

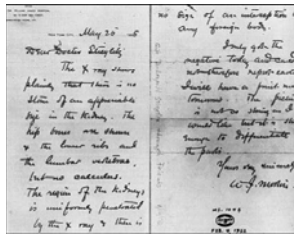


Structured Reporting: Project Orientation

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Outline

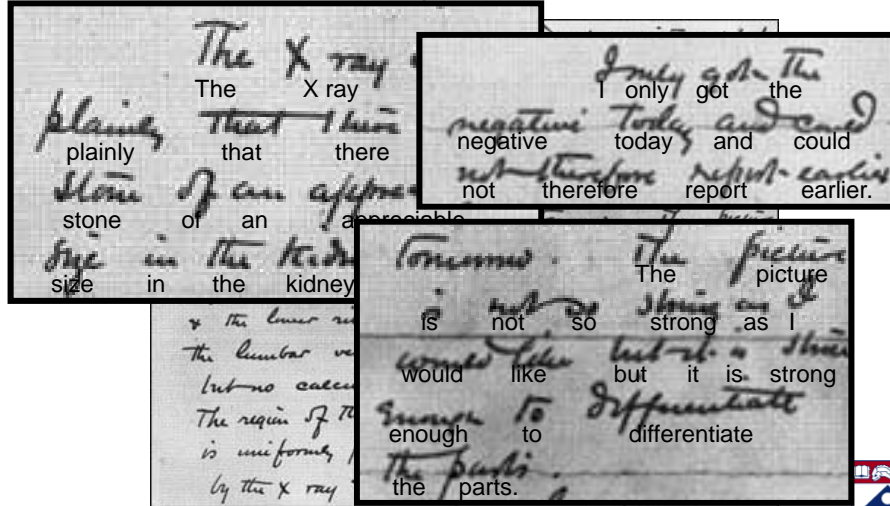
- Radiology reporting today
- Factors driving change
- Definition of structured reporting
- The RSNA reporting initiative
- Migration path to structured reporting



Knights & Reiner, *Imaging Economics*: November, 2004



Report from William James Morton, MD May, 1896



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Knight & Reiner, *Imaging Economics*: November, 2004



Radiology Reporting Today

~80%

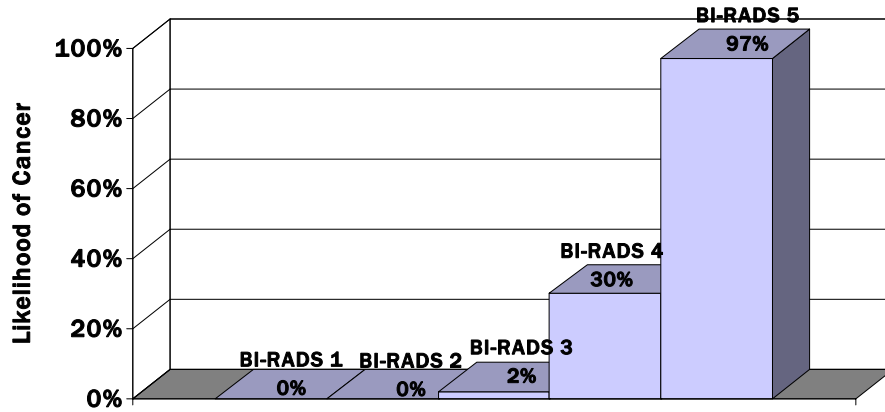
~19%



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Breast Structured Reporting



Orel, SG, et al. Radiology 211:845, 1999

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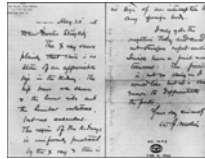
Forces Driving Change

- Consistency of report format and content
- Compliance with accreditation requirements
- Compensation from pay for reporting incentives
- Continuous quality improvement programs



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Tradeoffs of Radiology Reporting



Knight & Reiner
Imaging Economics, 2004



Radiologists



Payers



Referring
providers



Practice
managers



Patients



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ACR™ Intersociety Conference: AMERICAN COLLEGE OF RADIOLOGY Summary Conclusions 2007

- Structured reporting is the optimal reporting method, provided that structured reporting tools do not impede radiologist productivity
- Reporting tools should enable a hybrid of speech recognition and structured reporting
- Radiology professional organizations should create a repository of exemplary reports based on RadLex and other standard terminologies

Dunnick & Langlotz, *J Am Coll Radiol* 5:626, 2008

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The **RSNA** Reporting Initiative

- ❑ Goal: Create an on-line library of best-practices radiology report templates for key clinical scenarios
- ❑ Based on standard terminology, including RadLex
- ❑ Developed by consensus in collaboration with professional organizations and standards bodies
- ❑ Available as text report templates, speech recognition macros, and true structured reports
- ❑ Adapted by radiology practices based on local practice patterns

