



# 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



# Company Background

## 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



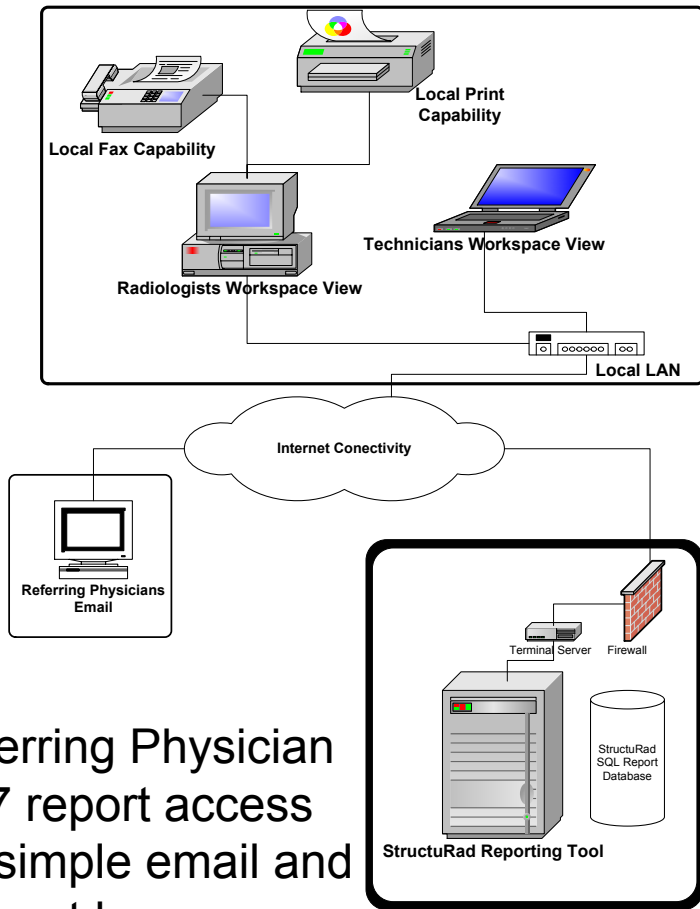
## End Result using StructuRad: *Better Faster reporting...*

- ☑ 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

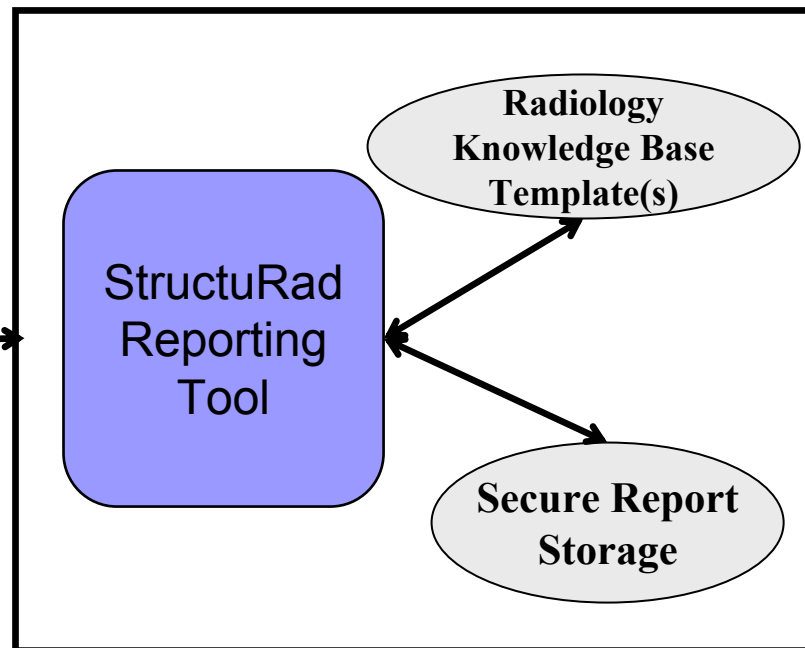


# StructuRad's Reporting Tool Overview

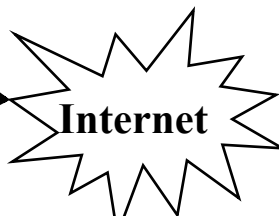
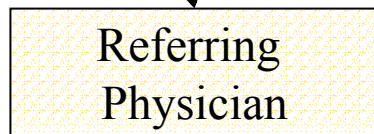
## Application Views



