



Measuring population utilization of medical diagnostic procedures: data sources and challenges

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Outline

- Stating the problem
- Data sources used for NCRP 160
- Upcoming sources: ACR Dose Index Registry
- Challenges in collecting and using the data

Stating the problem

Measuring population utilization of medical diagnostic procedures

2 sets of problems:

- Counting the number of imaging procedures performed on the population
- Grouping these procedures into appropriate meaningful categories by level of radiation dose

Population utilization of imaging

- **Surveys of patients or providers**
 - Covers patient and provider populations across payors
 - Relies on accuracy of reporting and data collection
 - Not very granular data on procedure types
 - May still miss patient and provider groups (dentists)
- **Administrative claims**
 - Medicare data publicly available
 - More descriptive on procedures than surveys
 - Do not cover patients of all ages
 - Data from private payers generally not available
- **Registries**
 - Detailed data, but relatively new source

Grouping into procedure categories

- High level modalities: CT, Radiography, Nuclear medicine, interventional imaging
- And organ systems: CT of the head, MRI of the lumbar spine
- Within these, identify groups that have similar ranges of radiation dose estimates associated with them. Which nomenclature, if any:
 - CPT and ICD-9 not granular enough and not available at ordering location
 - RadLex is detailed but not generally used

Data sources used for NCRP 160

■ IMV

- Survey data from facilities
- Very high response rate
- Covers wide range of modalities

■ Medicare Summarized Claims

- Counts of all procedures performed on Medicare beneficiaries
- Relatively low error because data collected electronically from submitted claims
- Data could be aggregated to CPT level, which is fairly detailed

Challenges in using IMV and Medicare Claims

- **IMV**
 - Covered a large number of imaging facilities
 - No detailed break out of procedures
- **Medicare**
 - Could identify distribution by CPT code for elderly population
 - Projections to population of all ages not always accurate
 - CPT not granular or descriptive enough for CT, interventional

New Source: ACR Dose Index Registry

- Collects data on all procedures
- Contains standardized procedure names
- Single source for counts of procedures and radiation dose indices
- Has patient age and gender

What the DIR brings to procedure tracking

- **Standardization:** Terminology standardized to RadLex
- **Automation:** Collect data from a variety of platforms:
 - with minimal effort for facilities
 - high accuracy
- **High participation**
 - All exams from participating facilities, but long way to go before we will have entire population of US and all imaging procedures

Procedure name standardization

- **Radlex Playbook** – much more granular than CPT and specific to imaging
- **Each facility will map exam descriptions** to ensure appropriate interpretation
- **Suggested tags will be provided** to make facility's task easier

DIR Exam Name Mapping

[Home](#) [Logout](#)

Role: FacilityAdmin / UserName: 100853_administrator

Exam:

Status: Show Everything

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Exams	Status	Action
Cardiac:CT ASIL_COR_CTA_100KV (Adult)	Not Tagged	Edit
CT ANGIO CHEST	Not Tagged	Edit
CT CHEST WITH CONTRAST	Tagging Suggested	Edit



DIR Exam Name Mapping

Home Logout

Role: Facilitator

Facility 100853

Exams CT CHEST WITH CONTRAST



Tagging Suggested



Predicate

POPULATION
BODY REGION
MODALITY MODIFIER
PROCEDURE MODIFIER
ANATOMIC FOCUS
LATERALITY
REASON FOR EXAM
TECHNIQUE
CONTRAST_ENHANCEMENT

Values

ABDOMEN
BONE
CERVICAL SPINE REGION
CHEST
FACE
HEAD
LOWER EXTREMITY
LUMBAR SPINE REGION
LUMBOSACRAL SPINE REGION
NECK

ADD Tag

Variant Tags

BODY REGION : CHEST

Delete



DIR Exam Name Mapping

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Facility 100853

Exams CT CHEST WITH CONTRAST



Tagging Suggested



Predicate

POPULATION
BODY REGION
MODALITY MODIFIER
PROCEDURE MODIFIER
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LATERALITY
REASON FOR EXAM
TECHNIQUE
CONTRAST_ENHANCEMENT

Values

INTRATHECAL CONTRAST
ORAL CONTRAST
RECTAL CONTRAST
WITH IV CONTRAST
WITHOUT IV CONTRAST
WITHOUT THEN WITH IV CONTRAST
XENON

