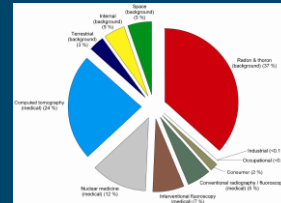


ACR Dose Index Registry

Richard L. Morin, Ph.D., FACR

Why a Dose Index Registry?

CT scans contribute 25% of radiation dose



From NCRP Report No. 160, "Ionizing Radiation Exposure of the Population of the United States" (2009)

2

What is the national average level of radiation administered by imaging facilities for a CT of the head?

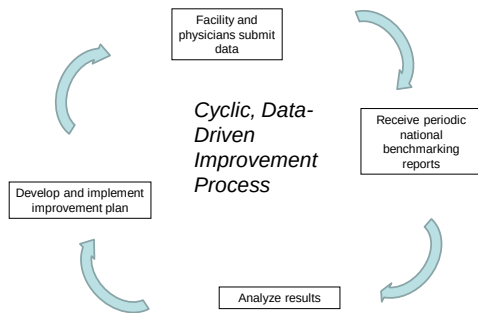


3

What is the Dose Index Registry?

- One component of the National Radiology Data Registry
- Collects and compares dose index information across facilities
- Uses standard methods of data collection
 - DICOM SR, IHE REM Profile
- Establishes national benchmarks and practice patterns in dose indices

Guiding Principle Behind Registries



Does It Work?

- Evidence of data-driven improvement in performance from:
 - Medicine in general (outside radiology)
 - CT dose (for CCTA)
 - ACR registries (for recent registries)

Evidence on CABG mortality from the Society of Thoracic Surgeons National Adult Cardiac Database

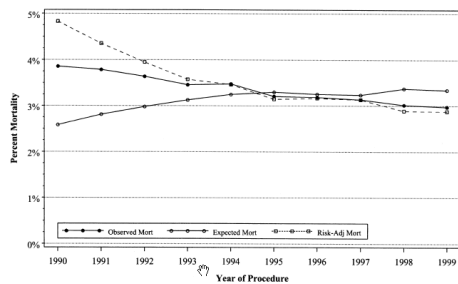
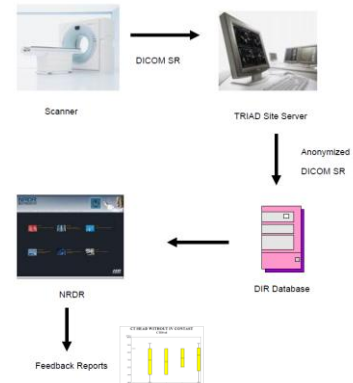


Fig 1. Observed, expected and risk-adjusted mortality, 1990 to 1999. Entire coronary artery bypass grafting population (n = 1,154,486).

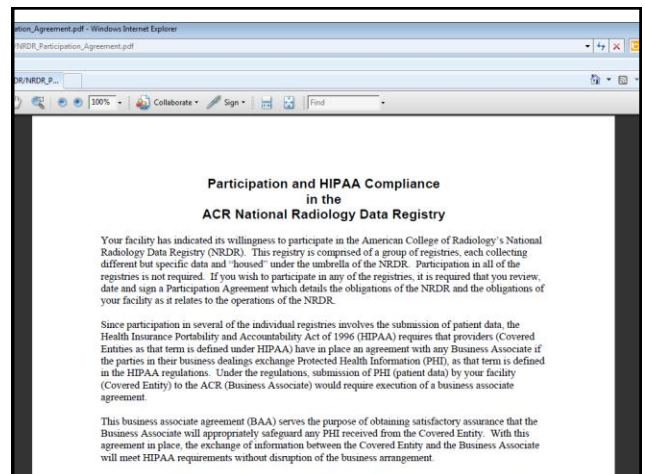
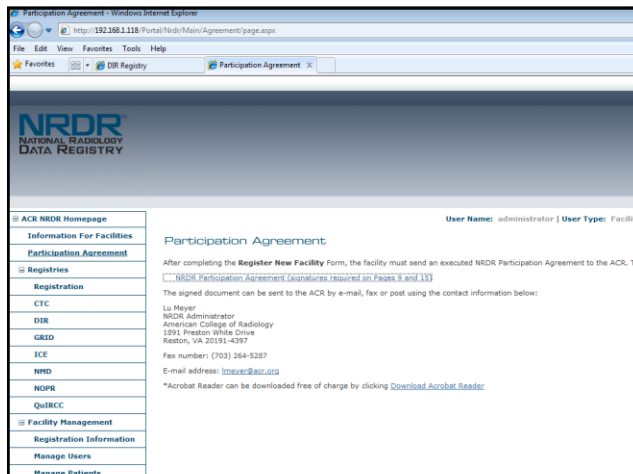
Ferguson TB Jr, Hammill BG, Peterson ED, DeLong ER, Grover FL; STS National Database Committee. A decade of change—risk profiles and outcomes for isolated coronary artery bypass grafting procedures, 1990-1999: a report from the STS National Database Committee and the Duke Clinical Research Institute. Society of Thoracic Surgeons. *Annals of Thoracic Surgery* 2002 February;73(2):480-9.