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RSNA | Radiological Society
of North America
Founded in 1915



Structured Reporting Attributes

- Structured report format
 - ❑ Achieved today in most practices
 - Consistent report content
 - ❑ Improved referring physician acceptance
 - Standard report language
 - ❑ The essence of structured reporting
- } Need all 3

Sistrom & Langlotz, *J Am Coll Radiol* 2: 159-167, 2005

Naik et al, *AJR* 176:591, 2001

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Structured Report Format

PA and Lateral Chest X-Ray

HISTORY:

Positive PPD

IMPRESSION:

No active cardiopulmonary disease

COMMENT:

PA and lateral views of the chest exposed at 13:45 hours on June 10th are reviewed without prior exams. The lungs are clear. The heart is normal in size. The mediastinal contours are normal. There is no evidence of tuberculosis.

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Consistent Report Organization: Macros and Templates

LIVER: [..]

GALLBLADDER: [..]

BILIARY: [..]

PANCREAS: [..]

SPLEEN: [..]

KIDNEYS: [..]

VASCULAR: [..]

OTHER FINDINGS: [..]

IMPRESSION: [..]

Sistrom & Langlotz, *J Am Coll Radiol* 2: 159-167, 2005

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Consistent Report Organization

LIVER: Demonstrates diffuse increased echogenicity, likely due to fatty infiltration. There are no focal lesions.

GALLBLADDER: Normally distended with no gallstones. There is no pericholecystic fluid, wall thickening, or sonographic Murphy's sign.

BILIARY: No intrahepatic ductal dilatation is identified. The common duct measures 6 mm at the porta hepatis.

PANCREAS: Limited visualization due to gas in the stomach and colon.

SPLEEN: Measures 9.9 cm in length and is normal.

KIDNEYS: The right kidney measures 11.9 cm. There is an echogenic structure within the inferior pole of the right kidney with posterior shadowing, likely a renal stone. It measures 8 mm. There is no right hydronephrosis or hydroureter. The left kidney measures 12.3 cm. and is normal.

VASCULAR: The abdominal aorta is non aneurysmal.

OTHER FINDINGS: The bladder was empty and not evaluated.

IMPRESSION: No gallstones and no evidence of cholecystitis. There is an 8mm. stone within the inferior pole of the right kidney without evidence of hydronephrosis.

Sistrom & Langlotz, *J Am Coll Radiol* 2: 159-167, 2005

Standard Report Language

MRI Knee

Medial meniscus: [normal]
 tear
 intersubstance tear
 flap tear
 radial tear
 meniscal cyst
 degenerative change



The Radiology Report in 10 Years: Structured, Customized, and Interactive

PENN
RADIOLOGY

Patient: Twist, Oliver
MRN: 12345678
Date of Birth: July 8, 1960

Ordering Provider: John Hamm, MD
Contact: 566-555-4015
Examination: RIGHT KNEE

CLINICAL INDICATION:
Tear of medial meniscus

TECHNIQUE:
Single AP/lat and coronal sequences were performed.

OBSERVATIONS:
The lateral meniscus is unremarkable. Medial meniscus demonstrates some degenerative signals which do not touch the inferior articular surface of the femur, for example series 4, images 5-6. However, on image 7, a small, globular focus abuts the inferior articular surface near the free edge; this is compatible with a tear.


Quadriceps tendon and patellar tendon are intact. Anterior cruciate ligament and posterior cruciate ligament are intact. Medial collateral ligament and fibular collateral ligaments are intact.

As far as can be seen, the articular cartilage is unremarkable.

Moderate amount of suprapatellar fluid is identified.

IMPRESSION:
DEGENERATIVE CHANGES OF THE MEDIAL MENISCUS
• MODERATE AMOUNT
• THERE IS SUGGESTION OF A TEAR

Signed:
Curtis P.
1/15/09



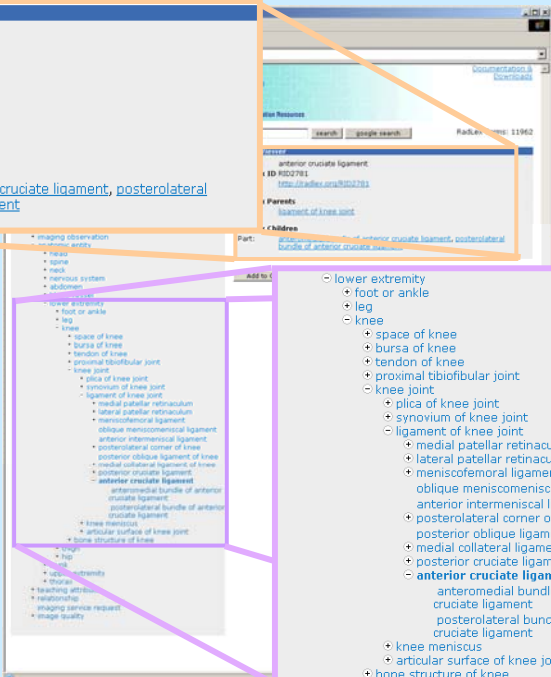
McCauley, T. R. et al. Am. J. Roentgenol. 2002;179:645-648
Copyright © 2008 by the American Roentgen Ray Society

