

Reducing Radiation Dose: A Community CT Image Record

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EXECUTIVE SUMMARY

- A plan to reduce radiation dose and improve patient safety was established in northeast Georgia by creating a CT image record in a tri-fold wallet format that patients could carry with them. The intent was for multiple facilities to take part and share this information within the community.
- Patient questionnaires were also distributed in the ED and were used to collect prior CT information. They gave consistency to the information and it guided the ED physician through the patient care process.
- Repeat CT scans were ultimately reduced, and awareness among technologists and physicians increased. However, there was poor patient compliance in using the wallet tri-fold CT image record.

Northeast Georgia Medical Center was awarded the AHRA and Toshiba Putting Patients First grant in 2010. The funds were used to improve patient care and safety in diagnostic imaging by reducing radiation dose to CT patients from the emergency department (ED). The plan was to create a CT image record in a tri-fold wallet format that patients could carry with them. It would indicate that a CT scan had been performed with a date and facility name. To make an even greater impact, other imaging facilities in the community were included. Once the other facilities heard about the project they gladly joined. The project began in January 2011 and data gathering was completed in May 2011.

The goals of the program were to:

- Reduce radiation exposure from repeat CT scans
- Share information across facilities
- Improve patient care
- Create an image record
- Create a best practice model
- Gain data to assist with the creation and evidence for funding of the cloud technology (image access) to share images between facilities

Materials and Methods

The CT image record was designed by the radiology and ED staff and representatives from the participating sites. See Figure 1. Participating facilities were

from the Northeast Georgia Medical Center, two imaging centers owned by the hospital, two large multispecialty clinics owned by physician groups, and a privately owned independent free standing imaging center. The CT technologists and radiologists were involved as part of the initial project team. The technologist role was to interview the patients and collect data. The radiologists reviewed all the data with the team and summarized the findings.

The CT image record was given to outpatients undergoing CT scans at participating facilities to provide documentation and tracking of CT scans performed in the event of an ED visit. The steering committee helped facilitate the information needed on the card as well as assisted in gaining support from physicians on its use. The technologist performing the study at the particular facility filled out the patient card and gave it to the patient. The patient would present in the ED and the registrar would ask for card, if available, and place it in front of ED chart which went with the patient to the treatment area. The card was instrumental in streamlining the workflow from area to area (see Figure 2). This card was a communication tool and served as documentation.

Patient questionnaires (Figure 3) given in the ED were also tools used to communicate and serve as documentation. Patients seen in the ED received questionnaires in order to collect prior

NORTHEAST GEORGIA HEALTH SYSTEM IMAGING SERVICE		
CT IMAGING RECORD		
DATE	EXAM	FACILITY

Figure 1 • The CT image record card.

CT information. The questionnaire was provided to the ED physician to alert him that a CT had recently been performed, document why the CT was needed, and to provide a reason for repeating the CT scan. The questionnaire gave consistency to the information and it guided the ED physician through the patient care process. The cost to use these communication tools was minimal. The cost for supplies included the paper for the questionnaire itself, the CT image record card, and stationary and stamps used for an introductory letter to the referring physicians explaining the project and asking for support. Total cost spent on these items was \$510. The hospital graphics department produced them. The trial period of distributing and collecting

these cards ran from January 31, 2011 to May 31, 2011.

Creating the CT questionnaire enabled the ED physician who might order a CT scan to ask for the imaging record card at the time of registration in the ED. This was documented by copying the CT image record and creating a separate monitoring tool. The information from the image record card was written on the tracking sheet and placed on the front of the ED chart by registration. The ED physician would immediately know a CT scan had been previously performed. The intent was to track how many scans were prevented as well as the reasons CT scans were ordered, even though a recent scan was available with a monitoring tool (Table 1).

Data captured during the trial period included:

- Number of ED visits
- Number of questionnaires completed
- Number of CT procedures ordered during study period
- Locations and dates of prior studies
- Indication/reason for CT order
- Number of CT exams completed during study period and indication for repeat if applicable
- Number of CT exams not repeated due to priors
- Number of tracking cards presented to participants

Results

The results from this study were as expected; however, all data was not collected in the same manner and ED physicians did not use a card on every patient when indicated. See Table 2 for total cards distributed and returned.

