



Louisiana eHealth Conference

April 28, 2006

Technology Models for Regional Health Information Infrastructure

Jerry Rankin

Quovadx

Jerry.Rankin@quovadx.com

415-546-3009

Topics – RHIN Architectures

- Goals
- Setting
- Key Components for RHIN
- Architectural Models
 - Example deployments
- Summary

Goals – Health Information Exchange

- Interconnect Providers
- Inform clinical practice
 - Actionable information in workflow
- Personalize patient care
 - Engage consumer via access and control
- Improve Population Health
 - Automate aggregation, reporting, surveillance, alerts
- Collectively
 - Drive down cost of healthcare
 - Improve quality
 - Outcome
 - Hassle factor

Landscape

- US Health System
 - Diverse, Fragmented
 - Largest Cottage Industry
- Systems supporting healthcare information are diverse
 - *Best of Breed* - Multiple Vendors service different areas
 - *Best of Suite* - Single Vendors acquire and migrate platforms
 - Standards allow different interpretations of the same content – medical terminology and transaction standards
 - Process for person identification vary from site to site and source to source
- Low EMR Penetration in MD Office
 - 15-20%
 - EMRs not well integrated into medical community
- Givens:
 - Urgency
 - Cost effectiveness – no rip and replace
 - No Universal Patient Identifier

Key Components of HIE/RHIN

- **Data Integration** by Message Broker Technology
 - Translation, Standardization, Routing
- **Master Patient Indexing Service** – correlates patient identities across medical region
- **Record Locator Service** – registers location of clinical data for a correlated patient
- **Access Control Service** – supports HIPAA compliance, user defined security rules, role based access, logs access events/reasons
- **EMR/Portal/UI/Data Repository** – gives clinicians ability to access results, customize patient lists, perform searches, message
 - Laboratory results
 - Radiology reports and images
 - Clinical Notes
 - CCR or equivalent
 - Eligibility and other Admin/Health Plan data
 - Medication History

Architectural Models

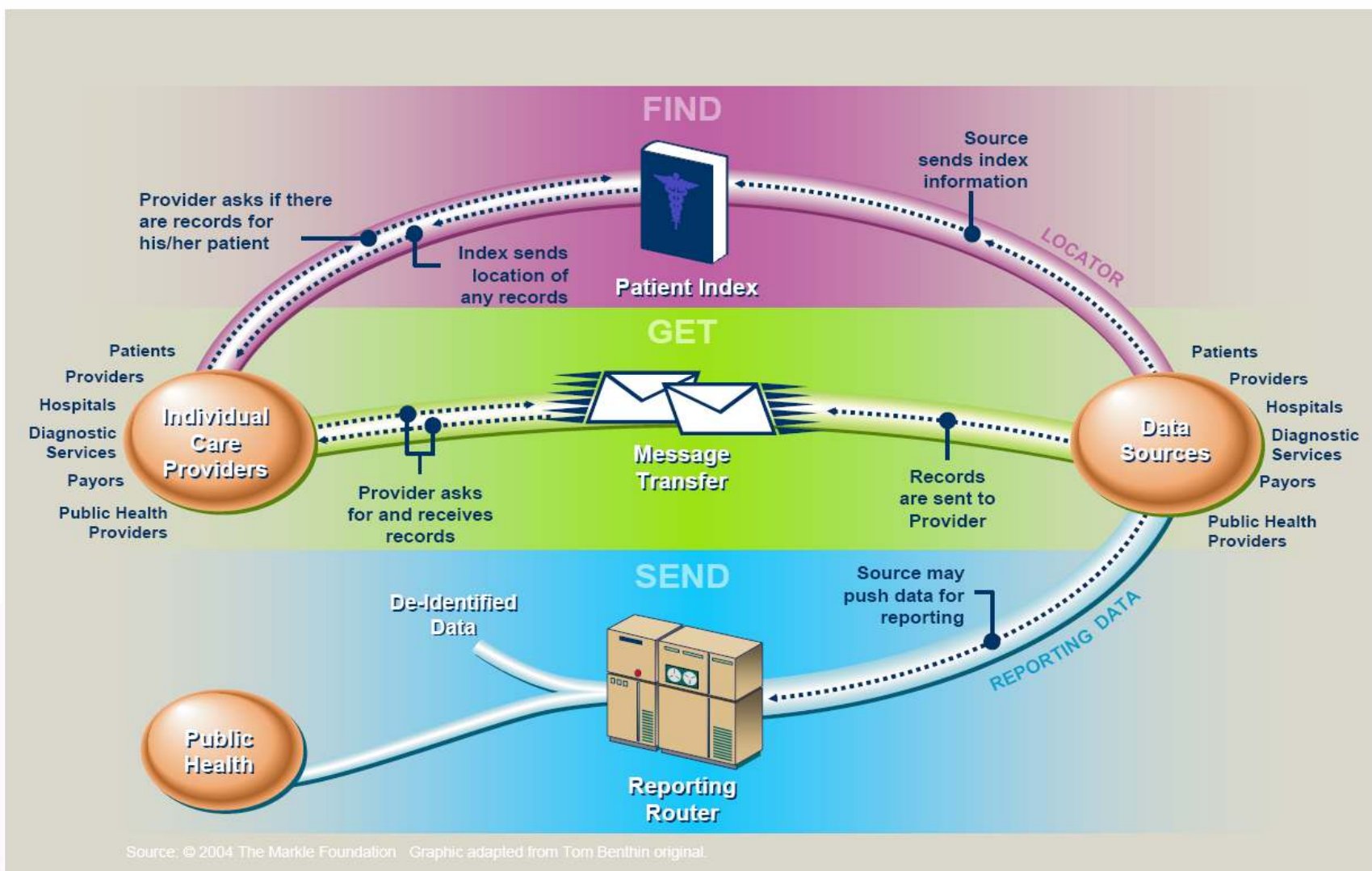
- **Record Locator Service**
 - Example: Connecting for Health
- **Federated Repositories**
 - Example: Santa Barbara County Care Data Exchange*
 - Example: NLCHI*
- **Centralized Repository**
 - Examples: Capital Health*
 - Example: Healthvision*
- **Message Distribution**
 - Example: HealthBridge
- **Patient Carried**
 - Example: Queens Health System Smart Card