Term Viewer

Name: anterior cruciate ligament
RadLex ID: RID2781
URI: <http://radlex.org/RID2781>

RadLex Parents
Is a: [ligament of knee joint](#)

RadLex Children
Part: [anteromedial bundle of anterior cruciate ligament](#), [posterolateral bundle of anterior cruciate ligament](#)



www.radlex.org

- lower extremity
 - foot or ankle
 - leg
 - knee
 - space of knee
 - bursa of knee
 - tendon of knee
 - proximal tibiofibular joint
 - knee joint
 - plica of knee joint
 - synovium of knee joint
 - ligament of knee joint
 - medial patellar retinaculum
 - lateral patellar retinaculum
 - menisofemoral ligament
 - oblique meniscomeniscal ligament
 - anterior intermeniscal ligament
 - posterolateral corner of knee
 - posterior oblique ligament of knee
 - medial collateral ligament of knee
 - posterior cruciate ligament
 - **anterior cruciate ligament**
 - anteromedial bundle of anterior cruciate ligament
 - posterolateral bundle of anterior cruciate ligament
 - knee meniscus
 - articular surface of knee joint
 - bone structure of knee

Disadvantages of Structured Reporting



"Are we thinking here, or is this just so much pointing and clicking?"

© The New Yorker collection. All rights reserved.
From *The New Yorker Book of Technology Cartoons*.

Weiss DL & Langlotz CP,
Structured reporting: Patient care enhancement or productivity nightmare?
Radiology 249(3):739-47, 2008

RSNA Reporting Workshop Consensus Section Headings

- **Administrative Information**
 - Facility, provider, date/time
- **Patient Identification**
 - Name, identifier, gender, date of birth
- **Clinical History**
 - Includes allergies and reason for exam
- **Imaging Technique**
 - Device, device settings, patient maneuvers, radiation dose, medications administered, including contrast
- **Comparison**
 - Date and type of previous exams reviewed
- **Observations**
 - Imaging findings, including measurements and annotations
- **Summary or Impression**
 - An itemized list of important findings, including recommendations
- **Signature**



Proposed Template Authoring Conventions (1)

- *[The lungs are clear.]*—square brackets signify a place for data entry, and can contain default text
- *[normal* | dilated]*—vertical bars or “pipes” separate mutually exclusive options, e.g., menu items. Asterisk indicates default value.
- *[chronic chest pain; atypical angina; pre-valve replacement]*—semicolons separate multiple binary choices, e.g., check boxes
- *[# mL]*—number sign signifies a number (often followed by units). Real numbers contain a decimal point.
- *{If left or co-dominant: LPDA and LPL branches should be addressed.}*—curly brackets signify a comment or help text, removed when finalized
- *[<date>]*-- pointy brackets signify a pre-defined data type
- All square brackets and all comments (in curly brackets) should be removed upon report finalization (or sooner)
- Rules
- Certainty
- Criticality
- Comparisons/temporal change

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Proposed Template Authoring Conventions (2)

- Headings and subheadings indicated by font and indentation. Heading on a separate line.
- Any portion of the report can be marked up with sets of terms from a controlled vocabulary, using the standard tuple to identify a term: (term name, term ID, vocabulary ID)
- Any structured information (except headings and subheadings) can be replaced by free text.

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Sample Template From Library: Chest Radiography

Clinical History:

[cough; fever; hemoptysis; post-op day #; oxygen requirement; change in respiratory status; check tube or line]

Imaging Technique:

[Portable AP chest radiograph* | PA and lateral chest radiograph]

Comparison:

[<Exam type>, <Date>]

Observations:

Lungs: [Clear]

Heart: [Normal* | mildly enlarged | moderately enlarged | markedly enlarged]

Mediastinum: [Normal | post-operative changes]

{information about tubes and lines here, if needed}

Impression:

[No active disease]

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Sample Template As Finalized: Chest Radiography

Clinical History:

cough, fever

Imaging Technique:

Portable AP chest radiograph

Comparison:

chest radiography, May 17, 2009

Observations:

Lungs: clear

Heart: mildly enlarged, but unchanged from prior

Mediastinum: post-operative changes

Impression:

1. Cardiomegaly
2. No pneumonia

Keywords:

Heart, mildly, enlarged

Medastinum, post-operative changes

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The End

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