## StructuRad Application Portal



Report View

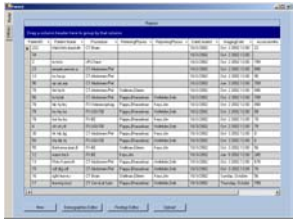




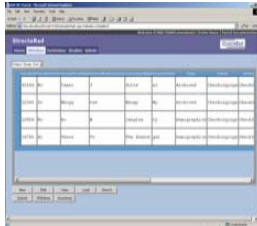


# StructuRad Reporting Tool v2.5

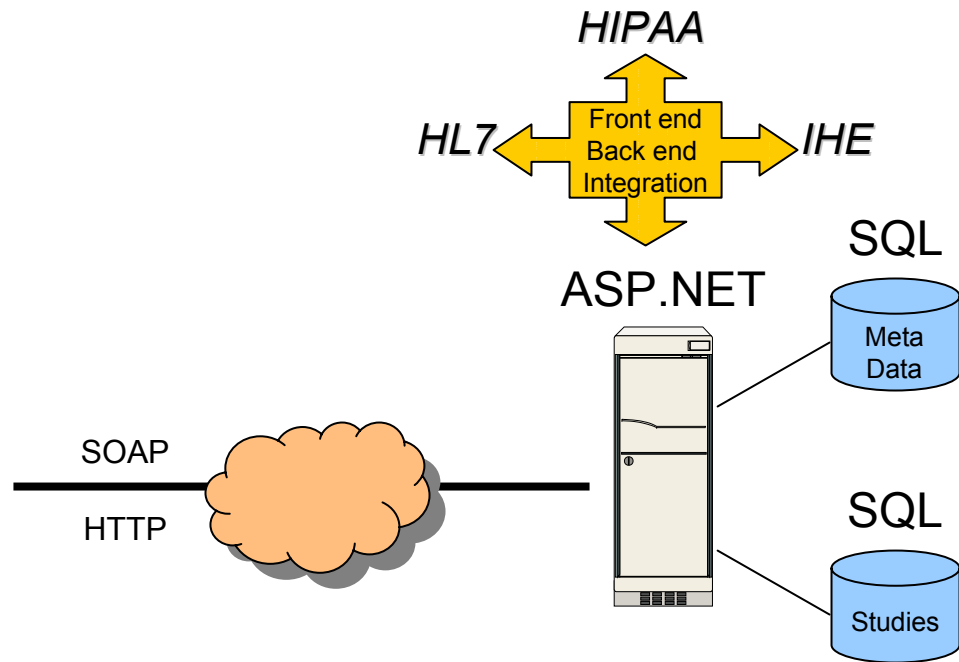
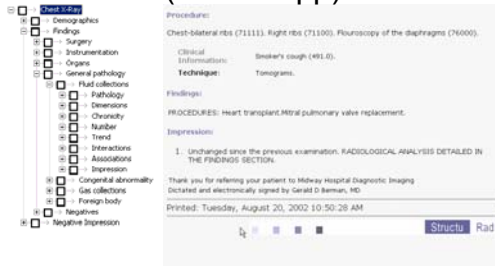
Stand Alone  
Workspace  
(WinForm)



Portal  
Workspace  
(IE 6)



Findings Editor  
(Win32 App)



## 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





## How do we do it...

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.

- 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

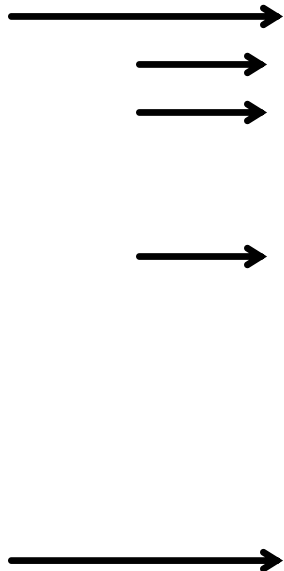
**Technologist enters  
Demographic Data**

**Radiologist uses  
Findings Editor to  
create Structured  
Report**

**Radiologist  
Approves and  
Publishes Report**

**Referring Physician  
retrieves Report off  
of StructuRad Web  
Portal**

# Sample StructuRad End Report



**Midway Hospital  
Department of Radiology**

**Patient: John Smith**  
**XR # 24-35-48**  
**Referring Physician: William Jones, MD**

**RM #: 208**  
**Hospital #: 1234987450**  
**Date: August 10, 2001**

**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.

Normal cardiac silhouette. Unremarkable aorta. Normal pulmonary vascularity. No evidence of pulmonary consolidation.

Unremarkable pleural spaces. No pleural effusions identified.

Unremarkable osseous structures. Normal soft tissues.