How does it work?



Registration Process

- Sign Participation Agreement
- Register on NRDR website
- Download software to transmit data
 - We will contact you and walk you through the installation
- Configure scanners (or PACs)
- Data transmission to NRDR is **completely automated** – no personnel required beyond initial setup



DIR Registry - Windows Internet Explorer

File Edit View Favorites Tools Help

https://www.acr.org/Portal/DIR/Main/page.aspx

ACR NDR Homepage

Dose Index Registry

User Type: ACR Staff

- DIR Registry
- New Facility Registration
- FAQ
- DIR Sample Report
- NDR

DIR

The Dose Index Registry (DIR) is a data registry that allows facilities to compare their CT dose indices to regional and national values. Information related to ACR, and stored in a database. Institutions are then provided with periodic feedback reports comparing their results by body part and exam type against national benchmarks for CT dose indices.

Integrating the Healthcare Enterprise (IHE) is a global initiative that creates the framework for seamlessly exchanging information across systems. This profile allows all vendors to collect and transmit the information related to CT dose indices and techniques in a similar format. The DIR collects the dose information in the DICOM CT Dose SR and some additional information contained in the metadata in the DICOM information related to the patient (e.g., age in years, etc.) is transmitted to the registry. Patient identifiers are removed at the facility before the data is sent.

To participate in the registry, a facility sends in the DIR through the NDR portal and is assigned a unique facility identifier. The ACR's TRGQ automatically sends the appropriate DICOM SR object to the PC for every CT exam performed on the scanner. TRGQ is used to anonymize and transfer the NDR portal comparing their results to aggregate results by exam type. Comparisons to both regional and national data are provided.

Currently there is no standard for naming exam types across facilities. For example, an adult CT of the head without contrast might be labeled as "The another." To handle this problem, the DIR is implementing the Radex Playbook. The Playbook is the list of standard-name procedures with a Radex file to the Playbook so that accurate comparisons can be made.

The DIR has begun a pilot at facilities located across the country. The pilot is testing the first implementation of the IHE XDS profile for a new manufacturer. Once this pilot is complete, the DIR will then be ready to launch nationwide in Spring 2011.

Headquarters Office: 1891 Preston White Dr., Reston, VA 20191, (703) 649-8900
 Clinical Research Office: 1923 Market St., Suite 1000, Philadelphia, PA 19103, (215) 574-5100
 Government Relations Office: 200 Park St., 8th Floor, Suite 810, Washington, DC 20006, (202) 333-1870
 © 2004-2008 American College of Radiology

Version: 2.42.207

New Facility Registration - Windows Internet Explorer

File Edit View Favorites Tools Help

http://192.168.1.118/Portal/Ndr/Main/NewFacilityRegistration/page.aspx

ACR NDR Homepage

Register New Facility

User Type: Facility Admin

- ACR NDR Homepage
- Information For Facilities
- New Facility Registration
- Participation Agreement
- Registries
- CTC
- DIR
- GRID
- ICE
- NMD
- NOPR
- QuIBCC
- News
- FAQ
- IRB Exemption
- NDR User Guide

1. Facility Information

* Facility name:

* Facility category:

* Location:

* Trauma Center Level:

* Street line 1:

* Street line 2:

* City:

* Country:

* State or province:

* ZIP or postal code:

* Telephone:

New Facility Registration - Windows Internet Explorer

File Edit View Favorites Tools Help

http://192.168.1.118/Portal/Ndr/Main/NewFacilityRegistration/page.aspx

ACR NDR Homepage

Register New Facility

User Type: Facility Admin

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* Facility name:

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* Street line 1:

* Street line 2:

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* Country:

* State or province:

* ZIP or postal code:

* Telephone:

* Fax:

* Medicare Provider Number:

* NPI:

* Radiology group:

New Facility Registration - Windows Internet Explorer

File Edit View Favorites Tools Help

http://192.168.1.118/Portal/Ndr/Main/NewFacilityRegistration/page.aspx

ACR NDR Homepage

Register New Facility

User Type: Facility Admin

* Medicare Provider Number:

