

Patient Identification and Matching

*National Committee on Vital and
Health Statistics
Subcommittee on Standards and Security*

December 7, 2005

Slides are a summary of submitted written testimony

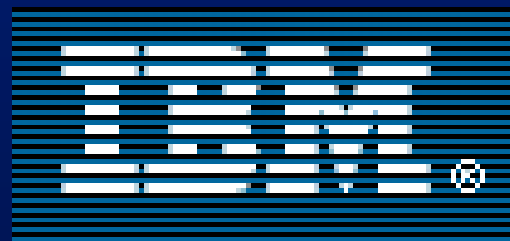


Overview

- **Advanced Health Information Network Background**
- **AHIN System Architecture**
- **Patient Identification/Matching on AHIN**
- **AHIN Experience with Algorithms and Identifiers**
- **Summary and Conclusions**



AHIN Founding Partners

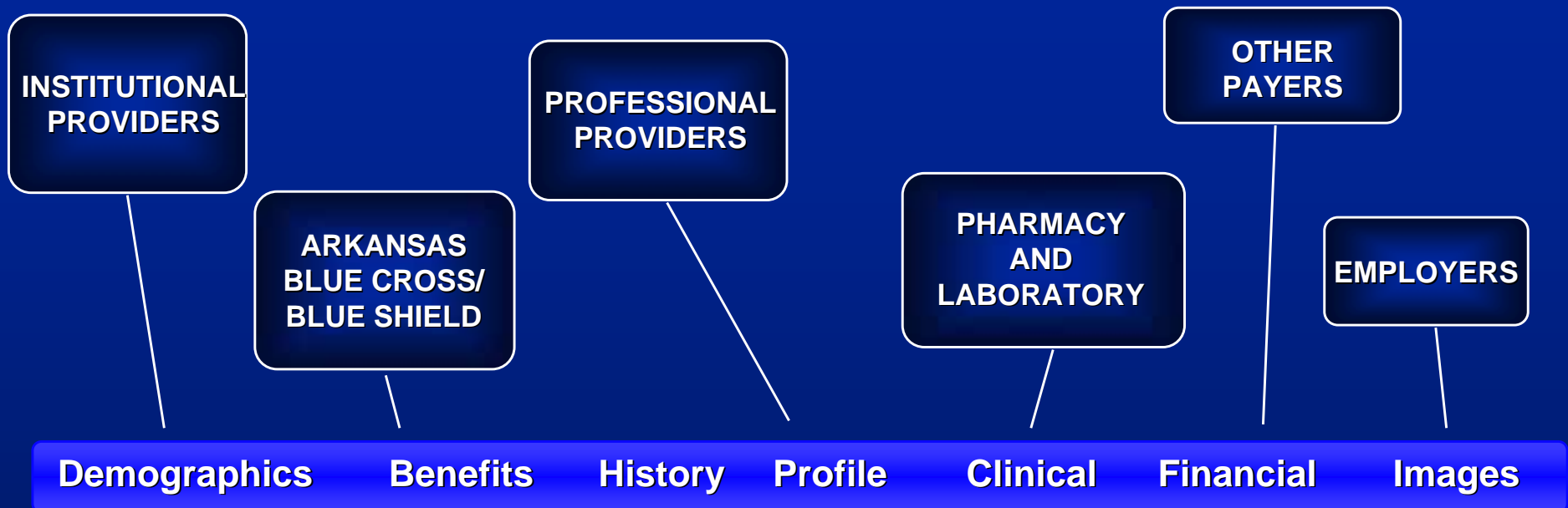


Architectural Guiding Principles

- The Patient/Member is the “Epicenter” of the architecture; all actions revolves around him/her
- Think globally of the HC Industry; not organizationally
- Leverage existing IT Investments wherever possible
- Provide “alternative options” for integration where possible
- Innovate through System Integration, where no organization has ever gone --- “Think outside the box”
- Create a “Virtual Secured View” of the Patient’s/Member’s Global record, via a Master Patient Index
- Build upon Industry Standards; ANSI and HL7
- Create Open systems, not burdened by only one tool or vendor
- While designed for Arkansas; architect for “portability to anywhere”



ARCHITECTURAL FOUNDATION



● Global Member Data

Demographics

- Address
- Date of Birth
- Soc Sec Num
- Employer
- Dependents
- Other data

Benefits

- Plan
- Deductible
- Copayment
- Amount of deductible paid
- Other Payer Liability
- Other coverage data