**IMPRESSION:**

1. Multiple 10-20 mm bilateral pulmonary cavitating nodules.

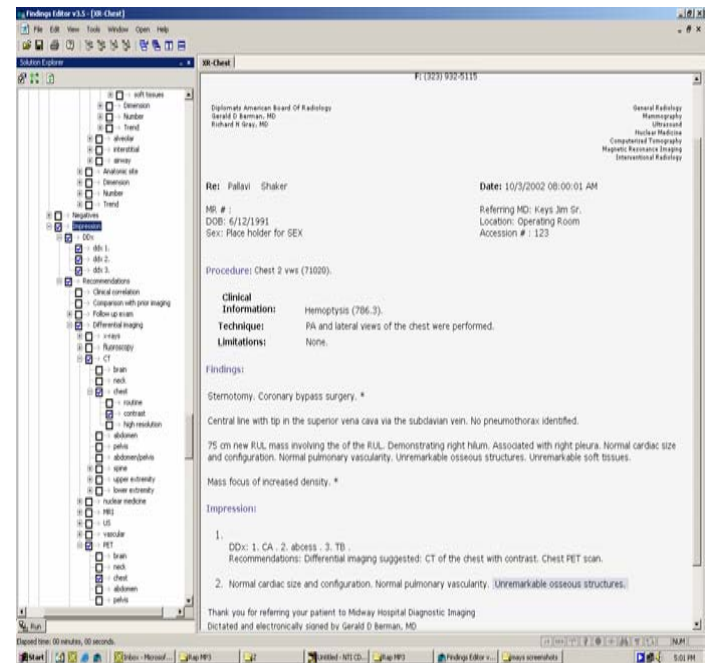
DDx: 1. Abscesses 2. TBC. 3. Metastases.

Recommendations: Additional imaging requested: CT of the chest.

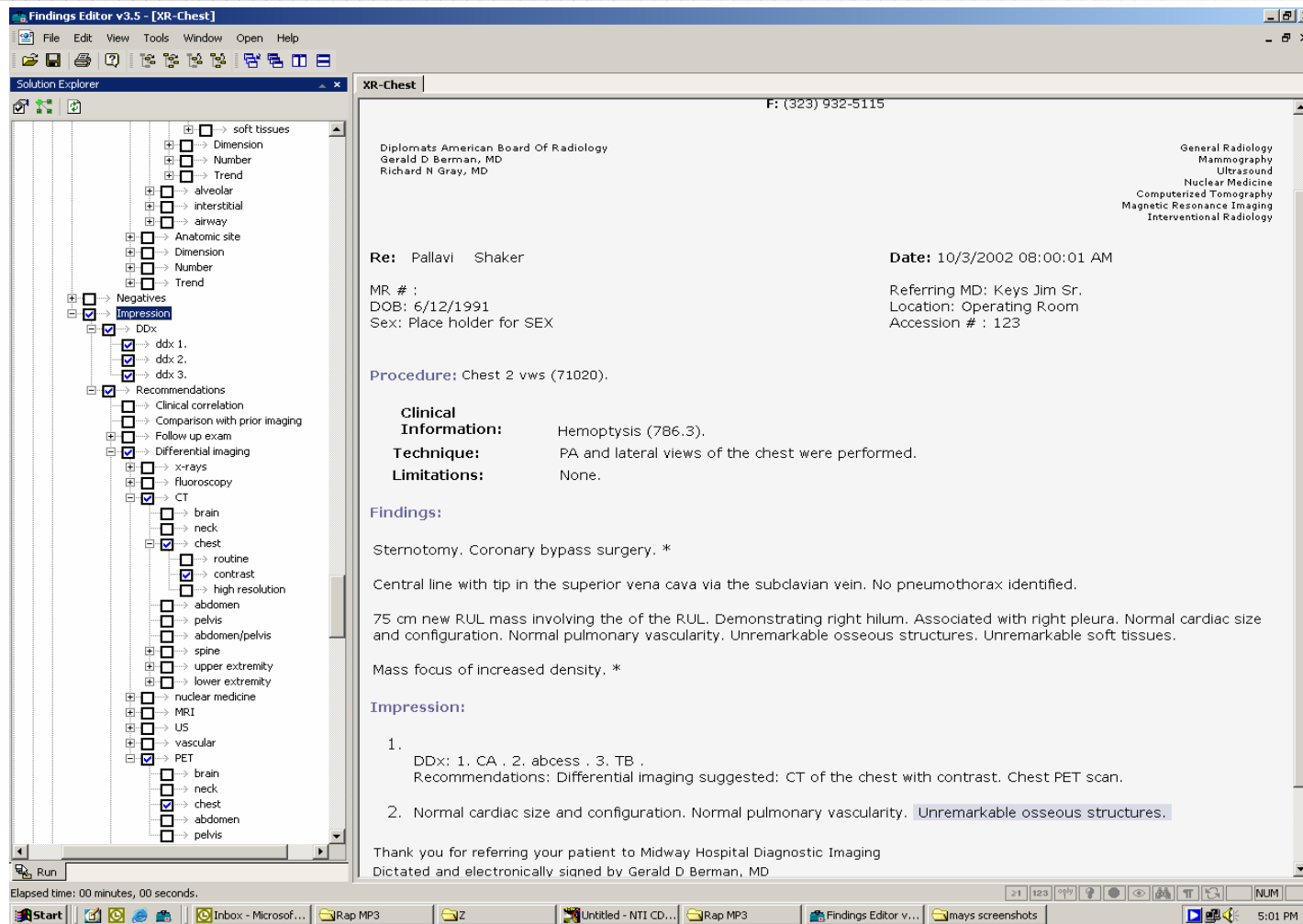
Gerald Berman, MD (electronic signature)

