

RPC WEBPAGE NEWSLETTER

Volume 3, Issue 3

May 2004

TLD Results: How does your institution compare?

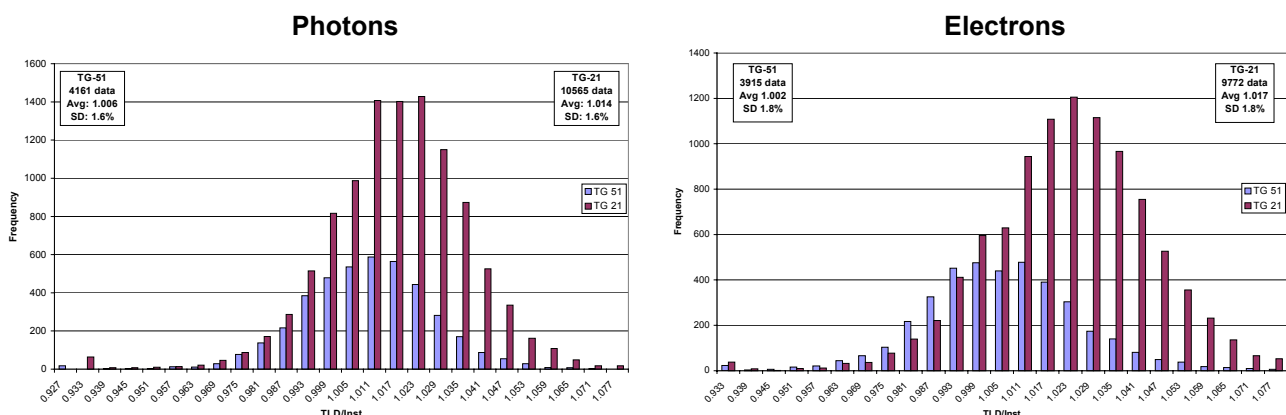
All institutions that participate actively in clinical trials are continuously monitored by the RPC. This is done using a variety of tools, some of them remote and others that require visits to the institution. Remote tools range from questionnaires, benchmark treatment plans, and review of patient dosimetry, to verifications of dose output, dose distributions or beam energy through the use of mailed dosimeters and phantoms. One of the RPC's largest programs is the mailed thermoluminescent dosimetry program that verifies basic machine output and energy as required by the cooperative study groups and by NCI's Cancer Therapy Evaluation Program (CTEP). This program provides a mechanism for identifying potential problems at new institutions and provides remote surveillance of participating institutions. The results of the TLD assessment are reported to the institution. If the institution and the RPC disagree by more than 5% in absorbed dose, the discrepancy is discussed by phone with the participating physicist to identify the source of discrepancy. A second set of TLD is then mailed immediately. If the discrepancy persists, the RPC schedules an on-site dosimetry review visit with the participating physicist to investigate and resolve the discrepancy.

The majority of TLD readings fall within the 5% criteria and TLD/institution ratios are distributed approximately normally about 1.0. The attached table and figures demonstrate this distribution. It should be noted that the figures exclude TLD/institution ratios exceeding $\pm 7\%$ error as these outliers often reflect set-up errors or incorrect MU settings. The figures also indicate the impact of the adoption of the new AAPM TG-51 calibration protocol. As of this writing, about 50% of institutions have converted to the new protocol. Institutions continuing to use the TG-21 protocol, and basing their calibrations on NIST-traceable instrument calibrations dated before July 1, 2003 are delivering doses that are 1% (photons) or 2% (electrons) greater than those indicated by the new protocol.

The figures indicate that TLD/institution ratios are characterized by the following means and standard deviations:

| Beam and Protocol | Mean | Standard Deviation |
|-------------------|-------|--------------------|
| Photons, TG-21 | 1.014 | 1.6% |
| Photons, TG-51 | 1.006 | 1.6% |
| Electrons, TG-21 | 1.017 | 1.8% |
| Electrons, TG-51 | 1.002 | 1.8% |

Clearly, the variations in readings are small, and 95% of measurements (2 standard deviations) fall within $\pm 4\%$ of the mean. The RPC's experience with its "standard" TLD measurements indicates a standard deviation of just under 1.0%. Consequently, the RPC's criterion of acceptability of 5% appears to be justified. Institutions whose TLD/institution ratios fall outside $\pm 5\%$ are clearly deviating significantly from other participating institutions.



Additional information about the RPC's TLD program can be obtained by contacting the RPC (713/745-8989).

For previous issues of the RPC Newsletter, please visit the [FAQ](#) page.