Medical History

- Summary data
- Allergic reactions
- Immunizations

Profile

- Genetic factors
- Lifestyle characteristics
- Stress index
- Wellness index

Clinical

- Laboratory results
- Physician observations
- Physician transcription
- Treatment prescribed
- Medications

Financial

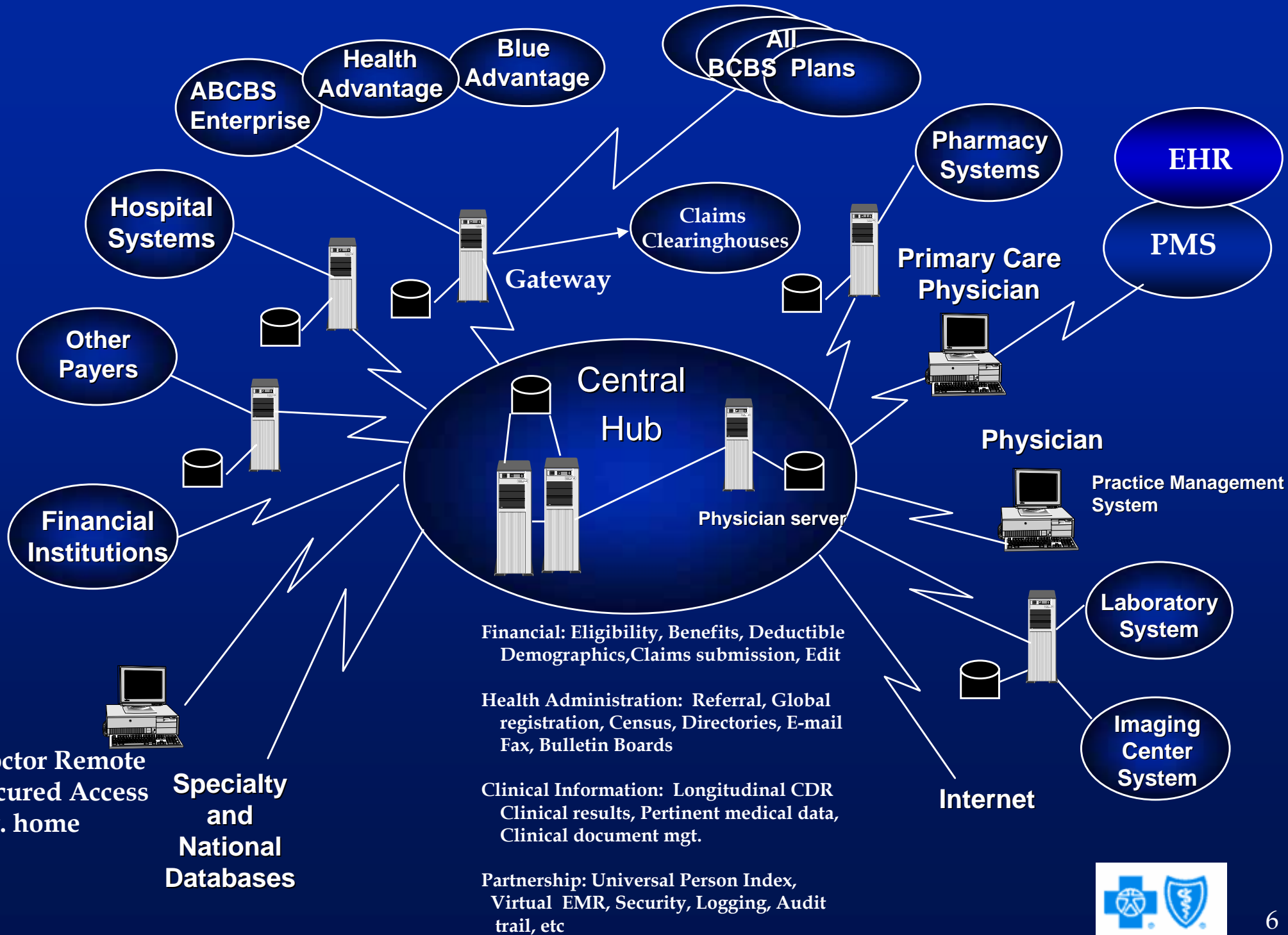
- Claims
- Claim status
- Remittance

Images

- Radiology
- Ultrasound
- MRI
- Other



AHIN ARCHITECTURE





Address bar with a pencil icon and a dropdown arrow.



