Std. Deviation | Maximum  | F <sub>overall</sub> with 4, N-5 df |
|--|--|-------------------------------------|-------|---------|----------------|----------|-------------------------------------|
|  |  | 176 - 700                           | 12    | .2500   | .62158         | 2.00     |                                     |
|  |  | > 700 per wk                        | 2     | .0000   | .00000         | .00      |                                     |
|  |  | Total                               | 44    | .4545   | 1.59147        | 10.00    |                                     |
|  | Reports of broken bottles > 0                                      | 1-28                                | 5     | .4000   | .54772         | 1.00     | .927                                |
|  |  | 29 - 70                             | 11    | .2727   | .46710         | 1.00     |                                     |
|  |  | 71-175                              | 14    | .0714   | .26726         | 1.00     |                                     |
|  |  | 176 - 700                           | 12    | .1667   | .38925         | 1.00     |                                     |
|  |  | > 700 per wk                        | 2     | .0000   | .00000         | .00      |                                     |
|  |  | Total                               | 44    | .1818   | .39015         | 1.00     |                                     |
|  | No. of procedures between contrast bottle breakages                | 1-28                                | 2     | 1040.0  | 367.69553      | 1300.00  | 13.106*                             |
|  |  | 29 - 70                             | 3     | 1664.0  | 1199.38651     | 2600.00  |                                     |
|  |  | 71-175                              | 1     | 1733.3  | .              | 1733.33  |                                     |
|  |  | 176 - 700                           | 2     | 20800.0 | 7353.91052     | 26000.00 |                                     |
|  |  | > 700 per wk                        | 0     | .       | .              | .        |                                     |
|  |  | Total                               | 8     | 6300.7  | 9398.01943     | 26000.00 |                                     |
|  | No. of contrast bottle breakages per 1,000 procedures              | 1-28                                | 5     | .4103   | .59030         | 1.28     | 1.187                               |
|  |  | 29 - 70                             | 11    | .3700   | .95633         | 3.21     |                                     |
|  |  | 71-175                              | 14    | .0412   | .15419         | .58      |                                     |
|  |  | 176 - 700                           | 12    | .0085   | .02070         | .06      |                                     |
|  |  | > 700 per wk                        | 2     | .0000   | .00000         | .00      |                                     |
| Total                                    |  | 44                                  | .1546 | .53210  | 3.21           |          |                                     |
| Prefilled syringes                       | No. of incidents involving broken contrast bottles, past 12 months | 1-28                                | 12    | .0000   | .00000         | .00      | .732                                |
|  |  | 29 - 70                             | 8     | .2500   | .46291         | 1.00     |                                     |
|  |  | 71-175                              | 7     | .2857   | .75593         | 2.00     |                                     |
|  |  | 176 - 700                           | 3     | .0000   | .00000         | .00      |                                     |
|  |  | > 700 per wk                        | 1     | .0000   | .              | .00      |                                     |
|  |  | Total                               | 31    | .1290   | .42755         | 2.00     |                                     |
|  | Reports of broken bottles > 0                                      | 1-28                                | 12    | .0000   | .00000         | .00      | .972                                |
|  |  | 29 - 70                             | 8     | .2500   | .46291         | 1.00     |                                     |

| Main Packaging Type<br>(99-100% of time) | Dependent Variable                                    | No. of Contrast Procedures per Week | N  | Mean      | Std. Deviation | Maximum | F <sub>overall</sub> with 4, N-5 df   |
|--|---|-------------------------------------|----|-----------|----------------|---------|---------------------------------------|
|  |   | 71-175                              | 7  | .1429     | .37796         | 1.00    |                                       |
|  |   | 176 - 700                           | 3  | .0000     | .00000         | .00     |                                       |
|  |   | > 700 per wk                        | 1  | .0000     | .              | .00     |                                       |
|  |   | Total                               | 31 | .0968     | .30054         | 1.00    |                                       |
|  | No. of procedures between contrast bottle breakages   | 1-28                                | 0  | .         | .              | .       | Too few facilities with breakages > 0 |
|  |   | 29 - 70                             | 2  | 3250.0000 | 551.54329      | 3640.00 |                                       |
|  |   | 71-175                              | 1  | 1950.0000 | .              | 1950.00 |                                       |
|  |   | 176 - 700                           | 0  | .         | .              | .       |                                       |
|  |   | > 700 per wk                        | 0  | .         | .              | .       |                                       |
|  |   | Total                               | 3  | 2816.6667 | 845.83292      | 3640.00 |                                       |
|  | No. of contrast bottle breakages per 1,000 procedures | 1-28                                | 12 | .0000     | .00000         | .00     | .774                                  |
|  |   | 29 - 70                             | 8  | .0780     | .14590         | .35     |                                       |
|  |   | 71-175                              | 7  | .0733     | .19383         | .51     |                                       |
|  |   | 176 - 700                           | 3  | .0000     | .00000         | .00     |                                       |
|  |   | > 700 per wk                        | 1  | .0000     | .              | .00     |                                       |
|  |   | Total                               | 31 | .0367     | .11818         | .51     |                                       |

<sup>a</sup> , \*\* . \*\*\* P < .05, .01, .001, respectively.

### Work-Area Injuries from Broken Contrast Media Bottles

| Main Packaging Type (99-100% of time) | Dependent Variable  | No. Contrast Procedures per Week | N  | Mean      | Std. Deviation | Maximum  | F <sub>overall</sub> with 4, N-5 df |
|---------------------------------------|---|----------------------------------|--|-----------|----------------|----------|-------------------------------------|
| Glass bottles                         | Number of work-area injuries from broken contrast bottles, past 12 months | 1-28                             | 179  | .0000     | .00000         | .00      | 2.090                               |
|                                       |   | 29 - 70                          | 188  | .0426     | .22728         | 2.00     |                                     |
|                                       |   | 71-175                           | 151  | .0596     | .43561         | 5.00     |                                     |
|                                       |   | 176 - 700                        | 57   | .2105     | 1.33278        | 10.00    |                                     |
|                                       |   | > 700 per wk                     | 13   | .0000     | .00000         | .00      |                                     |
|                                       |   | Total                            | 588  | .0493     | .48761         | 10.00    |                                     |
|                                       | Reports of work-area injuries from broken bottles > 0                     | 1-28                             | 179  | .0000     | .00000         | .00      | 2.037                               |
|                                       |   | 29 - 70                          | 188  | .0372     | .18984         | 1.00     |                                     |
|                                       |   | 71-175                           | 151  | .0331     | .17953         | 1.00     |                                     |
|                                       |   | 176 - 700                        | 57   | .0526     | .22528         | 1.00     |                                     |
|                                       |   | > 700 per wk                     | 13   | .0000     | .00000         | .00      |                                     |
|                                       |   | Total                            | 588  | .0255     | .15780         | 1.00     |                                     |
|                                       | No. of procedures between work-area injuries from broken bottles          | 1-28                             | 0  | .         | .              | .        | 6.013*                              |
|                                       |   | 29 - 70                          | 7  | 1931.4    | 685.55157      | 2860.00  |                                     |
|                                       |   | 71-175                           | 5  | 4430.4    | 2391.54778     | 7280.00  |                                     |
|                                       |   | 176 - 700                        | 3  | 10790.0   | 8331.16438     | 15600.00 |                                     |
|                                       |   | > 700 per wk                     | 0  | .         | .              | .        |                                     |
|                                       |   | Total                            | 15   | 4536.1333 | 4850.58420     | 15600.00 |                                     |
|                                       | No. of work-area injuries from broken bottles per 1,000 procedures        | 1-28                             | 179  | .0000     | .00000         | .00      | 1.365                               |
|                                       |   | 29 - 70                          | 188  | .0225     | .12801         | 1.28     |                                     |
|                                       |   | 71-175                           | 151  | .0132     | .10274         | 1.20     |                                     |
| 176 - 700                             |   | 57                               | .0172  | .11353    | .85            |          |                                     |
| > 700 per wk                          |   | 13                               | .0000  | .00000    | .00            |          |                                     |
| Total                                 |   | 588                              | .0123  | .09609    | 1.28           |          |                                     |
| Polymer bottles                       | Number of work-area injuries from broken contrast bottles, past 12 months | 1-28                             | Only one report of injury from broken bottle in facilities using only polymer bottles, so no way to assess relationship to no. of procedures per week. |           |                |          | ---                                 |
|                                       |   | 29 - 70                          |  |           |                |          |                                     |
|                                       |   | 71-175                           |  |           |                |          |                                     |

|                    |  |      |   |     |
|--------------------|--|------|---|-----|
|                    | Reports of work-area injuries from broken bottles > 0                  | 1-28 |   |     |
|                    | No. of work-area injuries from broken bottles per 1,000 procedures     | 1-28 |   |     |
| Prefilled syringes | No. of work-area injuries from broken contrast bottles, past 12 months | 1-28 | No reports of injuries from broken bottles in facilities using only prefilled syringes. | --- |

<sup>a</sup>, \*\*, \*\*\* P < .05, .01, .001, respectively.

### Outside-Area Injuries from Broken Contrast-Media Bottles

| Main Packaging Type<br>(99-100% of time) | Dependent Variable   | No. of Contrast Procedures per Week | N     | Mean       | Std. Deviation | Maximum  | F <sub>overall</sub> with 4, N-5 df  |
|--|--|-------------------------------------|-------|------------|----------------|----------|--------------------------------------|
| Glass bottles                            | Number of outside-area injuries from broken contrast bottles, past 12 months | 1-28                                | 151   | .0066      | .08138         | 1.00     | .585                                 |
|  |  | 29 - 70                             | 164   | .0305      | .20496         | 2.00     |                                      |
|  |  | 71-175                              | 129   | .0155      | .12403         | 1.00     |                                      |
|  |  | 176 - 700                           | 49    | .0204      | .14286         | 1.00     |                                      |
|  |  | > 700 per wk                        | 13    | .0000      | .00000         | .00      |                                      |
|  |  | Total                               | 506   | .0178      | .14651         | 2.00     |                                      |
|  | Injuries outside work area from broken bottles > 0                           | 1-28                                | 151   | .0066      | .08138         | 1.00     | .465                                 |
|  |  | 29 - 70                             | 164   | .0244      | .15473         | 1.00     |                                      |
|  |  | 71-175                              | 129   | .0155      | .12403         | 1.00     |                                      |
|  |  | 176 - 700                           | 49    | .0204      | .14286         | 1.00     |                                      |
|  |  | > 700 per wk                        | 13    | .0000      | .00000         | .00      |                                      |
|  |  | Total                               | 506   | .0158      | .12486         | 1.00     |                                      |
|  | No. of procedures between outside-area injuries from broken bottles          | 1-28                                | 1     | 780.0000   | .              | 780.00   | Too few facilities with injuries > 0 |
|  |  | 29 - 70                             | 4     | 1820.0000  | 765.41928      | 2600.00  |                                      |
|  |  | 71-175                              | 2     | 4160.0000  | .00000         | 4160.00  |                                      |
|  |  | 176 - 700                           | 1     | 15600.0000 | .              | 15600.00 |                                      |
|  |  | > 700 per wk                        | 0     | .          | .              | .        |                                      |
|  |  | Total                               | 8     | 3997.5000  | 4866.01553     | 15600.00 |                                      |
|  | No. of outside-area injuries from broken bottles per 1,000 procedures        | 1-28                                | 151   | .0085      | .10433         | 1.28     | .518                                 |
|  |  | 29 - 70                             | 164   | .0164      | .11828         | 1.28     |                                      |
|  |  | 71-175                              | 129   | .0037      | .02981         | .24      |                                      |
| 176 - 700                                |  | 49                                  | .0013 | .00916     | .06            |          |                                      |
| > 700 per wk                             |  | 13                                  | .0000 | .00000     | .00            |          |                                      |
| Total                                    |  | 506                                 | .0089 | .08953     | 1.28           |          |                                      |

| Main Packaging Type<br>(99-100% of time) | Dependent Variable   | No. of Contrast Procedures per Week   | N | Mean | Std. Deviation | Maximum | F <sub>overall</sub> with 4, N-5 df |
|--|--|---|---|------|----------------|---------|-------------------------------------|
| Polymer bottles                          | Number of outside-area injuries from broken contrast bottles, past 12 months       | No reports of injuries from broken contrast bottles in facilities using only polymer bottles. |   |      |                |         | ---                                 |
| Prefilled syringes                       | Number of Outside-Area Injuries from Broken Contrast Media bottles, Past 12 Months | No reports of such injuries from facilities using only prefilled syringes.                    |   |      |                |         | ---                                 |

<sup>a</sup>\*, \*\*, \*\*\* P < .05, .01, .001, respectively.

**Back Strain Injuries (from carrying contrast media bottles)**

| Main Packaging Type (99-100% of time) | Dependent Variable  | No. of Contrast Procedures per Week | N     | Mean      | Std. Deviation | Maximum  | F <sub>overall</sub> with 4, N-5 df  |
|---------------------------------------|---|-------------------------------------|-------|-----------|----------------|----------|--------------------------------------|
| Glass bottles                         | No. of back strain Incidents (from carrying contrast bottles), past 12 months | 1-28                                | 178   | .0000     | .00000         | .00      | 1.319                                |
|                                       |   | 29 - 70                             | 187   | .0107     | .10314         | 1.00     |                                      |
|                                       |   | 71-175                              | 143   | .0280     | .26388         | 3.00     |                                      |
|                                       |   | 176 - 700                           | 56    | .0536     | .29663         | 2.00     |                                      |
|                                       |   | > 700 per wk                        | 14    | .0000     | .00000         | .00      |                                      |
|                                       |   | Total                               | 578   | .0156     | .17094         | 3.00     |                                      |
|                                       | Reports of back strain > 0  | 1-28                                | 178   | .0000     | .00000         | .00      | 1.426                                |
|                                       |   | 29 - 70                             | 187   | .0107     | .10314         | 1.00     |                                      |
|                                       |   | 71-175                              | 143   | .0140     | .11785         | 1.00     |                                      |
|                                       |   | 176 - 700                           | 56    | .0357     | .18726         | 1.00     |                                      |
|                                       |   | > 700 per wk                        | 14    | .0000     | .00000         | .00      |                                      |
|                                       |   | Total                               | 578   | .0104     | .10144         | 1.00     |                                      |
|                                       | No. of procedures between back-strain injuries                                | 1-28                                | 0     | .         | .              | .        | Too few facilities with injuries > 0 |
|                                       |   | 29 - 70                             | 2     | 2340.0    | 367.69553      | 2600.00  |                                      |
|                                       |   | 71-175                              | 2     | 3293.3    | 2696.43386     | 5200.00  |                                      |
|                                       |   | 176 - 700                           | 2     | 11063.0   | 2739.33167     | 13000.00 |                                      |
|                                       |   | > 700 per wk                        | 0     | .         | .              | .        |                                      |
|                                       |   | Total                               | 6     | 5565.4444 | 4614.93422     | 13000.00 |                                      |
|                                       | No. of back-strain injuries per 1,000 procedures                              | 1-28                                | 178   | .0000     | .00000         | .00      | .574                                 |
|                                       |   | 29 - 70                             | 187   | .0046     | .04491         | .48      |                                      |
|                                       |   | 71-175                              | 143   | .0064     | .06230         | .72      |                                      |
| 176 - 700                             |   | 56                                  | .0033 | .01774    | .11            |          |                                      |
| > 700 per wk                          |   | 14                                  | .0000 | .00000    | .00            |          |                                      |
| Total                                 |   | 578                                 | .0034 | .04052    | .72            |          |                                      |

|                    |   |  |    |           |            |         |                                      |
|--------------------|---|--|----|-----------|------------|---------|--------------------------------------|
| Polymer bottles    | No. of back-strain Incidents (from carrying contrast bottles), past 12 months | 1-28   | 5  | .0000     | .00000     | .00     | .575                                 |
|                    |   | 29 - 70  | 11 | .9091     | 3.01511    | 10.00   |                                      |
|                    |   | 71-175   | 14 | .0714     | .26726     | 1.00    |                                      |
|                    |   | 176 - 700  | 13 | .1538     | .55470     | 2.00    |                                      |
|                    |   | > 700 per wk   | 1  | .0000     | .          | .00     |                                      |
|                    |   | Total  | 44 | .2955     | 1.53380    | 10.00   |                                      |
|                    | Reports of back strain > 0  | 1-28   | 5  | .0000     | .00000     | .00     | .123                                 |
|                    |   | 29 - 70  | 11 | .0909     | .30151     | 1.00    |                                      |
|                    |   | 71-175   | 14 | .0714     | .26726     | 1.00    |                                      |
|                    |   | 176 - 700  | 13 | .0769     | .27735     | 1.00    |                                      |
|                    |   | > 700 per wk   | 1  | .0000     | .          | .00     |                                      |
|                    |   | Total  | 44 | .0682     | .25497     | 1.00    |                                      |
|                    | No. of procedures between back-strain injuries                                | 1-28   | 0  | .         | .          | .       | Too few facilities with injuries > 0 |
|                    |   | 29 - 70  | 1  | 312.0000  | .          | 312.00  |                                      |
|                    |   | 71-175   | 1  | 6500.0000 | .          | 6500.00 |                                      |
|                    |   | 176 - 700  | 1  | 7800.0000 | .          | 7800.00 |                                      |
|                    |   | > 700 per wk   | 0  | .         | .          | .       |                                      |
|                    |   | Total  | 3  | 4870.6667 | 4001.07252 | 7800.00 |                                      |
|                    | No. back-strain injuries per 1,000 procedures                                 | 1-28   | 5  | .0000     | .00000     | .00     | .687                                 |
|                    |   | 29 - 70  | 11 | .2914     | .96638     | 3.21    |                                      |
|                    |   | 71-175   | 14 | .0110     | .04112     | .15     |                                      |
|                    |   | 176 - 700  | 13 | .0099     | .03556     | .13     |                                      |
|                    |   | > 700 per wk   | 1  | .0000     | .          | .00     |                                      |
|                    |   | Total  | 44 | .0793     | .48312     | 3.21    |                                      |
| Prefilled syringes | No. of back-strain Incidents (from carrying contrast bottles), past 12 months | No back-strain incidents reported by facilities using only prefilled syringes. |    |           |            |         | ---                                  |
|                    |   | Total  | 30 | .0000     | .00000     | .00     |                                      |

\*, \*\*, \*\*\* P < .05, .01, .001, respectively.

