

REPORT TO THE AAPM THERAPY PHYSICS COMMITTEE

Report No. 1

September 22, 2013 – April 21, 2014

ADMINISTRATIVE

This is the last RPC report and the first IROC Houston report to the AAPM's TPC after 45 years of RPC reports. As such I have begun to renumber the report as Report No. 1. The RPC grant ended officially on December 31, 2013 and was given an administrative extension until February 28, 2014. Effective March 1, 2014, the NCI's Cooperative Clinical Trial Program ceased to exist and the new National Clinical Trial Network Program began. As mentioned before, a component of the NCTN was an Imaging and Radiation Oncology Core service that the former trial QA centers joined to respond to the FOA. The new organization is called the Imaging and Radiation Oncology Core (IROC) Cooperative. It consists of 6 QA centers as shown in figure 1. Although we began the new NCTN program on March 1st, we have yet to receive our award notice. What we do know is that we were recommended for the full requested amount of \$15.3M, but will get no more than \$7.0M as submitted by CTEP to the NCI's Office of Grants Administration. The \$7.0M total cost figure is what NCI paid the RPC, QARC, ATC plus \$1.0M prior to the NCTN program. Now the \$7.0M must cover these same groups plus the imaging QA centers and RTOG QA. Not only did the Core services' funding get a significant cut but the 5 new NCTN groups also got their funding cut. The NCTN has a fixed budget that cannot be exceeded thus a limit of patient accrual is also in effect. As a part of IROC, this year has been a transition year and this next year (2014) will be a year of evolution as we all try to adjust to our new funding reality. All of the QA centers are struggling to assess their ability to provide core services. It is anticipated that services across the board will be reduced to a minimum. The funding from NCI for IROC Houston has been cut by 54% with no possibility of reinstatement. The severity of this cut is lessened somewhat by the IROC Houston annual QA fee that has been in place for 20 years now. The final percent cut in our funds effectively approaches only 33% with no possibility of additional NCI funds. This 33% cut is still quite significant requiring us to find additional funding and cost savings on the order of \$1.0M per year.

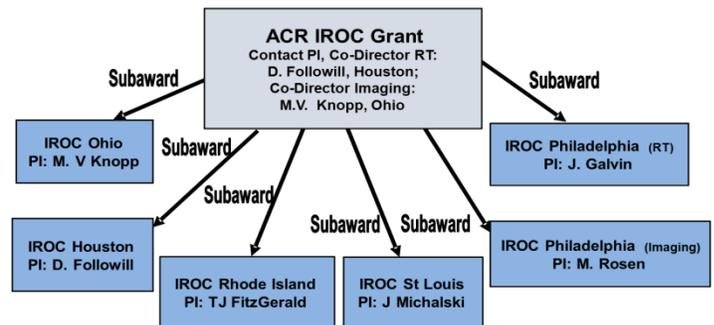


Figure 1. The IROC grantee, QA centers and PIs.

Additional IROC Houston Funded Efforts

Dept. of Veterans Affairs Contract

We have received a no cost extension to the VA contract until June 30, 2014 when a new 3 year contract will begin. We were able to visit all of the 38 VA radiotherapy centers. The VA contract will bring in another \$230K per year to help support our QA activities.

IROC Houston continues to be asked to provide its QA services for clinical trials conducted outside of North America. We are currently monitoring nearly 250 radiotherapy sites in 46 countries. Many of these international sites are affiliated with the RTOG, COG or GOG. NCI is in full support of these international efforts as they increase accrual to clinical trials.

International Activities

1. Aids Malignancy Consortium Contract
2. ANZGOG Outback Trial Supplement
3. Korean GOG (KGOG) Cervical Cancer TACO Trial

Proton Therapy Site Approval MGH Federal Share Contract

IROC Houston has carried forward funding support from MGH Federal Share funds for 2014 that includes a cost sharing mechanism. As such each new proton center will be invoiced a fee of \$12,000 for each site visit. We anticipate that 6 site visits will occur in 2014. In addition, IROC Houston staff spent a week at Heidelberg to learn their QA processes in regards to carbon ion therapy and to irradiate OSLD (see abstract this summer). We are also discussing with MGH the possibility of receiving additional federal share funds to continue our proton site approval/credentialing program.

IROC Houston Staffing Changes

There is only one personnel change since the last report.

Ashley Hollan (Research Dosimetrist) left IROC Houston on March 1, 2014.