- Total patient visits: 33,273
- Total cards returned by patients when presented in ED: 27 or 1.5%
- Total CT exams ordered: 8358 or approximately 43%
- Total CT exams with completed questionnaires reported: 1025 or 12.3%
- Total CT exams completed during trial with questionnaire: 889 or 86.7%
- Total CT exams canceled due to prior images available during trial: 136 or 13.3%

See Figure 4.

Results showed patients did not carry the cards with them and did not present them to the ED when asked. Also, 30% of patient volume through the ED had a CT scan ordered, which was lower than expected. Following were the indications for repeat CT scans:

- No recent prior within 6 months: 357 or 35%
- No relevant priors within 6 months: 323 or 32%
- Recurrent problems or new onset of symptoms: 174 or 17%
- Progression of symptoms: 74 or 7%

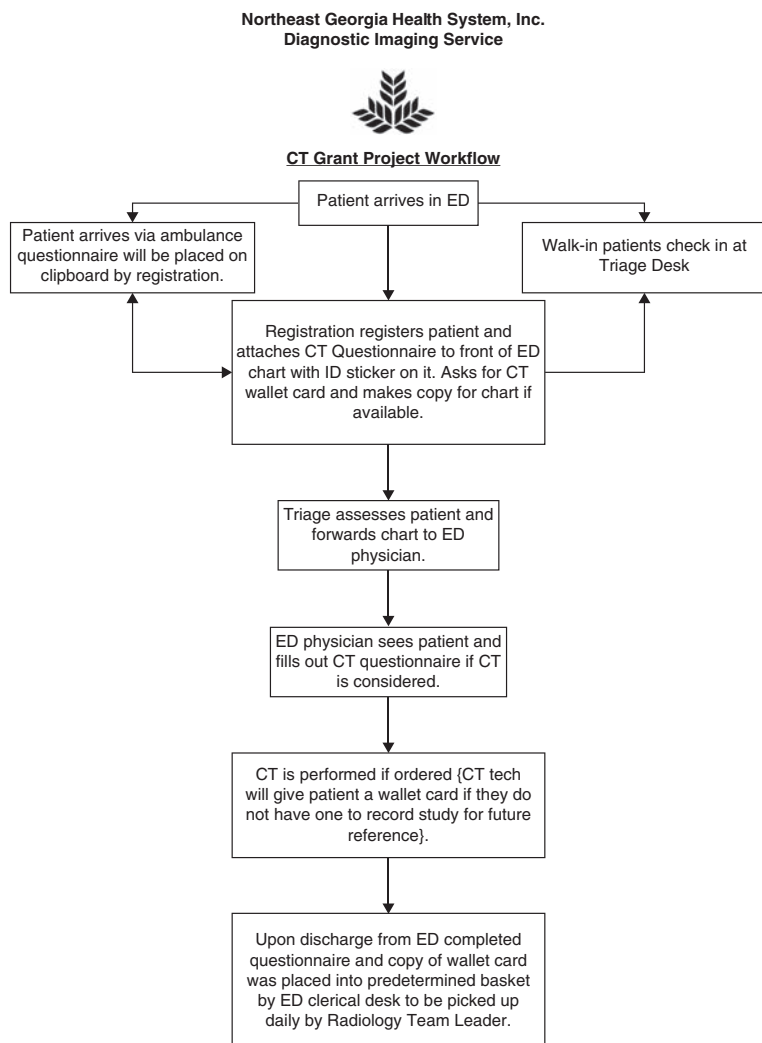


Figure 2 • Project workflow.

Has patient had prior CTs at any local facility? () Yes or () No
If yes, please check any of the following

() Imaging Center- Gainesville () Imaging Center- Braselton
 () Northeast Georgia Medical Center () Northeast Georgia Diagnostic Clinic
 () The Longstreet Clinic () MRI and Imaging of Georgia
 () Urology Clinic
 () Other: _____
 (please list location)

Does patient have CT record card? () Yes or () No Card# _____
 Did card result in CT not being ordered? () Yes or () No

Reasons for CT to be repeated

() progression/worsening of symptoms
 () Consulting physician requested imaging
 () Images/report unavailable
 () Trauma
 () unequivocal results/enhanced images needed
 () Patient/Family request
 () other: _____

Patient sticker

Figure 3 • CT exam record questionnaire.