* Quovadx experience

Record Locator Service

- Connecting for Health
 - Markle Foundation
 - Common Framework
 - Technical
 - Policy
 - Model Contracts
 - <http://www.connectingforhealth.org/commonframework>
- “RLS” Model Separates
 - MPI
 - RLS
 - “Get” Function (query, response)
 - Standardization/translation (assumed)
 - UI/Application
 - Storage and release/consent

Connecting for Health



Source: © 2004 The Markle Foundation. Graphic adapted from Tom Benlhin original.

RLS + Gateway example - MA SHARE

RLS

- Returns record locations of patients matching demographics search criteria entered by authorized healthcare practitioner
- Maintains contract between providers & consumers

CMPI with record linking algorithm matches patients from different EHRs

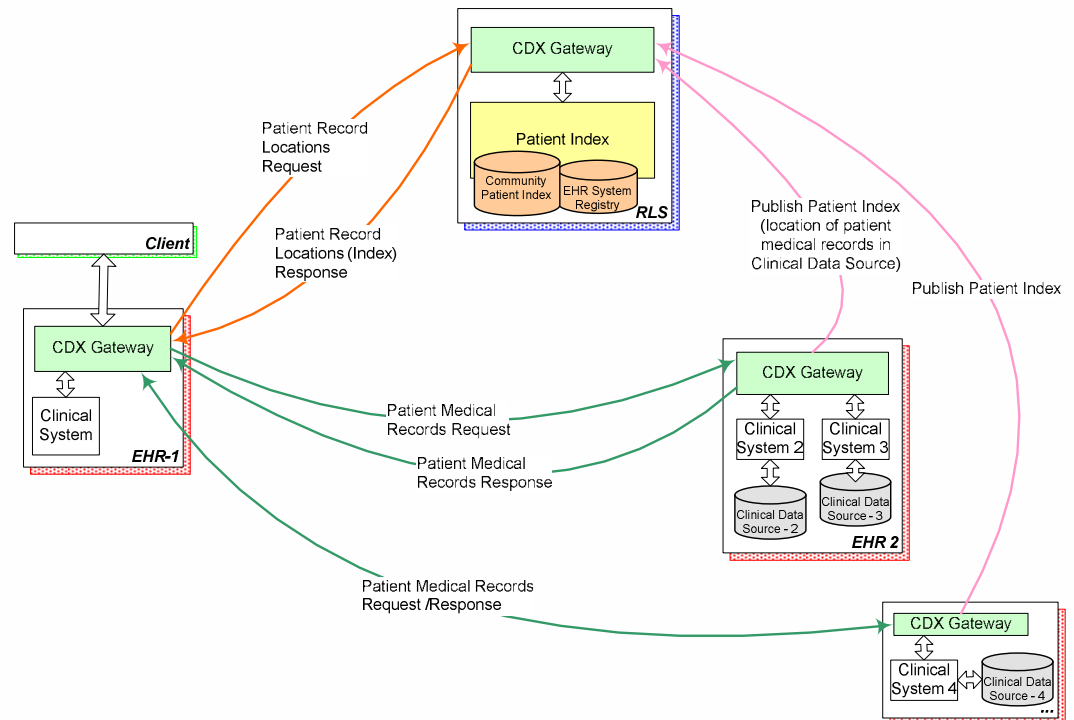
Gateway: secure, standards based data interchange

Encapsulate:

- Service gateway (agent) to consume web services without changing consuming application
- Service interface to wrap disparate legacy applications with web service interface
- Mapping service to transform message formats
- Security and Systems Management Services