* NPI:

* Radiology group:

2. Facility Administrator Information

* First name:

* Last name:

* E-mail:

* Confirm E-mail:

* Password:

* Confirm Password:

* Specialization:

* Office phone:

* Mobile phone:

* Address:

* Additional information:

3. Security Text

Enter the code you see on the image:



New Facility Registration - Windows Internet Explorer

http://192.168.1.118/Portal/NrdR/Main/NewFacilityRegistration/page.aspx

File Edit View Favorites Tools Help

NRDR
NATIONAL RADIOLOGY
DATA REGISTRY

ACR NRDR Homepage

Information For Facilities

New Facility Registration

Participation Agreement

Registries

CTC

DIR

GRID

ICE

NND

NOPE

QuERCC

News

FAQ

IRB Exemption

NRDR User Guide

User Type: Facility Admin

Registration information successfully saved.
Thank you for submitting the Facility Registration form.
You are now registered as the Facility Administrator for your facility.
Your Facility ID# is 100378
Your User Name is administrator

Please click the Continue button to select the registries in which you would like to participate.

Continue

Registration Information - Windows Internet Explorer

http://192.168.1.118/Portal/DIR/Main/FacilityManagement/RegistrationInformation/page.aspx

File Edit View Favorites Tools Help

DIR Registry

Dose Index Registry

DIR Registry

Registry Management

Registration Information

FAQ

DIR Sample Report

NRDR

User Name: administrator | User Type: Facility Administrator

Registration information saved successfully.
Thank you for submitting the DIR Facility Registration Form.
An e-mail confirmation and an invoice will be sent to the Facility Administrator.
Your facility can begin entering data once we receive the DIR addendum to your NRDR Participants Agreement and a

Continue

Headquarters Office: 1891 Preston White Dr., Reston, VA 20191, (703) 648-8900
Clinical Research Office: 1818 Market St., Suite 1600, Philadelphia, PA 19103, (215) 574-3115
Government Relations Office: 505 9th St., N.W., Suite 910, Washington, DC 20004, (202) 223-1616
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Version: 8.53.569

DIR Registry - Windows Internet Explorer

http://192.168.1.118/Portal/DIR/Main/page.aspx

File Edit View Favorites Tools Help

DIR Registry

Dose Index Registry

DIR Registry

Reports

Summary Of Data Submitted

Dose Information by Exam

Summary of Irradiation Events

CTDIvol Over Time

CTDIvol Box Plot

Aggregate Reports

Registry Management

Registration Information

FAQ

DIR Sample Report

NRDR

User Name: administrator | User Type: Facility Administrator | Facility ID: 100378

DIR

The Dose Index Registry (DIR) is a data registry that allows facilities to compare their CT dose indices to regional and national values. The data is collected and stored in a database. Facilities are then provided with periodic feedback reports comparing their results by body part, exam type, and national benchmarks for CT dose indices.

Integrating the Healthcare Enterprise (IHE) is a global initiative that creates the framework for passing vital health information across different systems. This profile allows all vendors to collect and transmit the information related to CT dose indices and testing. The CT Dose Index Registry (DIR) defines the data elements related to the specific data that should be stored. The DIR collects the dose information in the DICOM CT Dose SR and some additional information contained in the information related to the patient (e.g., age in years, sex) is transmitted to the registry. Patient identifiers are removed at the facility level.

To participate in the registry, a facility enrolls in the DIR through the NRDR portal and is assigned a unique facility identifier. The NRDR portal then sends the appropriate DICOM SR object to the DIR for every CT exam performed on the scanner. The DIR is used to aggregate the data and compare the results by exam type. Comparisons to both regional and national data are provided. Currently there is no standard for naming exam types across facilities. For example, an adult CT of the head without contrast might be named "CT Head" or "CT Head No Contrast". To handle this problem, the DIR is implementing the Radlex Playbook. The Playbook is the list of standard-name procedures to the Playbook so that accurate comparisons can be made.

The DIR has begun a pilot at facilities located across the country. The pilot is testing the first implementation of the IHE CT Dose SR. Once this pilot is complete, the DIR will then be ready to launch nationwide in Spring 2011.

