Empowering Patients and Improving Outcomes

ONC Annual Meeting

Nov 30, 2018

OPTUM®

Sarah's Wellness Journey

Vitals

Seasonal allergies

Medication

Quit smoking

Diet and exercise

PCP

Plan

Claims

Lab results

Rx

Vitals

X-Ray

Referral

Plan

Claims

Eye exam

Rx

Optometrist

Uncovered

Bills

OPTUM®

Empowering Sarah

Her Perspective

Daily log

- Vitals
- Medication
- Diet and exercise
- Seasonal allergies

Care team

- PCP
- Referral
- Optometrist

Clinical history

- Rx
- Lab results
- X-Ray
- Vitals
- Eye exam

Financials

- Claims
- Bills

"How have my vitals changed over time with diet, exercise, and other life changes and events?"

"How can I allow my PCP to see the notes and test results from the specialist I was referred to?"

"I want to participate in a study on young mothers. How do I give the researchers access to my insurance claims and health records without compromising my privacy?"

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Warning: Some assembly required…

This is a challenge

Thank you.

Contact Information:

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Sr Principal Engineer, Optum

@IamMeenaJ

OPTUM®

THE MORAL IMPERATIVE AND BUSINESS OPPORTUNITY TO IMPROVE HEALTH BY CONNECTING HEALTHCARE

Vik Kheterpal, MD

Improve Outcomes
Reduce Costs
Improve Patient Satisfaction
Improve Provider Satisfaction

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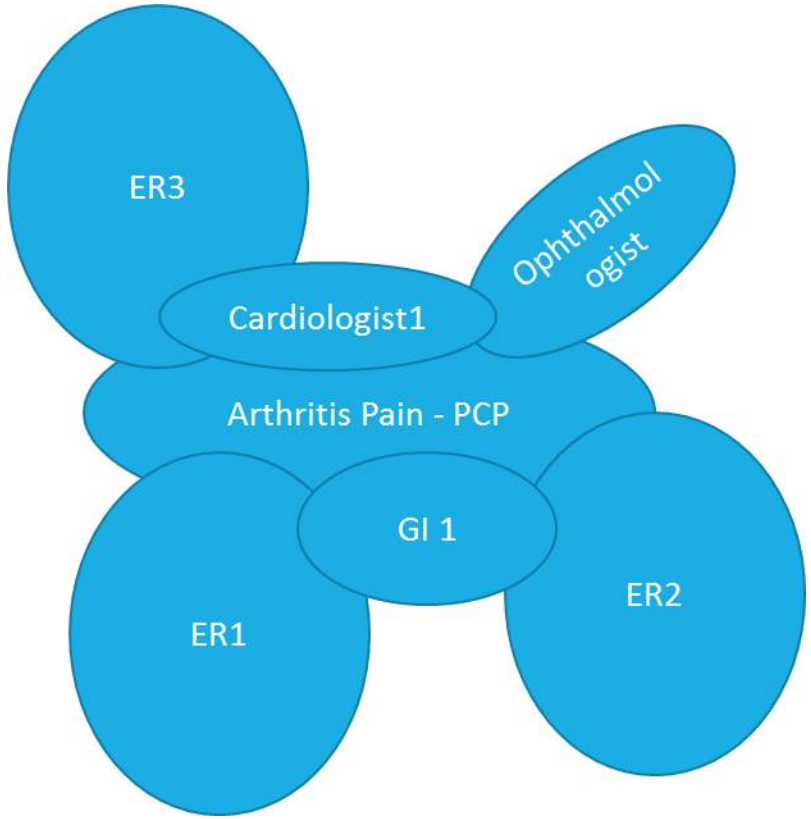
Lack of Longitudinal Data Creates Blind Spots – The Vioxx Experience

"Claims Data"

- Broad - time and population
- What actually happened (Filled Rx)

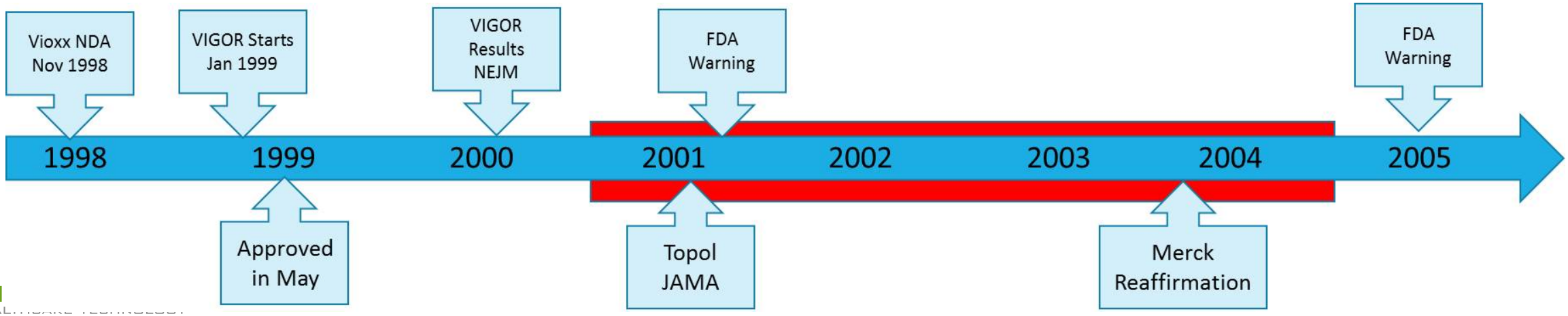
- But, shallow (HbA1c ordered)
- Late
- Lacks nuance



"Clinical Data"

- Deep (HbA1c results)
- Nuanced (social, severity, progression, intent)
- Near real time