- Abstract both RLS and EHR (legacy) systems to enable standards based communication between disparate systems

- Extensible to clinical data exchange (CDX)



MA SHARE

- Regional (statewide) MPI/RLS
 - Correlates Patients
 - Locates Records
 - Access Control layer
- “Gateway” model
 - To CDR
 - Direct to source
 - Web Services
 - Allow for “Region” to connect to grid
- Access Control
 - Local user roles to be mapped to common (RLS/CDX) roles and messaged along with user credentials
 - Security services embedded in CDX Gateway
- User interface
 - Portal/EMR
 - EMR or other Application

RLS Model

- Benefits

- “Thin”, Peer to Peer Model, Direct to Source
- Data ownership retained at source
- Facilitates expression of Patient Preference
- “Opt In” strategy supported
- Potentially Application/UI/Vendor agnostic
- “Common Framework” Published

- Challenges

- Many Legacy Systems not ready for Request/Reply
- Primarily a “Pull” model
- Potentially two UI’s
- Distributed Access Control/Rights Schema unproven
- Performance of Request/Reply cycle, XML
- Data standardization, Interoperation

Federated Repositories/P2P

- Central Infrastructure
 - MPI
 - RLS
 - Integration Layer
 - UI/Access control
- CDRs
 - Inconsistent, non standardized
 - Consistent/standardized
- Examples
 - Santa Barbara Care Data Exchange
 - Newfoundland and Labrador Centre for Health Information

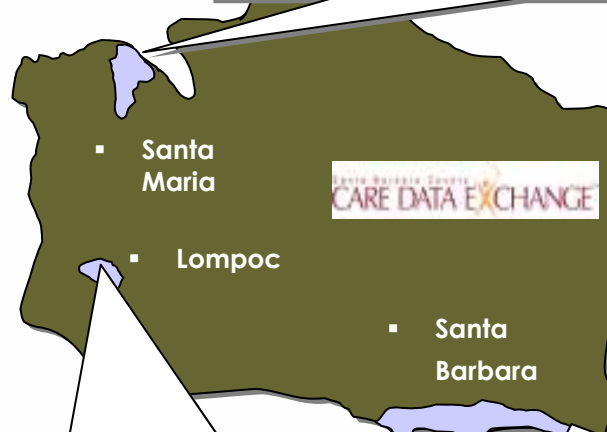
Santa Barbara Medical Community – Early RHIO Prototype

County profile

- Population: ~500,000
- Major Cities
 - Santa Barbara
 - Santa Maria
 - Lompoc
- Per capita income: \$28,698
- 5 major hospitals
- ~1,000 physicians
- 72 retail pharmacies
- Total SB health care spending: approximately \$1.1 Billion*

Santa Maria

- Population: 72,900
- 184 physicians, 21% of physicians in SBCMS
- 1 major hospital
- 14 pharmacies
- Major CDE participants: MidCoast IPA, Quest, Marian Medical Center



Active CDE participation**

- Major hospitals 5 of 5
- Physicians ~325 of 1000
- Retail pharmacies ~60 of 72
- Payors 1 of 8