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Summary Of Data Submitted - Windows Internet Explorer

http://192.168.1.118/Portal/DIR/Main/ReportsDir/SummaryOfDataSubmitted/page.aspx

File Edit View Favorites Tools Help

DIR Registry

Dose Index Registry

Summary Of Data Submitted

Summary of Data Submitted

Dose Information by Exam

Summary of Irradiation Events

CTDIvol Over Time

CTDIvol Box Plot

Aggregate Reports

Registry Management

Registration Information

FAQ

DIR Sample Report

NRDR

User Name: administrator | User Type: Facility Administrator | Facility ID: 100378

Summary of Data Submitted

DIR Facility Number: 100001

DIR Facility Name: Kingstree City State Community Facility

Submit Date range: / / to / /

Submit

Headquarters Office: 1891 Preston White Dr., Reston, VA 20191, (703) 648-8900
Clinical Research Office: 1818 Market St., Suite 1600, Philadelphia, PA 19103, (215) 574-3115
Government Relations Office: 505 9th St., N.W., Suite 910, Washington, DC 20004, (202) 223-1616
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Summary Of Data submitted Report for facility #100001 - Windows Internet Explorer

http://192.168.1.118/Portal/Parts/DIR/Reports/ShowReport.aspx?Report=SummaryOfDataSubmittedReport&FacilityId=100001&mpGuid=fdbae6ef-3029-4633-af62-44971768d38e

Export to Excel 97-2000

Summary of Data Submitted to DIR

05/23/2011

Facility Name	# of Exams	# of Series	Last Exam Received
Kingstest City State Community Facility	11,685	33,610	2011.03.27 22:37:52

Dose Information By Exam Report for facility #100001 - Windows Internet Explorer

http://192.168.1.118/Portal/Parts/DIR/Reports/ShowReport.aspx?Report=DoseInformationByExamReport&FacilityId=100001&DateFrom=6/1/2010&DateTo=

Export to Excel 97-2000

Dose Information by Exam

06/01/2010 - 07/31/2010

Facility ID	Study	Institution	Total CT DIval (mGy)	Total DLP (mRy/cm)	Study Date
100001	Abdomen*01_ABD_PEL_WO (Adult)	MJH	25	1966	20100618
100001	Abdomen*01_ABD_PEL_WO (Adult)	MH CT P	14	246	20100617

Summary Of Irradiation Events Report for facility #100001 - Windows Internet Explorer

http://192.168.1.118/Portal/Parts/DIR/Reports/ShowReport.aspx?Report=SummaryOfIrradiationReport&FacilityId=100001

Export to Excel 97-2000

DIR Summary of Irradiation Events

05/23/2011

Patient's Facility ID	Study Start Date	Age	Sex	Study Description	Event Description
87	06/17/2010	053Y	F	Head*04_TEMP_BONES (Adult)	Head_Constant Angle Acquisition_CT without contrast
87	06/17/2010	053Y	F	Head*04_TEMP_BONES (Adult)	Head_Spiral Acquisition_CT without contrast
88	06/17/2010	077Y	F	Thorax*01_CHEST_WO_SLHR (Adult)	Chest_Constant Angle Acquisition_CT without contrast
88	06/17/2010	077Y	F	Thorax*01_CHEST_WO_SLHR (Adult)	Chest_Spiral Acquisition_CT without contrast
89	06/17/2010	072Y	F	Abdomen*04_4PH_LIVER (Adult)	Abdomen_Constant Angle Acquisition_CT without contrast
89	06/17/2010	072Y	F	Abdomen*04_4PH_LIVER (Adult)	Abdomen_Spiral Acquisition_CT without contrast
89	06/17/2010	072Y	F	Abdomen*04_4PH_LIVER (Adult)	Abdomen_Stationalary Acquisition_CT without contrast
89	06/17/2010	072Y	F	Abdomen*04_4PH_LIVER (Adult)	Abdomen_Stationalary Acquisition_Diagnostic radiography with contrast media
89	06/17/2010	072Y	F	Abdomen*04_4PH_LIVER (Adult)	Abdomen_Spiral Acquisition_Diagnostic radiography with contrast media
89	06/17/2010	072Y	F	Abdomen*04_4PH_LIVER (Adult)	Abdomen_Spiral Acquisition_Diagnostic radiography with contrast media
89	06/17/2010	072Y	F	Abdomen*04_4PH_LIVER (Adult)	Abdomen_Spiral Acquisition_Diagnostic radiography with contrast media
90	06/17/2010	065Y	M	Abdomen*07_DE_RENAL_MASS (Adult)	Abdomen_Constant Angle Acquisition_CT without contrast
90	06/17/2010	065Y	M	Abdomen*07_DE_RENAL_MASS (Adult)	Abdomen_Spiral Acquisition_CT without contrast
90	06/17/2010	065Y	M	Abdomen*07_DE_RENAL_MASS (Adult)	Abdomen_Spiral Acquisition_CT without contrast
90	06/17/2010	065Y	M	Abdomen*07_DE_RENAL_MASS (Adult)	Abdomen_Spiral Acquisition_CT without contrast
90	06/17/2010	065Y	M	Abdomen*07_DE_RENAL_MASS (Adult)	Abdomen_Spiral Acquisition_CT without contrast
90	06/17/2010	065Y	M	Abdomen*07_DE_RENAL_MASS (Adult)	Abdomen_Spiral Acquisition_CT without contrast
91	06/17/2010	080Y	F	Pelvis*1_BONE_PELVIS (Adult)	Pelvis_Constant Angle Acquisition_CT without contrast
91	06/17/2010	080Y	F	Pelvis*1_BONE_PELVIS (Adult)	Pelvis_Spiral Acquisition_CT without contrast
91	06/17/2010	080Y	F	Pelvis*1_BONE_PELVIS (Adult)	Pelvis_Spiral Acquisition_CT without contrast
92	06/17/2010	039Y	F	Abdomen*04_4PH_LIVER (Adult)	Abdomen_Constant Angle Acquisition_CT without contrast
92	06/17/2010	039Y	F	Abdomen*04_4PH_LIVER (Adult)	Abdomen_Constant Angle Acquisition_CT without contrast
92	06/17/2010	039Y	F	Abdomen*04_4PH_LIVER (Adult)	Abdomen_Spiral Acquisition_CT without contrast