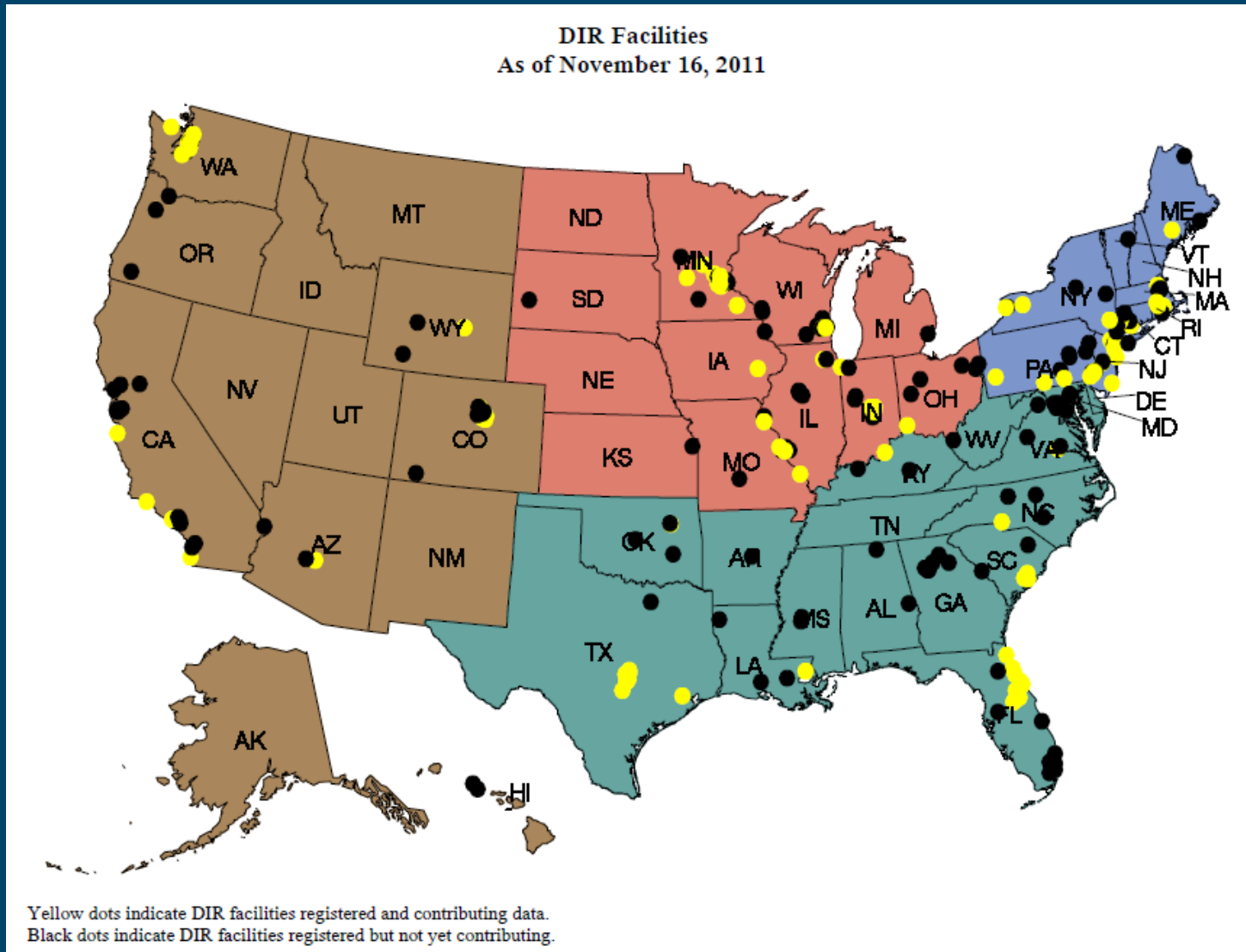
ADD Tag

Variant

BODY REGION : CHEST
CONTRAST_ENHANCEMENT : WITH IV CONTRAST