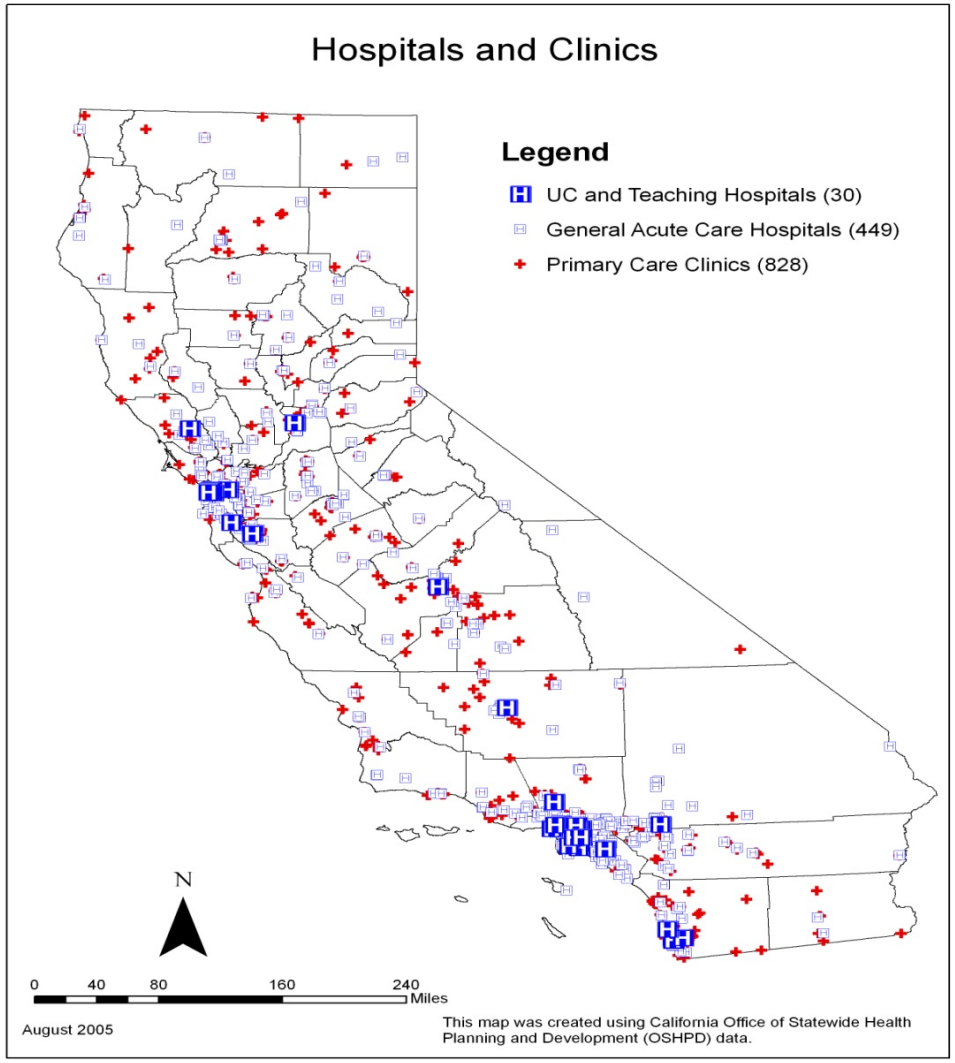
- But narrow
- What should happen (ordered Rx)



Key Themes

- The case for the LPR –Longitudinal Patient Record
- Reframing the typical discussion about claims versus clinical data – false choice
- Honesty about the traditional perversions that have been an invisible (but powerful) drag on sharing data
- CDeX – role of consumer mediated exchange – HIE of 1
- Establish case for optimism and call to action

Healthcare digitization has created digital islands of automation while our challenge is to manage patient health across time



Fragmented Healthcare : Geographic and Sub-specialization Trends Continue

Facility Focus : Just Get **My** Doctors and Nurses on-line

Traditional HIT Focus : EMR, PMIS, Departmental, HIT etc.

Pace of Adoption Quickening

Islands of Automation

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“Post-EMR” & “Post-Measure” Era – VBC requires remove cost out of system – not just cost shifting (Everyone is now a Pay-Vider)

Regulatory Framework	Healthcare Reform, Payment Reform, and Outcomes Focus
Technology and User Base	Users proficient in using web apps, Pervasive computing, m-Health,
Clinical Priority	Managing Chronic Disease; move from cost shifting to cost-out; Health Consumerism; care coordination
Competitive Positioning	Can’t scale up expenses with volume; growth requires exchanging data with partners; connected care
Business Model Inflection Point	Clinical Right thing to do is now Financially Right thing to do as well

- Visualization innovation (address “tab hell”)
- Transform/Translate data to insights
- Manage white space between clinical encounters
- **Engage consumer in their care – data recipient and originator**
- Pay for value not just for reporting and activities

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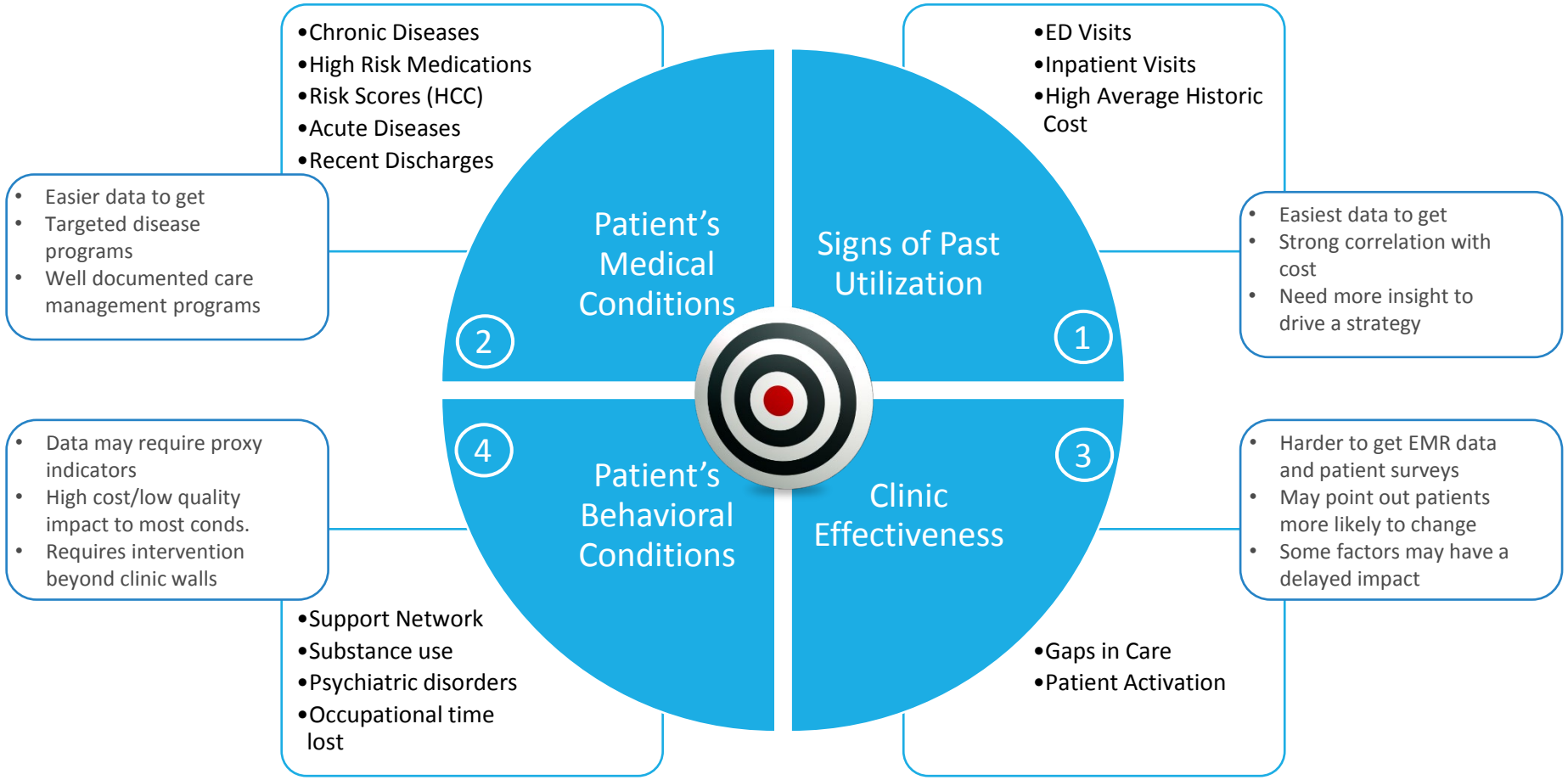
“Rising Risk”:
Find Targets for Care Management Interventions