## Latex Sensitivity Reactions

| Main Packaging Type (99-100% of time) | Dependent Variable                                      | No. of Contrast Procedures per Week | N     | Mean      | Std. Deviation | Maximum  | F <sub>overall</sub> with 4, N-5 <i>df</i> |
|---------------------------------------|---|-------------------------------------|-------|-----------|----------------|----------|--|
| Glass bottles                         | No. of latex sensitivity reactions, past 12 months      | 1-28                                | 176   | .3580     | 1.37830        | 15.00    | 2.163                                      |
|                                       |   | 29 - 70                             | 190   | .6105     | 1.88166        | 20.00    |  |
|                                       |   | 71-175                              | 157   | .7134     | 2.19572        | 25.00    |  |
|                                       |   | 176 - 700                           | 56    | 1.1964    | 2.88204        | 20.00    |  |
|                                       |   | > 700 per wk                        | 13    | .3846     | .50637         | 1.00     |  |
|                                       |   | Total                               | 592   | .6132     | 1.94963        | 25.00    |  |
|                                       | Reported latex reactions > 0                            | 1-28                                | 176   | .1705     | .37710         | 1.00     | 5.954***                                   |
|                                       |   | 29 - 70                             | 190   | .2789     | .44967         | 1.00     |  |
|                                       |   | 71-175                              | 157   | .3376     | .47440         | 1.00     |  |
|                                       |   | 176 - 700                           | 56    | .4643     | .50324         | 1.00     |  |
|                                       |   | > 700 per wk                        | 13    | .3846     | .50637         | 1.00     |  |
|                                       |   | Total                               | 592   | .2821     | .45040         | 1.00     |  |
|                                       | No. of procedures between latex sensitivity reactions   | 1-28                                | 30    | 732.2     | 444.71470      | 1300.00  | 142.012***                                 |
|                                       |   | 29 - 70                             | 53    | 1828.5    | 1005.92402     | 3640.00  |  |
|                                       |   | 71-175                              | 53    | 4140.5    | 2009.26381     | 7800.00  |  |
|                                       |   | 176 - 700                           | 26    | 10946.0   | 6151.40439     | 26000.00 |  |
|                                       |   | > 700 per wk                        | 5     | 86840.0   | 46992.79732    | 156000.0 |  |
|                                       |   | Total                               | 167   | 6330.0696 | 16515.59230    | 156000.0 |  |
|                                       | No. of latex sensitivity reactions per 1,000 procedures | 1-28                                | 176   | .6130     | 2.41848        | 19.23    | 3.057*                                     |
|                                       |   | 29 - 70                             | 190   | .2885     | .97784         | 10.99    |  |
|                                       |   | 71-175                              | 157   | .1265     | .31948         | 3.21     |  |
| 176 - 700                             |   | 56                                  | .0872 | .25397    | 1.83           |          |  |
| > 700 per wk                          |   | 13                                  | .0057 | .00883    | .02            |          |  |
| Total                                 |   | 592                                 | .3168 | 1.45390   | 19.23          |          |  |
| Polymer bottles                       | No. of latex sensitivity reactions, past 12 months      | 1-28                                | 6     | .1667     | .40825         | 1.00     | .614                                       |
|                                       |   | 29 - 70                             | 10    | 1.4000    | 3.09839        | 10.00    |  |
|                                       |   | 71-175                              | 14    | .2857     | .61125         | 2.00     |  |

| Main Packaging Type<br>(99-100% of time) | Dependent Variable                                      | No. of Contrast Procedures per Week | N  | Mean       | Std. Deviation | Maximum  | F <sub>overall</sub> with 4, N-5 df |
|--|---|-------------------------------------|----|------------|----------------|----------|-------------------------------------|
|  |   | 176 - 700                           | 12 | .8333      | 2.28963        | 8.00     |                                     |
|  |   | > 700 per wk                        | 1  | .0000      | .              | .00      |                                     |
|  |   | Total                               | 43 | .6744      | 1.94839        | 10.00    |                                     |
|  | Latex reactions reported > 0                            | 1-28                                | 6  | .1667      | .40825         | 1.00     | .419                                |
|  |   | 29 - 70                             | 10 | .4000      | .51640         | 1.00     |                                     |
|  |   | 71-175                              | 14 | .2143      | .42582         | 1.00     |                                     |
|  |   | 176 - 700                           | 12 | .2500      | .45227         | 1.00     |                                     |
|  |   | > 700 per wk                        | 1  | .0000      | .              | .00      |                                     |
|  |   | Total                               | 43 | .2558      | .44148         | 1.00     |                                     |
|  | No. of procedures between latex sensitivity reactions   | 1-28                                | 1  | 312.0000   | .              | 312.00   | 4.349*                              |
|  |   | 29 - 70                             | 4  | 1599.0000  | 1113.96170     | 2600.00  |                                     |
|  |   | 71-175                              | 3  | 4420.0000  | 1962.95695     | 6500.00  |                                     |
|  |   | 176 - 700                           | 3  | 10313.3333 | 5930.81220     | 15600.00 |                                     |
|  |   | > 700 per wk                        | 0  | .          | .              | .        |                                     |
|  |   | Total                               | 11 | 4628.0000  | 4839.46543     | 15600.00 |                                     |
|  | No. of latex sensitivity reactions per 1,000 procedures | 1-28                                | 6  | .5342      | 1.30849        | 3.21     | .981                                |
|  |   | 29 - 70                             | 10 | .7991      | 1.98962        | 6.41     |                                     |
|  |   | 71-175                              | 14 | .0556      | .11963         | .38      |                                     |
|  |   | 176 - 700                           | 12 | .0340      | .07606         | .26      |                                     |
|  |   | > 700 per wk                        | 1  | .0000      | .              | .00      |                                     |
|  |   | Total                               | 43 | .2880      | 1.08042        | 6.41     |                                     |

|                    |   |              |    |            |            |          |                                     |
|--------------------|---|--------------|----|------------|------------|----------|-------------------------------------|
| Prefilled syringes | No. of latex sensitivity reactions, past 12 months      | 1-28         | 12 | .0833      | .28868     | 1.00     | .471                                |
|                    |   | 29 - 70      | 8  | .2500      | .46291     | 1.00     |                                     |
|                    |   | 71-175       | 7  | .2857      | .48795     | 1.00     |                                     |
|                    |   | 176 - 700    | 3  | .3333      | .57735     | 1.00     |                                     |
|                    |   | > 700 per wk | 1  | .0000      | .          | .00      |                                     |
|                    |   | Total        | 31 | .1935      | .40161     | 1.00     |                                     |
|                    | Reported latex reactions > 0                            | 1-28         | 12 | .0833      | .28868     | 1.00     | .471                                |
|                    |   | 29 - 70      | 8  | .2500      | .46291     | 1.00     |                                     |
|                    |   | 71-175       | 7  | .2857      | .48795     | 1.00     |                                     |
|                    |   | 176 - 700    | 3  | .3333      | .57735     | 1.00     |                                     |
|                    |   | > 700 per wk | 1  | .0000      | .          | .00      |                                     |
|                    |   | Total        | 31 | .1935      | .40161     | 1.00     |                                     |
|                    | No. of procedures between latex sensitivity reactions   | 1-28         | 1  | 416.0000   | .          | 416.00   | Too few incidents for meaningful F. |
|                    |   | 29 - 70      | 2  | 3250.0000  | 551.54329  | 3640.00  |                                     |
|                    |   | 71-175       | 2  | 4550.0000  | 919.23882  | 5200.00  |                                     |
|                    |   | 176 - 700    | 1  | 11700.0000 | .          | 11700.00 |                                     |
|                    |   | > 700 per wk | 0  | .          | .          | .        |                                     |
|                    |   | Total        | 6  | 4619.3333  | 3813.47121 | 11700.00 |                                     |
|                    | No. of latex sensitivity reactions per 1,000 procedures | 1-28         | 12 | .2003      | .69393     | 2.40     | .179                                |
|                    |   | 29 - 70      | 8  | .0780      | .14590     | .35      |                                     |
|                    |   | 71-175       | 7  | .0641      | .11103     | .26      |                                     |
|                    |   | 176 - 700    | 3  | .0285      | .04935     | .09      |                                     |
|                    |   | > 700 per wk | 1  | .0000      | .          | .00      |                                     |
|                    |   | Total        | 31 | .1149      | .43500     | 2.40     |                                     |

\*, \*\*, \*\*\* P < .05, .01, .001, respectively.

### Eye Splatter from Contrast Media

| Main Packaging Type (99-100% of time) | Dependent Variable   | No. of Contrast Procedures per Week | N     | Mean      | Std. Deviation | Maximum  | F <sub>overall</sub> with 4, N-5 df |
|---------------------------------------|--|-------------------------------------|-------|-----------|----------------|----------|-------------------------------------|
| Glass bottles                         | No. of Incidents of eye splatter from contrast media, past 12 months | 1-28                                | 176   | .4489     | 2.10786        | 26.00    | 4.217**                             |
|                                       |  | 29 - 70                             | 187   | .7219     | 1.60901        | 10.00    |                                     |
|                                       |  | 71-175                              | 145   | 1.1241    | 2.76858        | 20.00    |                                     |
|                                       |  | 176 - 700                           | 57    | 1.6316    | 2.90093        | 12.00    |                                     |
|                                       |  | > 700 per wk                        | 14    | .1429     | .53452         | 2.00     |                                     |
|                                       |  | Total                               | 579   | .8152     | 2.24812        | 26.00    |                                     |
|                                       | Reports of eye splatter > 0  | 1-28                                | 176   | .1818     | .38680         | 1.00     | 5.902***                            |
|                                       |  | 29 - 70                             | 187   | .2888     | .45441         | 1.00     |                                     |
|                                       |  | 71-175                              | 145   | .3586     | .48126         | 1.00     |                                     |
|                                       |  | 176 - 700                           | 57    | .4386     | .50063         | 1.00     |                                     |
|                                       |  | > 700 per wk                        | 14    | .0714     | .26726         | 1.00     |                                     |
|                                       |  | Total                               | 579   | .2832     | .45096         | 1.00     |                                     |
|                                       | No. of procedures between eye splatter incidents                     | 1-28                                | 32    | 666.4     | 394.66629      | 1300.00  | 42.132***                           |
|                                       |  | 29 - 70                             | 54    | 1507.0    | 978.38802      | 3640.00  |                                     |
|                                       |  | 71-175                              | 52    | 3663.3    | 2323.98435     | 9100.00  |                                     |
|                                       |  | 176 - 700                           | 25    | 7461.5273 | 5539.83915     | 18200.00 |                                     |
|                                       |  | > 700 per wk                        | 1     | 20800.0   | .              | 20800.00 |                                     |
|                                       |  | Total                               | 164   | 3052.0222 | 3673.06226     | 20800.00 |                                     |
|                                       | No. of eye splatter incidents per 1,000 procedures                   | 1-28                                | 176   | .6294     | 2.64593        | 25.00    | 2.105                               |
|                                       |  | 29 - 70                             | 187   | .3462     | .84981         | 6.41     |                                     |
| 71-175                                |  | 145                                 | .2170 | .55108    | 3.85           |          |                                     |
| 176 - 700                             |  | 57                                  | .1255 | .23531    | .96            |          |                                     |
| > 700 per wk                          |  | 14                                  | .0034 | .01285    | .05            |          |                                     |
| Total                                 |  | 579                                 | .3699 | 1.57124   | 25.00          |          |                                     |
| Polymer bottles                       | No. of Incidents of eye splatter from contrast media, past 12 months | 1-28                                | 5     | .8000     | 1.30384        | 3.00     | 1.596                               |
|                                       |  | 29 - 70                             | 12    | .6667     | .98473         | 3.00     |                                     |
|                                       |  | 71-175                              | 14    | .0000     | .00000         | .00      |                                     |
|                                       |  | 176 - 700                           | 12    | 1.0000    | 1.59545        | 5.00     |                                     |

| Main Packaging Type (99-100% of time) | Dependent Variable  | No. of Contrast Procedures per Week | N  | Mean   | Std. Deviation | Maximum  | F <sub>overall</sub> with 4, N-5 df |          |
|---------------------------------------|---|-------------------------------------|----|--------|----------------|----------|-------------------------------------|----------|
|                                       |   | > 700 per wk                        | 1  | .0000  | .              | .00      | 2.348                               |          |
|                                       |   | Total                               | 44 | .5455  | 1.10925        | 5.00     |                                     |          |
|                                       | Reports of eye splatter > 0   | 1-28                                | 5  | .4000  | .54772         | 1.00     |                                     | 2.348    |
|                                       |   | 29 - 70                             | 12 | .4167  | .51493         | 1.00     |                                     |          |
|                                       |   | 71-175                              | 14 | .0000  | .00000         | .00      |                                     |          |
|                                       |   | 176 - 700                           | 12 | .4167  | .51493         | 1.00     |                                     |          |
|                                       |   | > 700 per wk                        | 1  | .0000  | .              | .00      |                                     |          |
|                                       |   | Total                               | 44 | .2727  | .45051         | 1.00     |                                     |          |
|                                       | No. of procedures between eye splatter incidents                      | 1-28                                | 2  | 606.7  | 245.13035      | 780.00   |                                     | 14.459** |
|                                       |   | 29 - 70                             | 5  | 1820.0 | 900.66642      | 2600.00  |                                     |          |
|                                       |   | 71-175                              | 0  | .      | .              | .        |                                     |          |
|                                       |   | 176 - 700                           | 5  | 9620.0 | 3794.57508     | 14560.00 |                                     |          |
|                                       |   | > 700 per wk                        | 0  | .      | .              | .        |                                     |          |
|                                       |   | Total                               | 12 | 4867.8 | 4829.61557     | 14560.00 |                                     |          |
|                                       | No. of eye splatter incidents per 1,000 procedures                    | 1-28                                | 5  | .7179  | 1.04784        | 2.31     |                                     | 2.937*   |
|                                       |   | 29 - 70                             | 12 | .3285  | .56583         | 1.92     |                                     |          |
|                                       |   | 71-175                              | 14 | .0000  | .00000         | .00      |                                     |          |
|                                       |   | 176 - 700                           | 12 | .0499  | .06903         | .19      |                                     |          |
|                                       |   | > 700 per wk                        | 1  | .0000  | .              | .00      |                                     |          |
|                                       |   | Total                               | 44 | .1848  | .49099         | 2.31     |                                     |          |
| Prefilled syringes                    | No. of Incidents of eye splatter from contrast media , past 12 months | 1-28                                | 11 | .0909  | .30151         | 1.00     | 1.204                               |          |
|                                       |   | 29 - 70                             | 8  | 1.1250 | 2.10017        | 5.00     |                                     |          |
|                                       |   | 71-175                              | 6  | .0000  | .00000         | .00      |                                     |          |
|                                       |   | 176 - 700                           | 2  | 1.0000 | 1.41421        | 2.00     |                                     |          |
|                                       |   | > 700 per wk                        | 1  | .0000  | .              | .00      |                                     |          |
|                                       |   | Total                               | 28 | .4286  | 1.23013        | 5.00     |                                     |          |
|                                       | Reports of eye splatter > 0   | 1-28                                | 11 | .0909  | .30151         | 1.00     | 1.027                               |          |
|                                       |   | 29 - 70                             | 8  | .2500  | .46291         | 1.00     |                                     |          |
|                                       |   | 71-175                              | 6  | .0000  | .00000         | .00      |                                     |          |
|                                       |   | 176 - 700                           | 2  | .5000  | .70711         | 1.00     |                                     |          |

| Main Packaging Type (99-100% of time) | Dependent Variable                                 | No. of Contrast Procedures per Week | N         | Mean       | Std. Deviation | Maximum | F <sub>overall</sub> with 4, N-5 df                    |      |
|---------------------------------------|--|-------------------------------------|-----------|------------|----------------|---------|--|------|
|                                       |  | > 700 per wk                        | 1         | .0000      | .              | .00     | Too few facilities with incidents > 0 for meaningful F |      |
|                                       |  | Total                               | 28        | .1429      | .35635         | 1.00    |  |      |
|                                       | No. of procedures between eye splatter incidents   | 1-28                                | 1         | 520.0000   | .              | 520.00  |  |      |
|                                       |  | 29 - 70                             | 2         | 721.5000   | 9.19239        | 728.00  |  |      |
|                                       |  | 71-175                              | 0         | .          | .              | .       |  |      |
|                                       |  | 176 - 700                           | 1         | 5850.0000  | .              | 5850.00 |  |      |
|                                       |  | > 700 per wk                        | 0         | .          | .              | .       |  |      |
|                                       | Total  | 4                                   | 1953.2500 | 2599.57476 | 5850.00        |         |  |      |
|                                       | No. of eye splatter incidents per 1,000 procedures | 1-28                                | 11        | .1748      | .57983         | 1.92    |  | .428 |
|                                       |  | 29 - 70                             | 8         | .3465      | .64168         | 1.40    |  |      |
|                                       |  | 71-175                              | 6         | .0000      | .00000         | .00     |  |      |
|                                       |  | 176 - 700                           | 2         | .0855      | .12087         | .17     |  |      |
|                                       |  | > 700 per wk                        | 1         | .0000      | .              | .00     |  |      |
|                                       |  | Total                               | 28        | .1738      | .49906         | 1.92    |  |      |

\*, \*\*. \*\*\* P < .05, .01, .001, respectively.

## Use of Contrast Media

6. Think of the iodinated contrast media brands that are used in your work area. Please indicate how often different brands were used in the past 3 months by allocating a total of 100% across the following brands:

|                |         | 6. Think of the iodinated contrast media brands that are used in your work area. Please indicate how often different brands were used in the past 3 months by allocating a total of 100% across the following brands: |           |              |            |           |              |              |
|----------------|---------|---|-----------|--------------|------------|-----------|--------------|--------------|
|                |         | Hexabrix  | 6. Isovue | 6. Omnipaque | 6. Opitray | 6. Oxilan | 6. Ultravist | 6. Visipaque |
| N              | Valid   | 1439  | 1439      | 1439         | 1439       | 1439      | 1439         | 1439         |
|                | Missing | 0   | 0         | 0            | 0          | 0         | 0            | 0            |
| Mean           |         | .496  | 28.5341   | 33.5622      | 19.8596    | .833      | 5.4065       | 11.308       |
| Median         |         | .030  | .5914     | .8758        | .3293      | .012      | .0803        | .960         |
| Mode           |         | .0  | .00       | .00          | .00        | .0        | .00          | .0           |
| Std. Deviation |         | 4.3413  | 42.28075  | 42.23710     | 37.24162   | 8.6311    | 21.07812     | 20.0613      |

|              |       |        |        |        |       |        |       |
|--------------|-------|--------|--------|--------|-------|--------|-------|
| Minimum      | .0    | .00    | .00    | .00    | .0    | .00    | .0    |
| Maximum      | 100.0 | 100.00 | 100.00 | 100.00 | 100.0 | 100.00 | 100.0 |
| Percent 0%   | 97.1% | 62.7%  | 53.0%  | 75.2%  | 98.8% | 92.6%  | 49.3% |
| Percent 100% | .1%   | 16.2%  | 12.2%  | 9.0%   | 0.6%  | 2.7%   | 1.3%  |

<sup>a</sup> Calculated from grouped data.

Note: Omitted cases where entries summed to < 99% or > 100%.

**7. Think of x-ray contrast media and the packaging types that are used in your work area. Please indicate how often different types of packaging were used in the past 3 months:**

| Statistic           |         | 7. Think of x-ray contrast media and the packaging types that are used in your work area. Please indicate how often different types of packaging were used in the past 3 months: |                    |  |  |
|---------------------|---------|--|--------------------|--|--|
|                     |         | Glass Bottles/Vials  | 7. Polymer Bottles | 7. Prefilled Syringes for Hand-held Injections | 7. Prefilled Syringes for Power Injections |
| N                   | Valid   | 1450   | 1450               | 1450   | 1450                                       |
|                     | Missing | 0  | 0                  | 0  | 0  |
| Mean                |         | 69.5352  | 13.9062            | 2.881  | 13.6779                                    |
| Median <sup>a</sup> |         | 99.1578  | .3035              | .134   | .2496                                      |
| Mode                |         | 100.00   | .00                | .0   | .00  |
| Std. Deviation      |         | 40.40163   | 30.59542           | 11.3132  | 30.39159                                   |
| Percent 0%          |         | 10.6%  | 76.6%              | 81.1%  | 80.0%                                      |
| Percent 100%        |         | 54.0%  | 4.4%               | 0.4%   | 2.1%                                       |

<sup>a</sup> Calculated from grouped data.