Enter Search Terms

Person Search

* **SSN:** (SSN or Last Name is required)

* **Last Name:** **First Name:**

Middle Name: **Suffix:**

Birth Date: **Gender:**

UPI: **Fuzzy Search:**

File Edit View Go Bookmarks Tools Window Help



Home Search

Netscape

Search

Pop-Up Block Off

Form Fill

Clear Browser History

News

Email

Weather

Maps

New Tab

AHIN

[HOME](#)[PERSONS](#)[PROVIDERS](#)[ORGANIZATIONS](#)[PHONE BOOK](#)[LOGOFF](#)[TUTORIAL](#)

Person Search Results

[Modify Search](#)[New Search](#)

Last	First	Middle	Suffix	Gender	Birth Date
BRADSHAW	JERRY	L		Male	09/08/1941
BRADSHAW	JERRY	O		Male	10/06/1948
BRADSHAW	JERRY	W		Male	02/14/1947
BRADSHAW	JERRY	W		Male	09/16/1967



Address bar with search icon and Netscape logo

Enter Search Terms

AHIN

INSURANCE

CLAIMS

REFERRALS

ADDRESSES

PERSONAL INFO

ENCOUNTERS

EMPLOYMENT

MEDICAL DATA

CLINICAL CHART

PERSONAL INFO

PERSONAL INFO

PERSONAL INFO

PERSONAL INFO

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PERSONAL INFO

Personal Information

Prefix: **Date of Birth:** 02/14/1947
First: JERRY **Gender:** Male
Middle: W
Last: BRADSHAW
Suffix:
UPI: 000200010000000000498749

AHIN Security Profile

- **Private Network for Communication Between Servers**
 - > X.509 Certificate Authentication Between Servers
- **Initial User Access via VPN using IPSec Tunnel Protocol**
 - > Predominantly Secure Socket Layer (SSL) Now Due to Maintenance Advantage
- **Users Associated with Specific Organization via ID & PW**
 - > Access to all Confidential Data Except Eligibility Limited to Organization's Patients
 - > Ability to Certify Patient Authorization for Access to New Patient Clinical Data
 - > Emergency Providers Given "Break the Glass" Capability to View All Clinical Data
- **Registration Documents Changed to Allow Opt Out**
 - > Clinical Data Concerning Some Conditions Suppressed



AHIN's Current Deployment Profile

Deployment: Began in 1998

- **Physicians: 8,195 -- nearly all**
- **Hospitals: 91 -- nearly all**
- **Other Providers: 344 -- major portion**
- **Deployed & Spun-off over 1,000 EHR Licenses**

Operational Status

- **Administrative Features: Fully Functional**
- **Clinical: Fully functional for 2+ years in 2 Regions;**
 - reduced scope currently due to Provider funding issues
 - Interfaces from Hospital Lab, radiology & dictation systems to Physician's EHR (Logician) remains operational in 1 region



AHIN Patient Identification & Matching

Data Flow



Data resulting from medical encounter is stored on a local server.



Local Server

A record of the patient encounter is forwarded to the Hub server.

AHIN Hub Server



A probabilistic algorithm is applied to each inbound record. Where a match is found, the existing UPI is associated with the record & stored in the MPI. If no match is found, a new UPI is created for the patient.

Identifiers	Match	Non-Match	Fuzzy Match
UPI	160	(40)	0
Last Name	50	(20)	0
First Name	20	(5)	5
Date of Birth	30	(10)	5
SSN	70	(30)	20
External ID	160	0	0

Threshold = 100



Probabilistic Algorithm Vulnerability

Ms. Jones is widowed, has lived in Maumelle, Arkansas for 10 years and has numerous records on the system.

Ms. Jones re-marries and moves to her new husbands home. After a year she sees a new physician who generates new records.

Last Name... Jones

First Name... Linda

Sex.....Female

DOB.....10/19/1948

Zip Code.... 72113

Last Name... **Smith**

First Name... Linda

Sex.....Female

DOB.....10/19/1948

Zip Code.... **71609**

- > The AHIN Database Contains Records on 1.5 Million Individuals
- > Of the 1.5 Million Individuals, 12,000 Have Linda as a First Name
- > Of the 12,000 Named Linda, 7 Have a DOB of 10/19/1948
- > Likelihood is the New Record Won't be Matched



Summary and Conclusions

- **Matching Algorithms are Good but Vulnerable When Data Changes, e.g. Marriage, Divorce, etc.**
- **A Static Identifier Would be Very Useful in Many Cases, Especially When Data has Changed.**
- **A Static Key Value Improves Response Time.**
- **A National Patient Identifier Provides Advantages but is Long Term at Best Because of Implementation Issues.**
- **Probabilistic Algorithms for Patient Matching and Identification is likely the Most Viable Alternative Given the Urgency Associated with the NHIN.**