Narrow to a population you can manage and who has factors you can impact…look for new service needs.



Optimize strategy by age, gender and zip code

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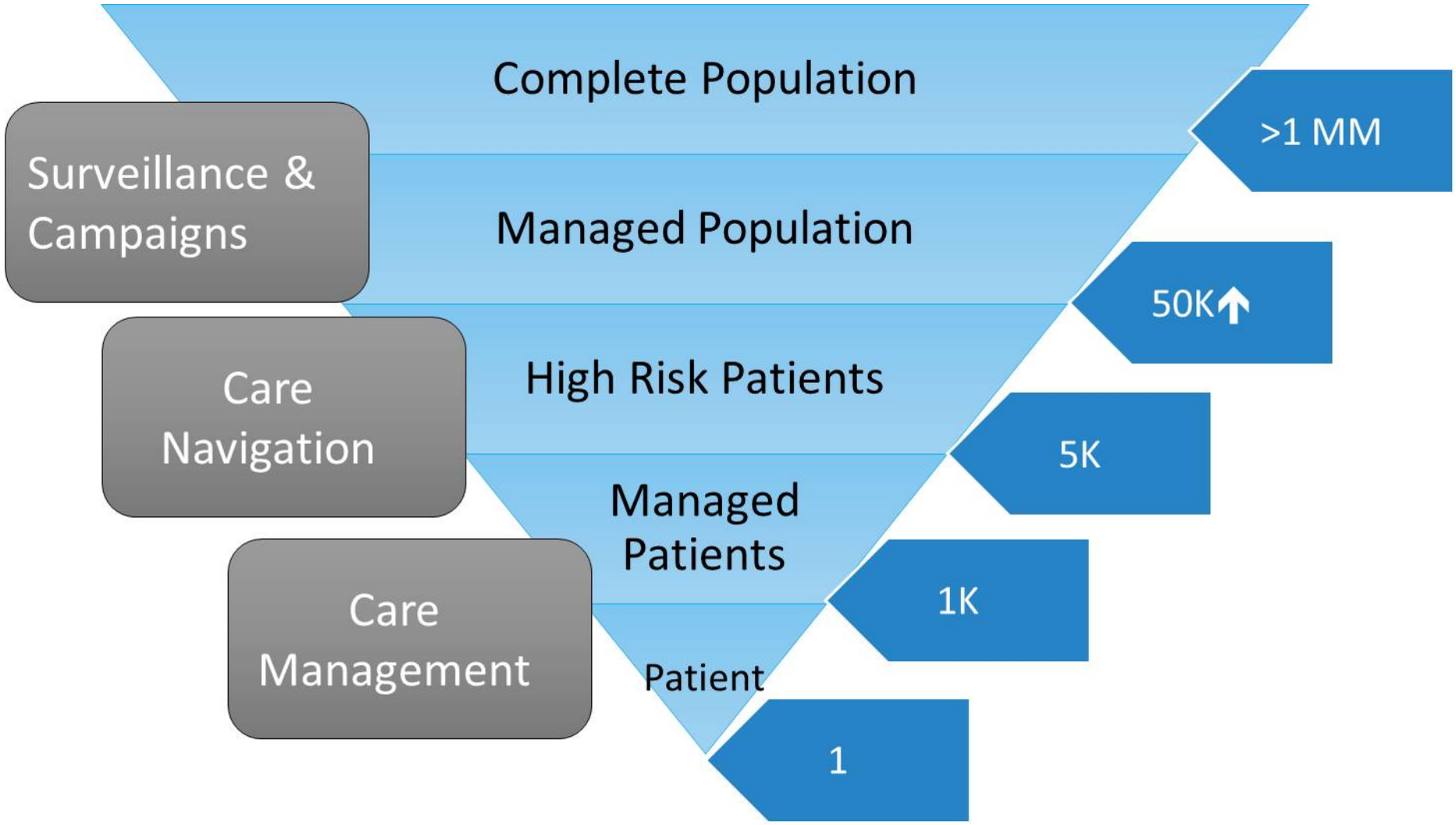
Big Data Paradox: Population Health Requires Focus: All About the “N of 1”