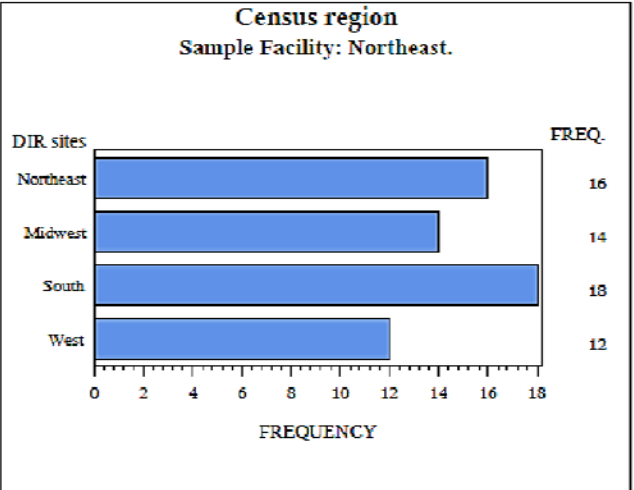
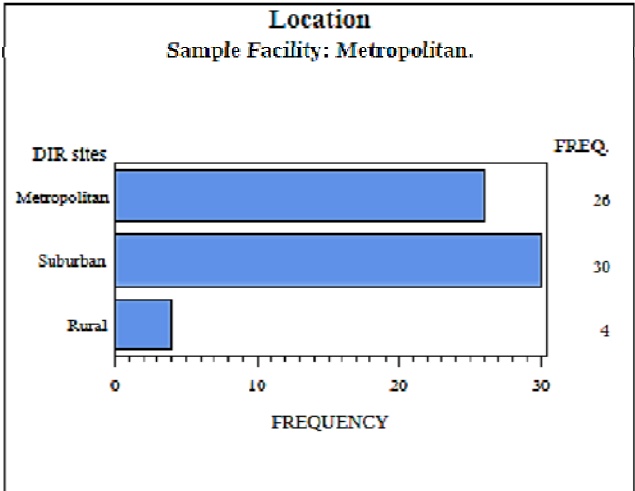
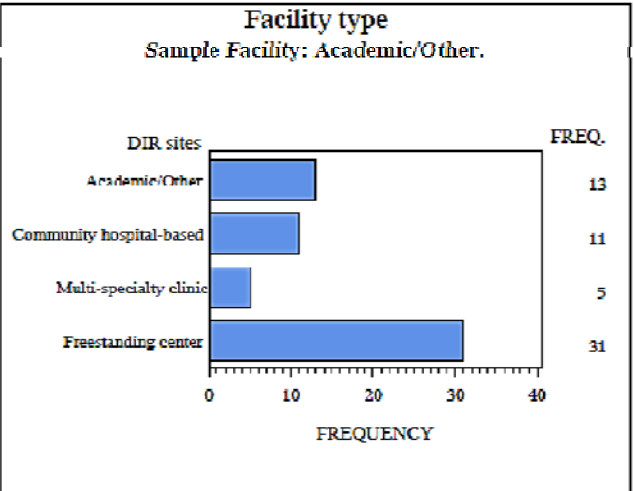
Delete

