StructuRad Presentation

Reporting Tool Overview

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Agenda

- StructuRad Introduction
  - Who are we, etc..

- Quick Update and Overview of StructuRad Reporting Tool solution

- Demonstration of Reporting Tool application

- Questions, Wrap up
StructuRad, LLC Profile

- Development started in 1996 by Dr’s Richard Gray and Gerald Berman at Midway Hospital, Los Angeles
- Case Study completed 1999 demonstrated benefits
- More than 320,000 structured reports generated
- StructuRad LLC formed 2001
  - Development started on user friendly application product for Radiology community
  - Developed business infrastructure and ASP service model
  - Hired experienced management team
- Product introduction Q1 2003
  - Extensive Alpha Testing
  - Currently in Beta software trials
Founders and Management Team:

- Gerald D. Berman, M.D., Founder
  Director of Radiology, Midway Hospital Medical Center

- Richard N. Gray, M.D., Founder
  Chief, Department of Neuroradiology, Midway Hospital Medical Center

- David Liu, Ph.D., President, CEO
  Professor, California State University, Northridge

- Mark Zucherman,
  VP Marketing & Business Development

- Gary Bachrach, VP Finance
StructuRad Value Proposition: To the Radiologist and Healthcare Provider

- **Better Productivity (Less Work, Faster Turnaround)**
  - Eliminate proofing of transcriptions
  - Automated generation of “impressions” from “findings”
  - More Accurate and Complete Findings report.

- **Increase Operational Efficiencies**
  - Re-use of previous radiology reports
  - Elimination of information and process disruptions (less phone calls)
  - Data base of Historical Records/Trends for Reporting and Billing

- **Faster Turnaround Time on Reports**
  - Turnaround time from 2-48 hours → Now minutes

- **Improved Quality of Service**
  - More responsive to referring physicians and hospitals → faster treatments
  - Instantaneous access to e-archived radiology reports
End Result using StructuRad:
Better Faster reporting...

- Transcription costs reduced.
- Time to create a report is neutral to speech
- Interruptions dramatically reduced.
- Reports available in seconds.
- No transcription errors.
- Accurate billing coding.
- Necessary information always entered.
- Facilitates report reuse and data mining
StructuRad Architectural Overview

ASP delivered Application

Existing Hospital or Group
H/W and Network Infrastructure

No new Hardware/Software to purchase, Install or maintain

StructuRad Application Portal
Hosted in Secure Data Center

24/7 Data Storage and Internet Connectivity

Referring Physician
24/7 report access via simple email and Internet browser
StructuRad’s Reporting Tool Overview

Application Views

- Technologist Workspace
- Radiologist Workspace

Report View

Referring Physician

StructuRad Application Portal

- Internet
- StructuRad Reporting Tool
  - Radiology Knowledge Base Template(s)
  - Secure Report Storage
StructuRad Reporting Tool v2.5

Stand Alone Workspace (WinForm)

Portal Workspace (IE 6)

Findings Editor (Win32 App)

HIPAA

HL7

IHE

Front end Back end Integration

ASP.NET

SQL

Meta Data

Studies

SOAP

HTTP
StructuRad Future Application Views

**Tomorrow’s Views will take advantage of New technologies**

Radiologist Notebook
- Full findings and demographics capability
  - Voice Recognition input capability
  - Pen input, etc.
  - Off-line Findings editor capacity.

Administration Workspace
- Organization online administration

Future Devices
- Wireless capabilities
StructuRad is the powerful combination of two distinct technologies:

- A complete knowledge base representation of 13 different Radiology modalities, *and*
- A sophisticated computational linguistics engine capable of generating natural sounding English language reports.
Knowledge Base Templates: 13 Modalities

- X-ray
- Fluoroscopy
- CT
- CTA
- PET
- Conventional Angiography
- Ultrasound Angiography
- Mammography
- Ultrasound
- MR
- MRA
- Interventional Radiology
- Nuclear Medicine
StructuRad Reporting Tool
Outline of use...

- Demographic data input
- Radiologist analyzes Image
- Uses StructuRad application program at Workstation to bring up the Findings Editor
- Uses StructuRad Templates to enter Findings and creates Structured Report;  
  - easy-to-use decision-tree format
- Distributes Report via secure Email, Print (or fax)
- Archives Report for future online reference
**Midway Hospital**
**Department of Radiology**

<table>
<thead>
<tr>
<th>Patient: John Smith</th>
<th>RM #: 208</th>
</tr>
</thead>
<tbody>
<tr>
<td>XR # 24-35-48</td>
<td>Hospital #: 1234987450</td>
</tr>
<tr>
<td>Referring Physician: William Jones, MD</td>
<td>Date: August 10, 2001</td>
</tr>
</tbody>
</table>

**PROCEDURE:** Chest 2 views (71020).
Clinical information: Shortness of breath (786.05).
Technique: Chest: PA. Lateral.
Limitations: Suboptimal inspiration.
Comparison: Chest x-ray (September 12, 2000).