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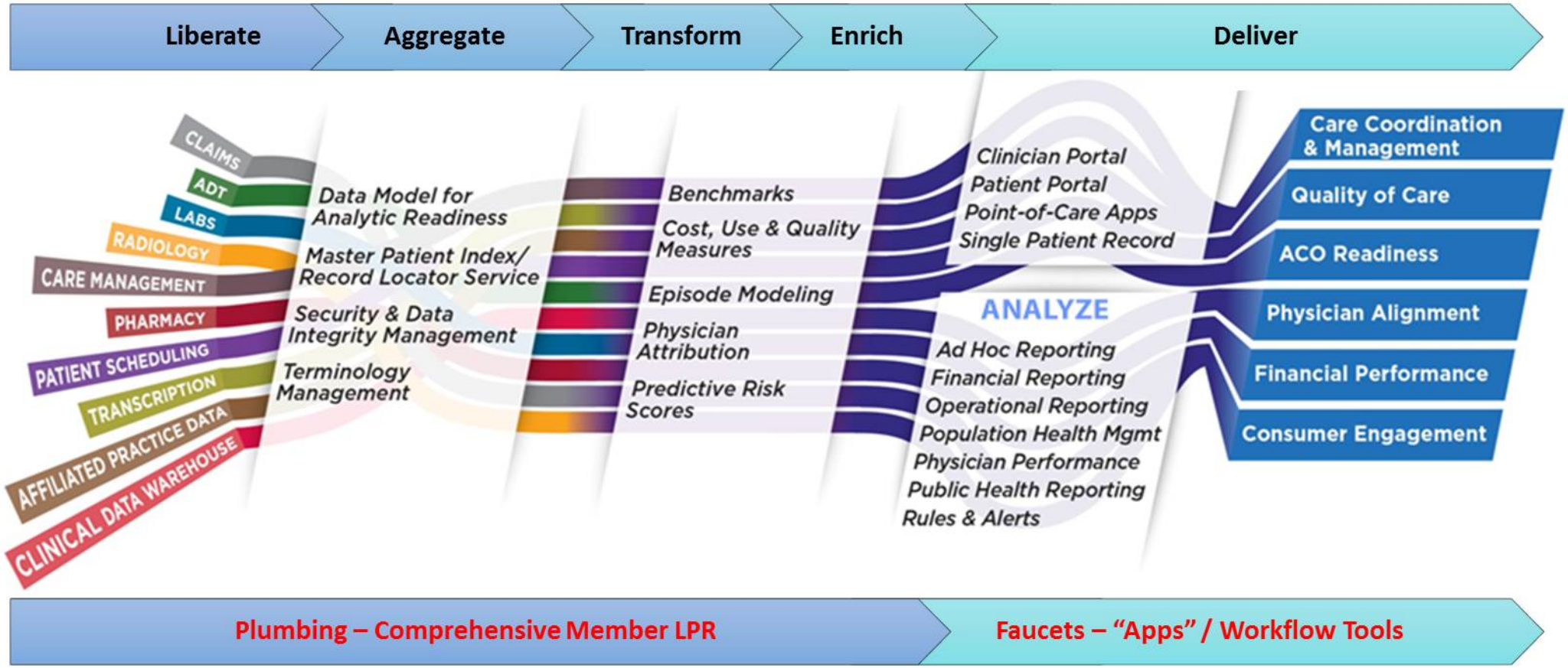
The Challenge: Need and Effective “Tricorder” – A Universal Translator for Healthcare Data (This is HIEBus™)

Vocabulary	Content & Structure	Transport	Services
SNOMED	HL7 2.x	SMTP/SMIME	“Direct”/messaging
NPI/NPPES	HL7 CCDA	HTTP/RESTful	IHE XDR
ICD10	CDA BPPC Etc.	SOAP	PIX/PDQ
LOINC	NCPDP / SCRIPT	TLS	XDS/XCPD (NwHIN)
RxNorm	HL7 2.5.1	-	FHIR/SMART
HCPCS/CPT	DICOM (MWL)	-	HPD/HPD+
HL7 and other Value Sets	FHIR	-	DICOM (MWL)

HIEBus™ : Last Mile Connectivity, MPI, Terminology, De-Duping, Attribution, Measures, Analytics and Predictive Models, Care Coordination ….



Reduce Execution Risk

Speed To Activation Advantage`

Lower Total Cost of Ownership

Superior Functionality

We Connect Healthcare To Help Manage Populations Across “Markets”

Payers / White Labeled Resellers

- LPR – claims+clinical data warehouse
- 360 view of members for CM/UM/DM
- Patient/member portal – mobile/web
- Clinical analytics /community care planning

Anthem BlueCross BlueShield · Clover · CMS Blue Button 2.0 · Amerigroup RealSolutions in healthcare · MOLINA HEALTHCARE · TRUVEN HEALTH ANALYTICS IBM Watson Health · CareMore It's what we do.

Providers/ACOs

- LPR – clinical+claims data warehouse
- MUII/III compliant interoperability engine
- Care management platform
- Patient portal – mobile/web
- Clinical Analytics/population Health/ACO

Trinity Health · ROPER ST. FRANCIS Every moment matters. · eamc east alabama medical center · HYGEA Holdings Corp. · VIDANT HEALTH · WHEELING HOSPITAL · University Healthcare · PARKVIEW HEALTH · Quality Independent Physicians

Research/PRO

- Research Data Warehouse
- Multi-center trials / National Societies
- ResearchKit based Participant enrollment and data gathering platform

MICHIGAN MEDICINE UNIVERSITY OF MICHIGAN · MPOG Multicenter Perioperative Outcomes Group · Framingham Heart Study A Project of the National Heart, Lung, and Blood Institute and Boston University · ASPIRE

Collaboratives

- Statewide HIE – MPI, aggregation, portal
- Provider Registry and Index
- Secure messaging
- Analytics/population health/ACO

Camden Coalition HEALTH INFORMATION EXCHANGE · TrentonHealthTeam · GNHCC Greater Newark Healthcare Coalition · SCHIEx · GEORGIA HEALTH INFORMATION NETWORK · PA eHEALTH PARTNERSHIP

135+ million patients

720+ hospitals

800+ HIT System Interfaces

220+ FQHC, SNF, and home health

260,000 active users

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Beyond Basic Connectivity & Exchange. Need A New Way To Frame The Solutions So We Don't Talk Past One Another