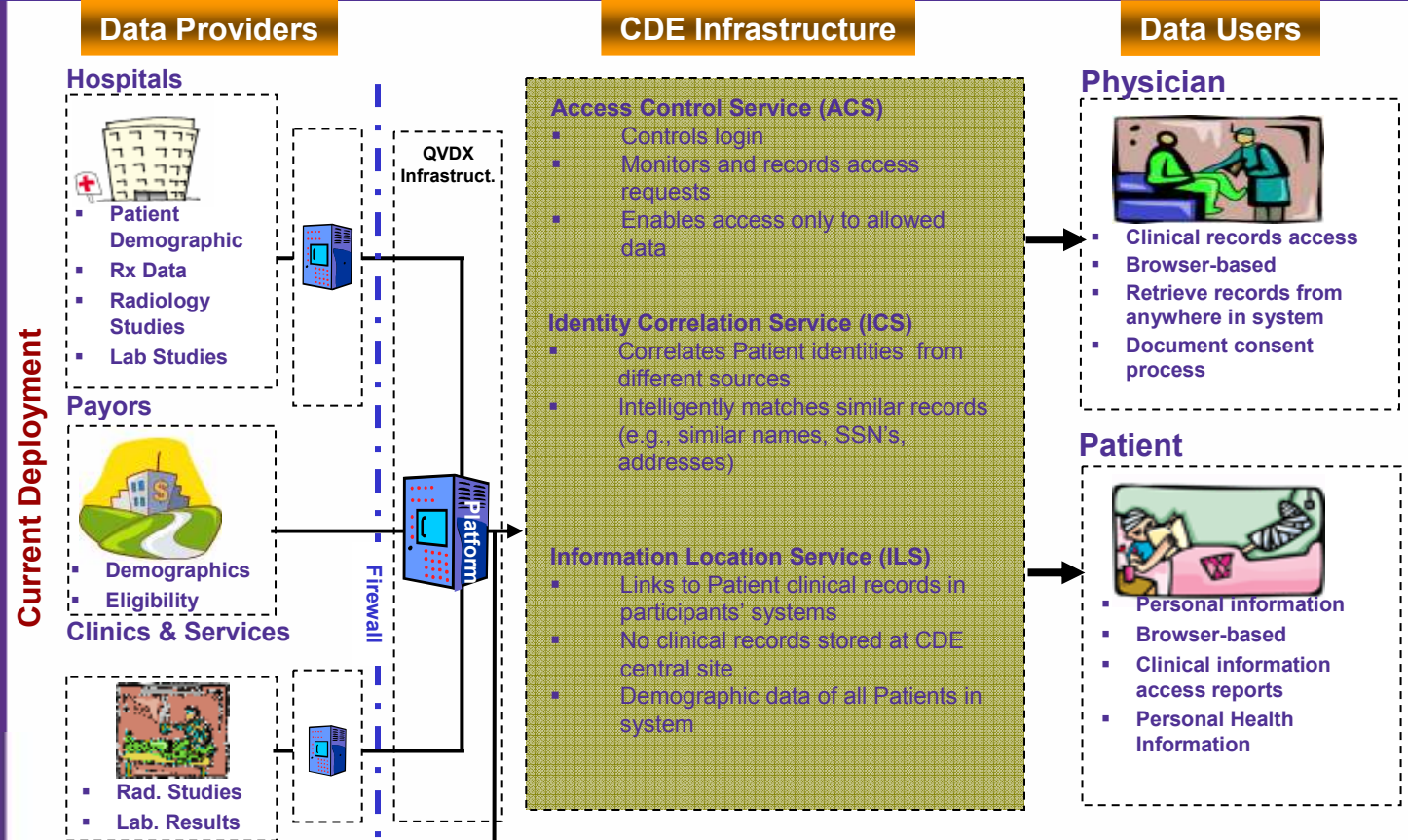
Lompoc

- Population: 43,300
- 75 physicians
- 21% of physicians in SBCMS
- 1 major hospitals
- 7 pharmacies
- Major CDE participants: Lompoc Valley Community Health Organization, Lompoc Hospital

Santa Barbara

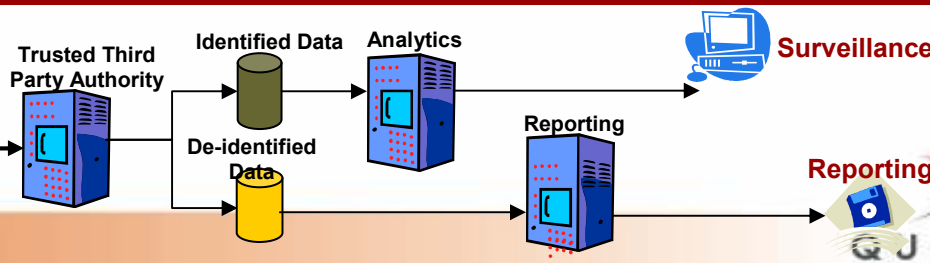
- Population: 92,800
- 693 physicians
- 53% of physicians in SBCMS
- 3 hospital Cottage Health System
- 32 pharmacies
- Major CDE participants: Santa Barbara Regional Health Authority, Sansum-Santa Barbara Medical Found. Clinic, Santa Barbara Public Health Dept. Cottage Health System