**FINDINGS:**

**PROCEDURES:** Sternotomy. Coronary bypass surgery.

**INSTRUMENTATION:** Triple lumen catheter with tip in the superior vena cava via the right subclavian vein. No evidence of a pneumothorax.
Nasogastric tube with tip coiled in the fundus of the stomach.

**PATHOLOGY:** Multiple 10-20 mm bilateral pulmonary cavitating nodules.
Normal mediastinum. Unremarkable hila.
Unremarkable pleural spaces. No pleural effusions identified.
Unremarkable osseous structures. Normal soft tissues.

**IMPRESSION:**
1. Multiple 10-20 mm bilateral pulmonary cavitating nodules.
   Recommendations: Additional imaging requested: CT of the chest.

Gerald Berman, MD (electronic signature)

Printed: Thursday, August 10, 2001 10:49:03 PM  StructuRad LLC
Demonstration of actual Report Creation using the Findings Editor

- **Easy to Visualize and Navigate**
  - Access by tree-like decision process (categories, sub-categories, etc.)

- **Easy and Fast to Use**
  - Categories chosen by simple click
  - Information can be entered randomly

- **Completeness of Data**
  - Specific report templates provided for each modality

- **Natural English Composition**
  - Use of Sophisticated Computational Linguistics Built in Flexibility

- **Supports both general and specific pathologies**
StructuRad Formatted Reports

- Consistent, focused and to-the-point
- Standardized structure, easy to read and comprehend
- Clearly delineates demographic, procedural and clinical information
- Impressions easily found, numbered for clarity
Billing abstraction

- Report templates have ICD-9 and CPT codes attached to menu items.
- Removes manual coding step from billing process.
- Coding accuracy improved
  - 1996 Transcription: 95%
  - 1999 StructuRad: 100%
<table>
<thead>
<tr>
<th>Event</th>
<th>1996 Transcription</th>
<th>StructuRad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to Release report (avg.)</td>
<td>29 hours</td>
<td>60 sec</td>
</tr>
<tr>
<td>Time to Release report (range)</td>
<td>6 – 52 hours</td>
<td>60 sec</td>
</tr>
<tr>
<td>Final report faxed to physician</td>
<td>30 hours</td>
<td>35 min</td>
</tr>
<tr>
<td>Final report on chart</td>
<td>30 hours</td>
<td>1 hour</td>
</tr>
<tr>
<td>Final report to HIS</td>
<td>40 – 48 hours</td>
<td>immediate</td>
</tr>
<tr>
<td>Final report to billing</td>
<td>40 – 60 hours</td>
<td>12 – 24 hours</td>
</tr>
<tr>
<td>Billing abstraction</td>
<td>5 days</td>
<td>immediate</td>
</tr>
<tr>
<td>Submit to third party</td>
<td>12 days</td>
<td>8 days</td>
</tr>
</tbody>
</table>
## Implementation Findings

### Myth vs Reality

<table>
<thead>
<tr>
<th>Structured Reporting</th>
<th>Myth</th>
<th>Reality</th>
</tr>
</thead>
</table>
| Inadequate Knowledge Coverage or Representation | Impossible for template to hold all possible findings | Extensive use and refinement leads to broad coverage in templates.  
|                                          |                                                                     | Ad Hoc “Comment” input fields used very rarely.                        |
| Unwieldy navigation or Too Difficult to Use | Decision tree is so large that it is difficult to navigate.  
|                                          | Radiologist spends too much time searching for appropriate selection.  | Organization of tree has huge effect.  
|                                          |                                                                     | Continuous improvement of trees since 1995. Structured selection can be as fast as dictation. |
### New Process Acceptance

| Referring Physicians | Consistent structure and organization.  
|                     | Format of reports.  
|                     | Structure of findings statements.  
|                     | Reduced time to receive final report.  
|                     | Naturalness of English text.  
| Reporting Radiologists | Reports are more complete, consistent and comprehensive than dictation.  
|                     | Automation of technique sections.  
|                     | Common nomenclature in the templates converts a production task into a search task.  
| Administrators | Automated billing abstraction.  
|                 | Less expensive.  
|                 | Less time consuming.  
|                 | No errors.  
|                 | Faster submission to third party with less rework.  
|                 | Lower operational costs.  

StructuRad Report Benefits

- No effort to format
- Procedure and ICD-9 codes automatically inserted
- When finding tagged as an impression, it is automatically reproduced in impressions section
- Radiologist not forced to dictate in the order information appears on report.
- No need to wait for sign off – electronic signature and communication get results to physician immediately
- Much easier Data Mining for Outcomes Research
Conclusions based on Real Use

- Improved quality and consistency of reports.
- Improved response time by eliminating process steps.
- Reduced costs by eliminating transcription.
- Reduced costs and improved cash flow through automated billing codes.