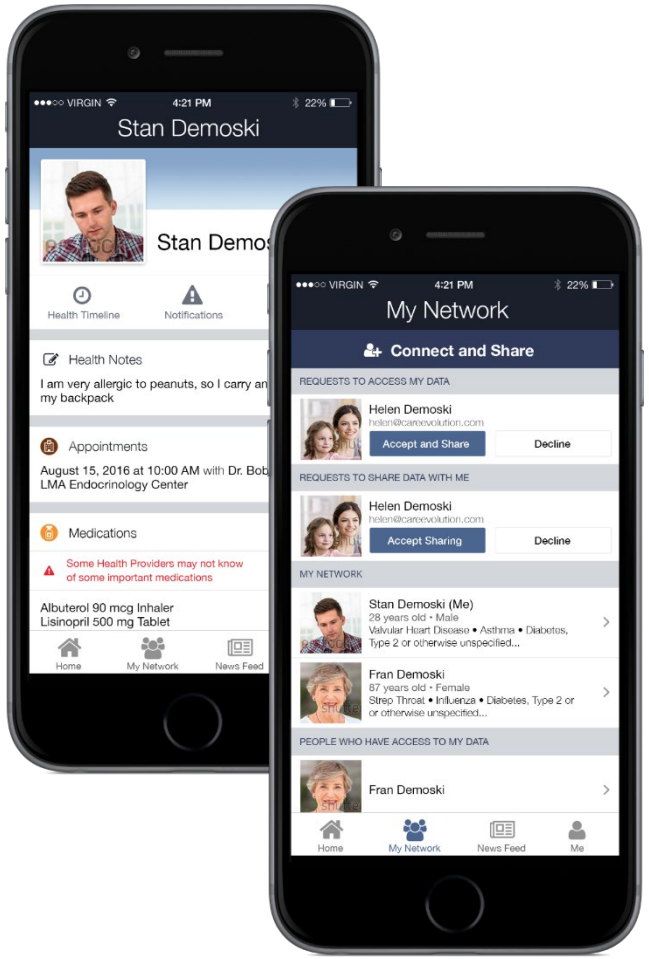
Health Plan: Economic View Measure and Track Focus		**Provider: Care Delivery and Workflow Continuous Perf Improvement Focus**
"Leakage", Network Utilization	⟺	Minimize Handoffs, Improve Transitions of Care
Risk Score Optimization	⟺	Falling Risk or Patients Lost to Follow Up
Benchmarking, "Rack and Stack" Physicians	⟺	Continuous Improvement & Feedback To Assist Physicians So they Can Improve
Gaps In Care To Support Comparison Across Plans	⟺	Evidenced Based Best Practices to Reduce Unexplained Clinical Variation
Analytics and Risk Score to Price Premiums and Populations	⟺	Patient Stratification and Prioritize Those Needing Attention
Retrospective Performance and Dashboards ("Rear View Mirrors")	⟺	Prospective Patients Needing Attention – Triage ("Out the Windshield View")

Payer Provider Convergence Challenges and Opportunities

Today, effectiveness limited by disconnected clinical and claims data, unclear attribution and inconsistent definition of risk.

With CE, integrated clinical and claims data driven insights inform consistent care management.

With CE, one can pivot to prospective patient management with holistic, patient-centric, actionable care provider and care manager worklists



MY+FHR
FAMILY HEALTH RECORD

A Platform Leveraging Interoperability Standards To Empower The Consumer and Connect Them to Their Caregivers

Enabling Consumers To Manage And Control Their Health Information – Items of Note in Demonstration

- Data
  - Liquidity: Access to multiple EHRs using FHIR API (CDA and other standards)
    - Aggregation: De-duplication, terminology mapping
    - Enrichment: Therapeutic classification; “reconcile” what different providers may know about the patient
  - Device Integration (HealthKit mediated) – BP, Weight scales, Glucometers
  - CCD/CDA Integration
- Patient Directed Control and Workflow
  - Amend information – annotate and tag information (ex. add OTC medications)
  - Share with family members and other caregivers
  - Create a summary across multiple sources and share back with new providers
  - Clinical Alerts and reminders
  - Sync For Science Ready (share with researchers)
- Connecting Patients to Caregivers
  - Ability to perform surveillance on thousands of patients at home and establish triggers for caremanagers
  - Rule based automated monitoring and tasking of notifications to patients and caregivers
- Multiple Platform Support

MY FHR FAMILY HEALTH RECORD

Available on the App Store

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Already Connected to Over 120 Large Health Systems Who Are Advanced Adopters of Latest EMR Vendor Support for FHIR