### Reasons for Using Packaging Types

8. Please indicate the primary packaging type for your work area by checking one of the boxes below.

|         |  | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------|--|-----------|---------|---------------|--------------------|
| Valid   | Glass bottles/vials                        | 1028      | 68.5    | 69.6          | 69.6               |
|         | Plastic/polymer bottles                    | 161       | 10.7    | 10.9          | 80.4               |
|         | Prefilled syringes for hand held injection | 22        | 1.5     | 1.5           | 81.9               |
|         | Prefilled syringes for power injection     | 267       | 17.8    | 18.1          | 100.0              |
|         | Total                                      | 1478      | 98.5    | 100.0         |                    |
| Missing | Did not respond                            | 8         | .5      |               |                    |
|         | System                                     | 15        | 1.0     |               |                    |
|         | Total                                      | 23        | 1.5     |               |                    |
| Total   |  | 1501      | 100.0   |               |                    |

9. Think of your primary packaging; indicate the main reason that your work area uses this packaging. (Check one.)

| 8. Please indicate the primary packaging type for your work area by checking one of the boxes below. | Statistic | 9. Think of your primary packaging; indicate the main reason that your work area uses this packaging. (Check one.) |                     |             |             |                    |                 |                        |       | Total  |
|--|-----------|--|---------------------|-------------|-------------|--------------------|-----------------|------------------------|-------|--------|
|  |           | Contrast Cost  | Cost Effective-ness | Convenience | Work Safety | Patient Throughput | Work Efficiency | Work Area Satisfaction | Other |        |
| Glass bottles/vials  | Count     | 318  | 351                 | 73          | 7           | 7                  | 25              | 39                     | 182   | 1002   |
|  | % Within  | 31.7%  | 35.0%               | 7.3%        | .7%         | .7%                | 2.5%            | 3.9%                   | 18.2% | 100.0% |
| Plastic/polymer bottles  | Count     | 12   | 60                  | 31          | 32          | 1                  | 8               | 10                     | 7     | 161    |
|  | % Within  | 7.5%   | 37.3%               | 19.3%       | 19.9%       | .6%                | 5.0%            | 6.2%                   | 4.3%  | 100.0% |
| Prefilled syringes for hand held injection   | Count     | 1  | 3                   | 3           | 7           | 2                  | 3               | 1                      | 0     | 20     |
|  | % Within  | 5.0%   | 15.0%               | 15.0%       | 35.0%       | 10.0%              | 15.0%           | 5.0%                   | .0%   | 100.0% |
| Prefilled syringes for power injection   | Count     | 17   | 41                  | 71          | 23          | 22                 | 69              | 7                      | 11    | 261    |
|  | % Within  | 6.5%   | 15.7%               | 27.2%       | 8.8%        | 8.4%               | 26.4%           | 2.7%                   | 4.2%  | 100.0% |
| Total  | Count     | 348  | 455                 | 178         | 69          | 32                 | 105             | 57                     | 200   | 1444   |
|  | % Within  | 24.1%  | 31.5%               | 12.3%       | 4.8%        | 2.2%               | 7.3%            | 3.9%                   | 13.9% | 100.0% |

**11. Think about your primary packaging: please indicate your agreement or disagreement with the following statements by placing a check in one of the columns.**

| 8. Please indicate the primary packaging type for your work area by checking one of the boxes below. |                   | 11a. Helps me or someone in my work area avoid sharps risks <sup>a</sup> | 11b. Helps me or someone in my work area avoid ergonomic risks <sup>a</sup> | 11c. Helps me or someone in my work area avoid latex allergies <sup>a</sup> | 11d. Helps me or someone in my area comply with work safety guidelines (OSHA, JCAHO, etc.) <sup>a</sup> |
|--|-------------------|--|---|---|---|
| Glass bottles/vials  | Mean              | -.4436   | -.5510  | -.5978  | -.4990  |
|  | N                 | 1001   | 1000  | 992   | 996   |
|  | Std. Deviation    | 1.63066  | 2.05515   | 2.54019   | 2.56826   |
|  | Strongly Disagree | 12.8%  | 8.8%  | 6.1%  | 5.6%  |
|  | Disagree          | 26.5%  | 20.8%   | 14.2%   | 11.8%   |
|  | Neither Agree/Dis | 37.7%  | 46.1%   | 45.6%   | 44.4%   |
|  | Agree             | 15.4%  | 15.8%   | 20.5%   | 22.5%   |
|  | Strongly Agree    | 5.6%   | 4.0%  | 6.3%  | 8.3%  |
|  | Don't Know        | 2.1%   | 4.5%  | 6.1%  | 7.3%  |
| Plastic/polymer bottles  | Mean              | 1.0062   | .3043   | -.5901  | .3230   |
|  | N                 | 161  | 161   | 161   | 161   |
|  | Std. Deviation    | 1.73023  | 2.23339   | 3.15133   | 2.37856   |
|  | Strongly Disagree | 4.3%   | 3.1%  | 3.1%  | 4.3%  |
|  | Disagree          | 5.0%   | 6.8%  | 10.6%   | 3.7%  |
|  | Neither Agree/Dis | 5.0%   | 28.6%   | 34.2%   | 27.3%   |
|  | Agree             | 36.6%  | 31.7%   | 23.6%   | 29.8%   |
|  | Strongly Agree    | 47.2%  | 25.5%   | 17.4%   | 29.8%   |
|  | Don't Know        | 1.9%   | 4.3%  | 11.2%   | 5.0%  |
| Prefilled syringes for hand held injection   | Mean              | .8636  | .1905   | -.0952  | 1.0909  |
|  | N                 | 22   | 21  | 21  | 22  |
|  | Std. Deviation    | 2.29483  | 2.31558   | 2.30010   | .97145  |
|  | Strongly Disagree | .0%  | .0%   | 9.5%  | 4.5%  |
|  | Disagree          | .0%  | 14.3%   | 4.8%  | 0.0%  |
|  | Neither Agree/Dis | 9.1%   | 23.8%   | 33.3%   | 13.6%   |

|  |                   |         |         |         |         |
|--|-------------------|---------|---------|---------|---------|
|  | Agree             | 45.5%   | 38.1%   | 38.1%   | 45.5%   |
|  | Strongly Agree    | 40.9%   | 19.0%   | 9.5%    | 36.4%   |
|  | Don't Know        | 4.5%    | 4.8%    | 4.8%    | 0.0%    |
| Prefilled syringes for power injection | Mean              | 1.0114  | .5833   | -.1069  | .4621   |
|  | N                 | 263     | 264     | 262     | 264     |
|  | Std. Deviation    | 1.33217 | 1.95789 | 2.70590 | 2.41637 |
|  | Strongly Disagree | 3.0%    | 1.9%    | 4.2%    | 1.9%    |
|  | Disagree          | 4.2%    | 6.8%    | 8.0%    | 3.0%    |
|  | Neither Agree/Dis | 15.2%   | 22.0%   | 33.2%   | 20.1%   |
|  | Agree             | 35.4%   | 36.4%   | 23.7%   | 38.6%   |
|  | Strongly Agree    | 41.4%   | 29.9%   | 23.7%   | 31.1%   |
|  | Don't Know        | .8%     | 3.0%    | 7.3%    | 5.3%    |
| Total                                  | Mean              | .0021   | -.2379  | -.5000  | -.2072  |
|  | N                 | 1447    | 1446    | 1436    | 1443    |
|  | Std. Deviation    | 1.73624 | 2.11440 | 2.64707 | 2.54080 |

<sup>a</sup> Computed from grouped data.

<sup>b</sup> Scored as -2, -1, 0, 1, 2 for Strongly Disagree, Disagree, Neither Agree nor Disagree, Agree, and Strongly Agree, respectively.

**12. Think about your primary packaging. Please indicate your level of satisfaction with this packaging on a scale of 1-10, where “1” is not at all satisfied and “10” is highly satisfied.**

| 8. Please indicate the primary packaging type for your work area by checking one of the boxes below. | Descriptive Statistics |      |                | Frequency Distribution of Responses |      |      |      |       |      |       |       |          |                       |
|--|------------------------|------|----------------|-------------------------------------|------|------|------|-------|------|-------|-------|----------|-----------------------|
|  | Mean                   | N    | Std. Deviation | 1 = Not at all satisfied            | 2    | 3    | 4    | 5     | 6    | 7     | 8     | 9 or 9.5 | 10 = Highly satisfied |
| Glass bottles/vials  | 6.763                  | 1012 | 2.3635         | 2.9%                                | 2.4% | 5.0% | 5.8% | 17.6% | 7.2% | 12.6% | 21.0% | 11.9%    | 13.5%                 |
| Plastic/polymer bottles  | 8.892                  | 157  | 1.4437         | .0%                                 | .6%  | .0%  | .6%  | 3.8%  | 1.3% | 5.1%  | 21.0% | 20.4%    | 47.1%                 |
| Prefilled syringes for hand held injection   | 9.091                  | 22   | 1.1509         | .0%                                 | .0%  | .0%  | .0%  | .0%   | .0%  | 13.6% | 18.2% | 13.6%    | 54.5%                 |
| Prefilled syringes for power injection   | 8.955                  | 265  | 1.2931         | .4%                                 | .0%  | .4%  | .0%  | 1.1%  | 3.4% | 4.2%  | 20.0% | 26.8%    | 43.8%                 |
| Total  | 7.427                  | 1456 | 2.3307         | 2.1%                                | 1.7% | 3.6% | 4.1% | 12.8% | 5.8% | 10.3% | 20.9% | 15.5%    | 23.3%                 |

**13. Think of your primary packaging and how it is disposed. Please indicate how often your primary packaging was discarded in a sharps container.**

|  |  |          | 13. Think of your primary packaging and how it is disposed. Please indicate how often your primary packaging was discarded in a sharps container. |       |           |       |        |        |
|--|--|----------|---|-------|-----------|-------|--------|--------|
|  |  |          | Always  | Often | Sometimes | Never | Total  |        |
| 8. Please indicate the primary packaging type for your work area by checking one of the boxes below. | Glass bottles/vials                        | Count    | 184   | 112   | 192       | 538   | 1026   |        |
|  |  | % Within | 17.9%   | 10.9% | 18.7%     | 52.4% | 100.0% |        |
|  | Plastic/polymer bottles                    | Count    | 10  | 3     | 22        | 126   | 161    |        |
|  |  | % Within | 6.2%  | 1.9%  | 13.7%     | 78.3% | 100.0% |        |
|  | Prefilled syringes for hand held injection | Count    | 12  | 1     | 6         | 3     | 22     |        |
|  |  | % Within | 54.5%   | 4.5%  | 27.3%     | 13.6% | 100.0% |        |
|  | Prefilled syringes for power injection     | Count    | 65  | 21    | 54        | 123   | 263    |        |
|  |  | % Within | 24.7%   | 8.0%  | 20.5%     | 46.8% | 100.0% |        |
| Total  |  |          | Count   | 271   | 137       | 274   | 790    | 1472   |
|  |  |          | % Within  | 18.4% | 9.3%      | 18.6% | 53.7%  | 100.0% |

**14. Think about plastic/polymer bottles; please indicate your level of familiarity with this packaging by checking one box.**

|  |  |          | 14. Think about plastic/polymer bottles; please indicate your level of familiarity with this packaging by checking one box. |                   |                   |                     | Total  |
|--|--|----------|---|-------------------|-------------------|---------------------|--------|
|  |  |          | Very Familiar   | Somewhat Familiar | Not very Familiar | Not at all Familiar |        |
| 8. Please indicate the primary packaging type for your work area by checking one of the boxes below. | Glass bottles/vials                        | Count    | 133   | 210               | 245               | 428                 | 1016   |
|  |  | % Within | 13.1%   | 20.7%             | 24.1%             | 42.1%               | 100.0% |
|  | Plastic/polymer bottles                    | Count    | 139   | 20                | 2                 | 0                   | 161    |
|  |  | % Within | 86.3%   | 12.4%             | 1.2%              | .0%                 | 100.0% |
|  | Prefilled syringes for hand held injection | Count    | 4   | 6                 | 3                 | 9                   | 22     |
|  |  | % Within | 18.2%   | 27.3%             | 13.6%             | 40.9%               | 100.0% |
|  | Prefilled syringes for power injection     | Count    | 93  | 52                | 57                | 63                  | 265    |
|  |  | % Within | 35.1%   | 19.6%             | 21.5%             | 23.8%               | 100.0% |
|  | Total                                      | Count    | 369   | 288               | 307               | 500                 | 1464   |
|  |  | % Within | 25.2%   | 19.7%             | 21.0%             | 34.2%               | 100.0% |

**Usage of Plastic/Polymer Bottles**

**15. Now, please indicate your agreement or disagreement with each of the following statements about the use of plastic/polymer bottles by placing a check in one of the columns.**

|   | Valid N | Strongly Disagree | Disagree | Neither A nor D | Agree | Strongly Agree | Mean <sup>b</sup> | Median <sup>a,b</sup> | Std. Deviation <sup>b</sup> |
|---|---------|-------------------|----------|-----------------|-------|----------------|-------------------|-----------------------|-----------------------------|
| 15a. Helps/would help me or my work area with sharps risks.   | 1443    | 2.5%              | 3.3%     | 14.3%           | 46.6% | 33.3%          | 1.0506            | 1.1664                | .91045                      |
| 15b. Helps/would help me or my work area with ergonomic risks.  | 1442    | 2.4%              | 4.0%     | 27.3%           | 41.8% | 24.5%          | .8225             | .8686                 | .92635                      |
| 15c. Helps/would help me or my work area with latex allergies.  | 1433    | 2.7%              | 4.5%     | 35.5%           | 35.7% | 21.5%          | .6874             | .7013                 | .94837                      |
| 15d. Helps/would help me or my work area with compliance to work safety guidelines (OSHA, JCAHO, etc.). | 1440    | 2.3%              | 3.3%     | 27.8%           | 41.3% | 25.3%          | .8396             | .8824                 | .91923                      |
| 15e. I am interested in learning more about plastic/polymer bottles.                                    | 1422    | 3.6%              | 5.9%     | 31.7%           | 37.9% | 20.9%          | .6660             | .7081                 | .98701                      |
| 15f. I would like to try plastic/polymer bottles.   | 1409    | 3.1%              | 4.1%     | 32.2%           | 35.5% | 25.2%          | .7566             | .7912                 | .97683                      |
| 15g. I would like to purchase plastic/polymer bottles.  | 1388    | 3.5%              | 5.9%     | 53.4%           | 20.6% | 16.6%          | .4078             | .3749                 | .95054                      |

<sup>a</sup> Calculated from grouped data.

<sup>b</sup> Scored as -2, -1, 0, 1, 2 for Strongly Disagree, Disagree, Neither Agree nor Disagree, Agree, and Strongly Agree, respectively.

**Attitudes Toward Polymer Bottle Use for Facilities Currently Using a Particular Type of Packaging**

| Statement   | Valid N | Strongly Disagree | Disagree | Neither A nor D | Agree | Strongly Agree | Mean <sup>b</sup> | Median <sup>a,b</sup> | Std. Deviation <sup>b</sup> |
|---|---------|-------------------|----------|-----------------|-------|----------------|-------------------|-----------------------|-----------------------------|
| <b>Respondents Whose Facilities Use Glass Bottles 99-100% of the Time</b>                               |         |                   |          |                 |       |                |                   |                       |                             |
| 15a. Helps/would help me or my work area with sharps risks.   | 761     | 2.6%              | 2.9%     | 16.8%           | 47.4% | 30.2%          | .9974             | 1.1015                | .9076                       |
| 15b. Helps/would help me or my work area with ergonomic risks.  | 760     | 2.8%              | 3.7%     | 29.7%           | 39.9% | 23.9%          | .7855             | .8242                 | .9424                       |
| 15c. Helps/would help me or my work area with latex allergies.  | 754     | 2.9%              | 4.5%     | 40.5%           | 33.0% | 19.1%          | .6088             | .6083                 | .9416                       |
| 15d. Helps/would help me or my work area with compliance to work safety guidelines (OSHA, JCAHO, etc.). | 758     | 2.5%              | 4.1%     | 31.0%           | 38.7% | 23.7%          | .7704             | .8011                 | .9408                       |
| 15e. I am interested in learning more about plastic/polymer bottles.                                    | 757     | 2.8%              | 3.2%     | 25.2%           | 43.2% | 25.6%          | .8573             | .9189                 | .9305                       |
| 15f. I would like to try plastic/polymer bottles.   | 758     | 2.8%              | 2.8%     | 25.1%           | 40.2% | 29.2%          | .0924             | .9778                 | .9455                       |
| 15g. I would like to purchase plastic/polymer bottles.  | 740     | 3.0%              | 4.7%     | 55.9%           | 20.0% | 16.4%          | .4203             | .3772                 | .9191                       |
| <b>Respondents Whose Facilities Use Plastic/Polymer Bottles 99-100% of the Time</b>                     |         |                   |          |                 |       |                |                   |                       |                             |
| 15a. Helps/would help me or my work area with sharps risks.   | 69      | 2.9%              | 4.3%     | 5.8%            | 33.3% | 53.6%          | 1.3043            | 1.4667                | .9748                       |
| 15b. Helps/would help me or my work area with ergonomic risks.  | 70      | 2.9%              | 1.4%     | 15.7%           | 40.0% | 40.0%          | 1.1286            | 1.2500                | 1.0408                      |
| 15c. Helps/would help me or my work area with latex allergies.  | 69      | 2.9%              | 2.9%     | 23.2%           | 39.1% | 31.9%          | .9420             | 1.0408                | .9684                       |
| 15d. Helps/would help me or my work area with compliance to work safety guidelines (OSHA, JCAHO, etc.). | 71      | 2.8%              | 2.8%     | 18.3%           | 39.4% | 36.6%          | 1.0423            | 1.1667                | .9627                       |
| 15e. I am interested in learning more about plastic/polymer bottles.                                    | 66      | 9.1%              | 10.6%    | 56.1%           | 10.6% | 13.6%          | .0909             | .0682                 | 1.0630                      |
| 15f. I would like to try plastic/polymer bottles.   | 66      | 6.1%              | 4.5%     | 43.9%           | 21.2% | 24.2%          | .5303             | .5349                 | 1.0985                      |
| 15g. I would like to purchase plastic/polymer bottles.  | 64      | 4.7%              | 4.7%     | 43.8%           | 17.2% | 29.7%          | .6250             | .6154                 | 1.1055                      |
| <b>Respondents Whose Facilities Use Prefilled Syringes 99-100% of the Time</b>                          |         |                   |          |                 |       |                |                   |                       |                             |

| Statement   | Valid N | Strongly Disagree | Disagree | Neither A nor D | Agree | Strongly Agree | Mean <sup>b</sup> | Median <sup>a,b</sup> | Std. Deviation <sup>b</sup> |
|---|---------|-------------------|----------|-----------------|-------|----------------|-------------------|-----------------------|-----------------------------|
| 15a. Helps/would help me or my work area with sharps risks.   | 37      | 2.7%              | 8.1%     | 18.9%           | 54.1% | 16.2%          | .7297             | .8148                 | .9324                       |
| 15b. Helps/would help me or my work area with ergonomic risks.  | 36      | 0.0%              | 8.3%     | 33.3%           | 41.7% | 16.7%          | .6667             | .6667                 | .8619                       |
| 15c. Helps/would help me or my work area with latex allergies.  | 37      | 2.7%              | 8.1%     | 35.1%           | 40.5% | 13.5%          | .5405             | .5714                 | .9308                       |
| 15d. Helps/would help me or my work area with compliance to work safety guidelines (OSHA, JCAHO, etc.). | 37      | 2.7%              | 5.4%     | 35.1%           | 40.5% | 16.2%          | .6216             | .6429                 | .9235                       |
| 15e. I am interested in learning more about plastic/polymer bottles.                                    | 37      | 5.4%              | 18.9%    | 40.5%           | 24.3% | 10.8%          | .1622             | .1667                 | 1.0412                      |
| 15f. I would like to try plastic/polymer bottles.   | 36      | 5.6%              | 25.0%    | 44.4%           | 13.9% | 11.1%          | .0000             | -.0800                | 1.0420                      |
| 15g. I would like to purchase plastic/polymer bottles.  | 36      | 11.1%             | 25.0%    | 50.0%           | 8.3%  | 5.6%           | -.2778            | -.2963                | .9743                       |

## **APPENDIX A:**

### **COVER LETTER AND SURVEY INSTRUMENT**

ASRT Logo

August 2005

Dear Radiologic Technologist or Radiology Manager,

The ASRT would appreciate your help in assessing workplace safety issues surrounding the administration of iodinated contrast media. In specific, the ASRT is investigating how workplace safety might be affected by the recent development of plastic/polymer bottles for contrast media.

