

Digital Forms for Clinical Care



Greg Shorr, M.D.
Cherokee Indian Health Authority
Cherokee, NC
June 1, 2005

A Brief History of Electronic Medical Records in Indian Country

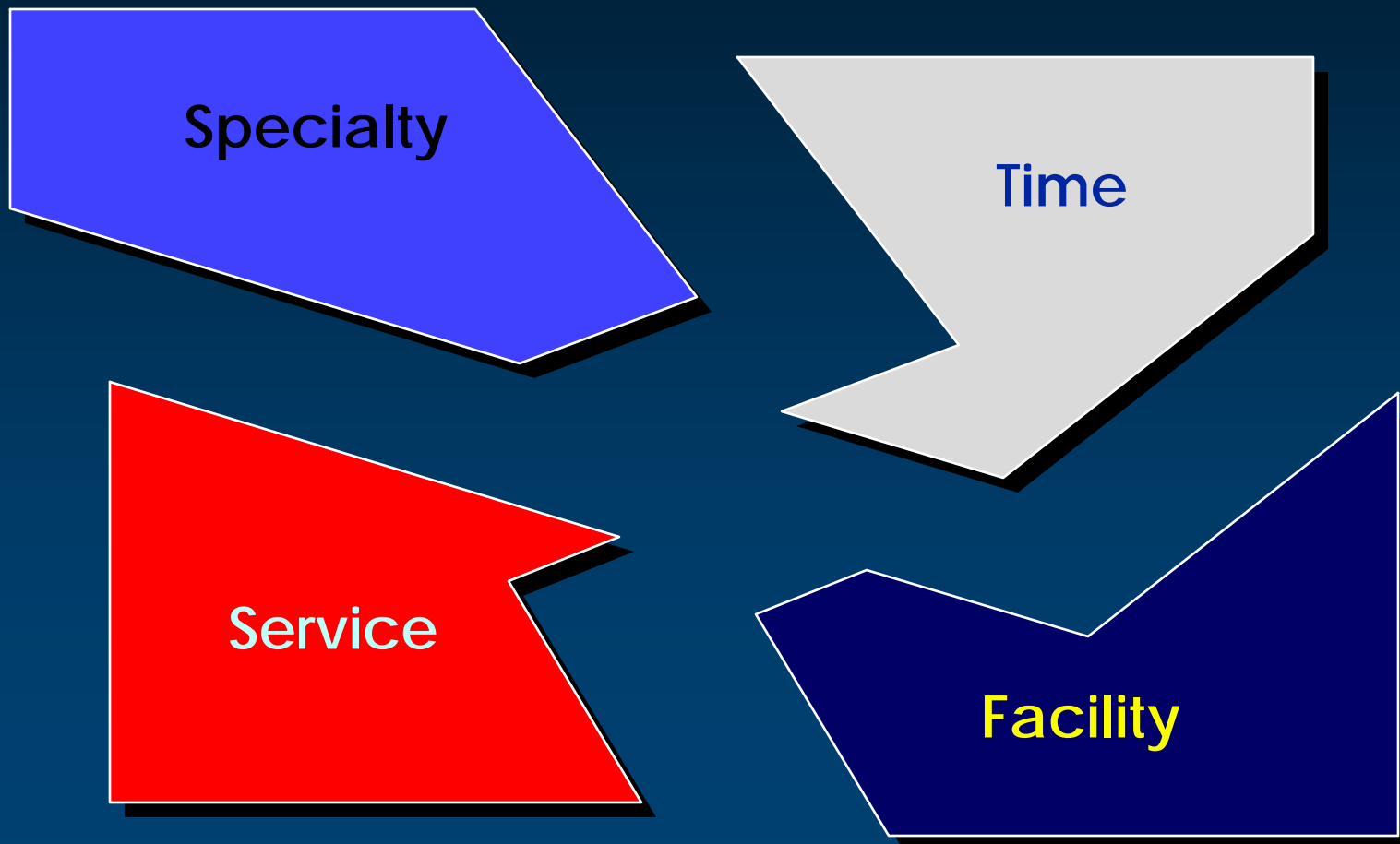
The Challenge

Given:

- Defined patient population
- Defined benefits package
- Defined budget

“Do the greatest good for the greatest number...”