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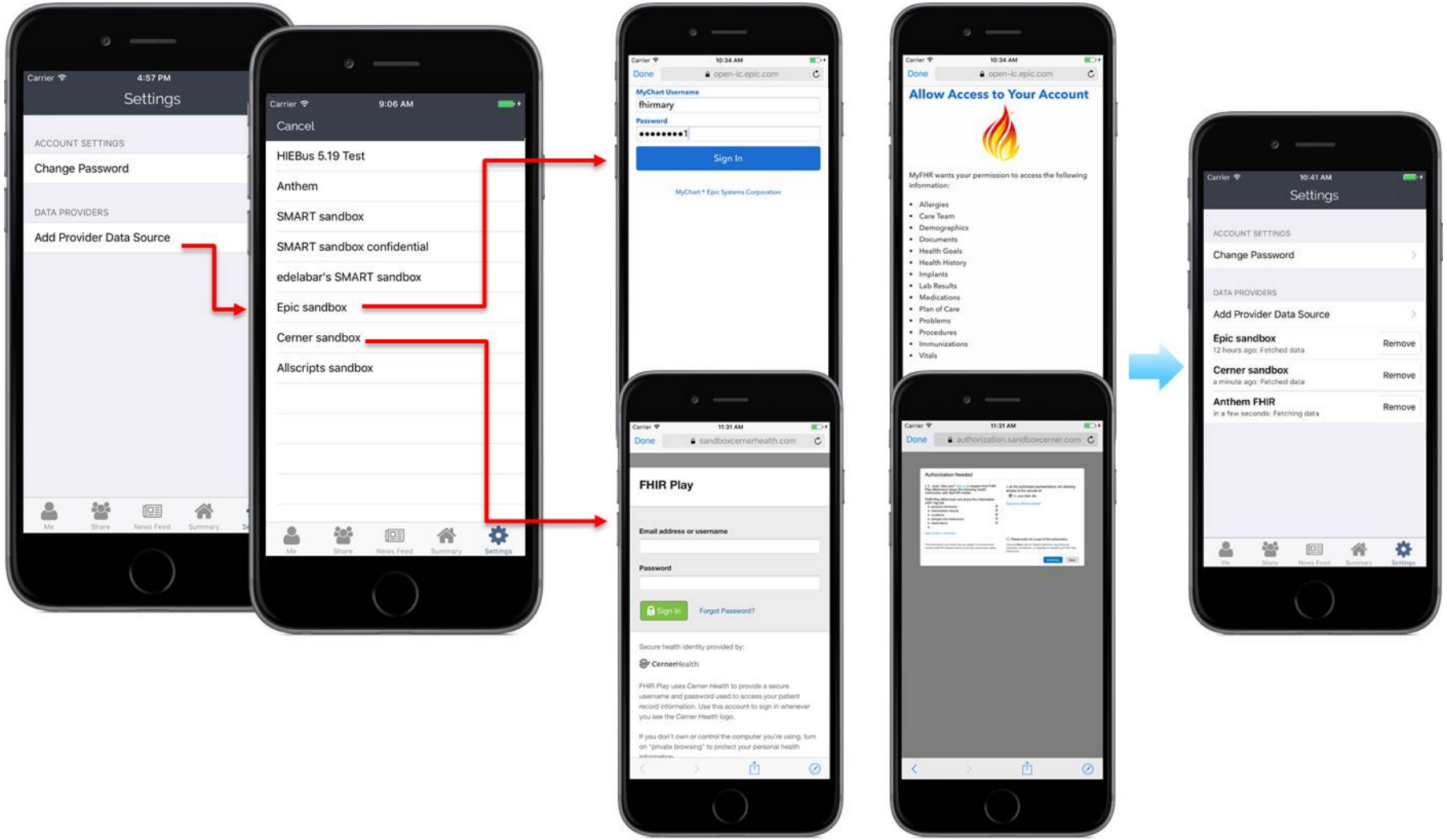
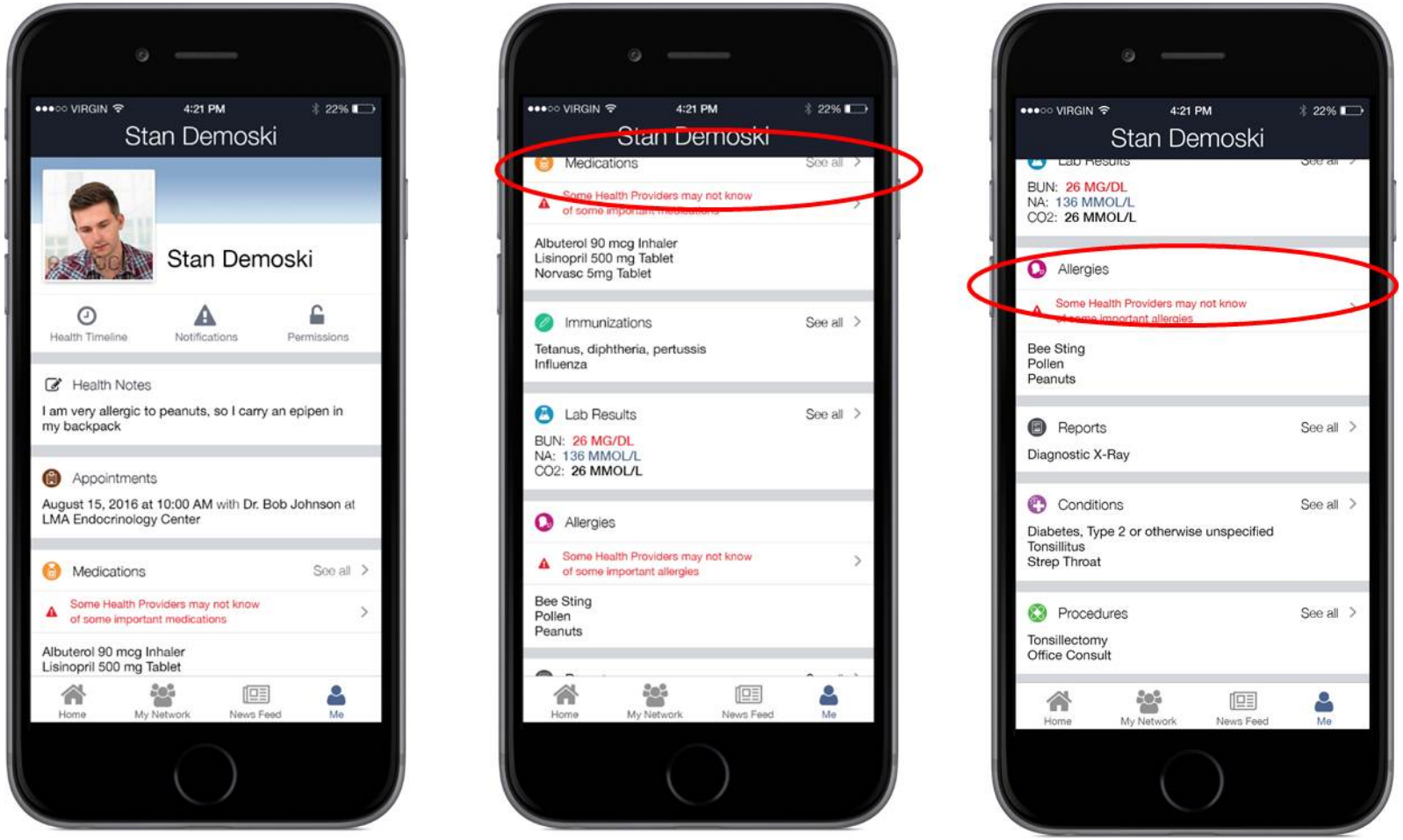
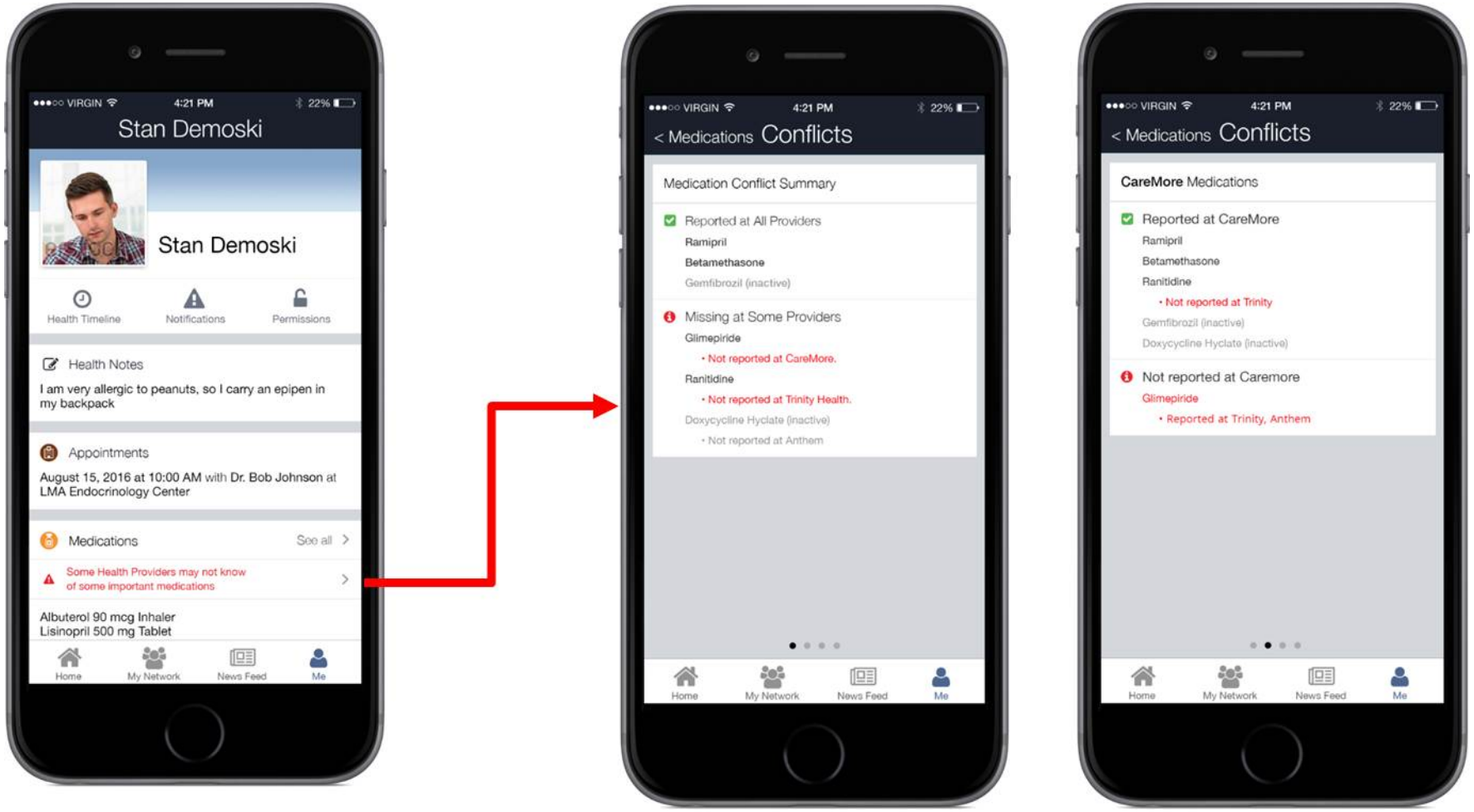
Consumer Can Connect to Multiple FHIR Endpoints Such as Epic, Cerner, Allscripts, BB2.0 etc.