If you are involved in the administration of iodinated contrast media (whether directly or as a supervisor of those who administer iodinated contrast media), you are invited to participate in this survey. There are two ways for you to participate. Because of its lower cost and greater ease of data entry, we prefer that you complete the questionnaire online by going to [www.asrt.org](http://www.asrt.org) and clicking on “Contrast Administration Safety Survey” in the “ASRT News” section just right of the middle of the page. (Please enter the survey code, “ContrastSafety,” as your response to the second question on the online form.) Alternatively, you may complete the hardcopy questionnaire enclosed with this note and return it to the ASRT Research Department in the enclosed postage-paid reply envelope. Please respond within the next two weeks if possible.

We are offering an incentive to respond promptly and via the online route. If you submit your responses to the online version of this survey by 11:59 p.m. Mountain time on Aug. 20, 2005, you will be entered in a drawing for a \$100 American Express gift certificate. To participate in the drawing, please provide your name, telephone number and e-mail address or postal address in the online form that pops up when you submit your responses. (The information you provide on this form will be stored in a separate file so that your survey responses remain confidential.)

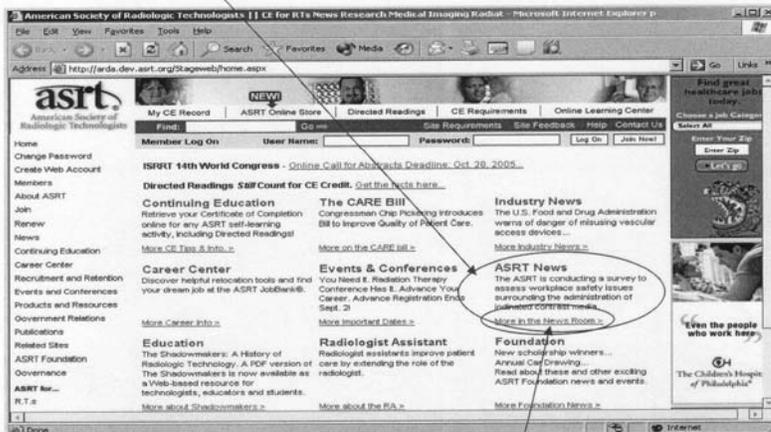
Thanks for your help with this important survey.

Sal's signature

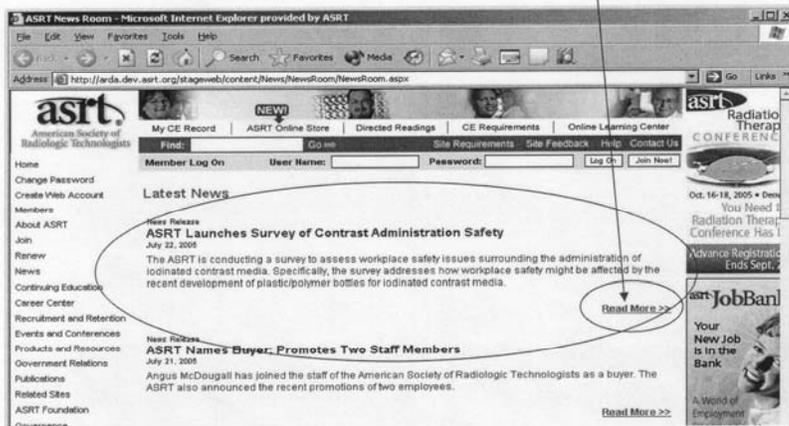
Sal Martino  
Executive Vice President and Chief Academic Officer

P.S. See the back of this page for a guide to finding the online Contrast Administration Safety questionnaire on ASRT's home page.

Use the links illustrated below to access the online Contrast Administration Safety questionnaire.  
Thank you.



Click here, then here.



### ASRT Contrast Administration Safety Survey

Are you involved in the administration of iodinated contrast media?     Yes     No

Do you supervise those who administer iodinated contrast media?     Yes     No

**If your answer to both of these questions is “No,” please accept our apologies for the intrusion on your busy schedule and, if possible, pass this questionnaire on to someone in your organization who is involved in contrast administration.**

This survey pertains to the administration of iodinated contrast media. Please respond to all questions in terms of your experience with the administration of iodinated contrast media.

1. Think about your health care organization and your work area. Please indicate your agreement or disagreement with the following statements by placing an “X” in one of the columns.

|   | Strongly<br>Disagree | Disagree | Neither Agree<br>nor Disagree | Agree | Strongly<br>Agree |
|---|----------------------|----------|-------------------------------|-------|-------------------|
| a. The safety of workers is a priority in this health care organization.  |                      |          |                               |       |                   |
| b. Safety issues are almost always discussed during staff meetings.   |                      |          |                               |       |                   |
| c. Personal accountability for safety is assessed during annual performance evaluations.                                    |                      |          |                               |       |                   |
| d. Sharps containers are available where and when I need them to dispose of needles and other sharp devices.                |                      |          |                               |       |                   |
| e. Employees and management work together to ensure the safest possible health care environment for patients and personnel. |                      |          |                               |       |                   |
| f. Safety training is part of staff development orientations and programs.  |                      |          |                               |       |                   |

2. Think about work-related injuries. Please write in the first column your best estimate of the number of times each incident occurred in the past 12 months. Please also indicate how many of those incidents were reported. Technologists, please respond based on your own experience. Administrators, respond based on the experience of your work area.

| Type of Incident   | Number of Incidents,<br>Past 12 Months | Number<br>Reported | Don't<br>Know |
|--|--|--------------------|---------------|
| a. I or someone in my work area was injured by sharps objects.   |  |                    |               |
| b. I or someone in my work area was injured by the metal crimp when opening contrast media bottles.    |  |                    |               |
| c. I or someone in my work area used hemostats to open contrast media bottles.                         |  |                    |               |
| d. I or someone in my work area set aside contrast media bottles because of difficulties with opening. |  |                    |               |
| e. I or someone in my work area dropped and broke contrast media bottles.                              |  |                    |               |
| f. I or someone in my work area was injured by broken contrast media bottles.                          |  |                    |               |
| g. Someone outside my area was injured by broken contrast media bottles.                               |  |                    |               |
| h. I or someone in my work area was injured (e.g., back strain) from carrying contrast media bottles.  |  |                    |               |
| i. I or someone in my work area experienced latex sensitivity reactions.                               |  |                    |               |
| j. I or someone in my work area experienced eye splatter from contrast media.                          |  |                    |               |

## ASRT Contrast Administration Safety Survey - 2

2k. How many individuals in your work area are involved in any way with contrast media bottles (e.g., administering media or stocking, delivering, disposing of bottles)?

2l. If there were any incidents in which contrast media bottles were set aside because of difficulty opening them, what ultimately happened to these bottles?

- They were discarded.
- They were opened and used when time and tools permitted.
- They were returned to the vendor for refund or replacement.
- Other disposition (Please specify \_\_\_\_\_)
- N/A; contrast media bottles never had to be set aside because of difficulty opening them.

2m. On average, approximately how much time is required to clean up when a bottle is dropped and broken?  minutes.

3. If any of the injuries which occurred in the past 12 months were not reported, please indicate the reason(s) for not reporting. (Check all that apply.) For technologists, please respond based on your own experience. For administrators, please respond based on the experience of your work area.

| Type of injury  | Did not have time to report | Thought of negative repercussions | Thought injury was low risk | Did not know reporting procedure/protocol | Did not have reporting procedure/protocol | Other |
|---|-----------------------------|-----------------------------------|-----------------------------|---|---|-------|
| a. Injuries from sharp objects in your work area.                                       |                             |                                   |                             |   |   |       |
| b. Injuries due to metal crimp on contrast media bottles in your work area.             |                             |                                   |                             |   |   |       |
| c. Injuries from broken contrast media bottles in your work area.                       |                             |                                   |                             |   |   |       |
| d. Injuries from broken contrast media bottles outside your work area.                  |                             |                                   |                             |   |   |       |
| e. Injuries (e.g., back strain) from carrying contrast media bottles in your work area. |                             |                                   |                             |   |   |       |
| f. Latex sensitivities in your work area.   |                             |                                   |                             |   |   |       |
| g. Eye splatter from contrast media.  |                             |                                   |                             |   |   |       |

4. If you checked "Other" for any of the injuries in question 3, please indicate the other reason(s) for not reporting injuries.

5. Think of the x-ray/CT procedures that are performed in your work area. How many procedures requiring iodinated contrast media are performed in an average week?

6. Think of the iodinated contrast media brands that are used in your work area. Please indicate how often different brands were used in the past 3 months by allocating a total of 100% across the following brands:

| Hexabrix<br>(ioxaglate)<br>Tyco | Isovue<br>(iopamidol)<br>Bracco | Omnipaque<br>(iohexol)<br>GE | Optiray<br>(ioversol)<br>Tyco | Oxilan<br>(ioxilan)<br>Guerbet | Ultravist<br>(iopromide)<br>Berlex | Visipaque<br>(iodixanol)<br>GE | Total       |
|---------------------------------|---------------------------------|------------------------------|-------------------------------|--------------------------------|------------------------------------|--------------------------------|-------------|
|                                 |                                 |                              |                               |                                |                                    |                                | <b>100%</b> |

### ASRT Contrast Administration Safety Survey – 3

7. Think of x-ray contrast media and the packaging types that are used in your work area. Please indicate how often different types of packaging were used in the past 3 months by allocating a total of 100% across the following packaging types:

| Glass bottles/vials | Plastic/polymer bottles | Prefilled syringes for hand-held injection | Prefilled syringes for power injection | Total       |
|---------------------|-------------------------|--|--|-------------|
|                     |                         |  |  | <b>100%</b> |

8. Please indicate the primary packaging type for your work area by checking one of the boxes below.

- Glass bottles/vials
  Prefilled syringes for hand held injection  
 Plastic/polymer bottles
  Prefilled syringes for power injection

9. Think of your primary packaging; indicate the main reason that your work area uses this packaging. (Check one.)

| Contrast cost | Cost effectiveness | Convenience | Work Safety | Patient Throughput | Work efficiency | Work area satisfaction | Other |
|---------------|--------------------|-------------|-------------|--------------------|-----------------|------------------------|-------|
|               |                    |             |             |                    |                 |                        |       |

10. If you checked "Other" in response to question 9, please indicate the other reason(s) for using the primary packaging.

11. Think about your primary packaging; please indicate your agreement or disagreement with the following statements by placing a check in one of the columns.

|  | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree | Don't Know |
|--|-------------------|----------|----------------------------|-------|----------------|------------|
| a. Helps me or someone in my work area avoid sharps risks                                |                   |          |                            |       |                |            |
| b. Helps me or someone in my work area avoid ergonomic risks                             |                   |          |                            |       |                |            |
| c. Helps me or someone in my work area avoid latex allergies                             |                   |          |                            |       |                |            |
| d. Helps me or someone in my area comply with work safety guidelines (OSHA, JCAHO, etc.) |                   |          |                            |       |                |            |

12. Think about your primary packaging. Please indicate your level of satisfaction with this packaging on a scale of 1-10, where "1" is not at all satisfied and "10" is highly satisfied.

- 1      2      3      4      5      6      7      8      9      10

13. Think of your primary packaging and how it is disposed. Please indicate how often your primary packaging was discarded in a sharps container.

- Always                       Often                       Sometimes                       Never

14. Think about plastic/polymer bottles; please indicate your level of familiarity with this packaging by checking one box.

- Very familiar       Somewhat familiar       Not very familiar       Not at all familiar

Please read the following description of plastic/polymer bottles and be prepared to answer several questions concerning how you perceive this packaging.

A plastic/polymer bottle is manufactured from pharmaceutical-grade plastic/polymer with latex-free components. It has a twist-off cap for access to the contrast media when one uses a j-straw or pours and a pull ring for access to the stopper; therefore, no more cuts on the metal crimp on glass bottles. Unlike glass, it won't break when dropped. Compared to a comparable-sized glass bottle, it is 30%-40% smaller and lighter when full, roughly 80% lighter when empty. As an example, a 500 mL plastic/polymer bottle is about the same size as a 300 mL glass bottle. It also has a clear label with an integrated hanger and peel-off tracking labels for product documentation in patient charts and on empty syringes.

**ASRT Contrast Administration Safety Survey – 4**

15. Now, please indicate your agreement or disagreement with each of the following statements about the use of plastic/polymer bottles by placing a check in one of the columns.

|   | Strongly Disagree | Disagree | Neither Agree nor Disagree | Agree | Strongly Agree |
|---|-------------------|----------|----------------------------|-------|----------------|
| a. Helps/would help me or my work area with sharps risks.   |                   |          |                            |       |                |
| b. Helps/would help me or my work area with ergonomic risks.  |                   |          |                            |       |                |
| c. Helps/would help me or my work area with latex allergies.  |                   |          |                            |       |                |
| d. Helps/would help me or my work area with compliance to work safety guidelines (OSHA, JACHO, etc.). |                   |          |                            |       |                |
| e. I am interested in learning more about plastic/polymer bottles.                                    |                   |          |                            |       |                |
| f. I would like to try plastic/polymer bottles.   |                   |          |                            |       |                |
| g. I would like to purchase plastic/polymer bottles.  |                   |          |                            |       |                |

16. What best describes your position? (Check one.)

- Staff or Senior Staff Technologist
- Administrative/Managerial
- Other (Please specify \_\_\_\_\_)

17. What best describes your primary discipline/sphere of employment?

- Radiography
- Computed Tomography
- Interventional Radiography (CVIT, CI, VI, etc.)
- Other (Please specify \_\_\_\_\_)

18. What best describes your healthcare organization? (Check one)

- Hospital
 

|   |                                    |
|---|------------------------------------|
| Type                                    | Size                               |
| <input type="radio"/> Academic/Teaching | <input type="radio"/> <100 beds    |
| <input type="radio"/> Community         | <input type="radio"/> 100-300 beds |
|   | <input type="radio"/> >300 beds    |
- Clinic
- Other \_\_\_\_\_

19. What best describes your years of service in your area of specialization?

- 1-5 years     6-10 years     11-20 years     21-30 years     31 or more years

20. In what state is your primary site located?

What is your ZIP code?

Gender?

- Female     Male

**Thank you for completing this important survey. Please return the completed questionnaire or respond online within the next two weeks. Call or e-mail John Culbertson, ASRT Research Manager ([jculbertson@asrt.org](mailto:jculbertson@asrt.org), 800-444-2778, Ext. 1297) if you have questions about the survey. All responses will be kept strictly confidential.**