IROC Houston currently employs 6 medical physicists (2 PhD and 4 MS), 1.5 dosimetrists, 4 physics assistants, 5 OSLD/TLD technical staff, 3 IT support staff, and 7 administrative/data staff. This is the smallest number of physicists and dosimetrists that IROC Houston has ever had and the current funding will not support any expansion even though the workload (institutions, beams monitored and phantoms mailed) continues to increase. Work effort for clinical trials will be reduced and staff effort placed on other contracts associated with the MD Anderson Dosimetry Lab (RT QA services for fee). We will continue to initiate new efficiencies to maximize our services to the clinical trials, but some services will not continue and be reduced such as:

1. Minimize travel to NCTN group meetings
2. Minimize onsite dosimetry review visits (except proton site visits or as required by contracts)
3. Discontinue patient dose recalculations for patients past the first patient/institution
4. Discontinue providing the prostate phantom for credentialing
5. Discontinue requiring re-irradiation of the IMRT phantom for VMAT
6. New remote QA audit tools (HDR brachy and small field OPF) offered only for a fee
7. Rely on remote QA audits.
8. Discontinue offering QA services for new Alliance studies (IROC RI responsibility)

9. Only work with patients records who got brachytherapy
10. Reduce the number of electronic credentialing benchmarks and use pre-treatment reviews of the first patient instead

IROC Houston currently has 2 MS students and 8 PhD students funded by Dr. Followill or Dr. Kry's institutional research funds or Dr. Ibbott's chairman's/research funds. All of the projects are designed to enhance the IROC Houston's dosimetry capabilities to verify the dose delivery/calculation at participating institutions.

STUDIES AND RESULTS

IROC Houston is aware of **3165** radiation therapy facilities worldwide (~**2700** in USA and Canada). IROC Houston currently monitors **2014** megavoltage therapy sites in North America and elsewhere in the world, that participate in cooperative group clinical trials funded by the NCI or collaborating with the NCI. The cooperative groups monitored include ECOG/ACRIN, Alliance, AMC, COG, EORTC, NRG Oncology, JGOG, KGOG, ANZGOG, and SWOG. Today, nearly 137 EORTC members are taking advantage of IROC Houston's remote audit programs. Because of limited funding from NCI, the services provided by IROC Houston will diminish especially to international unless other sources of funding are obtained.

IROC Houston currently provides QA monitoring services to nearly 242 radiotherapy facilities in 46 different countries outside of North America. This represents nearly a 70% increase in the number of international sites over the past 6 years.

IROC Houston QA Monitoring Activities: IROC Houston over the next year will be evaluating and evolving to best determine what QA services to institutions participating in NCI funded clinical trials as listed below can be provided.

- a) **On-Site Dosimetry Reviews:** IROC Houston physicists continued to make visits to North American study group participating sites to conduct on-site dosimetry reviews during 2013. In 2013, 34 radiotherapy sites (350 megavoltage photon, electron and proton beams) were audited. Going forward in the new NCTN program, the number of site visits will be diminished dramatically. The only site visits that will be conducted will those for dosimetry errors that cannot be resolved remotely, as required by a contract or to gather dosimetry data for new linac machines. The reliance on virtual visits that use the IROC Houston standard data instead of measurements will be the priority going forward for IROC Houston.
- b) **Proton Therapy Center Approval:** To date IROC Houston has made 16 visits to proton centers and has approved one or more treatment modalities at 11 of the 16 clinically active proton centers for the use in NCI funded clinical trials. We anticipate that 4-6 site visits to occur in 2014. I do not expect that the proton portion of the IROC Houston QA program to diminish since it was never funded by NCI, but rather from MGH funds and site visit cost sharing fees.
- c) **OSLD/TLD:** IROC Houston monitored nearly ~15,000 photon, electron and proton beams last year with 10-15% of the institutions requiring a repeat. OSLDs have been commissioned for proton beams but will not be used until the process is programmed within the IROC Houston database. Until that time we will continue to use TLD. In December 2013, IROC Houston physicists visited the carbon ion facility at Heidelberg to receive some training and to irradiate

OSLD to determine their usefulness as a carbon ion beam output audit dosimeter. The results will be in a poster at this summer's AAPM meeting. The ^{192}Ir HDR brachytherapy OSRD remote audit tool and the single beam small field size output factor audit tool that were developed and piloted, have not been implemented and are anticipated that they will not be implemented within the NCI program but may be offered for a fee. A new OSRD reader from Landauer is being evaluated for use at IROC Houston that will hopefully increase our work efficiency. A new TLD reader was purchased and commissioned. The existing TLD readers were approaching 15 years of use and were showing their age.