# 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**



# Findings Editor and Report



**Findings Editor v3.5 - [XR-Chest]**

File Edit View Tools Window Open Help

Solution Explorer

- soft tissues
  - Dimension
  - Number
  - Trend
- alveolar
  - interstitial
  - airway
- Anatomic site
  - Dimension
  - Number
  - Trend
- Negatives
  - Impression
    - DDx
      - ddx 1.
      - ddx 2.
      - ddx 3.
    - Recommendations
      - Clinical correlation
      - Comparison with prior imaging
      - Follow up exam
      - Differential imaging
        - x-rays
        - fluoroscopy
        - CT
          - brain
          - neck
          - chest
            - routine
            - contrast
            - high resolution
          - abdomen
            - pelvis
            - abdomen/pelvis
            - spine
          - upper extremity
          - lower extremity
        - nuclear medicine
        - MRI
        - US
        - vascular
        - PET
          - brain
          - neck
          - chest
          - abdomen
          - pelvis

XR-Chest

F: (323) 932-5115

Diplomats American Board Of Radiology  
Gerald D Berman, MD  
Richard N Gray, MD

General Radiology  
Mammography  
Ultrasound  
Nuclear Medicine  
Computerized Tomography  
Magnetic Resonance Imaging  
Interventional Radiology

**Re:** Pallavi Shaker **Date:** 10/3/2002 08:00:01 AM

MR # : Referring MD: Keys Jim Sr.  
DOB: 6/12/1991 Location: Operating Room  
Sex: Place holder for SEX Accession # : 123

**Procedure:** Chest 2 vws (71020).

**Clinical Information:** Hemoptysis (786.3).  
**Technique:** PA and lateral views of the chest were performed.  
**Limitations:** None.

**Findings:**

Sternotomy. Coronary bypass surgery. \*

Central line with tip in the superior vena cava via the subclavian vein. No pneumothorax identified.

75 cm new RUL mass involving the of the RUL. Demonstrating right hilum. Associated with right pleura. Normal cardiac size and configuration. Normal pulmonary vascularity. Unremarkable osseous structures. Unremarkable soft tissues.

Mass focus of increased density. \*

**Impression:**

- DDx: 1. CA , 2. abscess , 3. TB .  
Recommendations: Differential imaging suggested: CT of the chest with contrast. Chest PET scan.
- Normal cardiac size and configuration. Normal pulmonary vascularity. Unremarkable osseous structures.

Thank you for referring your patient to Midway Hospital Diagnostic Imaging  
Dictated and electronically signed by Gerald D Berman, MD

Elapsed time: 00 minutes, 00 seconds.

Start | Inbox - Microsof... | Rap MP3 | Untitled - NTI CD... | Rap MP3 | Findings Editor v... | Imays screenshots | 5:01 PM





# 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

- 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%



# Savings in Report turnaround time

	1996 Transcription	StructuRad
Time to Release report (avg.)	29 hours	60 sec
Time to Release report (range)	6 – 52 hours	60 sec
Final report faxed to physician	30 hours	35 min
Final report on chart	30 hours	1 hour
Final report to HIS	40 – 48 hours	immediate
Final report to billing	40 – 60 hours	12 – 24 hours
Billing abstraction	5 days	immediate
Submit to third party	12 days	8 days



# Implementation Findings

## Myth vs Reality

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



# New Process Acceptance....

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



# 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.