**APPENDIX B:**  
**RESPONSES TO OPEN-ENDED QUESTIONS**

## Responses to Open-Ended Questions

### 2I. Please specify:

| Response   | Frequency | Percent |
|--|-----------|---------|
| Blank  | 1390      | 92.6    |
| 8 [Infinity sign]  | 1         | .1      |
| A pair of pliers had to be located to open the bottle.   | 1         | .1      |
| All CT contrast is in prefilled syringes   | 1         | .1      |
| Almost all of our contrast bottles are plastic. Only two particular doses are in glass.  | 1         | .1      |
| Although sometimes the metal clips on the bottles break (especially the 50mL bottles), most of the time the bottle can still be opened with the aid of a hemostat.   | 1         | .1      |
| Although we haven't had to set aside contrast due to difficulty opening them, we do use the hemostats often. The tab on the contrast seems to break off easily. Also, we use the plastic 500ml multidose vials (300) so that cuts down on having to open the glass   | 1         | .1      |
| Any bottles that were unable to be opened or difficult were thrown away. We have since switched to plastic bottles.  | 1         | .1      |
| Any contrast bottles set aside that I know of have been used after opening them with an instrument.  | 1         | .1      |
| As far as I know, no problems with opening contrast.   | 1         | .1      |
| Bottles that are left partially open are discarded before the next exam.   | 1         | .1      |
| Bottles were replaced in the warmer and just tried later   | 1         | .1      |
| Difficult bottles are put aside until needed later. Hemostats or other tools are used to open the bottles.   | 1         | .1      |
| Do not know of any   | 1         | .1      |
| Don't Know   | 1         | .1      |
| Don't know of any but this is likely what they'd do  | 1         | .1      |
| Every so often, a pull tab on the contrast top will come apart and can't be removed easily during the course of the procedure. That bottle will be used later, either by IV tubing puncturing the rubber stopper, or at the beginning of the case, hemostats will be used to pull the remaining metal ring off of the rubber stopper and poured into a sterile medicine cup for a new procedure. | 1         | .1      |
| HAVE NOT USED BOTTLES SINCE 1998   | 1         | .1      |
| Hemostats were used to get the top off of the contrast media bottle.   | 1         | .1      |
| Hemostats used to open bottles.  | 1         | .1      |
| I can't remember any incidents in the last year - We now use the plastic bottles which are much safer and easier to open   | 1         | .1      |
| I have not been informed of any difficulties with my staff opening contrast media bottles.   | 1         | .1      |
| I have not had the problem recently but do remember cases of using hemostats or getting pinched by the metal ring on contract bottles. Also having contrast leak all over my hand if I have to repuncture the stopper for any reason.  | 1         | .1      |
| I have not heard of anyone complaining about any of the above in our department.   | 1         | .1      |
| I know this has happened many times. I do not know specifics for this year; however, I personally have had trouble opening the bottles and have gotten cut on the metal cap. I have set them aside until I have a hemostat that will remove the cap safely.  | 1         | .1      |
| I work in the Cardiac Cath lab. When contrast is ready to be replaced, the circulatingRN/technologist replaces it. During an intense procedure there isn't time to take hemostats and attempt to pry the metal ring off. The contrast is placed on the counter until t   | 1         | .1      |
| IF AND WHEN I HAVE A CONTRAST BOTTLE THAT WAS TOO DIFFICULT TO OPEN, I WOULD SWITCH THE BOTTLE OUT WITH A NEW ONE.   | 1         | .1      |
| if bottles failed to open due to breaking off of the metal crimp device they were opened later with hemostats  | 1         | .1      |
| if needed hemostats are used to open the bottle immediately  | 1         | .1      |
| If very busy with ER patients and a bottle of Isovue wouldn't open well or the ring came off, I would grab another until I finished the patient and then come back to it. This doesn't happen very often, but now we have pre-loaded contrast media and don't h  | 1         | .1      |
| If we are busy we open the bottle later and use hemostats to open it.  | 1         | .1      |

|  |   |    |
|--|---|----|
| If we have difficulty opening the bottles we use hemostats to open. We have recently had trouble spiking the bottles of Visipaque 270 with our new company's sterile waste system. The rubber stopper is very hard to penetrate with the spike and if you push             | 1 | .1 |
| In my facility we use 500ml Plastic bottles.   | 1 | .1 |
| It hasn't happened yet.  | 1 | .1 |
| Metal top broke, used hemostat to open   | 1 | .1 |
| Most of our contrast is pre drawn contrast   | 1 | .1 |
| Most of the contrast we use are spiked for delivery via IV tubing or suctioned out of the bottle via a needleless system and a syringe.  | 1 | .1 |
| My numbers above are probable very low. I wish they were more of a yes or no. Never thought much about the contrast eye splash.  | 1 | .1 |
| Not aware of any   | 1 | .1 |
| NOT SURE   | 1 | .1 |
| On at least 5 occasions in the past year, contrast bottles were set aside to later be opened using hemostats.  | 1 | .1 |
| One time the tab broke off, and instead of fumbling with it we put it aside and grabbed a new one. Later the other one was opened with a kelly clamp.  | 1 | .1 |
| OPENED AT A LATER TIME   | 1 | .1 |
| Opened when time allows- usually with hemostats  | 1 | .1 |
| Opened with hemostats  | 1 | .1 |
| Our dept. has never set bottles aside; we've always found a way to open them, usually with hemostats.  | 1 | .1 |
| Set aside and opened later using hemostats   | 1 | .1 |
| Sometimes the rim of the bottle gets contaminated trying to remove the metal and the stopper so the bottle is discarded.   | 1 | .1 |
| Sometimes the tab will break off when initially opening the bottles and we have to use a hemostat to finish opening them.  | 1 | .1 |
| The answers to the above questions were from a hospital where I worked per diem. They used glass bottles for contrast. The hospital where I work now uses the plastic bottles of contrast. So I answered the best I could regarding both places where I worked.            | 1 | .1 |
| The bottles were opened when hemostats were available to open the contrast or other people opened them.  | 1 | .1 |
| The bottles were opened with a tool at time of difficulty. They generally were not set aside at another time.  | 1 | .1 |
| THE CONTRAST BOTTLES ARE PLASTIC, PLASTIC PULL RING AND SCREW CAP.   | 1 | .1 |
| The glass bottles are very difficult to open for some people. If the case were working on requires additional contrast, and the bottle doesn't open properly we don't have time to find a hemostat. We will grab another bottle, and come back to the other bottles later. | 1 | .1 |
| The metal rim did not fully tear off and hemostats had to be employed.   | 1 | .1 |
| The metal tab didn't work properly and hemostats were used to open them  | 1 | .1 |
| The metal wrap at top of bottle did not peel off as it usually does. Later a hemostat was used to peel off the metal so contrast media could be poured.  | 1 | .1 |
| The sharp metal closures on bottles have been an issue in our Interventional dept. Many are difficult to open "cleanly" without the help of hemostats.   | 1 | .1 |
| The tab commonly breaks off before you are able to lift off the entire cover, requiring scissors or a kelly clamp to remove the lid.   | 1 | .1 |
| The vendor is aware of the problems we were having with hard to open contrast media and they have taken care of any issues that we were having.  | 1 | .1 |
| THESE WERE THE POLYMER BOTTLES. THE PLASTIC TABS BROKE.  | 1 | .1 |
| They are opened with Kelley clamps because the tabs ripped off, PS, I DID NOT GET THIS SURVEY UNTIL THE 12TH OF SEPTEMBER, AFTER THEY DRAWING  | 1 | .1 |
| They were either opened with a scissors or a hemostat. I do not know the exact number.   | 1 | .1 |
| Those bottles were used when drawing up the contrast into a syringe with a needle (for hand injection)   | 1 | .1 |
| TRASHED UNOPENED   | 1 | .1 |
| Twice in the last 12 months I have set aside contrast media bottles because the metal crimps were unable to be removed quickly as needed. I would later use hemostats to open the bottles.   | 1 | .1 |
| Unscrewed top and used to pour into contrast cup.....some probably wasted due to difficulty in keeping stopper sterile   | 1 | .1 |

|   |   |    |
|---|---|----|
| Unused bottles  | 1 | .1 |
| Use of polymer bottles  | 1 | .1 |
| Use some device to open later like a knife or hemostats. Hard to answer 2c and 2b. Sometimes the crimp doesn't break right off - if time permits we will use some instrument to open them. Can happen 10 times a day or go months at a time with no problem.    | 1 | .1 |
| Used 18g strght. needle and syringe to draw contrast.   | 1 | .1 |
| USED AS ORAL CONTRAST   | 1 | .1 |
| Used hemostat or pliers to remove top   | 1 | .1 |
| Used hemostat and/or bottle opener 100+ for above questions 2 c & d   | 1 | .1 |
| Used hemostats to open  | 1 | .1 |
| Usually when someone strong enough enters the room or hemostats become available  | 1 | .1 |
| Visapaque bottles are more difficult to open  | 1 | .1 |
| Waited until we could find a pair of hemostats to finish opening  | 1 | .1 |
| We always find a way to open the bottles.   | 1 | .1 |
| We are sometimes in a hurry when we need contrast during an exam, and if they don't open quickly, we just set them aside and use them later.  | 1 | .1 |
| We are using prefilled plastic syringes.  | 1 | .1 |
| We cut down on worker injuries from opening bottles with hemostats and from wasting unopened bottles. We use a specific tool for taking the tops off of the contrast bottles. It is like pliers only made for opening different sizes of bottles with that type | 1 | .1 |
| We discard rather than take a chance on someone getting cut   | 1 | .1 |
| We do not use contrast media bottles.   | 1 | .1 |
| We do not use glass contrast bottles. We use prefilled syringes   | 1 | .1 |
| We don't let anything sit around, so we throw it away. I don't recall any broken bottles on my shift. I can't say regarding others but answered according to what I've heard.   | 1 | .1 |
| We have been using the polymer bottles for the past 9 months. We have been extremely pleased with them  | 1 | .1 |
| We have plastic bottles with a plastic pull-top, or turn top.   | 1 | .1 |
| We have plastic screw tops so do not have trouble opening the bottles   | 1 | .1 |
| WE HAVE PRELOADED SYRINGES  | 1 | .1 |
| We just used mosquitoes to get them opened when time permitted  | 1 | .1 |
| We looked for a hemostat.   | 1 | .1 |
| We may save for next case when we are able to open with hemostats or a bottle opener  | 1 | .1 |
| We now have 500 cc plastic bottles of contrast  | 1 | .1 |
| We return defective manufacturing of bottles to manufactures for refund and replacement. This hardly is an issue with our Mallincrodt product   | 1 | .1 |
| We switched to plastic bottles in the past 6 mos.   | 1 | .1 |
| We use bulk bottles for multiple draws with a dual head injector.   | 1 | .1 |
| We use hemostats to open bottles they usually come open with them.  | 1 | .1 |
| We use plastic bottles of Omnipaque.  | 1 | .1 |
| We use plastic bottles. They unscrew. Never any problem opening them.   | 1 | .1 |
| WE USE PLASTIC EASY OPEN BOTTLE   | 1 | .1 |
| We use polymer bottles exclusively in my dept. and on occasion the plastic ring either breaks at one side or completely off. We have had to resort to using a pair of hemostats to pry off the top.   | 1 | .1 |
| We use prefilled plastic syringes only, individually packaged. They are delivered already out of box and shelved in a keyed storage area. We only take as many as are scheduled for the day to put in warmer  | 1 | .1 |
| We use prefilled syringes only.   | 1 | .1 |
| We use preload contrast.  | 1 | .1 |
| WE USE PREFILLED SYRINGES!!!!!!THEY ARE THE BEST!!!!!!  | 1 | .1 |
| We use prefilled plastic syringes.  | 1 | .1 |
| We use prefilled syringes for almost everything.  | 1 | .1 |

|   |             |              |
|---|-------------|--------------|
| We use the Acsist injector and don't open bottles.  | 1           | .1           |
| We used hemostats to open them  | 1           | .1           |
| When there is difficulty opening the bottles, we frequently use hemostats to open the to avoid the sharp edges of the metal ring. | 1           | .1           |
| When you had time to open with hemostats  | 1           | .1           |
| <b>Total</b>  | <b>1501</b> | <b>100.0</b> |

4. If you checked "Other" for any of the injuries in question 3, please indicate the other reason(s) for not reporting injuries.

| Reason for Not Reporting an Incident(s)  | Frequency | Percent |
|--|-----------|---------|
| <b>Blank</b>   | 1211      | 80.7    |
| <b>Because There Were No Injuries to Report</b>  |           |         |
| "Other" meaning no injury.   | 1         | .1      |
| 0 injuries occur.  | 1         | .1      |
| 3a,d,e,g: None. q3b: Heat makes metal crimp q3f: We switched to nonlatex   | 1         | .1      |
| a- all needle sticks were reported c- no broken glass bottles, we use plastic d- don't know of any injuries g- don't know of any issues of eye splash, only on glass | 1         | .1      |
| A,D,E,G - DID NOT HAVE ANY INCIDENTS IN MY FACILITY OR KNOW OF ANY OUTSIDE FACILITY. I HAVE A LATEX ALLERGY BUT IT IS KNOWN ALREADY                                  | 1         | .1      |
| AS FAR AS I KNOW, THERE HASN'T BEEN ANY INJURIES   | 1         | .1      |
| As far as I know, we had no incidents to report, and therefore no incidents went unreported  | 1         | .1      |
| BROKEN BOTTLES PICKED UP WITH GLOVES. TO MY KNOWLEDGE NO BACK STRAINS DUE TO BOXES.  | 1         | .1      |
| DID NOT ANSWER ABOVE BECAUSE THERE WERE NO REPORTABLE INJURIES   | 1         | .1      |
| Did not apply  | 1         | .1      |
| DID NOT APPLY TO ANYTHING ABOVE  | 1         | .1      |
| Did not feel these were applicable to our environment.   | 1         | .1      |
| Did not happen.  | 1         | .1      |
| Did not have any in last 12 months   | 1         | .1      |
| Did not have any injuries  | 2         | .2      |
| DID NOT HAVE ANY INJURIES IN PAST 12 MO.   | 1         | .1      |
| Did not have any of these incidents to report  | 1         | .1      |
| Did not have these accidents   | 1         | .1      |
| Did not have those incidents at my facility.   | 1         | .1      |
| Did not hear of any one reporting the issue  | 1         | .1      |
| Didn't happen  | 1         | .1      |
| DIDN'T OCCUR   | 1         | .1      |
| Didn't know of any...  | 1         | .1      |
| DO NOT KNOW ANY INJURIES RELATED TO CONTRAST MEDIA BOTTLES   | 1         | .1      |
| DO NOT KNOW OF ANY INJURY. BUT HAVE PROTOCOL   | 1         | .1      |
| DON'T KNOW HOW/ABOUT   | 1         | .1      |
| Don't know of any injuries.  | 1         | .1      |
| Don't know of any injuries that were reported. If broken bottles were reported no injuries occurred.   | 1         | .1      |
| E= No has had a back injury from Contrast F= No allergic reaction have occurred g= No known eye injuries   | 1         | .1      |
| Has not happened in many years   | 1         | .1      |
| Have no knowledge. Just finished training period in CT. None of the aforementioned has happened during any training period.  | 1         | .1      |
| HAVE NOT HAD ANY INJURIES  | 1         | .1      |

|  |    |     |
|--|----|-----|
| I am not completely sure if anyone, like housekeeping, ever got injured as a result of the broken glass. | 1  | .1  |
| I checked Other because we either didn't have an event or it was reported promptly                       | 1  | .1  |
| I DON'T BELIEVE THAT WE HAVE HAD ANY OF THESE INCIDENTS OCCUR  | 1  | .1  |
| I DON'T KNOW OF ANY INJURIES   | 1  | .1  |
| I have not had any accidents or injuries with contrast bottles   | 2  | .1  |
| I HAVE NOT HAD INJURY DUE TO ANY OF THESE REASONS.   | 1  | .1  |
| I ONLY KNOW OF 2 INSTANCES FROM SHARPS INJURIES.   | 1  | .1  |
| I or someone did not have any injuries.  | 1  | .1  |
| Injuries did not occur   | 1  | .1  |
| It never happened in my work area, so far as I'm concerned.  | 1  | .1  |
| Letter D: not applicable, no known instances   | 1  | .1  |
| N/A  | 9  | .6  |
| N/A these did not occur.   | 1  | .1  |
| N/A to me  | 1  | .1  |
| Never experienced an injury with contrast media that would need to be reported                           | 1  | .1  |
| NEVER HAPPENS  | 1  | .1  |
| No eye splatters known, No latex sensitivity, no broken bottles outside work area.                       | 1  | .1  |
| No incidences of this that I experienced   | 1  | .1  |
| No incidents   | 3  | .2  |
| NO INCIDENTS HAVE OCCURRED AT THIS WORK SITE.  | 1  | .1  |
| No injuries occurred/to report   | 22 | 1.5 |
| No known safety issues I   | 1  | .1  |
| No known injuries in our facility in past 12 months. We mainly use prefilled syringes.                   | 1  | .1  |
| No occurrences   | 1  | .1  |
| No categories.   | 1  | .1  |
| No problems in our work area as above. No work related injuries or latex allergies. No sharp injuries.   | 1  | .1  |
| NO REPORTS OF INCIDENT OR INJURY   | 1  | .1  |
| No serious injuries occurred to my knowledge   | 1  | .1  |
| No such injuries   | 1  | .1  |
| No injuries from these   | 1  | .1  |
| NO INJURIES I KNOW OF  | 2  | .1  |
| NONAPPLICABLE  | 1  | .1  |
| None   | 4  | .3  |
| NONE HAVE HAPPENED YET   | 1  | .1  |
| None known occurring incidents of bottle breakage or latex sensitivities                                 | 1  | .1  |
| NONE KNOWN OF  | 1  | .1  |
| NONE OF THE ABOVE QUESTIONS HAPPENED IN MY DEPT.   | 1  | .1  |
| NONE OF THESE INJURIES   | 1  | .1  |
| None of these injuries I in my areas.  | 1  | .1  |
| None of these  | 1  | .1  |
| NONE OF THESE THINGS HAPPENED IN MY WORKPLACE  | 1  | .1  |
| None of these were applicable  | 1  | .1  |
| NONE REPORTED  | 2  | .1  |
| NONE REPORTED NONE KNOWN   | 1  | .1  |
| None, as previously stated   | 1  | .1  |
| None, of these happened  | 1  | .1  |

|   |   |    |
|---|---|----|
| NOT APPLICABLE  | 4 | .3 |
| Not applicable. No such injuries occurred   | 1 | .1 |
| Not aware of any incident.  | 1 | .1 |
| Not aware of any incidents  | 1 | .1 |
| Not aware of any of these types of injuries in the department.  | 1 | .1 |
| Not aware of such incidents   | 1 | .1 |
| No injuries that I am aware of. If injuries occur, reports are made.  | 1 | .1 |
| Should have a N/A Block. Have not heard of anyone being injured in the past 12 months from a contrast bottle.   | 1 | .1 |
| Since no injuries occurred there were no reports filed. There was one latex allergy reported to ER for doctor verification.   | 1 | .1 |
| Small dept. only 2 techs & 1 assist. No known injury.   | 1 | .1 |
| STAFF HAVE NOT REPORTED ANY INJURIES FROM METAL CRIMP ON THE CORNER AND BOTTLES.  | 1 | .1 |
| The 2 times that the bottle did not open correctly, hemostats were used without incident.   | 1 | .1 |
| The five categories marked other because no one was injured during these mishaps. They did occur but no one was injured   | 1 | .1 |
| The injuries did not occur.   | 1 | .1 |
| THERE HAS BEEN NO INJURIES TO MY KNOWLEDGE OF ANY SORT WITH CONTRAST MATERIALS.   | 1 | .1 |
| There have been no injuries that I am aware of concerning the contrast bottles, ever, in my area, not just the past twelve months. We have started carrying the plastic bottles within the past twelve months, but no explanation was given to the change, and it only involves the 75ml bottles, not the 150 ml. | 1 | .1 |
| There were no incidents so no reporting was needed. We do have a reporting procedure protocol.  | 1 | .1 |
| There were no injuries  | 1 | .1 |
| There were no injuries from the dropped bottle.   | 1 | .1 |
| There were no injuries in the past 16 months in our department.   | 1 | .1 |
| There were no injuries in any of these areas.   | 1 | .1 |
| THERE WERE NO INJURIES. DROPPED A BOTTLE AND CLEANED IT UP  | 1 | .1 |
| THERE WERE NONE   | 1 | .1 |
| There were none to report   | 1 | .1 |
| There where none of these   | 1 | .1 |
| These situations did not happen   | 1 | .1 |
| THEY DID NOT HAPPEN IN OUR AREA. NO ONE HAS HAD A BACK STRAIN FROM LIFTING CONTRAST OR INJURIES FROM BROKEN GLASS.  | 1 | .1 |
| They did not occur. We are a small facility and there isn't too much that goes on that isn't told.  | 1 | .1 |
| THEY DIDN'T HAPPEN – NO NEED TO REPORT WHAT DIDN'T OCCUR  | 1 | .1 |
| To my knowledge these have not occurred at this particular location.  | 1 | .1 |
| TO MY KNOWLEDGE THESE INCIDENTS DID NOT OCCUR   | 1 | .1 |
| To my knowledge, there have been no injuries due to contrast media bottles.   | 1 | .1 |
| To my knowledge, there were no incidents  | 1 | .1 |
| To my knowledge, we did not have any injuries from contrast media administration.   | 1 | .1 |
| Unaware of any back strain injuries   | 1 | .1 |
| UNAWARE OF ANY INJURIES   | 1 | .1 |
| UPS DRIVER HAS HAD BOTTLES BREAK, BUT I DON'T KNOW OF ANY INJURIES.   | 1 | .1 |
| We did not have any accidents involving contrast media or sharps this past year.  | 1 | .1 |
| We did not have any injuries or incidents.  | 1 | .1 |
| We did not have any of these incidents occur.   | 1 | .1 |
| We did not have any of these incidents, or it did not apply to us.  | 1 | .1 |
| WE DIDN'T HAD ANY OF THESE INCIDENTS  | 1 | .1 |