- Images/reports from priors at other facilities not available: 50 or 5%
- Trauma patients: 42 or 4%
- MD request: 5 or < 1%

See Figure 5.

Summary

Ultimately, there was a positive impact on this study. Repeat CT scans were reduced by 136 exams due to the information being available when prior or similar exams were present. It is also estimated that this resulted in a minimum cost avoidance of \$5,805. There was poor patient compliance in using the wallet tri-fold CT image record. Patients forgot to bring cards or were not putting them in their wallets as soon as received from the facility. Also, the CT technologists became more aware of the number of scans and exposures as they began the process of educating the patients and administering the cards. Education to the ED physicians and staff brought realization that information was needed and, if available, was used to determine a path to diagnosis. Further education on the Imaging Gently campaign was re-emphasized with staff and physicians.

Data was gathered for six months due to complexity of the manual process and ED volume. This was a limitation to the study. Currently, there is more of a reliance on utilization data collected to inform the ED of their ordering patterns. The intent is to use the ACR Dose Index Registry (DIR) to define and educate benchmarking with local area and national hospitals regarding radiation dose. DIR information is just now becoming available.

Benefits of the program included:

- Patient/physician/technologist radiation safety awareness
- Improved patient care by creating best possible practice by sharing image record with other facilities in the community
- Reduced the number of CT scans ordered and performed

■ TABLE 2. CT Imaging Record Distribution	
Participants	Cards Distributed
Medical Center	200
Imaging Center #1	400
Imaging Center #2	200
Multispecialty Clinic #1	350
Multispecialty Clinic #2	250
Free Standing Imaging Center	400
Total Distributed:	1,800
# Returned :	27 (2%)

access to recent studies without having to repeat them.

The AHRA & Toshiba Putting Patients First grant helped perform this study, increase awareness, and obtain data to move forward with a more robust and proactive approach to utilization of CT scans from the ED. Changes continue to be made for a best practice model. Education of referring physicians has continued by creating a CT and MRI guide to services. This guide helps educate referring physicians and staff on the appropriate ordering of these studies. Data is being routinely monitored and shared with the ED. Best practices can be developed in all areas by finding the right tool that works for facilities and creating radiation safety awareness among the team. ☸

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Summary of Data

Total ED Visits	33,273	
Questionnaires Completed:	19,457	58.5%
Total CT Ordered:	8,358	43.0%
CT in Sample:	1,025	12.3%
CT's Completed:	889	86.7%
CT Canceled:	136	13.3%

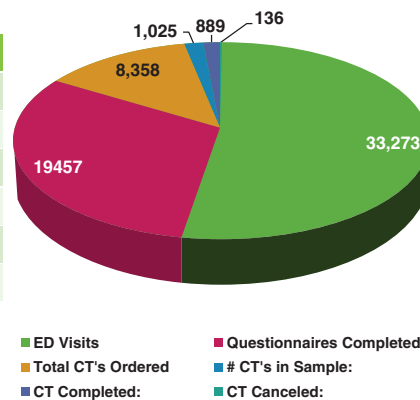


Figure 4 • Data collection from questionnaires.

Category	#	%
No Recent Prior: (Same study within 6 mo.)	357	35%
No Relevant Prior: (Not same as prior)	323	32%
New Onset: (Had recent study but new onset of symptoms)	174	17%
Progression Of Symptoms: (Worsening)	74	7%
Images/Report Unavailable: (Outside study/after hours)	50	5%
Trauma:	42	4%
Physician Request: (Directed to repeat anyway)	5	0%

Repeated Studies

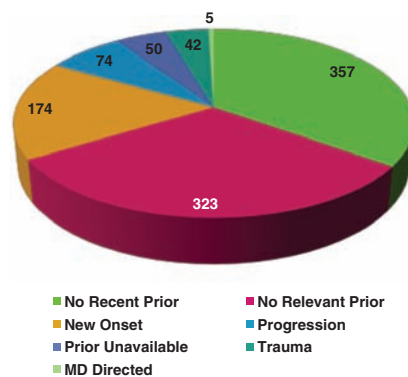


Figure 5 • reason for repeats.

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