- d) **VA Agreement:** We are in a no cost extension of the VA contract while a new three year agreement with the Veterans Administration to provide remote audits and on-site dosimetry reviews to VA radiation therapy facilities is put into effect.
- e) **Credentialing Processes:** IROC Houston will be the RT QA center in charge of RT credentialing within the NCTN for protocols involving advanced technologies including HDR brachytherapy, IMRT, stereotactic radiosurgery (SRS), stereotactic body radiation therapy (SBRT) and proton therapy. Credentialing activities will be modified to adapt the reduced NCI funding such that

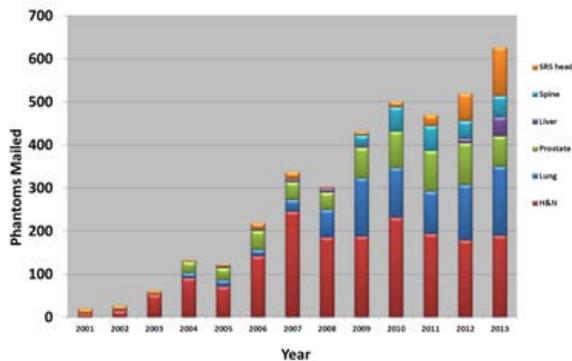


Figure 2. Number of phantoms shipped by year.

prostate phantoms (except for Cyberknife treatment) will not be used, VMAT will not require re-irradiation of a phantom, benchmark cases will be replaced with pre-treatment review of the first patient submitted by an institution onto a specific protocol, and a tiered/category approach to phantom irradiation has been developed to enhance grandfathering of institutions. In 2013, nearly 620 phantoms were shipped all around the world, but mainly to sites in North America (Figure 2). IROC Houston is hoping to reverse the increasing trend and to reduce the number of phantoms shipped in 2014. The historical pass rate now is between 67% - 85% depending on the phantom. The pass rate for the IMRT phantoms

for the past 2-3 years is between 85-90% with the exception of the liver phantom and spine phantom which are lower.

- f) **Assurance of Consistency of Clinical Trial Treatment Records:** In 2013 to date, individual protocol patient treatment records for 717 patients treated on GOG, NSABP, NCCTG, and RTOG protocols were evaluated. Of these, ~450 patients received either HDR or LDR brachytherapy treatments along with their external beam. IROC Houston continues to be the only QA center that performs extensive QA of the brachytherapy treatments for clinical trial patients. Within IROC, IROC Houston will only be responsible for those patient records that have brachytherapy and thus will most likely not evaluate patient records from Alliance (NCCTG) any longer.
- g) **Facility Questionnaire (FQ):** IROC Houston implemented a web-based facility questionnaire to be used by all study groups and their participants. To date, the questionnaire has been sent to all participating radiotherapy centers. IROC Houston was updated to include specific IMRT QA questions from which a publication is being generated. An electronic web based version of the proton facility questionnaire is being developed.
- h) **IROC Houston Webpage:** IROC Houston webpage (<http://irochouston.mdanderson.org>) continues to be the primary site to find credentialing details, proton center approval information, site participation and research findings. Newsletter articles can be found on the website.

- i) **Publications:** Since 2011, a total of **61** manuscripts have been published or accepted for publication. In 2014 alone, 11 manuscripts have been published.

PUBLICATIONS AND ABSTRACTS

Publications Accepted/Published (2011-present):

61 total (34 as major author (*)/ 31 as 1st or 2nd author) Since the beginning of the RPC, a total of 231 publications have been published by staff at the RPC.

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BOOK CHAPTERS

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Respectfully submitted,



David S. Followill, Ph.D.

YEAR-END FINANCIAL SUMMARY OF THE RADIOLOGICAL PHYSICS CENTER

January 1, 2013 through December 31, 2013

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|--|-----------------------|
| PERSONNEL (salaries and fringe benefits) | \$2,104,254.06 |
| 6 Physicists, 2.5 Research Dosimetrists, 2 Sr. Physics Assistants, 2 Physics Assistants, 1 Manager of Scientific Computing Resources, 1 Database Administrator, 1 Programmer Analyst I, 1 Radiological Physics Supervisor, 4 Radiological Physics Technicians, 1 Sr. Coordinator of Research Data, 1 Machine Fabrication Specialist, 1 Department Administrator, 1 Office Manager, 1 Sr. Administrative Assistant, 1 Administrative Assistant, 1 Secretary, 1 Administrative Clerk, and 6 Graduate Research Assistants | |
| TRAVEL | \$ 97,531.97 |
| Number of Site Visits | 26 |
| Number of Scientific Meetings | 30 |
| Number of Study Group Meetings | 37 |
| Number of International Meetings | 8 |
| Other | 6 |
| CONSULTANTS | \$73,356.21 |
| CONSUMABLES | \$339,233.90 |
| Office supplies, laboratory and record keeping, TLD, TLD supplies, software, etc. | |
| EQUIPMENT | \$555,099.36 |
| OTHER EXPENSE | \$114,317.39 |
| Postage, telephone, reprints, copying, computer fees, equipment repair, registration fees, tuition, freight/delivery, etc. | |
| SPACE RENTAL AND TUITION | \$18,745.22 |
| Total | \$3,302,538.11 |
| Indirect Costs @ 26% | \$390,623.30 |
| TOTAL RPC EXPENSES | \$3,693,161.41 |