RUN Chart Report - Windows Internet Explorer

http://192.168.1.118/Portal/Main/Reports/Dir/RUNChart/page.aspx

File Edit View Favorites Tools Help

Favorites DIR Registry RUN Chart Report

Dose Index Registry

User Name: administrator | User Type: Facility Administrator | Facility

DIR Registry

- Reports
 - Summary of Data Submitted
 - Dose Information by Exam
 - Summary of Irradiation Events
 - CTDIvol Over Time
 - CTDIvol Box Plot
 - Aggregate Reports
- Registry Management
 - Registration Information
 - FAQ
 - DIR Sample Report
 - NRDR

CTDIvol Over Time

DIR Facility Number: 100001

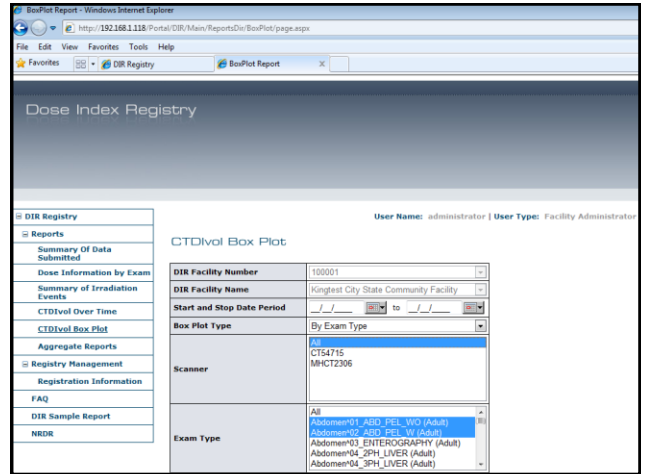
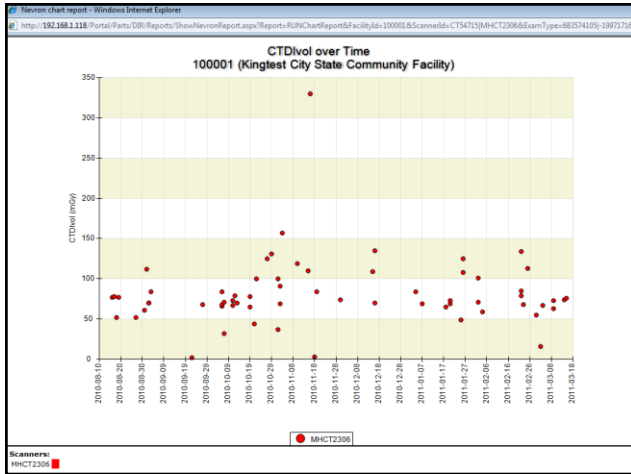
DIR Facility Name: Kingstest City State Community Facility