Quovadx Care Data Exchange Model



Current Deployment

Data Aggregations Component



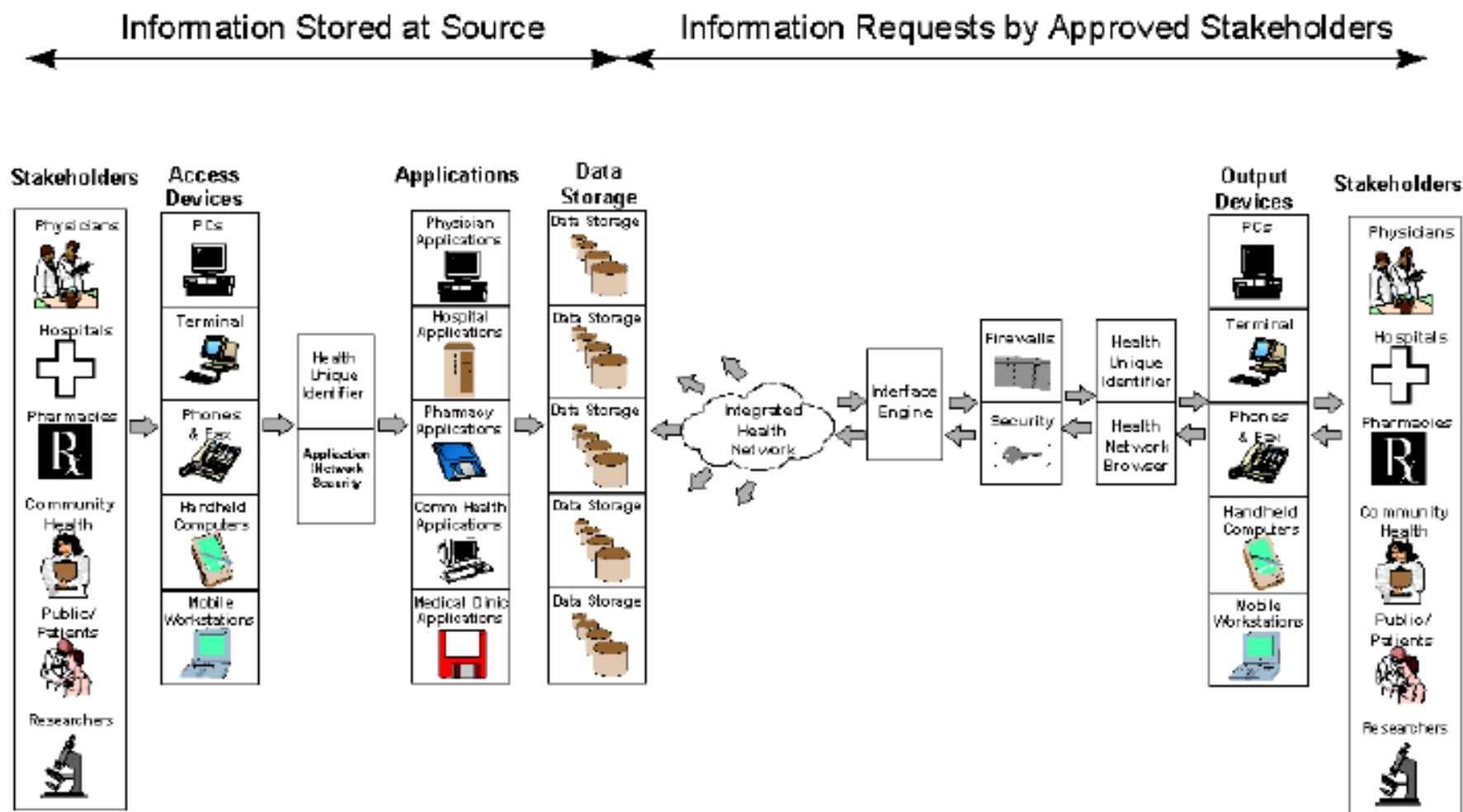
CDE Components

- Data Integration
- Identity Correlation System (ICS)
- Information Locator System (ILS)
- Access Control Service (ACS)
- CIA (Data Collection/Processing) Service
- Clinical Data Repository (CDR)
- CDE Portal

Newfoundland - NLCHI

- Serves 8 Medical Regions
 - Separate Enterprise Systems
 - Population 500k +
- Responsible for Development of EHR
 - Client Registry (MPI)
 - EHR components
 - Pharmacy
 - Laboratory
 - Diagnostic Imaging
 - Data Standards, Reporting

NLCHI



Federated Repository Model

- Benefits

- Data ownership retained at source
- Separation of enterprise system vs. regional
- Legacy “publish” capability supported
- Greater Standardization (consistent CDRs)

- Challenges

- “Opt Out” oriented
- Primarily a “Pull” model
- Potentially two UI’s
- Performance of Request/Reply cycle
- Potential Cost, Scalability
- Data standardization, Interoperation (for inconsistent)

Centralized Repository

- All data in one DB
 - May be partitioned
- Standardized, normalized
- Typically one UI
- Examples
 - Capital Health
 - Healthvision
 - Vendor collaboration