Problem #1: Fragmentation of Clinical Information



Problem #2: Information Overload

- Lifetime clinical record
- Multiple disciplines
- “Foreign” data
- Inpatient/outpatient

Problem #3: Lack of “Cross Sectional” Views

- Administrative support
- Planning
- Managed care
- CQI
- Epidemiology
- Case management
- Ad Hoc Research

The Objective: Build an Electronic Medical Record

- See the “whole” patient
 - Emphasis on prevention
 - Decreased utilization of services
 - Reduce the “Starting over” syndrome
- See the whole patient population
 - Plan
 - Measure and manage
 - Do research and epidemiology

Electronic Medical Records:

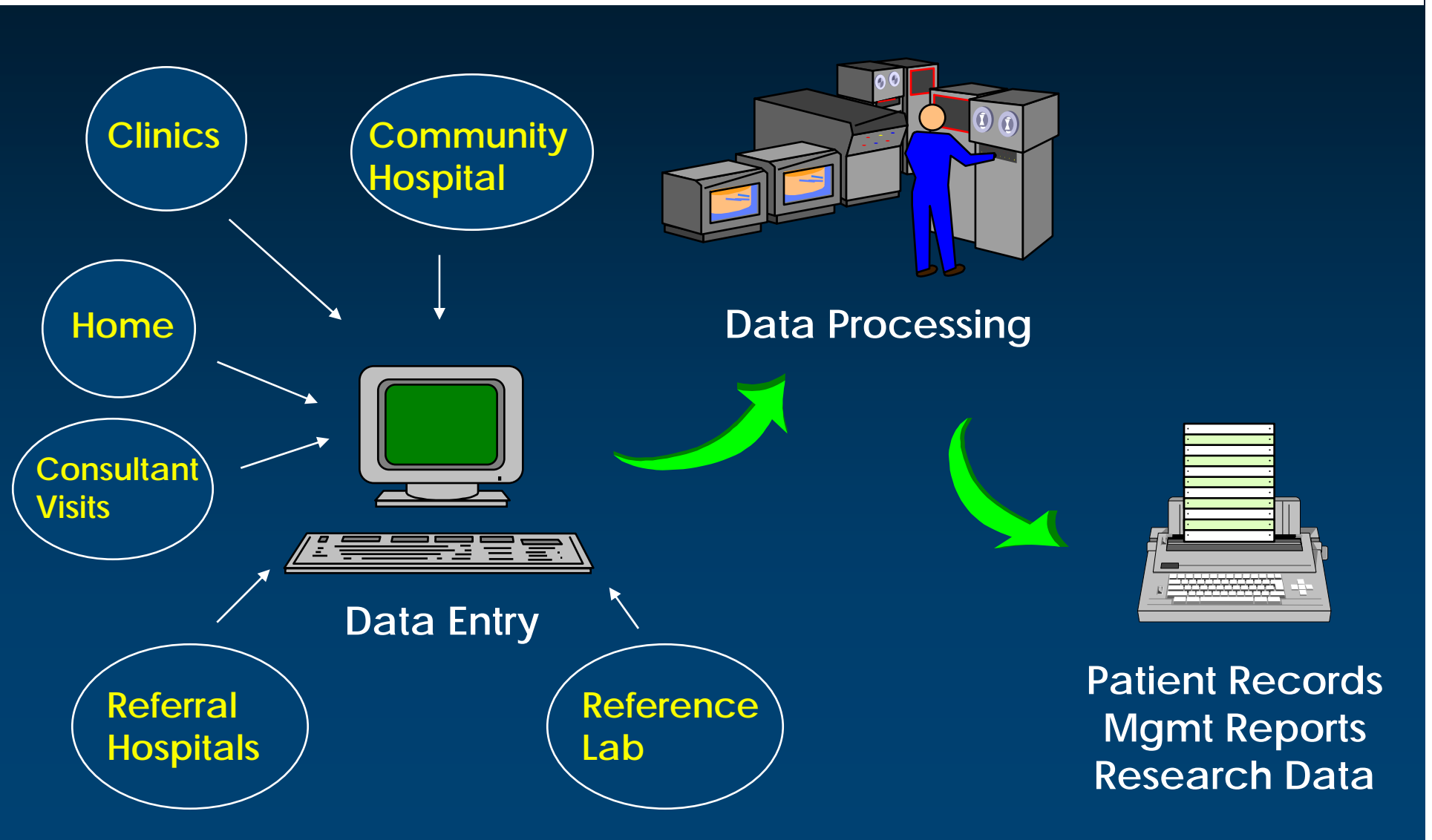
Technical Solutions

User Interfaces to Clinical Computer Systems

- Paper
- Dictation
- PDAs
- Workstations
- Smart Paper
- Digital Paper
- Virtual Paper

Solution #1 (cont.)

RPMS/PCC



Solution #2

Clinical Work Stations

- High Overall Cost
- Extensive Training Required
- Maintenance issues
- Change process/workflow
- Reduced productivity
- Lack of integration between clinical data capture and charge capture

Despite 15+ years of availability, these systems have < 5% penetration in small to medium office practices!