Start and Stop Date Period: / / to / /

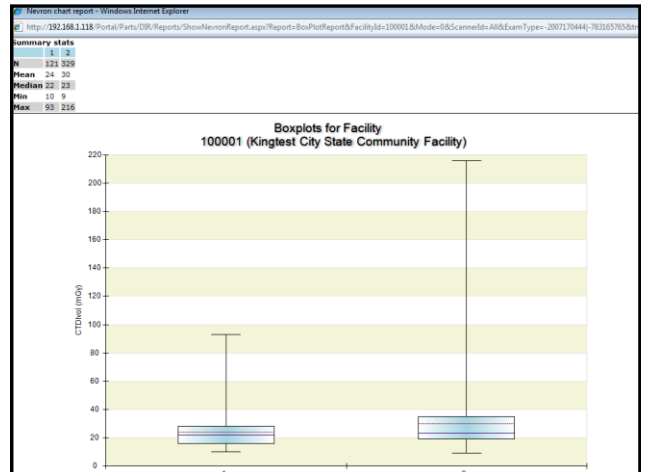
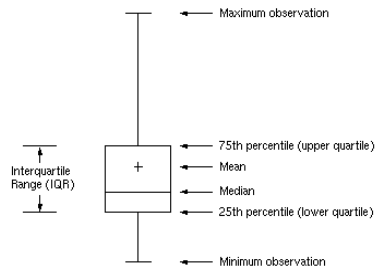
DIR Facility Scanner Types: All CT54715 MHCT2306

DIR Facility Exam Types: All Abdomen*01_ABD_PEL_WO (Adult) Abdomen*02_ABD_PEL_W (Adult) Abdomen*03_ENTEROGRAPHY (Adult) Abdomen*04_2PH_LIVER (Adult) Abdomen*04_3PH_LIVER (Adult)

Submit



Box Plots

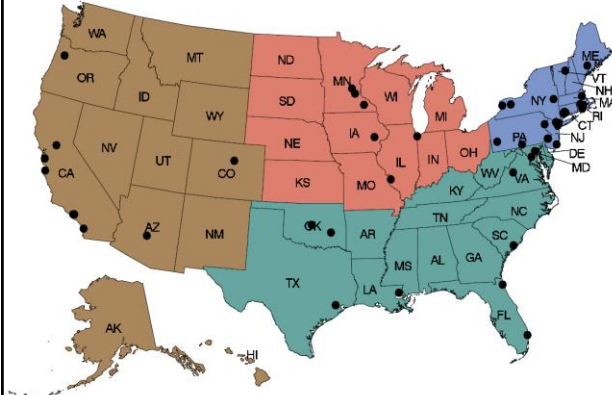


Sample Feedback Report

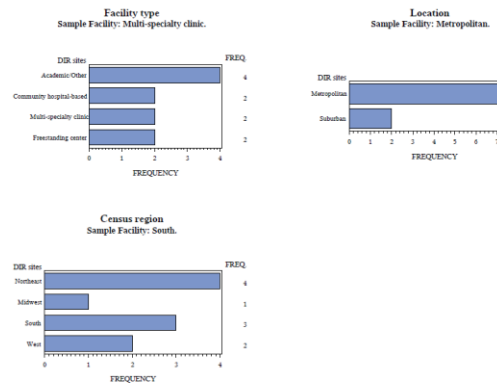
ACR
AMERICAN COLLEGE OF
RADIOLOGY
QUALITY IS OUR IMAGE

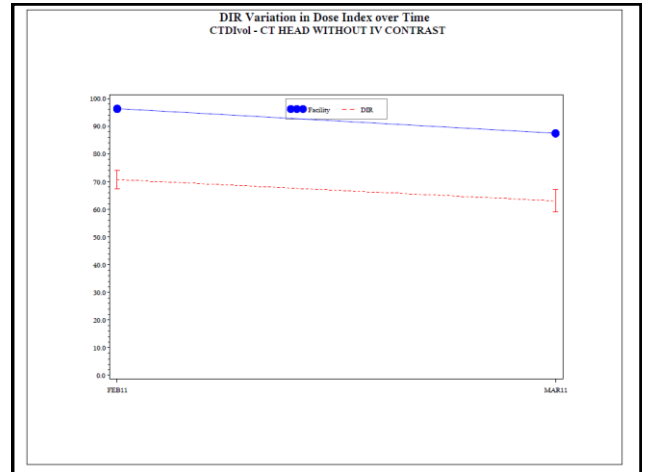
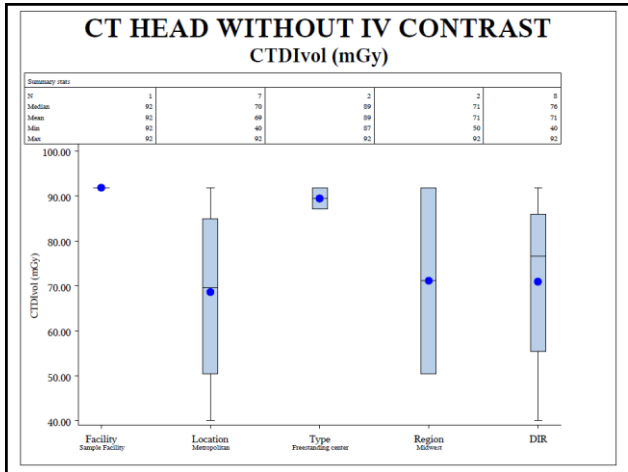