|  |   |    |
|--|---|----|
| We had no incidents to report, zero!!  | 1 | .1 |
| We had no injuries   | 2 | .2 |
| We had no reported injuries from any of the above categories.  | 1 | .1 |
| We had no sharps injuries, broken bottles, or eye splatters, and we are a nonlatex hospital  | 1 | .1 |
| WE had very few if any injuries in these areas   | 1 | .1 |
| We have a policies in place but didn't have any incident to report.  | 1 | .1 |
| We have had no contrast-related injuries in the past year  | 1 | .1 |
| We have had no injuries from broken contrast bottles or sharps . We have had no broken contrast bottles.   | 1 | .1 |
| WE HAVE NOT HAD ANY OF THE INJURIES FROM QUESTION 3  | 1 | .1 |
| We have very few or no injury from contrast containers   | 1 | .1 |
| While the potential for injury exists with glass bottles and tops no real injuries were reported in my immediate work area... We currently have changed to polymer | 1 | .1 |
| <b>Explanation of Why There Were No Injuries/Incidents</b>   |   |    |
| Do not have injuries, use plastic bottles.   | 1 | .1 |
| Do not use bottles. Vials of contrast used with needle and syringe only. All other contrast media is prefilled.  | 1 | .1 |
| Either not applicable or for latex sensitivity, already taken into account and preventive measures in place  | 1 | .1 |
| Have spill clean-up system in place  | 1 | .1 |
| We have been using plastic bottles for close to 12 months  | 1 | .1 |
| I have known latex sensitivities; however my work place provides me with vinyl non-sterile and sterile gloves for my protection.                                   | 1 | .1 |
| I personally have not known of any employees with any such incidents. Patients are screened and latex free is used for those procedures.                           | 1 | .1 |
| NO CONTRAST MEDIA BOTTLES IN USE SINCE 1998  | 1 | .1 |
| No injuries our facility uses the prefilled syringes   | 1 | .1 |
| NO INJURIES WE USE PREFILLED SYRINGES!!  | 1 | .1 |
| NONE OF THESE HAPPENED IN OUR AREA WE DO NOT USE BOTTLES.  | 1 | .1 |
| OUR CONTRAST IS IN PLASTIC CONTAINERS. ---   | 1 | .1 |
| Our department uses prefilled plastic syringes   | 1 | .1 |
| Switched to nonlatex product   | 1 | .1 |
| USE PRE CONTRAST SYRINGES  | 1 | .1 |
| VERY LITTLE USE OF CONTRAST  | 1 | .1 |
| WE ARE VERY CAREFUL IN OUR IMAGING CTR.HAVE NO INJURIES OR MISHAP WITH IV CONTRAST.  | 1 | .1 |
| We do not use contrast bottles....only pre filled  | 1 | .1 |
| We don't use glass bottles, and we are needle-less and have all non latex materials, our boxes of contrast bottles is only about 6 lbs                             | 1 | .1 |
| WE USE LATEX FREE GLOVES   | 1 | .1 |
| We use pre-load contrast.  | 1 | .1 |
| We use prefilled syringes and have no problems. We work in CT.   | 1 | .1 |
| <b>Elaboration of "Thought Injury was Low Risk"</b>  |   |    |
| #b- I thought cut was a nuisance only, not large and definitely not reportable. #g- splash was a nuisance, not injurious   | 1 | .1 |
| 3a: I actually stuck myself with a clean needle; I felt there was NO risk for infection/disease. 3f: I did report that a pt. was allergic to latex.                | 1 | .1 |
| Contrast splatter was from clean bottle.   | 1 | .1 |
| Cut finger on crimp top. Did not think I needed to report it. Just stopped bleeding and put a bandaid on it.   | 1 | .1 |
| Did not think it was important due to contrast containers being cleaned. You throw on a bandaid and go back to work.   | 1 | .1 |
| Didn't really think about eye splatter as being an incident.   | 1 | .1 |

|  |   |    |
|--|---|----|
| Didn't think of G as a reportable occurrence   | 1 | .1 |
| Employee was splashed in face, not directly in eye. This was also from injecting contrast rather than from trying to open a bottle or drawing out of a bottle.                   | 1 | .1 |
| Eye splatter, to my [manager?], is not considered an injury worth reporting.   | 1 | .1 |
| HAD GLASSES ON-CONTRAST SPLASHED ON FACE/HAIR & ON GLASSES BUT NOT SPECIFICALLY IN EYES. (WOULD HAVE IF NOT FOR EYE GLASSES.)  | 1 | .1 |
| I am not aware of any injuries not reported. However, if I know the staff appropriately, I would say they did not feel they were at risk of injury.                              | 1 | .1 |
| I am possibly latex allergy sensitive. I got a rash, but at the time I didn't think of it as an allergic reaction. I treated it myself and went to my primary                    | 1 | .1 |
| INJURY FROM METAL CRIMP USED A BAND-AID.NO REAL INJURY FROM CONTRAST SPLATTER. SPLATTER WHEN TUBING FROM INJECTOR POPPED OFF.  | 1 | .1 |
| INJURY NOT SEVERE  | 1 | .1 |
| It felt that it was [not?] severe enough to report   | 1 | .1 |
| Most of them had no injuries latex sensitivities mild ,and the crimp on bottle was just a small scratch  | 1 | .1 |
| NOT IN EYES, BUT SPLATTERED ON EYEGLASSES  | 1 | .1 |
| NOT SERIOUS  | 1 | .1 |
| Safety glasses were worn and there was no injury to eye  | 1 | .1 |
| SMALL CUT  | 1 | .1 |
| The injuries occurred before patient contact and resulted in paper-cut lacerations.  | 1 | .1 |
| The injury was not severe: like a bad paper cut  | 1 | .1 |
| THE ONLY TYPES OF PROBLEMS WE REPORT ARE MULTIPLE CONTRAST REACTION PER BATCH, OR EXTRAVASATIONS.  | 1 | .1 |
| THESE ARE USUALLY FROM THE TAB THAT SEPARATES THE RING AND IS MORE MINOR THAN POKING MY HAND WITH A PIN OR A SHAVING INJURY. IT WOULD BE EMBARRASSING TO REPORT IT.              | 1 | .1 |
| THIS HAPPENS DAILY. A METAL CUT IN THE WORK PLACE IS AS COMMON TO ME AS A PAPER CUT.   | 1 | .1 |
| We report needle sticks. Others were minor cuts from contrast bottles or paper cuts no injuries from breakage of bottles that I am aware of                                      | 1 | .1 |
|  |   |    |
| <b>Because All Injuries/Incidents Were Reported</b>  |   |    |
| ALL INJURIES ARE REPORTED AT THIS FACILITY.  | 1 | .1 |
| All injuries or reactions in our department were reported, to my knowledge.  | 1 | .1 |
| All injuries were reported   | 2 | .1 |
| All injuries were reported. It is common for contrast bottles to be opened with hemostats when one specific procedure is performed with one specific MD.                         | 1 | .1 |
| I am not aware of any unreported incidents.  | 1 | .1 |
| I am the Director of Ancillary Services at a hospital. There would be no negative repercussions if an injury was reported. We have an excellent program for reporting incidents. | 1 | .1 |
| If they happened they were reported  | 1 | .1 |
| In my facility we report every negative I. Our culture is one of root cause not blame.   | 1 | .1 |
| INJURIES FROM SHARP OBJECTS ARE REPORTED THROUGH INCIDENT REPORT AT HOSPITAL. LATEX SENSITIVITIES ARE REPORTED AND WORKER/PT ARE EVALUATED                                       | 1 | .1 |
| Injuries were reported   | 1 | .1 |
| ONLY 1 INCIDENT AND IT WAS REPORTED  | 1 | .1 |
| There was only one sharps incident. It was reported.   | 1 | .1 |
| They were reported   | 1 | .1 |
| Was reported to risk management and occupational medicine.   | 1 | .1 |
| We didn't have any of these injuries that were not reported  | 1 | .1 |
| We had one eye splatter in the past year and it was reported. I do not know of any other injuries in my area occurring.  | 1 | .1 |
| WE REPORT ALL INJUIRES NO MATTER HOW MINOR.  | 1 | .1 |
| We report all injuries   | 1 | .1 |

|   |   |    |
|---|---|----|
| We report all injuries no matter how minor. We also report all needle sticks to patients or employees.  | 1 | .1 |
| We report all things diligently. Only incident of needle stick was reported.  | 1 | .1 |
| <b>Because Reporting Is Not a Priority</b>  |   |    |
| All of the instances in question 2 have happened in my department, I just don't track the number of times, unless it required an incident report.   | 1 | .1 |
| Did not seem important I to take the time, which I don't have extra at work.  | 1 | .1 |
| DID NOT THINK IT NEEDED TO BE REPORTED  | 1 | .1 |
| Employee had known sensitivity  | 1 | .1 |
| I don't think it is necessary to report something as simple as a self inflicted minor injury from a contrast bottle.  | 1 | .1 |
| Management didn't feel necessary  | 1 | .1 |
| Sensitivity was not reported on co-worker because the sensitivity to latex was already established & appropriate gloves and tape (etc.)are available in the Department  | 1 | .1 |
| <b>Described Response to the Incident or the Report Thereof</b>   |   |    |
| Dept got latex free gloves for the person   | 1 | .1 |
| EMPLOYEE SENT TO EMPLOYEE HEALTH  | 1 | .1 |
| No injuries from in or outside work area. Large pieces of glass picked up and placed in sharps container. Next, Large blanket or sheet placed on contrast med   | 1 | .1 |
| No, when patient was splashed in eye during arthrogram procedure, notified supervisor and documented everything, time, people involved and what happened and ho   | 1 | .1 |
| None of these things happen. But if something like this did occur, the technologist would fill out an incident report asap.   | 1 | .1 |
| OUR STAFF TAKES ALL PRECAUTIONS OF INJECTABLE CONTRAST MEDIUM. IF SPILL, SPLATTER OR STICK OCCURS, THE APPROPRIATE PERSONNEL ARE CONTACTED AND THE PROPER PROCEDURE IS FOLLOWED.  | 1 | .1 |
| Person was allergic to latex so we got nonlatex gloves  | 1 | .1 |
| Category procedure used and problem resolved  | 1 | .1 |
| The physician who developed latex allergies was diagnosed at an outside facility and later addressed the staff as to his recent sensitivity. Staff accommodate  | 1 | .1 |
| The Imaging Center has recently implemented a [query?] upon registration--asking latex sensitivity -- the patient's charts are flagged and only latex free [materials used?]  | 1 | .1 |
| This was a cut from a metal ring on the contrast. I H2O irrigated, wiped cut with betadine, and placed a bio-occlusive on the site.   | 1 | .1 |
| To my knowledge. Reporting is not an issue. No blame is ever given. We are encouraged to report on the assumption the the incident you do not report is the one you have a problem with at a later date. We have dropped glass bottles but to my knowledge have never had a broken glass bottle.  | 1 | .1 |
| Two employees in our work area have known latex allergies. They do not wear latex gloves or touch any latex. In regard to the rubber stopper of the contrast bottle, we wear non-latex non sterile gloves to remove the stopper.  | 1 | .1 |
| WE HAVE A POLICY FOR REPORTING ANY INJURIES   | 1 | .1 |
| We have a robust employee reporting system for injury or adverse event. These are nonpunitive and electronic reporting systems. In the event of an injury, we have a workers employee health clinic that manages the injury according to guidelines prescribed by the CDC and a physician in attendance. Our facility is a latex free facility and all contrast is broken down and delivered by the materials management department and dispersed to the imaging area in manageable packages. | 1 | .1 |
| We have an extensive work safety education program that includes prevention of needle sticks, back injuries, etc. Our incidence of these things from the use of contrast media is low.  | 1 | .1 |
| WE HAVE REPORTING PROCEDURE/PROTOCOL  | 1 | .1 |
| <b>Because Respondent Didn't Know About the Incident(s)</b>   |   |    |
| Did not find about injury until weeks (sometimes months) after the event.   | 1 | .1 |
| Do not have way to know information   | 1 | .1 |
| HAD NO PERSONAL EXPERIENCE W/ THEM  | 1 | .1 |
| Have not happened to me – unsure of others reasons  | 1 | .1 |
| I have no idea if anyone reports anything. Each employee reports to the supervisor on their own.  | 1 | .1 |
| I work 3rd shift. No incident has been reported. I am not management and do not have access to stats in reference to (injury reporting). [Checked "Don't know" for all of question 2.]  | 1 | .1 |

|   |             |              |
|---|-------------|--------------|
| I work alone and have not encountered these types of injuries.  | 1           | .1           |
| If an injury occurs outside the immediate work area I am unaware of the reporting reasons or issues of the employee that was injured.                   | 1           | .1           |
| If the injuries were not reported how would one know they were not reported and the reason they were not reported?                                      | 1           | .1           |
| None of the injuries listed above (where I check other) happen to me personally at all. NO one reported on any injury at all.                           | 1           | .1           |
| NOT SURE IF OTHERS WERE INJURED. SAME ON ALL THAT ARE CHECKED OTHER   | 1           | .1           |
| Not sure of this ever happening   | 1           | .1           |
| Not sure what other workers did when this happened  | 1           | .1           |
| <b>Because Reporting the Incident Wouldn't Help</b>   |             |              |
| I DID NOT THINK THAT IT MATTERED; NOTHING WOULD CHANGE  | 1           | .1           |
| Since [name] slithered into the manager spot no one will report anything because nothing will get done about it anyway except maybe a negative write up | 1           | .1           |
| <b>Report Not Turned In by Manager</b>  |             |              |
| Incident report filled out by technologist, but report never turned in by manager   | 1           | .1           |
| <b>Other "Other" Response</b>   |             |              |
| Checked other for those reported.   | 1           | .1           |
| Cumulative effect of long time usage of latex products  | 1           | .1           |
| Injuries happen very seldom, I you think you can find better things to ask about?   | 1           | .1           |
| MD's I report when they get stuck   | 1           | .1           |
| NOT AN ISSUE AT MY WORKPLACE  | 1           | .1           |
| One person, carelessness in duty  | 1           | .1           |
| REPORT THROUGH HOSPITAL   | 1           | .1           |
| <b>Total</b>  | <b>1501</b> | <b>100.0</b> |

**10. If you checked "Other" in response to question 9, please indicate the other reason(s) for using the primary packaging.**

| Response |  | Frequency | Percent |
|----------|--|-----------|---------|
|          | Blank  | 1013      | 85.2    |
|          | Currently in "buying group" to purchase bottles until year end. Will then research bulk packaging.   | 1         | .1      |
|          | Our large multi-hospital system has central contracts/purchasing agreements and dictates type of supplies which we use. I would also assume they go with the most cost effective option; this seems to be the trend throughout the hospital system- get what is cheapest.  | 1         | .1      |
|          | We are on a buying contract and have no say in this decision except that we use a nonionic contrast. Also, your questions about for the percentages do not let you put in "100". [Corrected early on.]   | 1         | .1      |
|          | All contrast is dispensed from Pharmacy  | 1         | .1      |
|          | Aren't contrast cost & cost effectiveness essentially the same thing? We are a 25 bed CAH hospital & we are encouraged to reduce costs.  | 1         | .1      |
|          | AS LONG AS I'VE WORKED IN CT.  | 1         | .1      |
|          | At the outpatient center that I work for it is just habit to order the glass bottles. At the hospital that I work for they have changed to the plastic bottles and are using them only now. At the hospital we do on average about 60 patients per day with i.v. contrast. | 1         | .1      |
|          | Because company has not provided plastic bottles. If it is not too much difference in price, we can order plastic bottles.   | 1         | .1      |
|          | Bottles are easily stored in our pharmacy. Each bottle(s) is labeled with the patient's name, acct. no., DOB etc. and is not drawn up until the patient is ready to go. We have nursing staff that are available during the week that take care of our contrast            | 1         | .1      |
|          | Buying group purchase.   | 1         | .1      |
|          | CANNOT GET PREFILLED SYRINGES  | 1         | .1      |
|          | COMPANY SENDS IT IN GLASS CON  | 1         | .1      |
|          | CONTRACT AGREEMENTS FOR PRICING  | 1         | .1      |

|   |   |    |
|---|---|----|
| Contract pricing  | 1 | .1 |
| CONTRACT PURCHASE   | 1 | .1 |
| Contract restrictions   | 1 | .1 |
| Contract with service company   | 1 | .1 |
| Contrast vendor does not have prefilled syringes for Med-rad injector   | 1 | .1 |
| Contrast is not available in 50cc doses in plastic. We have always used glass   | 1 | .1 |
| CONTRAST NOT OFFERED IN PREFIL  | 1 | .1 |
| Contrast not offered prefilled for specific type of power injectors.  | 1 | .1 |
| CONTRAST NOT ORDERED FROM OUR DEPT,   | 1 | .1 |
| CONVENIENCE = TRADITION   | 1 | .1 |
| Cost effectiveness  | 1 | .1 |
| Cost is a strong factor in our facility, consideration of waste/recycling is not. Why does the manufacturer not do more for recycling such as Kodak does for the laser film printer cartridges and packaging we use in CT?  | 1 | .1 |
| Currently in "buying group" to purchase bottles until year end. Will then research bulk packaging.  | 1 | .1 |
| Delivery by the company this way to the hospital  | 1 | .1 |
| Did not know about polymer bottles until recently   | 1 | .1 |
| Did not know any other types existed.   | 1 | .1 |
| DID NOT KNOW OF PLAST/POLYMER   | 1 | .1 |
| Did not know that there were other methods of packaging.  | 1 | .1 |
| Did not know there were plastic bottles available.  | 1 | .1 |
| Didn't know it came in plastic bottles  | 1 | .1 |
| DIDN'T KNOW THERE WERE PLASTIC  | 1 | .1 |
| Disposal of glass   | 1 | .1 |
| Do not know why we still use the glass bottles. There has been talk of using the polymer bottles, but the company is slow to act.   | 1 | .1 |
| Do not know!  | 1 | .1 |
| Doctors prefer Hypaque 50% used for ductograms in Mammography, and that is how it is ordered through the hospital.  | 1 | .1 |
| DON'T HAVE AVAILABLE PLASTIC  | 1 | .1 |
| DON'T KNOW. PURCHASING ISSUE  | 1 | .1 |
| Don't know  | 1 | .1 |
| ENTERPRISE WIDE DISTRIBUTION  | 1 | .1 |
| Even though it is the plastic container, it is very hard to pull the tab off of the contrast container. There is a yanking motion with the resistance built up. Also, the tabs when they break and the tab doesn't come off, we use the contrast bottle for filling up the contrast injector. | 1 | .1 |
| Exclusive contrast, with no alternative.  | 1 | .1 |
| GE Healthcare does not provide prefilled power injector syringes.   | 1 | .1 |
| GLASS BOTTLES ARE THE ONLY TYPE   | 1 | .1 |
| GOVT. PURCHASING  | 1 | .1 |
| Have always used and have not explored other options  | 1 | .1 |
| Have contract with purchasing group   | 1 | .1 |
| HAVEN'T HAD ANY COST EFFECTIVE  | 1 | .1 |
| Healthcare system contract  | 1 | .1 |
| Hospital belongs to a buying group and apparently there is a cost effective benefit, but I don't know for certain.  | 1 | .1 |
| I'm not in control of ordering so I don't know if it's more cost effective.   | 1 | .1 |
| I'm not sure why it's used. I don't do the ordering, so I don't know if it's cost effective or not.   | 1 | .1 |
| I'm not sure why the hospital buys this kind of contrast  | 1 | .1 |
| I'm not sure why we use glass bottles. Probably cost effectiveness  | 1 | .1 |