Solution #3

Customized Encounter Forms (PCC+)

- In the most general sense, PCC+ is a seamless, real time connection between the database and Microsoft Word
- Specifically , PCC+ is a real time form generator
 - New encounter form
 - Health Summary
 - Outguide
 - Patient hand out

Customized Forms: Advantages

- Virtually all essential data is directly in front of the provider (context)
 - Problem List
 - Recent encounters
 - Medications
 - Lab results
 - Health maintenance reminders
- Guidelines and disease specific data collection
- Integration of clinical and billing information
- Flow charting and graphing
- Improved data capture and data quality
- Provider productivity improves

Customized Forms: Disadvantages

- **Transcription required**
 - Cost
 - Errors
 - Delays
- **Copies must be generated**
- **Paper must be transported**

Solution #4

Digital Forms (MOJO)

- Medical Office Journaling & Operations
- Designed for small to medium-sized office practices
- 2 Interfaces
 - Digital Paper (FAS)
 - Virtual Paper (Tablet PC)
- Overcomes the disadvantages of PCC+
 - Transcription cost reduced by 67%
 - Image instantly available without need for scanning
- Health Professionals Like It
 - Doctors can easily customize their own forms
 - Doctors don't have to change the way they do business.
 - Simplifies billing and coding

MOJO

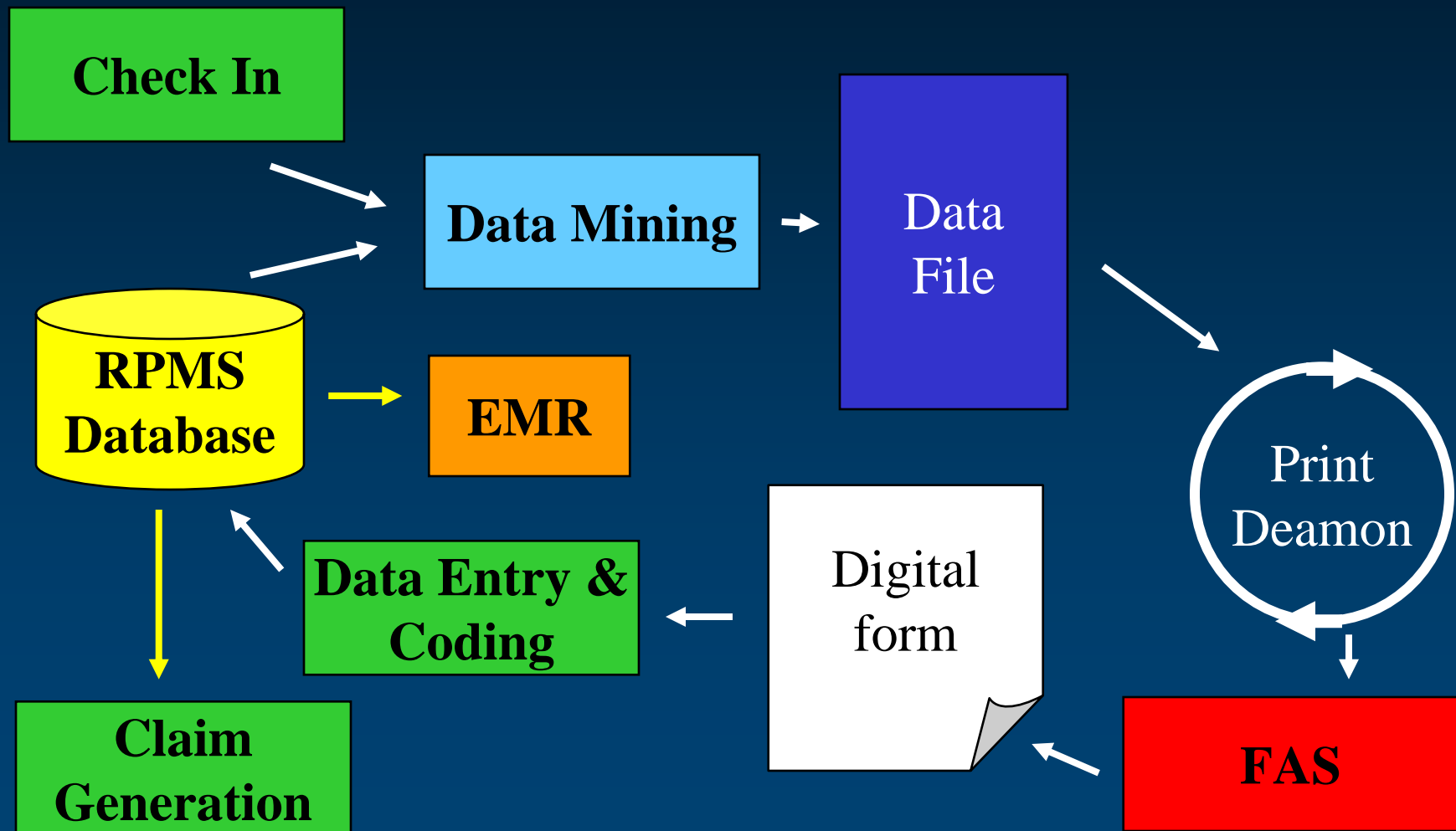
MOJO

- **Mojo is not an application. It is a solution.**
 - The user designs digital forms for Tablet PC and Digital Pen/Paper using the Mojo Form Developer Tools
 - The user fills out the digital form during the encounter
 - A precise image of the completed encounter form is instantly available anywhere on a secured network
 - The RPMS database is automatically updated
 - Charges are captured, claims are filed and \$ appears in the bank account
- **Mojo can be run via an ASP model where all processing and billing are done off site. The local RPMS database is updated in this process.**
- **Mojo can also be run locally where all processing takes place on local servers**