DIR Registered Facilities
as of May 2011



DIR Facility Characteristics
Spring 2011





Mapping

- Radlex Playbook
- Each facility will map exam descriptions

35

ACR - DOSE Tagging

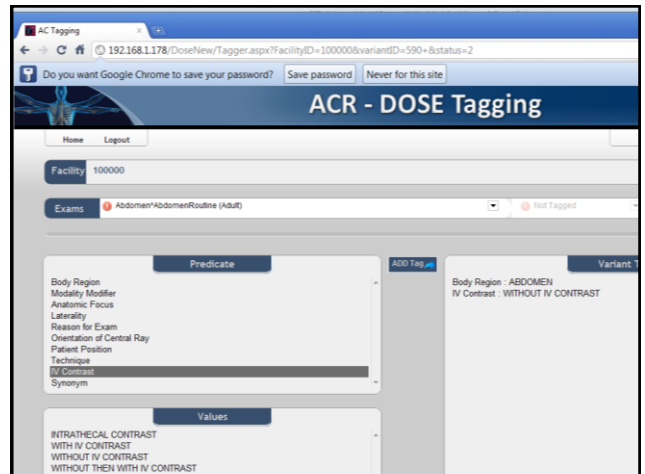
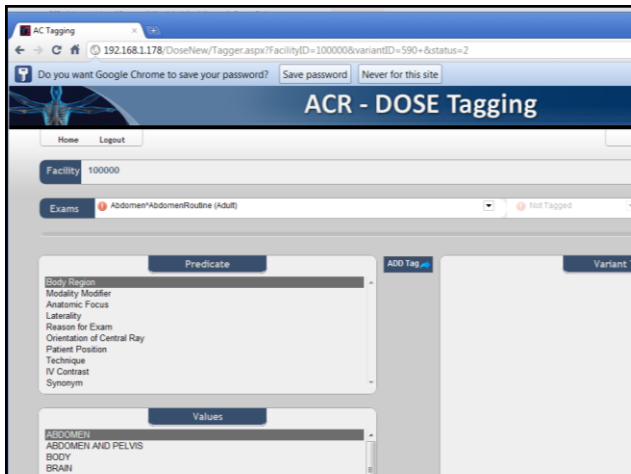
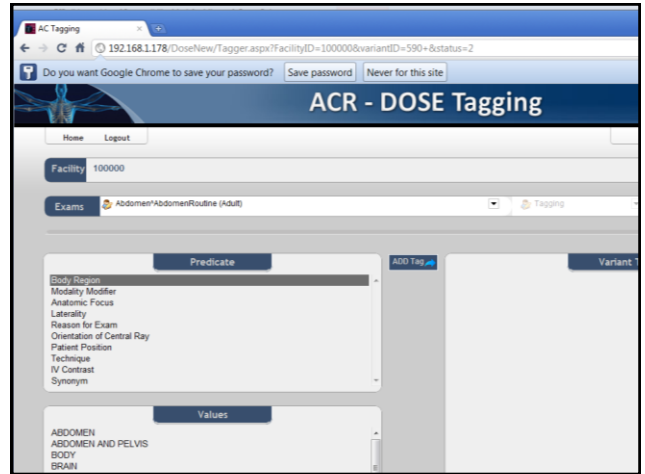
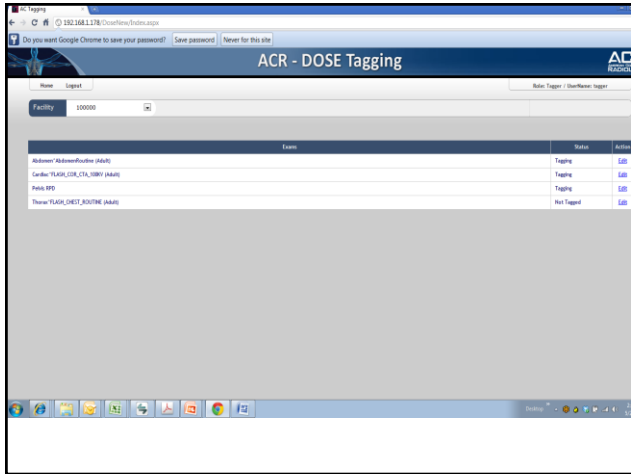
Log In