|  |   |    |
|--|---|----|
| I'm not sure why we use the glass vials. We have used them for as long as I have worked here. 7.5 yrs.   | 1 | .1 |
| I'm unsure why we use glass bottles. I didn't know they have any other type of packaging.  | 1 | .1 |
| I am not aware of the reason they changed to these bottles.  | 1 | .1 |
| I am not involved in the purchasing decision. Probably have a contract with the company.   | 1 | .1 |
| I am not sure if they are packaged any other way.  | 1 | .1 |
| I am not sure why we use glass bottles. I don't order contrast agents.   | 1 | .1 |
| I am unsure or have never been told that with Visipaque, which is used most often in my department, could come any other way but in glass vials.   | 1 | .1 |
| I continued to order and use what was used prior to my employment in work area.  | 1 | .1 |
| I didn't know there were options   | 1 | .1 |
| I do not know, other than the distributor packages in glass.   | 1 | .1 |
| I DO NOT LIKE PREFILLED SYRING   | 1 | .1 |
| I DON'T KNOW THE ANSWER  | 1 | .1 |
| I DON'T KNOW WHY WE USE GLASS  | 1 | .1 |
| I don't know.  | 1 | .1 |
| I don't really know why. Probably because that is what we have always had. Maybe cost...I've heard prefilled syringes are kind of costly. Also, versatility; can fill a syringe with 50, 100, or 150 ml depending on exam and patient needs. | 1 | .1 |
| I FEEL THAT THERE IS LESS CHAN   | 1 | .1 |
| I have been the Director of this department for 1 year and a couple of months. I have continued to order from the same vendor, but soon will be changing to Isovue. I will continue to order my contrast in bottle form.                     | 1 | .1 |
| I HAVE NO IDEA   | 1 | .1 |
| I HAVE NO IDEA ABOUT PRIMARY P   | 1 | .1 |
| I have no idea why we use this. Not in administrative position.  | 1 | .1 |
| I NEVER ASKED FOR ANY OTHER.   | 1 | .1 |
| I only use what is given to us. Decision on why we use what type of packaging is out of my control.  | 1 | .1 |
| I really don't know the answer. We receive most of our contrast by an automated ship. I don't believe the dept head has inquired as to the type of container. I have personally asked for glass recycling but with no response.              | 1 | .1 |
| I USE WHAT IS PROVIDED FOR ME. I HAVE USED GLASS, THE PLASTIC BOTTLE, AND THE PREFILLED SYRINGES.  | 1 | .1 |
| If offered in another packaging I do not know about it.  | 1 | .1 |
| It's poured out into a cup on a sterile tray   | 1 | .1 |
| It comes from the manufacturer in glass bottles, and as far as I know, no one has discussed supplying it to the hospital in another form   | 1 | .1 |
| IT COMES THAT WAY  | 1 | .1 |
| IT COMES THAT WAY. WE ARE MOVING to plastic bottles.   | 1 | .1 |
| It is just what we have.   | 1 | .1 |
| It is the only packaging I know of   | 1 | .1 |
| It is the only way we knew it came.  | 1 | .1 |
| It is the product that I trust to use on our patients.   | 1 | .1 |
| It is the way that Bracco packages the material. [Respondent's first name.]  | 1 | .1 |
| It is the way the manufacturer packages the product. Until recently, the past month, all our contrast was packaged in glass bottles. Now contrast is received in plastic bottles.  | 1 | .1 |
| IT IS UNKNOWN TO ME WHY CONTRAST IS ONLY DISPERSED AS SUCH. WE HAVE HAD THE GLASS BOTTLES FOR AT LEAST 8-10 YEARS THAT I KNOW OF.  | 1 | .1 |
| It is what our supplier brings us. I do the ordering and did not realize there was an alternative to the glass bottles. We use spikes for filling the syringes and do not normally have problems.  | 1 | .1 |
| It is what purchasing stocks   | 1 | .1 |
| Just the way it has always been done   | 1 | .1 |
| Mandated to use due to buying group. We use what is offered by vendor  | 1 | .1 |

|  |   |    |
|--|---|----|
| NEVER MENTIONED/EXPLAINED/ NO  | 1 | .1 |
| Never offered another packaging from rep or vendor   | 1 | .1 |
| Never presented an alternative   | 1 | .1 |
| No prefilled syringes available at this time.  | 1 | .1 |
| Not all of these different amounts come in plastic bottles. 50-100-125 glass, 500-plastic, now I have noticed 100 ml bottles of Visipaque  | 1 | .1 |
| Not aware that contrast is packaged in any other manner.   | 1 | .1 |
| NOT SURE   | 2 | .2 |
| Offered to organization, because we always have :)   | 1 | .1 |
| Only choice given by institution.  | 1 | .1 |
| Only option  | 1 | .1 |
| ONLY WAY IT IS OFFERED...WOULD LOVE PREFILLED POWER SYRINGES   | 1 | .1 |
| OPTIRAY IS PACKAGED IN THE GLASS   | 1 | .1 |
| Our injector will not take prefilled. We have to use the glass bottles to load.  | 1 | .1 |
| OUR SISTER HOSPITAL USES THE Contrast and so do we.  | 1 | .1 |
| Package deal for injector purchase making use of Optiray most cost effective   | 1 | .1 |
| Patient safety   | 2 | .2 |
| PATIENT SATISFACTION (VIALS ST   | 1 | .1 |
| Pharmacy orders our contrast and delivers it   | 1 | .1 |
| Plastic bottles is the way it is usually sent now. Occasionally we still receive glass bottles.  | 1 | .1 |
| Primary packaging is cheaper w/bottles. We tried polymer bottles but the cost was too great and there was no real problems with the glass bottles to justify the increased cost    | 1 | .1 |
| Purchasing agreement/injector do not match-Optiray does not make prefilled syringes for the Medrad injector.   | 1 | .1 |
| Recycling  | 1 | .1 |
| Small bottles not efficient. They are ordering bigger. No clue about cost effectiveness, etc.  | 1 | .1 |
| That's all that was ever offered to us by our hospital.  | 1 | .1 |
| THAT'S HOW THE CONTRACT COMES  | 1 | .1 |
| THAT'S HOW THEY'VE ALWAYS GOTTEN IT  | 1 | .1 |
| That's the way it comes  | 2 | .2 |
| That's the way the VA buys it.   | 1 | .1 |
| That is the way it comes packaged.   | 1 | .1 |
| That is the way the product is shipped. We don't believe we can change to packaging of our primary contrast product.   | 1 | .1 |
| That is what is provided by the vendors/warehouse.   | 1 | .1 |
| The glass bottles are all that are available for us to order.  | 1 | .1 |
| The glass vials are what we have always used. If I had to pick a reason, I would probably say cost effectiveness.  | 1 | .1 |
| The injector we use in CT does not have their syringes prefilled - in the process of getting a new scanner and injector and will definitely be looking into the prefilled syringes | 1 | .1 |
| THE PHARMACY DEPARTMENT DECIDES ON WHAT TYPE PACKAGING WE USE.   | 1 | .1 |
| The way it comes   | 1 | .1 |
| THIS IS HOW CONTRAST IS SHIPPED  | 1 | .1 |
| This is how it is supplied   | 1 | .1 |
| This is the only way offered   | 1 | .1 |
| This is the only way the pharmacy orders it.   | 1 | .1 |
| This is what is ordered by the person responsible for the contrast stock.  | 1 | .1 |
| This is what management orders   | 1 | .1 |
| THIS IS WHAT OUR PHARMACY ORDERS   | 1 | .1 |
| Unaware if contrast comes in another kind of bottle  | 1 | .1 |

|   |      |       |
|---|------|-------|
| Unknown   | 2    | .2    |
| Unknown management decision   | 1    | .1    |
| Unsure manager does not share that. Possibly due to cost.   | 1    | .1    |
| UNSURE WHY WE USE GLASS   | 1    | .1    |
| VENDOR  | 1    | .1    |
| Vendor is starting to change over to plastic now  | 1    | .1    |
| Volume and we have not had safety issues to change at this time   | 1    | .1    |
| VOLUME ORDER FOR LARGE HEALTHCare system.   | 1    | .1    |
| WAS NEVER ASKED TO CHANGE.  | 1    | .1    |
| Was not aware that there was an alternative.  | 1    | .1    |
| Was unaware that contrast was packaged differently.   | 1    | .1    |
| Way product is packaged   | 1    | .1    |
| We are a pediatric hospital and use varying amounts from 6cc's to 120cc's.  | 1    | .1    |
| We are presently looking at plastic packaging   | 1    | .1    |
| We don't purchase it for the packaging.   | 1    | .1    |
| We have just recently been given the opportunity to order the polymer bottles. It was an option to us before.   | 1    | .1    |
| We have never used any other packaging material than glass bottles/vials. It is what our contrast material are packaged.  | 1    | .1    |
| WE ONLY ORDER GLASS   | 1    | .1    |
| We only recently were approached by our Amersham rep. re: possibly changing to the plastic bottles. The increased cost for the plastic will need to be further evaluated but I am pretty sure we will make the change to plastic because of the safety and convenience. | 1    | .1    |
| We use a manually filled injector, and have to fill from bottles.   | 1    | .1    |
| We use a nonsodium diatrizoate medium and that is how it comes. Either a 50 ml or 100 ml bottle.  | 1    | .1    |
| We use both - prefilled syringes for cost effectiveness in CT and bottles in diagnostic and specials - no prefilled available for them. CT injections outnumber all others.   | 1    | .1    |
| We use Isovue 100% of the time and glass bottles 100% of the time. Use Isovue Bracco brand per Health Trust Purchasing Group contract savings and for Medrad older contrast auto injector.  | 1    | .1    |
| We use multidose bottle not addressed in survey   | 1    | .1    |
| We use omni 240, 300, 350 and Visipaque 320 seven days a week. Prefilled does not allow for odd dosing where multidose polymer containers does. We have little waste if one patient receives 75cc and another 130cc. Smaller bottles were single use only.              | 1    | .1    |
| WE USE THE 500 ML PLASTIC BOTT  | 1    | .1    |
| We use to use prefilled syringes, but we are trying to use less contrast so we do not want to throw away contrast from the refills.   | 1    | .1    |
| WHAT SUPPLIED BY MANUFACTURE  | 1    | .1    |
| WHAT THE HOSPITAL USES  | 1    | .1    |
| WHAT THE MANUFACTURER SENDS   | 1    | .1    |
| WHAT THE SUPPLIER DELIVERS  | 1    | .1    |
| Work in high volume CV lab --- packaging and use based upon individual use for charging purposes  | 1    | .1    |
| Works better with dual head power injector  | 1    | .1    |
| Total   | 1189 | 100.0 |

**16. Specify other job title/description.**

| Job Title/Description | Frequency | Percent |
|-----------------------|-----------|---------|
| Blank                 | 1176      | 98.9    |
| CARDIOLOGY DIRECTOR   | 1         | .1      |
| CHIEF                 | 1         | .1      |

|                                  |      |       |
|----------------------------------|------|-------|
| CHIEF TECH                       | 2    | .2    |
| CHIEF TECH TECHNICAL COORDINATOR | 1    | .1    |
| CHIEF TECHNOLOGIST               | 1    | .1    |
| PERFORM CT AS WELL               | 1    | .1    |
| RADIOLOGY PRACTITIONER ASSISTANT | 1    | .1    |
| SPECIALS R.T. ALSO               | 1    | .1    |
| SUPERVISOR                       | 1    | .1    |
| TECHNOLOGIST                     | 1    | .1    |
| TRAVELER                         | 1    | .1    |
| Total                            | 1189 | 100.0 |

## 17. Other primary discipline/sphere of employment

| Response  | Frequency | Per cent |
|---|-----------|----------|
| Blank   | 970       | 81.6     |
| Angio suite coordinator   | 1         | .1       |
| We do a lot more MRIs than CT scans.  | 1         | .1       |
| I work mainly in the cath lab, but also work in diagnostic x-ray when they are short  | 1         | .1       |
| The hospital we work in is a state mental institute and as of right now we only have x-ray and fluoroscopy exams.                         | 1         | .1       |
| 50% in special procedures and 50% in mammography. Both areas use contrast media. Mainly Omnipaque 180 and 300 for Ductography procedures. | 1         | .1       |
| 50% MRI, 50% CT   | 1         | .1       |
| 80% MRI, 20% CT   | 1         | .1       |
| Admin   | 1         | .1       |
| Administrative over a multi-modality radiography dept. CT, MR, X-ray, Nuc. and US   | 1         | .1       |
| ALL AREAS   | 1         | .1       |
| All areas of radiology  | 1         | .1       |
| All aspects   | 1         | .1       |
| All of the above  | 2         | .2       |
| All of the above modalities, as well as MR.   | 1         | .1       |
| Both CT and mammography   | 1         | .1       |
| Both CT and rad- pretty much 1/2 and 1/2  | 1         | .1       |
| BOTH CT AND RADIOGRAPHY   | 1         | .1       |
| CT and radiology, radiology administrator   | 1         | .1       |
| Cardiac cath  | 2         | .1       |
| Cardiac cath and interventional radiology labs  | 1         | .1       |
| Cardiac cath is primary, also do a lot of interventional  | 1         | .1       |
| Cardiac cath lab  | 15        | 1.4      |
| CARDIAC CATH TECH   | 1         | .1       |
| Cardiac catheterization   | 2         | .1       |
| Cardiac catheterization and intervention  | 1         | .1       |
| CARDIAC INTERVENTIONAL  | 1         | .1       |
| Cardiology  | 1         | .1       |
| CARDIOLOGY  | 1         | .1       |
| Cardiology cath lab   | 1         | .1       |
| Cardiovascular-Interventional technology (Cath Lab)   | 1         | .1       |

|  |   |    |
|--|---|----|
| Cardiovascular Lab - cardiac cath, diagnostic and interventional angiography, PCN's, IVCF's, UFE, Kyphoplasty  | 1 | .1 |
| Cardiovascular lab   | 1 | .1 |
| Cath lab   | 1 | .1 |
| Cath Lab cardiology  | 1 | .1 |
| CATH LAB PERIPHERAL SUPERVISOR   | 1 | .1 |
| Chief technologist   | 2 | .2 |
| Chief technologist...mostly cover in CT or MRI occasionally mammo/xray.  | 1 | .1 |
| Clinical coordinator at a teaching institution.  | 1 | .1 |
| Clinical instructor for 12 full-time students.   | 1 | .1 |
| Clinical instructor/quality/education  | 1 | .1 |
| Co-manager (and PACS administrator) with work expertise in CT & radiology for a urology group.                 | 1 | .1 |
| CT and MR  | 2 | .2 |
| CT and radiology work both areas   | 1 | .1 |
| CT, specials and diagnostic - working manager  | 1 | .1 |
| CT and x-ray   | 1 | .1 |
| CT nuclear medicine, PET imaging, radiography  | 1 | .1 |
| CT supervisor  | 1 | .1 |
| CT, specials and radiology   | 1 | .1 |
| Department manager   | 1 | .1 |
| Dept. director. R.T.(R)(CT)  | 1 | .1 |
| Director of diagnostic imaging ( all modalities)   | 1 | .1 |
| Director of imaging department   | 1 | .1 |
| Director of operations but I am a CT/MR technologist also.   | 1 | .1 |
| Director of radiology, CT, interventional, MR, sonography, mammography, PACS, nuc med                          | 1 | .1 |
| DIRECTOR OF RADIOLOGY/ INTERVENTIONAL RAD  | 1 | .1 |
| Director radiology, (nuclear medicine)   | 1 | .1 |
| Director, R.T.(R), MR, CT  | 1 | .1 |
| E-mail [respondent gave his/her email address]   | 1 | .1 |
| ELECTROPHYSIOLOGY LAB  | 1 | .1 |
| Evenly divided between CT/mammography/radiography/bone density   | 1 | .1 |
| Half and half in each - radiography and CT   | 1 | .1 |
| Heart cath lab   | 1 | .1 |
| Hospital including multimodalities   | 1 | .1 |
| I also perform CT exams daily.   | 1 | .1 |
| I am a CT simulation technologist in radiation therapy.  | 1 | .1 |
| I am a department director in a small hospital, so I work in all areas of radiology, CT, US, NM, MR and x-ray. | 1 | .1 |
| I am a department director with oversight over all these areas.  | 1 | .1 |
| I am a staff tech that specialized in angiography and cardiac cath.  | 1 | .1 |
| I AM A STAFF TECHNOLOGIST WORKING A WEEKEND OPTION SHIFT. I DO APPROXIMATELY 50/50 WORK IN RADIOGRAPHY AND CT  | 1 | .1 |
| I am a working manager that performs all radiologic and CT exams in addition to management duties.             | 1 | .1 |
| I am an R.T. but I operate the C-Arm for a physiatry clinic (orthopedic and spine clinic)                      | 1 | .1 |
| I am involved in both CT and the diagnostic radiography.   | 1 | .1 |
| I am supervisor over diagnostic, US and CT staff.  | 1 | .1 |
| I am the administrator as well as a working supervisor active in CT, x-ray, mammography and ultrasound         | 1 | .1 |