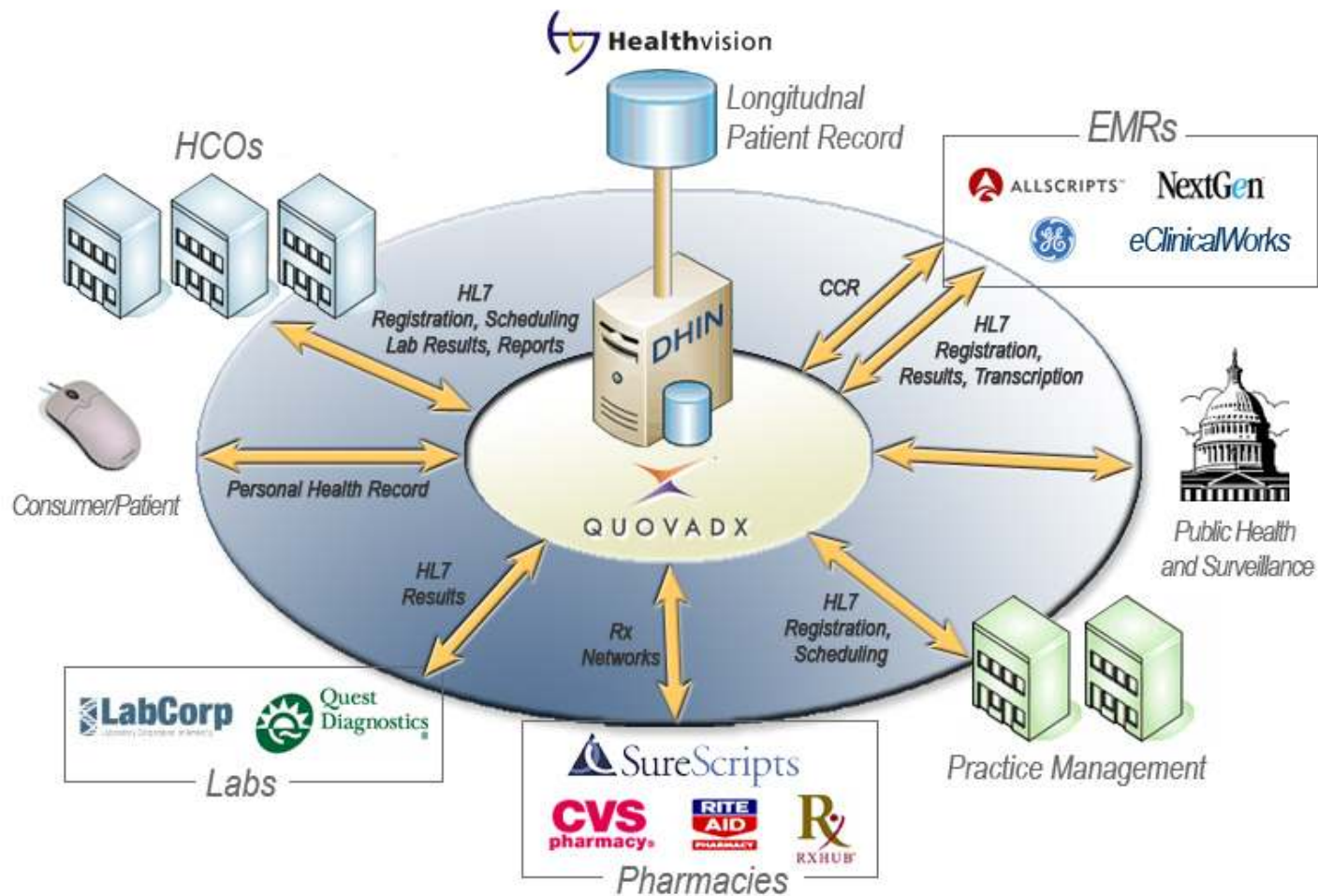
Canadian RHIO: Capital Health

- **Capitol Health Authority Overview**
 - A Canadian “Connected Community” servicing more than 1.6 million Alberta residents with an integrated Electronic Health Record
 - Consolidated 14 silos of clinical information
 - Utilized HL7 and XML as enabling standards
- **Technology Model**
 - Data Integration Services: HL7 & XML
 - Identity Correlation Services: EMPI for matching of Patient data across 14 silos; multiple data owners.
 - Record Location Services: Delivered flexible solutions through centralized CDR
 - Application/UI: Portal

Canadian RHIO: Capital Health

- Capitol Health Authority (cont.)
 - Enterprise wide rollout of the electronic health record (April 2004)
 - 2,300+ authorized users of the secure portal
 - Accessing information from 5+ million medical records
 - 80,000+ screens of information viewed by clinical professionals in the first 3 months...
- Basis for Alberta Provincial EHR

CDR Centric example - Healthvision



Healthvision

- Community-wide HIE Platform
 - Cloverleaf Integration Engine
- Community-wide MPI
- Community-wide CDR/RLS
- Fine grained Access Controls
 - Patient consent
 - Roles based
 - Relationship based
 - Temporal
- User interface
 - Portal/EMR
 - Data to alternate EMR
- Regions linked by “national” MPI/RLS