How are Digital Forms Developed

- Mojo Development Environment used to build customized forms
- The same environment is used to build forms for Tablet PCs and Digital Pen/Paper

DIGITAL FORM DATA CYCLE



How does MOJO Capture Encounter Data?

- **Check Boxes**
- **Character Recognition Boxes**
- Free Form Ink Images
- Automated Handwriting Transcription with Manual Corrections
- Automated Voice Transcription with Manual Corrections*
- Typed Input*

* Tablet PC only (in real time)

What happens after the form is submitted?

Data Entry

- A precise electronic image of the completed encounter form is instantly available to the data entry operator
- The new data entry process is based on PC Client, GUI interface
- The flow of data entry is customized for each form and is closely aligned with the individual structure of the form
- There is real time verification of data that is entered. If discrepancies are discovered, they are automatically reported back to the operator.

Data Entry

- Most of the data is captured via check boxes and character recognition boxes. It can be quickly reviewed and submitted with a single mouse click.
- Free text data is entered by handwriting transcription or by correcting text from automated transcription processes
- Data entry operators review, edit and add information using intelligent data grids (GUI spreadsheets)
- Data is entered in "segments"; e.g., measurements, POVs, immunizations, etc. Each segment has specialized data entry controls as well as a drill down image of the piece of the form that contains the raw ink strokes for that segment

Cherokee Indian Hospital **Anticoagulation Service Record**
Cherokee Indian Hospital **Clinic Number 50**

CHIEF COMPLAINT / HISTORY OF PRESENT ILLNESS

F/U of INR results performed during monitoring of anticoagulation therapy by protocol
 Test form

Providers

Hour	Minutes	Initials / I.D. No.
		0 2 S

Allergies / Adverse Drug Reactions

INR History		
Date	INR	PT

Vital Signs

BP 120 / 0 8 8

Demo Patient chart# 1 ssn 234-34-0678

- Measurements
- Providers
- POVs

Vital Signs

BP 1 2 0 / 8 8
 Sit Stand Lay

Pulse 8 4

Resp

Wt 1 7 5 lbs

Ht Ft 6 6 Inches

MEASUREMENT	RESULT
WEIGHT	175
BLOOD PRESSURE	120/80
HEIGHT	66
PULSE	84

What are the Expected Benefits of MOJO?

- 60% reduction in data entry costs
- Fewer data entry errors
- Cleaner claims, fewer rejections, fewer pass back to providers.
- Can re-direct data entry manpower to improve eligibility management and claims processing
- Faster data entry turn around time and shorter AR cycle
- Reduced chart pulls because the image of every encounter is available via a secure web browser
- Real time enforcement of “business rules”
- Real time decision support
 - Clinical (warnings for drug drug interactions)
 - Billing (claim scrubbing)

Advantages of Digital Paper

- Lower startup costs (although higher transaction fees and color printer costs may make it more expensive in the long run)
- Hardware (digital pen) is simpler and less likely to be broken or stolen than a Tablet PC.
- Closely matches the way most users currently enter information into RPMS. Therefore, there is a relatively flat learning curve for the professional staff.
- Process of generating digital forms closely matches the current PCC+ form generation process. Therefore, there is a relatively flat learning curve for the support staff, and no major process changes are required up front.

Advantages of Virtual Paper: Tablet PC

- **The tablet can be integrated with the Electronic Health Record (EHR)**
- **Potential for multi-modal data entry**
- **The tablet interface offers dynamic “real estate”**
- **Tablets can provide real time decision support at the time of clinical and billing data capture**
- **The tablet interface has built in business rules to promote real time correction of errors/omissions and thereby improve data quality**

MOJO Demo:

Mojo is operational today at
the Cherokee Indian
Hospital...

Technical Accomplishments: Critical contributions of Mi-Co and H-P

■ H-P Forms Automation Solution (FAS)

- Pen
- Unique dot pattern
- Print driver
- Printers

■ Mi-Co Mobile Solutions

- Integrated development environment
- Pre-fill (enables real time customization of forms)
- Form/ink management
- Handwriting recognition
- Database connectivity/updates
- Image management

Adios



Greg Shorr, M.D.