Broad geographic representation



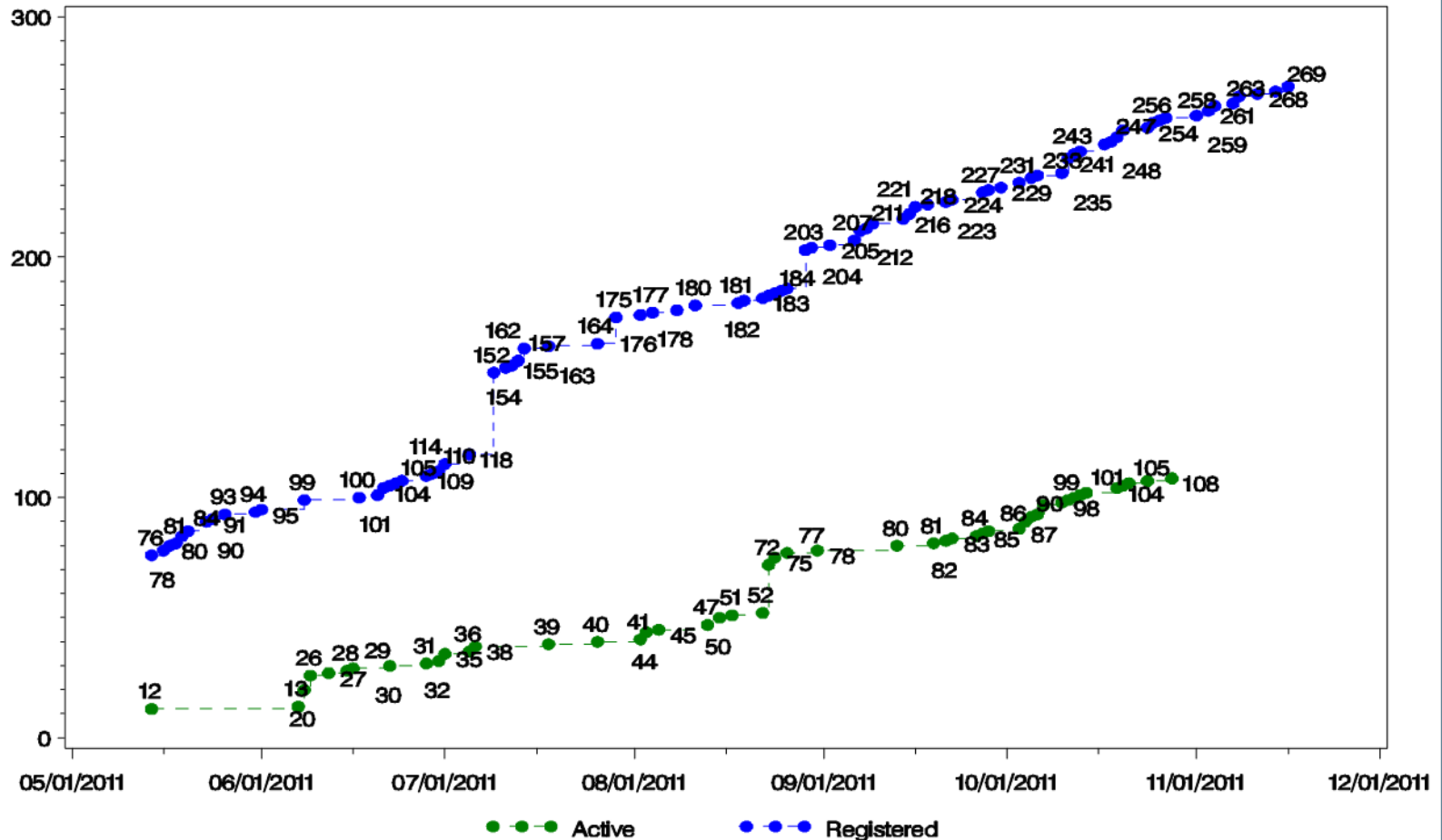
Representation across practice types

DIR Facility Characteristics Fall 2011



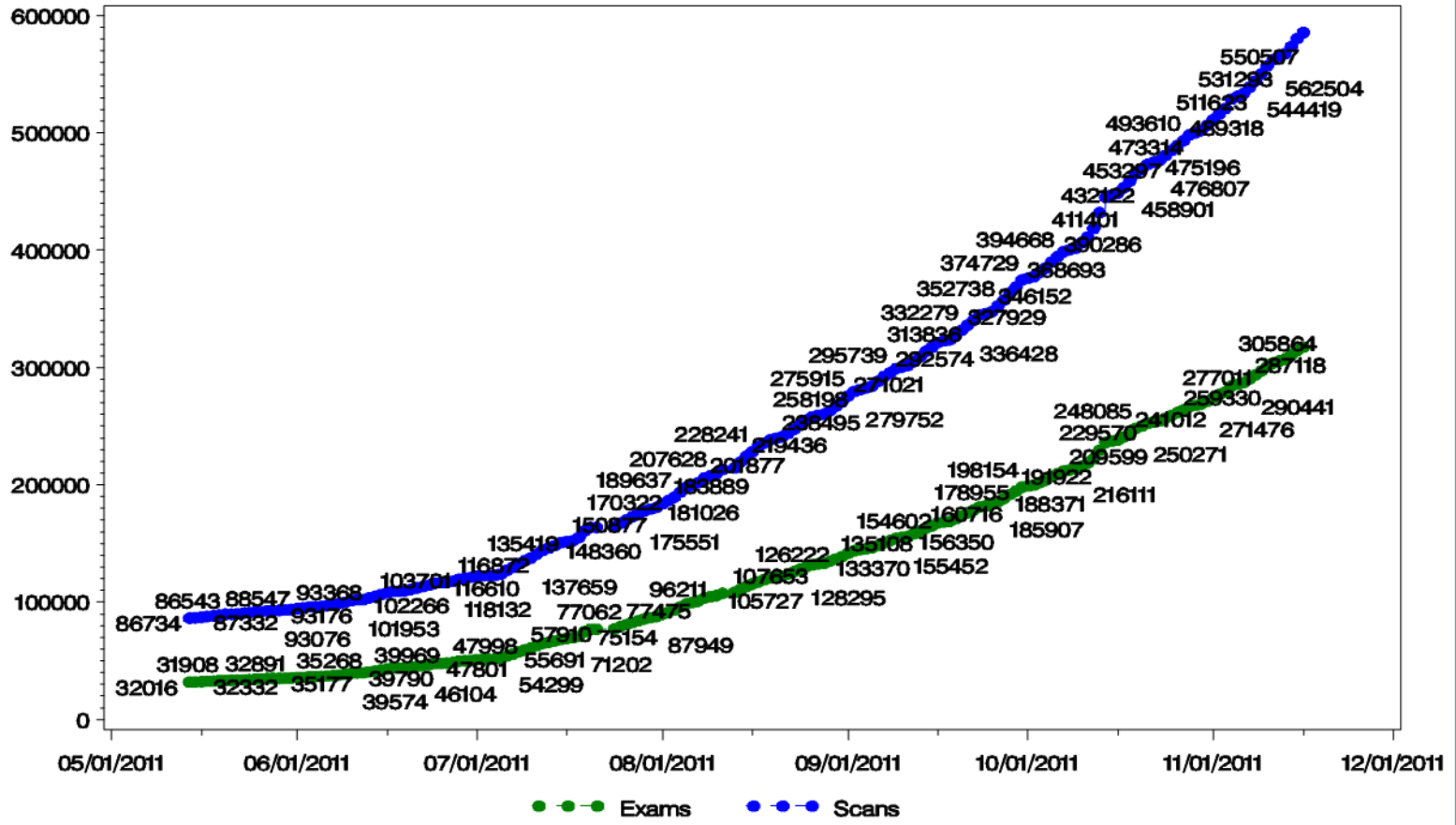
Current registry enrollment

DIR Registration Tracking



Quickly growing volume

DIR Tracking



Dose Index Registry Challenges

- **Currently does not cover all imaging**
 - Only CT at this point
 - Despite rapid growth, only around 300 facilities
 - Broad distribution, but may or may not be representative of overall populations
- **Roadblocks in participation**
 - Participation is voluntary, so participation unlikely to be universal
 - Fee to participate, though modest, may be a barrier
 - Data transmission is automated and secure, but some facilities may still hesitate

Dose Index Registry Challenges

- **Inconsistent naming conventions**
 - As demonstrated, wide range of names for any procedure
 - Within procedure, variation in protocols (3-phase versus 2-phase)
- **Privacy issues**
 - Patient privacy: DIR uses industry standard practices for data protection and signed BAAs
 - Facility privacy:
 - facility information not shared publicly, and
 - facility approval sought before displaying it on list of participants

Challenges in using the data for population dose monitoring

- **DIR currently only measures CT dose indices, not dose or dose estimates**
 - Size-Specific Dose Estimates (SSDE) will be available starting 2012
 - Plan to extend to organ doses, but no timeline available
- **Patient data are anonymized**
 - Cannot identify multiple exams on same patient
 - Cannot follow patient as he or she moves from facility to facility

Dose Index Registry Goal

Serve as a **tool** to **enable** facilities to **optimize protocols, implement standards** and contribute to the development of **reference levels**.

Dose Index Registry potential for population exposure monitoring?

- **Exposure monitoring requires**
 - Expert consensus and AAPM guidance on how to measure organ doses
 - Patient identifiers to track all exams on patient
- **Pursuing population exposure monitoring may compromise main registry goal**
 - Acting without consensus and requiring identifiers will decrease facilities' willingness to participate
 - Low participation will delay development of reference levels

Summary

- Many challenges in measurement of population utilization
- Particular attention needed on interpreting procedure names

Contact information

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Questions?