Central Repository

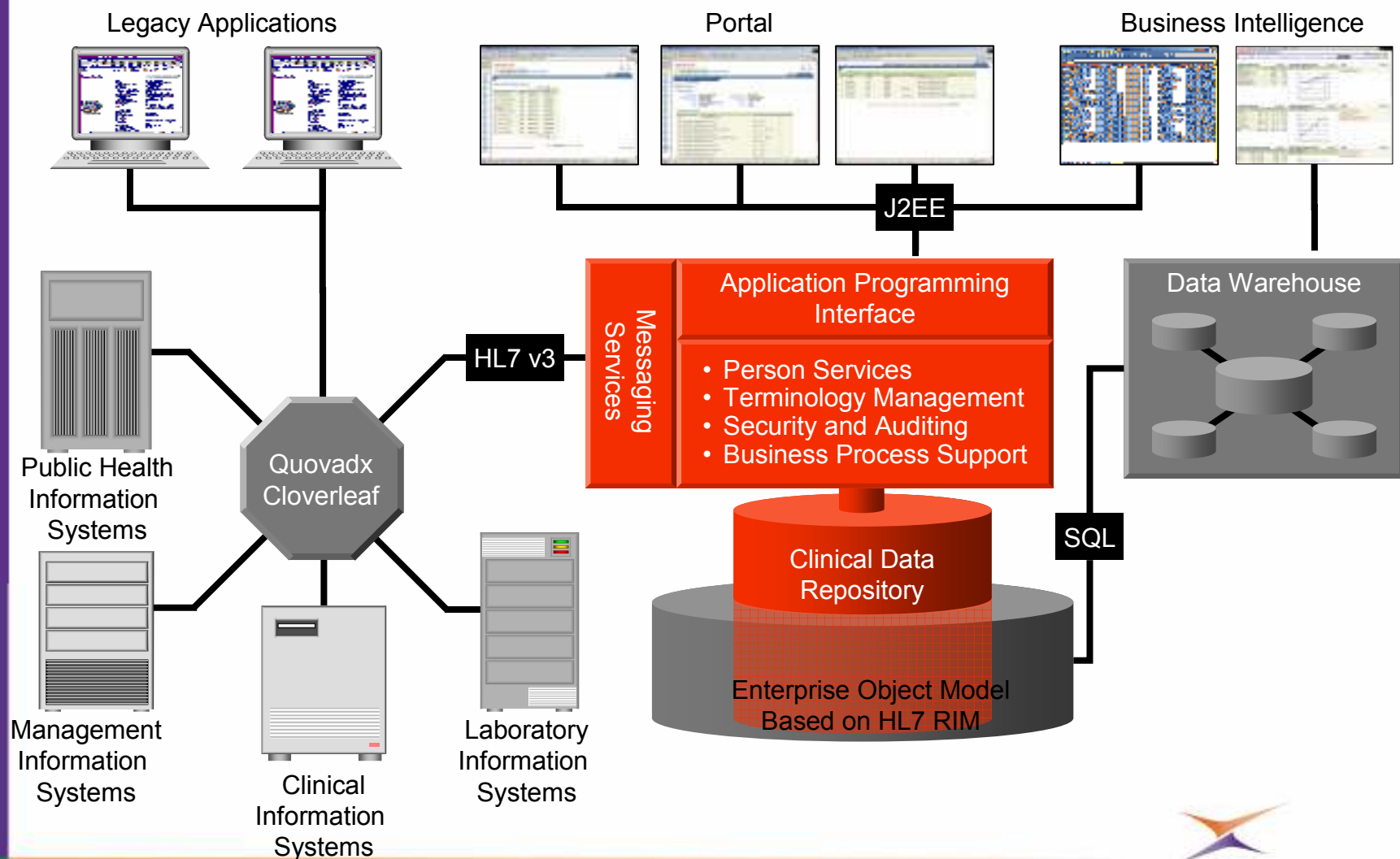
- Benefits

- Performance
- Data Standardization
- Terminology Normalization
- Granularity/consistency of Access Controls
- Rules/Workflow Support
 - Decision Support
- Application functionality e.g. eRx