User Name:

Password:

☐ Remember me next time

[Log In](#)



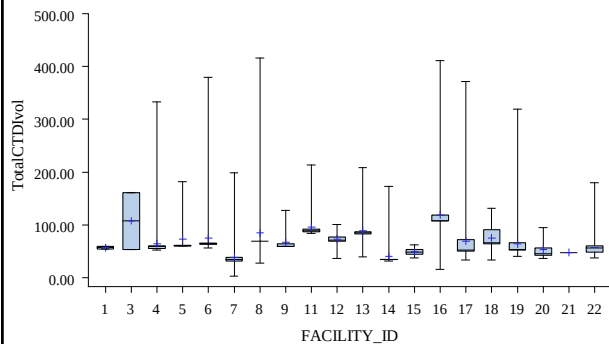
DIR Preliminary Data Total CTDIvol per Exam

Analysis Variable : TotalCTDIvol TotalCTDIvol							
Exam	N	Mean	Std Dev	Coeff of Variation	Minimum	Maximum	Range
CT HEAD WITH IV CONTRAST	114	112.17	51.37	45.80	37.68	331.72	294.04
CT HEAD WITHOUT IV CONTRAST	4944	78.89	39.60	50.20	2.71	416.22	413.51
CT CHEST WITH IV CONTRAST	1306	29.57	28.09	95.01	0.86	281.92	281.06
CT CHEST WITHOUT IV CONTRAST	1746	20.56	25.44	123.75	1.69	256.78	255.09
CT HEAD PERFUSION	96	364.10	497.08	136.52	48.68	2854.79	2806.11

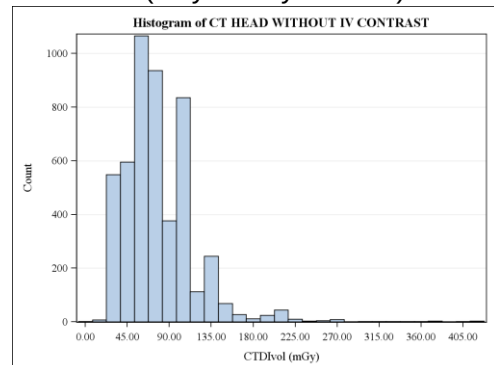
CT HEAD WITHOUT IV CONTRAST

Analysis Variable : TotalCTDIvol TotalCTDIvol							
FACILITY_ID	N Obs	N	Mean	Std Dev	Coeff of Variation	Minimum	Maximum
1	2	2	56.80	2.96	5.20	54.71	58.89
3	3	2	107.46	75.99	70.71	53.73	161.19
4	157	156	64.62	29.36	45.44	51.88	332.61
5	66	66	73.50	28.93	39.36	60.09	181.95
6	401	398	74.87	35.45	47.35	55.94	379.67
7	604	603	38.46	15.92	41.39	2.71	198.35
8	907	903	84.57	39.08	46.20	27.21	416.22
9	20	20	66.82	16.75	25.07	59.43	127.09
11	123	123	96.29	25.08	26.05	83.54	213.27
12	23	23	72.95	12.12	16.62	36.41	100.87
13	129	129	89.31	19.84	22.21	39.86	208.04
14	133	133	40.17	19.93	49.61	31.41	172.60
15	63	63	49.31	6.18	12.53	37.44	62.45
16	1057	1055	118.83	31.77	26.74	16.21	410.44
17	343	341	69.10	40.71	58.91	33.11	371.64
18	360	358	75.48	15.23	20.17	33.85	131.52
19	404	401	63.79	27.99	43.88	40.82	319.40
20	12	12	53.71	19.20	35.75	36.65	94.97
21	48	47	47.51	0.00	0.00	47.51	47.51
22	110	109	56.91	15.77	27.71	37.64	179.71

Analysis of DIR Preliminary Data (May01-July15 2011) CT Head Without IV Contrast



Analysis of DIR Preliminary Data (May01-July15 2011)



Participation fees

- One time registration fee of \$500
- Annual participation fee based on number of radiologists in practice and number of sites.
 - For most practices which have fewer than 5 sites, the annual participation fee is \$500-\$2000
 - For practices with 6 or more sites, the annual fee is \$1,000-\$10,000.
- The annual fee allows a facility to contribute data to any of five NRDR registries as a facility chooses. The five registries include DIR, NMD, CTC, ICE, and GRID.



For more information please contact:

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