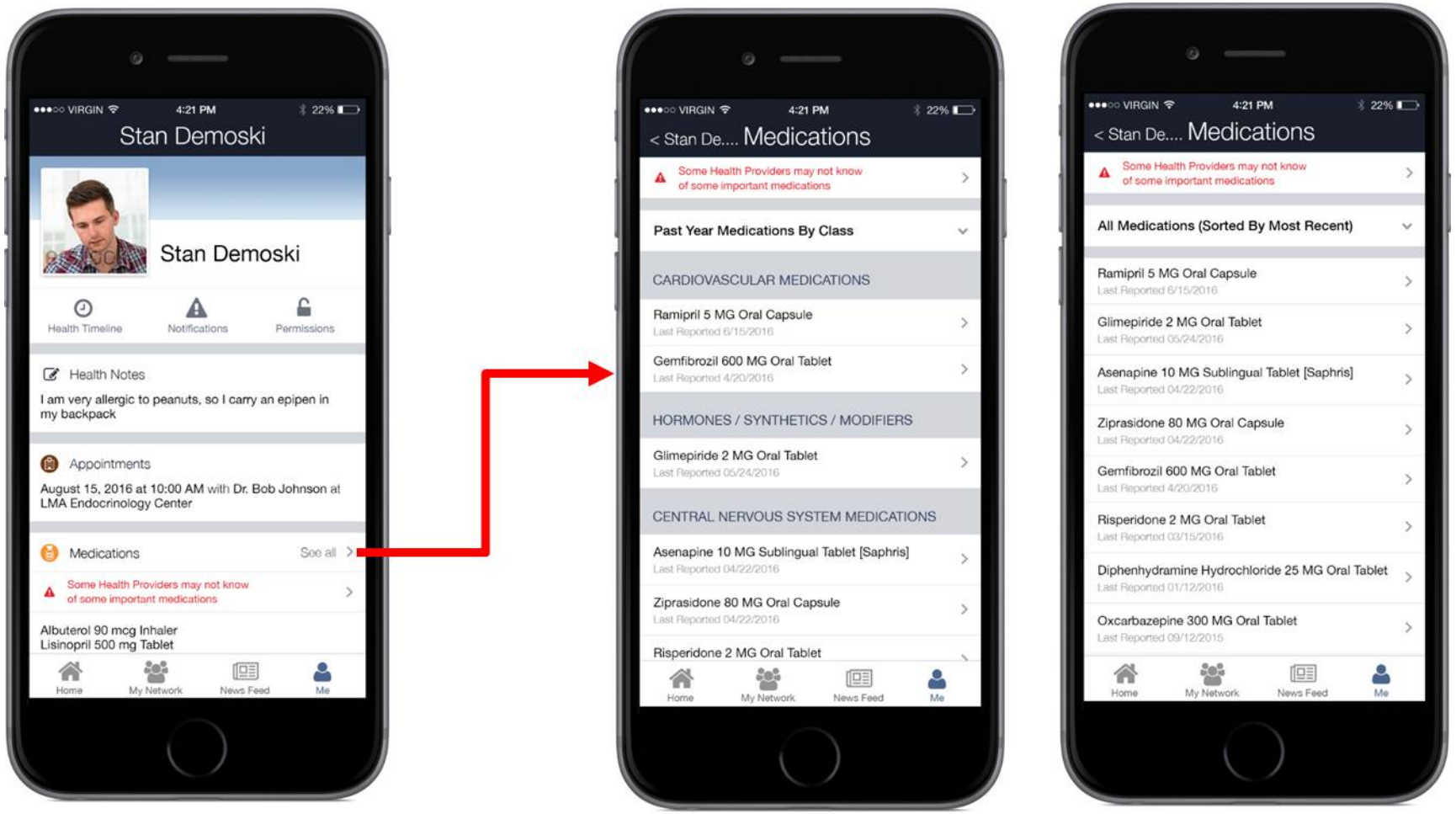
Data Is Aggregated to Drive Advanced Functionality - Medication and Allergy Reconciliation To Detect Conflicts