- Challenges

- Data ownership
- Dual UI's?
- Access control extensibility

RHIO Collaboration

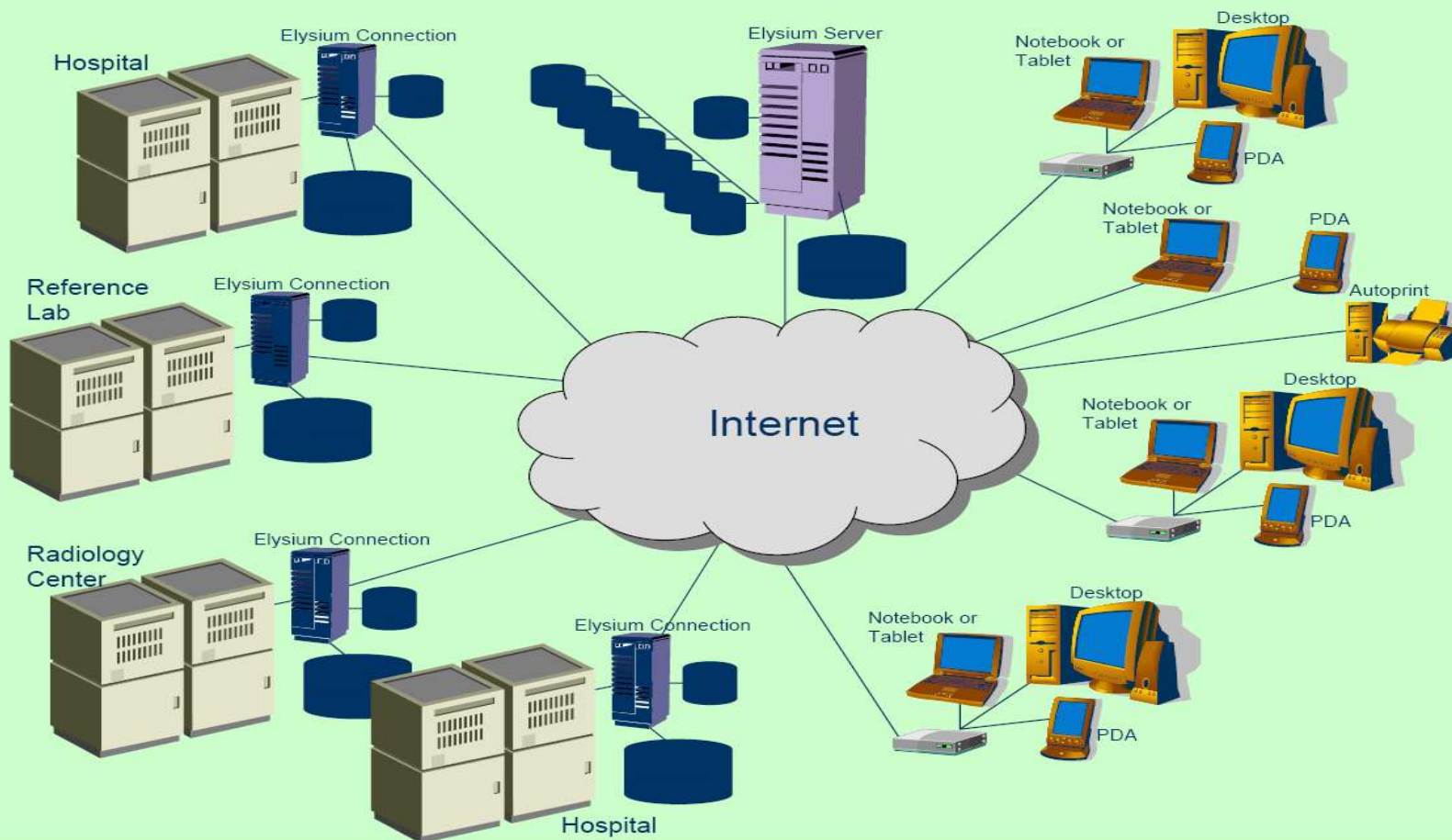


Messaging

- Overview
 - Source systems publish to edge server in MD centric fashion
 - Upload to central repository
 - Standardize, normalize
 - Application functionality
- Example:
 - HealthBridge

Messaging

Connectivity, Repositories & Access



Messaging

- Benefits
 - MD centric, push model
 - Simplifies consent
 - Legacy publish model supported
 - Separates enterprise from RHIN
 - Standardization, Normalization
 - Workflow
- Challenges
 - Potentially two UI's
 - Patient centric?
- Variation on Centralized

Patient Carried/Smart Card

- Smart Card = Repository of “CCI”/abstract
- Example: Queens Health Network
- Benefits
 - Patient controlled
 - Two factor authentication/token
- Challenges
 - Infrastructure required to read cards
 - Legacy system unable to upload/download
 - Latency in “finalizing” data – patient gone
 - Agreement on data set
 - Who’s is CCI of Record?
 - “lost my card” scenarios
- Supplementary to RHIN/HIE

Architectural Convergence to Hybrid

■ Drivers

- Standards evolving to support interoperation, connection to multiple specialized UIs/Apps, standard workflows
- Political and business model - inclusion
- Technology – web services

■ Examples

- Healthvision: Connect to other EMRs
- HealthBridge: pull → push → transactions
- INPC: monolithic CDR → Federated
- SBCCDE: Federated + DTS + API

■ Prediction:

- Hybrid architecture to predominate

Roles

- “Infrastructure” vendors
 - Integration/Message Broker
 - Secure Connectivity
 - Routing
 - Translation/Standardization
 - MPI
 - RLS
- Applications/Portal/UI
 - DB

Quovadx

- Infrastructure Vendor
- Cloverleaf Integration Suite
 - Secure transport/connectivity
 - Routing
 - Translation/standardization
 - Edit/filter/error handling
 - Monitoring integration feeds
 - Web Services enablement
 - Right sized solutions: MD office to Regional scale
- Quovadx Identity Services
 - Initiate MPI
 - RLS
- MD Office Connectivity
- eRx Support
 - Medication History

Thank You!



Questions or Comments
Jerry Rankin
Jerry.Rankin@quovadx.com
415-546-3009

Integrate. Analyze. Perform.

Three simple words. One powerful result: Success



- Global integration solutions
- Markets include healthcare, social services and public safety
- ***Cloverleaf Integration Suite - 40% IDNs***
- ***Cash Accelerator***
- ***Initiate Identity Services***



- Care management solutions to hospitals and health systems
- ***Care Management System***
- Pioneer in community-wide (RHIO) clinical data exchange
- ***Santa Barbara County Care Data Exchange***



- Leader in reusable software components and services
- Focus on professional developers with most demanding requirements
- Markets include financial services, telecommunications and ISV's