|  |    |     |
|--|----|-----|
| I am the CT coordinator at a 350-bed hospital. We have 3 CT scanners on which we do CT angiography studies that use contrast.  | 1  | .1  |
| I am the director of the diagnostic imaging department of a small, rural hospital. I oversee all the departments.  | 1  | .1  |
| I am the facility administrator and a back-up MR and CT technologist   | 1  | .1  |
| I am the MR supervisor and have responsibilities to supervise and perform CT on an as-needed basis. I perform about 10-20% of all CT exams in my department. I also assist in training new radiologic technologists in CT. | 1  | .1  |
| I do both computed tomography and x-ray (Radiography) equally in my job.   | 1  | .1  |
| I do full time CT and per diem neuro interventional radiology.   | 1  | .1  |
| I have many years of experience in interventional/cardiac cath, but presently, my primary is management over Genera  | 1  | .1  |
| I have one 12-hour day that is completely CTs and three nine hour days that are x-ray  | 1  | .1  |
| I manage radiography, CT, and angio areas.   | 1  | .1  |
| I supervise an OP center. 95% of contrast used is in prefilled syringes for CT and 5% come in bottles for IVPs.  | 1  | .1  |
| I work in a small community hospital. I am involved in CT, angio and OR as well as radiography. I see contrast used  | 1  | .1  |
| I work in radiography and interventional radiography. We have the prefilled syringes for radiography and we use the prefilled syringes with hand injection in interventional.  | 1  | .1  |
| I work weekends only and I am the primary CT person for the weekends. I do both CT and radiography.  | 1  | .1  |
| IMAGING TECH   | 1  | .1  |
| In my work at a small hospital, I do MR, CT, and radiography work. I'm also the one who orders the supplies for our dept.  | 1  | .1  |
| Interventional cardiology  | 1  | .1  |
| Interventional cardiology  | 1  | .1  |
| Interventional cardiovascular services: interventional cardiac procedures. Interventional peripheral vascular procedures   | 1  | .1  |
| IR   | 1  | .1  |
| Lead CT technologist.  | 2  | .2  |
| Lead technologist CR   | 1  | .1  |
| Lead technologist/interventional radiology   | 1  | .1  |
| MAMMO TECHNOLOGIST   | 1  | .1  |
| Mammography  | 4  | .4  |
| Mammography is primary; radiography is secondary   | 1  | .1  |
| Manager duties along with working technologist in radiology, CT, nuclear medicine and mammography  | 1  | .1  |
| Manager. Technologist for CT, MR, mammography and x-ray.   | 1  | .1  |
| MR/CT  | 1  | .1  |
| MR   | 24 | 2.0 |
| MR AND CT  | 4  | .4  |
| MR and CT together.  | 1  | .1  |
| MR, CT   | 1  | .1  |
| MR, CT, X-RAY ADMINISTRATOR  | 1  | .1  |
| MR is my primary and CT would be secondary.  | 1  | .1  |
| MR is primary, CT secondary  | 1  | .1  |
| MR SPECIAL PROCEDURES  | 1  | .1  |
| MR technologist, also help in CT and radiography, with injections. Coordinator for MR and CT.  | 1  | .1  |
| MR Technologist with CT 2 days a month.  | 1  | .1  |
| MR training  | 1  | .1  |
| MR/CT  | 3  | .3  |
| MRI/CT technologist  | 1  | .1  |

|   |   |    |
|---|---|----|
| MRT   | 1 | .1 |
| Neuro and interventional radiology  | 1 | .1 |
| Office manager of an MRI center   | 1 | .1 |
| Operations manager for entire department  | 1 | .1 |
| Operations manager of a full line service that includes NM, US, MR, CT, angio, mammo as well as radiology.                        | 1 | .1 |
| Our department works in CT and vascular intervention. I answered according to both modalities. We use all glass contrast bottles. | 1 | .1 |
| Outpatient heart cath lab   | 1 | .1 |
| PACS administrator/floor supervisor diagnostic radiology/clinical educator  | 1 | .1 |
| Perform both radiography and CT exams daily. About 50/50  | 1 | .1 |
| Primarily MR, but also conduct CT scans   | 1 | .1 |
| Quality assurance   | 1 | .1 |
| Radiography coordinator/RIS/PACS  | 1 | .1 |
| Radiation oncology  | 1 | .1 |
| Radiation therapist   | 1 | .1 |
| Radiation therapy   | 2 | .2 |
| RADIOGRAPHY, CT AND US  | 1 | .1 |
| Radiology administration  | 1 | .1 |
| Radiology clinical instructor/education coordinator, and senior staff   | 1 | .1 |
| RADIOLOGY, CT, MR AND MAMMO   | 1 | .1 |
| RADIOLOGY HYBRID CT   | 1 | .1 |
| Radiology nurse   | 1 | .1 |
| Recently crosstrained -- too green.   | 1 | .1 |
| Registered CT Technologist, chief technologist/administrator of an outpatient imaging center.                                     | 1 | .1 |
| RIS/PACS administrator and radiology supervisor   | 1 | .1 |
| RT, RCIS, invasive cardiac lab, inventory manager, senior staff technologist. The only reason we use glass is cost.               | 1 | .1 |
| Radiation therapist   | 1 | .1 |
| Shared time between CT and interventional along w/managerial functions  | 1 | .1 |
| Small rural hospital, one technologist on duty at a time, we are all the primary for radiography and CT                           | 1 | .1 |
| Special procedure, diagnostic, PICC lines, etc.   | 1 | .1 |
| Special procedures  | 1 | .1 |
| Special procedures technologist in both cardiac cath. lab and radiologic peripheral vascular lab.                                 | 1 | .1 |
| Specials technologist, cath lab technologist, back-up x-ray   | 1 | .1 |
| Split time in CT and generals.  | 1 | .1 |
| Split time in IR and MR   | 1 | .1 |
| Staff technologist in a cardiac cath lab, peripheral interventional lab, and EP lab. I also teach radiology technology            | 1 | .1 |
| Supervising technologist in an IR suite.  | 1 | .1 |
| Supervisor of radiology department. Registered in radiology, radiation therapy, competent in mammography                          | 1 | .1 |
| Supervisor of small radiology dept. encompassing all areas/modalities   | 1 | .1 |
| SUPERVISOR, DIAGNOSTIC IMAGING:GENERAL RADIOGRAPHYCTNMUSECHOVASCULAR (NON-IMAGING)  | 1 | .1 |
| Surgical radiography  | 1 | .1 |
| Surgical radiology: We specialize in vascular work in addition to cholangiograms, ERCPs, etc.                                     | 1 | .1 |
| Swing lab cath lab/interventional radiology   | 1 | .1 |
| This is what we use 95% of the time   | 1 | .1 |
| Ultrasound when not busy come out of department and do x-rays   | 1 | .1 |

|  |      |       |
|--|------|-------|
| Urology radiology  | 1    | .1    |
| Vascular intervention.                                     | 1    | .1    |
| Vascular interventional radiology.                         | 1    | .1    |
| We have CT, MR, and X-ray in an outpatient imaging center. | 1    | .1    |
| Worked CT25 yrs.   | 1    | .1    |
| Working manager/ct/mammo/diagnostic                        | 1    | .1    |
| X-ray, CT and interventional                               | 1    | .1    |
| Total  | 1189 | 100.0 |

## 18. Other best descriptor of your healthcare organization.

18ao. Please specify:

| Response  | Frequency | Percent |
|---|-----------|---------|
| Blank   | 1063      | 89.4    |
| 25-bed CAH rural  | 1         | .1      |
| 90-bed hospital with a very busy CT department                  | 1         | .1      |
| 94-bed community hospital                                       | 1         | .1      |
| A community hospital that has residents and a radiology program | 1         | .1      |
| AMBULATORY FACILITY   | 1         | .1      |
| Cancer center   | 1         | .1      |
| Diagnostic imaging center                                       | 2         | .2      |
| DOCTOR OFFICE   | 1         | .1      |
| DOCTORS OFFICE  | 1         | .1      |
| Freestanding outpatient surgery center                          | 1         | .1      |
| Freestanding outpatient imaging center                          | 1         | .1      |
| Freestanding diagnostic center                                  | 1         | .1      |
| Freestanding radiology center                                   | 1         | .1      |
| Freestanding radiology facility                                 | 1         | .1      |
| FREESTANDING CANCER CENTER                                      | 1         | .1      |
| FREESTANDING CLINIC   | 2         | .2      |
| Government hospital   | 1         | .1      |
| Health maintenance organization                                 | 1         | .1      |
| Heart hospital  | 1         | .1      |
| Hospital (community/teaching)                                   | 1         | .1      |
| Hospital-based outpatient imaging center                        | 1         | .1      |
| Hospital-owned outpatient diagnostic center                     | 1         | .1      |
| However, we do have radiography students rotate through.        | 1         | .1      |
| I already completed the questionnaire online                    | 1         | .1      |
| I HAVE TWO JOBS   | 1         | .1      |
| I supervise CT in both the hospital setting and the OP clinic.  | 1         | .1      |
| I work at the hospital as well                                  | 1         | .1      |
| I work for a group of physicians (approx. 12)                   | 1         | .1      |
| Imaging center  | 11        | .8      |
| Imaging center with full modality                               | 1         | .1      |
| Imaging facility  | 1         | .1      |

|   |   |    |
|---|---|----|
| Large outpatient urology practice with outpatient                         | 1 | .1 |
| Large physician practice  | 1 | .1 |
| Level one trauma center/community hospital/children's hospital            | 1 | .1 |
| Level one trauma hospital. It is also a teaching hospital.                | 1 | .1 |
| MDACC   | 1 | .1 |
| Medical facility in the U.S. Air Force                                    | 1 | .1 |
| MEDICAL GROUP   | 1 | .1 |
| Multihospital system with residency and nursing programs                  | 1 | .1 |
| Multiple hospital organization  | 1 | .1 |
| My facility is a freestanding healthcare facility                         | 1 | .1 |
| Office  | 1 | .1 |
| Outpatient clinic run by hospital.  | 1 | .1 |
| Outpatient facility   | 7 | .5 |
| Outpatient imaging center   | 1 | .1 |
| Outpatient imaging facility.  | 1 | .1 |
| Outpatient multimodality imaging center.                                  | 1 | .1 |
| Outpatient radiology office   | 1 | .1 |
| Outpatient  | 3 | .2 |
| OUTPATIENT CENTER   | 3 | .3 |
| Outpatient clinic attached to a teaching hosp                             | 1 | .1 |
| OUTPATIENT CT SCAN FACILITY   | 1 | .1 |
| Outpatient diagnostic Imaging center                                      | 1 | .1 |
| Outpatient doctor's office  | 1 | .1 |
| Outpatient hospital   | 1 | .1 |
| Outpatient hospital with an ER and OR but no inpatient beds except 23 hr. | 1 | .1 |
| OUTPATIENT IMAGING CENTER   | 1 | .1 |
| Outpatient imaging  | 1 | .1 |
| Outpatient Imaging center   | 7 | .5 |
| Outpatient imaging center owned by radiologists                           | 1 | .1 |
| Outpatient imaging office   | 1 | .1 |
| Outpatient medical imaging center   | 1 | .1 |
| OUTPATIENT RADIOLOGY  | 1 | .1 |
| OUTPATIENT RADIOLOGY FACILITY   | 1 | .1 |
| Outpatient urological surgery center                                      | 1 | .1 |
| Private doctor's office   | 1 | .1 |
| Private facility  | 1 | .1 |
| Private hospital  | 1 | .1 |
| Private imaging center  | 2 | .1 |
| Private imaging center full modality                                      | 1 | .1 |
| Private imaging facility.   | 1 | .1 |
| PRIVATE OFFICE  | 6 | .4 |
| Private office dedicated to dialysis accesses                             | 1 | .1 |
| Private outpatient center   | 1 | .1 |
| PRIVATE PRACTICE  | 1 | .1 |
| Private practice located within a hospital.                               | 1 | .1 |
| Private radiology office  | 2 | .1 |

|  |      |       |
|--|------|-------|
| Private, physician-owned hospital.   | 1    | .1    |
| Small community hospital in large metropolitan area                                    | 1    | .1    |
| S___ Hospital ___, MI - 400 bed  | 1    | .1    |
| Specialty for-profit heart hospital  | 1    | .1    |
| Specialty: ventilator, rehab and wound care, and associated long term skilled nursing. | 1    | .1    |
| St. ___ Medical CenterOne St. ___'s Place  | 1    | .1    |
| State mental health institute.   | 1    | .1    |
| University health center   | 1    | .1    |
| University of ___ imaging/radiation therapy  | 1    | .1    |
| VA MEDICAL CENTER  | 2    | .2    |
| VAMC   | 1    | .1    |
| We are a 35-bed community hospital.  | 1    | .1    |
| We are a teaching facility (hospital).   | 1    | .1    |
| WE DO BOTH HOSPITAL AND CLINIC   | 1    | .1    |
| WORK IN A UROLOGIST OFFICE   | 1    | .1    |
| Total  | 1189 | 100.0 |

### Other descriptor of size of hospital

18bo. Please specify:

| Response   | Frequency | Percent |
|--|-----------|---------|
| Blank  | 1047      | 88.0    |
| 125-bed hospital. I am only full-time tech   | 1         | .1      |
| 20-bed outpatient surgery diagnostic hospital  | 1         | .1      |
| 25 bed   | 1         | .1      |
| 25-bed acute care rural hospital   | 1         | .1      |
| 250 beds with large outpatient population  | 1         | .1      |
| 28 outpatient imaging centers  | 1         | .1      |
| 57   | 1         | .1      |
| All outpatient   | 1         | .1      |
| Ambulatory care center   | 1         | .1      |
| Approx. 300 beds   | 1         | .1      |
| As above   | 1         | .1      |
| Average 10 CTs a day   | 1         | .1      |
| Cancer center  | 1         | .1      |
| Clinic - consisting of outpatient services   | 1         | .1      |
| Clinic   | 2         | .2      |
| Clinic no bed size   | 1         | .1      |
| CLINIC NO BEDS   | 1         | .1      |
| Clinic. Just a question, I have read recently that plastic contains Dioxians, from an article of John Hopkins, so how can you ensure using plastic products will be more helpful than harmful for all of us? Plus, you are not supposed to warm plastic so how will we inject properly? Just something to think about..... | 1         | .1      |
| Contact info for the drawing: [Name, etc.]   | 1         | .1      |
| Diagnostic imaging center  | 1         | .1      |
| Freestanding clinic  | 1         | .1      |
| Freestanding imaging center private out  | 1         | .1      |
| Freestanding MRI center/utilized a C arm   | 1         | .1      |

|  |   |    |
|--|---|----|
| I believe there are 70                                     | 1 | .1 |
| I DON'T WORK IN A HOSPITAL                                 | 1 | .1 |
| I think we have 275 beds in our hospital.                  | 1 | .1 |
| I WORK FOR AN OUTPATIENT CLINC                             | 1 | .1 |
| I work in a 5 doctor urology office.                       | 1 | .1 |
| Imaging center   | 4 | .4 |
| imaging center only  | 1 | .1 |
| Imaging facility   | 1 | .1 |
| It is not a hospital. We do not have a bed.                | 1 | .1 |
| Large health care system with several hosp                 | 1 | .1 |
| More than 300 less than 500                                | 1 | .1 |
| Multispecialty group                                       | 2 | .2 |
| Multiple hospitals   | 1 | .1 |
| Multiple specialty facility.                               | 1 | .1 |
| My facility is an outpatient imaging center                | 1 | .1 |
| N/A outpt.   | 1 | .1 |
| No bed out patient facility only                           | 1 | .1 |
| No beds  | 3 | .2 |
| NO BEDS IN AND OUT   | 1 | .1 |
| No beds just clinic or imaging center                      | 1 | .1 |
| No beds. "Walkie-talkie" patients.                         | 1 | .1 |
| No beds/freestanding radiology center                      | 1 | .1 |
| No inpatients at all.                                      | 1 | .1 |
| No inpatient beds. We have 18 ER treatment beds.           | 1 | .1 |
| No inpatient care, just outpatient clinic                  | 1 | .1 |
| None   | 1 | .1 |
| NOT A HOSPITAL FACILITY                                    | 1 | .1 |
| NOTE: I USE PREFILLED SYRINGES, NO MED                     | 1 | .1 |
| On hospital campus. Hospital has less than 300 beds.       | 1 | .1 |
| Oncology clinic  | 1 | .1 |
| One of 5 in our "system" of facilities                     | 1 | .1 |
| OP center  | 1 | .1 |
| Our imaging center has 1 x-ray room, 1 ct                  | 1 | .1 |
| Outpatient   | 1 | .1 |
| Outpatient facility  | 2 | .2 |
| Outpatient imaging center                                  | 1 | .1 |
| Outpatient ortho practice                                  | 1 | .1 |
| Outpatient radiology                                       | 1 | .1 |
| Outpatient   | 4 | .3 |
| Outpatient clinic  | 1 | .1 |
| OUTPATIENT CLINIC OF 25 DOCTORS AND A Radiation Oncologist | 1 | .1 |
| Outpatient clinics 4 in the company                        | 1 | .1 |
| Outpatient facility  | 5 | .3 |
| Outpatient imaging facility                                | 1 | .1 |
| Outpatient imaging   | 1 | .1 |
| Outpatient only  | 1 | .1 |

|   |      |       |
|---|------|-------|
| Outpatient private practice.  | 1    | .1    |
| Outpt. clinic   | 1    | .1    |
| Outpatient  | 3    | .3    |
| Outpatient ambulatory care center   | 1    | .1    |
| Outpatient care only  | 1    | .1    |
| Outpatient cath lab owned by the cardiologist.  | 1    | .1    |
| Outpatient center   | 3    | .3    |
| Outpatient clinic   | 7    | .6    |
| Outpatient clinic. I would like to see our clinic recycle the glass bottles. It goes in regular garbage. Isn't the polymer bottle's shelf life less? When opened, what is the window of when it can still be safely used? I understood that the glass bottles had a little more time frame after opening. | 1    | .1    |
| Outpatient diag. clinic.  | 1    | .1    |
| Outpatient diagnostic center  | 2    | .2    |
| Outpatient diagnostic imaging center  | 1    | .1    |
| Outpatient facility--no beds  | 1    | .1    |
| Outpatient facility   | 7    | .5    |
| OUTPATIENT FACILITY OF A UNIVERSITY HOSPITAL  | 1    | .1    |
| Outpatient imaging center   | 5    | .3    |
| Outpatient Imaging facility   | 1    | .1    |
| Outpatient private office   | 1    | .1    |
| Outpatient procedures only  | 1    | .1    |
| OUTPATIENT RADIOLOGY CLINIC   | 1    | .1    |
| Outpatient radiology facility   | 1    | .1    |
| Outpatients only  | 1    | .1    |
| Overall comment: The injuries and incidents described above reflect the time prior to switching to polymer bottles.   | 1    | .1    |
| Private company   | 1    | .1    |
| Private practice of about 12 physicians.  | 1    | .1    |
| Private radiology office  | 1    | .1    |
| Radiology outpatient clinic   | 1    | .1    |
| Rural community hospital  | 1    | .1    |
| See above   | 2    | .2    |
| Surgical center   | 1    | .1    |
| This is for the hospital  | 1    | .1    |
| Urology office/private office   | 1    | .1    |
| We are an ambulatory orthopedic and spine   | 1    | .1    |
| We do not have hospital beds rather cages   | 1    | .1    |
| Total   | 1189 | 100.0 |

**“Bonus” Comments Written on Questionnaire**

**Bonus comments written on questionnaire**

| Response  | Frequency | Percent |
|---|-----------|---------|
| Blank   | 1183      | 99.5    |
| Bottom of 1st page: Survey not recv'd till 8/22/05. | 1         | .1      |

|  |      |       |
|--|------|-------|
| Q2: All media are in plastic easy open bottles. Q5 (na): Use noniodinated contrast (Omnipaque) (Visipaque). Q6: VISI for all diabetics and/or renal patients. Run (up arrow) 20. CR (up arrow) 1.2. Q13 (never): (Plastic). After Q15 stem: Labeling could be better -- colored top for size and type of contrast. 75ml same size as 100 ml. | 2    | .2    |
| Q2: ONLY use prefilled syringes.   | 1    | .1    |
| Qualifying questions (No/No): Work at an orthopedic office.  | 1    | .1    |
| Qualifying questions: RETIRED!   | 1    | .1    |
| Total  | 1189 | 100.0 |