The IROC Houston Quality Assurance Center's Independent Peer Review QA Program.

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Purpose/Objective: The Imaging and Radiation Oncology Core (IROC) Cooperative has been active for the past five years supporting the NCI's National Clinical Trial Network (NCTN). To that end, the IROC Houston QA Center has provided numerous quality audit processes over the past few years with the mission to ensure accuracy in RT dose delivery and consistency between participating institutions. The objective of this work is to demonstrate the magnitude and extent of independent peer review quality assurance audits performed by the IROC Houston QA Center.

Material/Methods: IROC was made up of six QA centers (Houston, Ohio, Philadelphia-RT, Philadelphia-DI, Rhode Island, St. Louis) providing an integrated RT and DI quality control program supporting NCI's clinical trials (Figure 1).

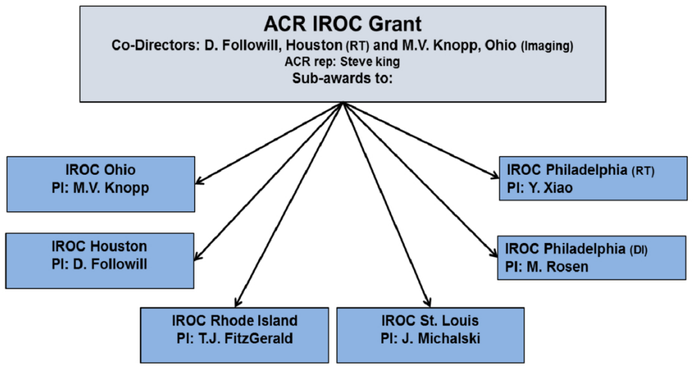

Figure 1. IROC QA Centers and their PIs.

IROC Houston utilizes a series of remote and onsite quality assurance (QA) audits to verify radiation therapy (RT) institutions ability to deliver photon, electron and proton radiation doses in an accurate and precise manner. These activities are led by a group of 6 dedicated medical physicists with over 100 years of experience in total. These QA tools include remote verification of RT machine output using TLD or OSLD, use of remote end to end anthropomorphic phantoms for advance technological RT treatments, review of patient case charts, onsite dosimetry review visits to select RT sites and various other credentialing methodologies. Personal consultation regarding specific issues is also provided.

Results: IROC Houston provides RT clinical trial core support and independent peer reviews to 2,313 RT institutions primarily in North America, but also to sites in 51 other countries. The extent and number of audits provided by IROC Houston make it the largest QA Center in the world.

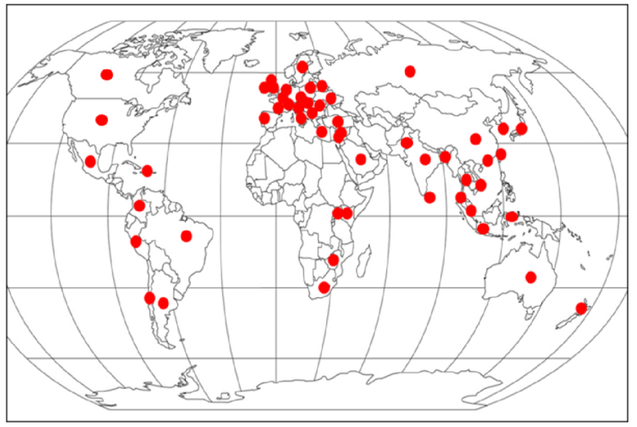

Figure 2. Countries with ≥ 1 RT centers monitored by IROC.

In 2019, 21,164 OSLD/TLD machine beam output checks were performed on nearly 4000 therapy machines as seen in Table 1. 738 patient cases and 137 benchmark cases were reviewed. A total of 3,383 clinical trial credentialing letters were sent to institutions. Thirteen institutions received an onsite dosimetry review visit. To date a total of 28 proton centers have been approved to participate in clinical trials.

Core Service	2017	2018	2019
OSLD/TLD beam checks	16,905	18,248	21,164
Visits: onsite/virtual	14/15	16/6	13/0
Patient treatment chart/benchmarks	510/140	472/91	699/133
Phantoms	721	625	755
Credentialing letters	2931	3055	3383
Proton centers approved (cumulative)	24	26	28

Table 1. Number of quality audit services provided for the past three years by IROC Houston.

Results: One of the key quality audits in this age of advanced technology dose delivery has been the use of the end-to-end anthropomorphic phantoms. IROC Houston has available over 100 of these phantoms for a different anatomic sites. This QA program began in 2001. A total of 755 photon and proton end-to-end QA phantoms were shipped to RT sites all over the world in 2019 and 251 IGRT processes were evaluated as part of our credentialing activities.

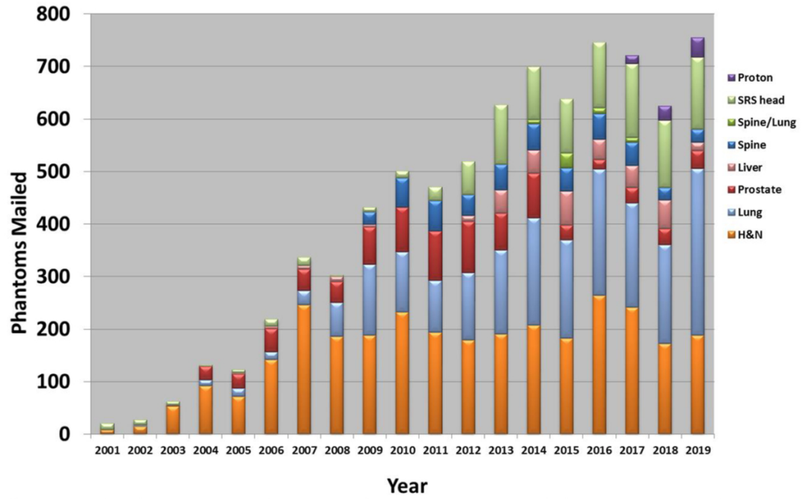

Figure 3. Number and type of end-to-end QA Phantom mailed per year by IROC Houston.

Conclusion: The volume of QA services provided by IROC were numerous, are continually being evaluated for effectiveness, harmonized across all NCTN Groups and administered in an efficient/timely manner to enhance accurate and per protocol trial data submission. To this end, **107** peer reviewed manuscripts were published since 2014 focused on improving dose delivery quality and accuracy to cancer patients worldwide. The IROC Houston QA Center is the largest independent peer review QA office in the world in terms of outreach to centers around the world and volume of QA audits performed each year. Discrepancies continue to be found and assistance with correcting them is provided.

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