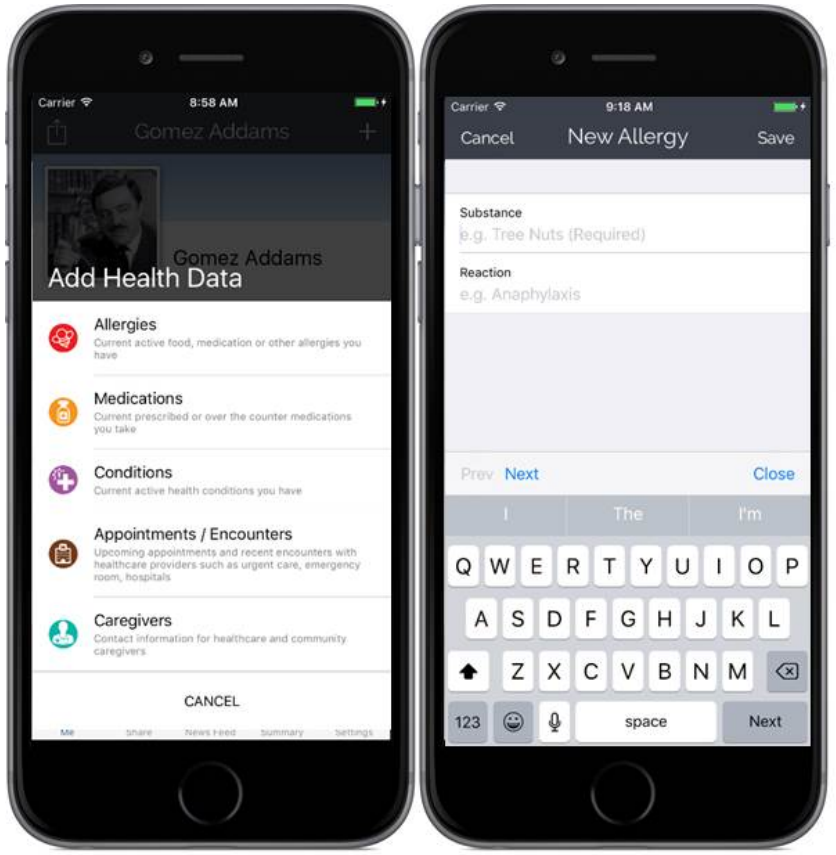
“Med Reconciliation” – Highlighting Providers That May Not Be Aware of One-Another’s Medication List



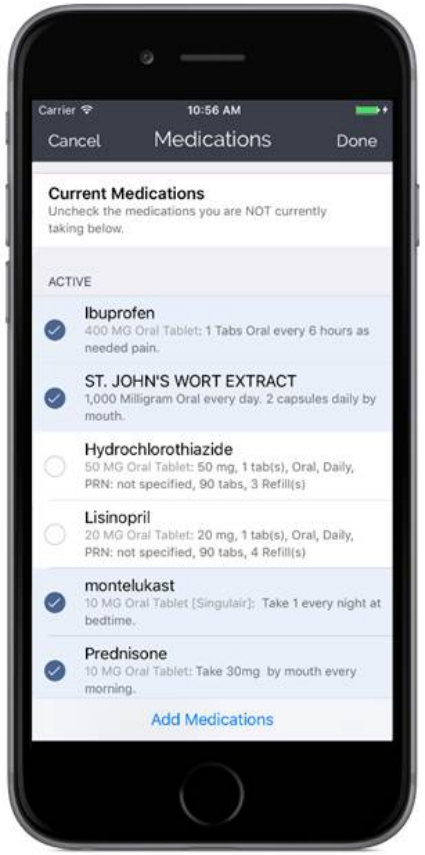
Helping Consumers Understand Medication List By Therapeutically Classifying The Medications



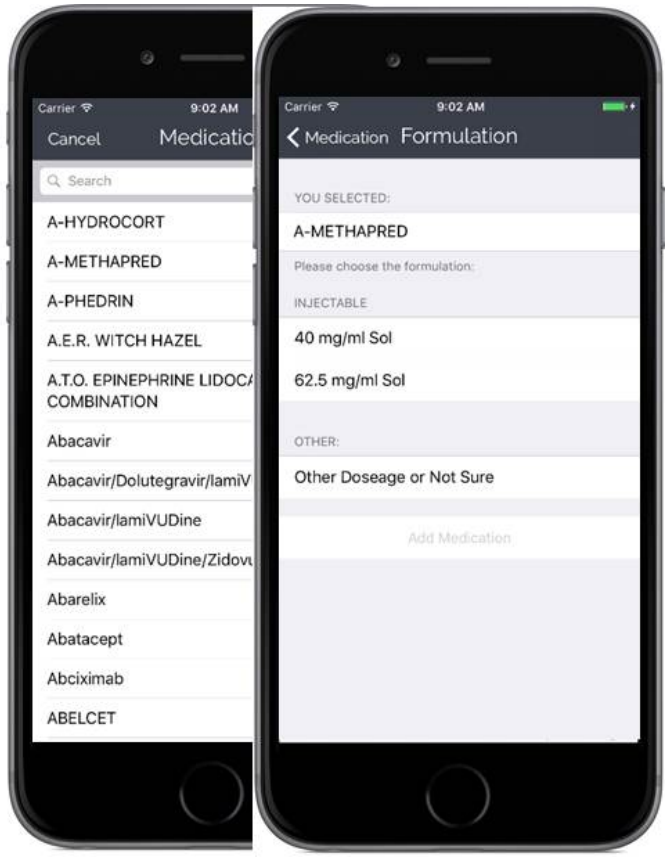
Empowering Consumers To Edit or Add Information to Their Record



Add Allergy

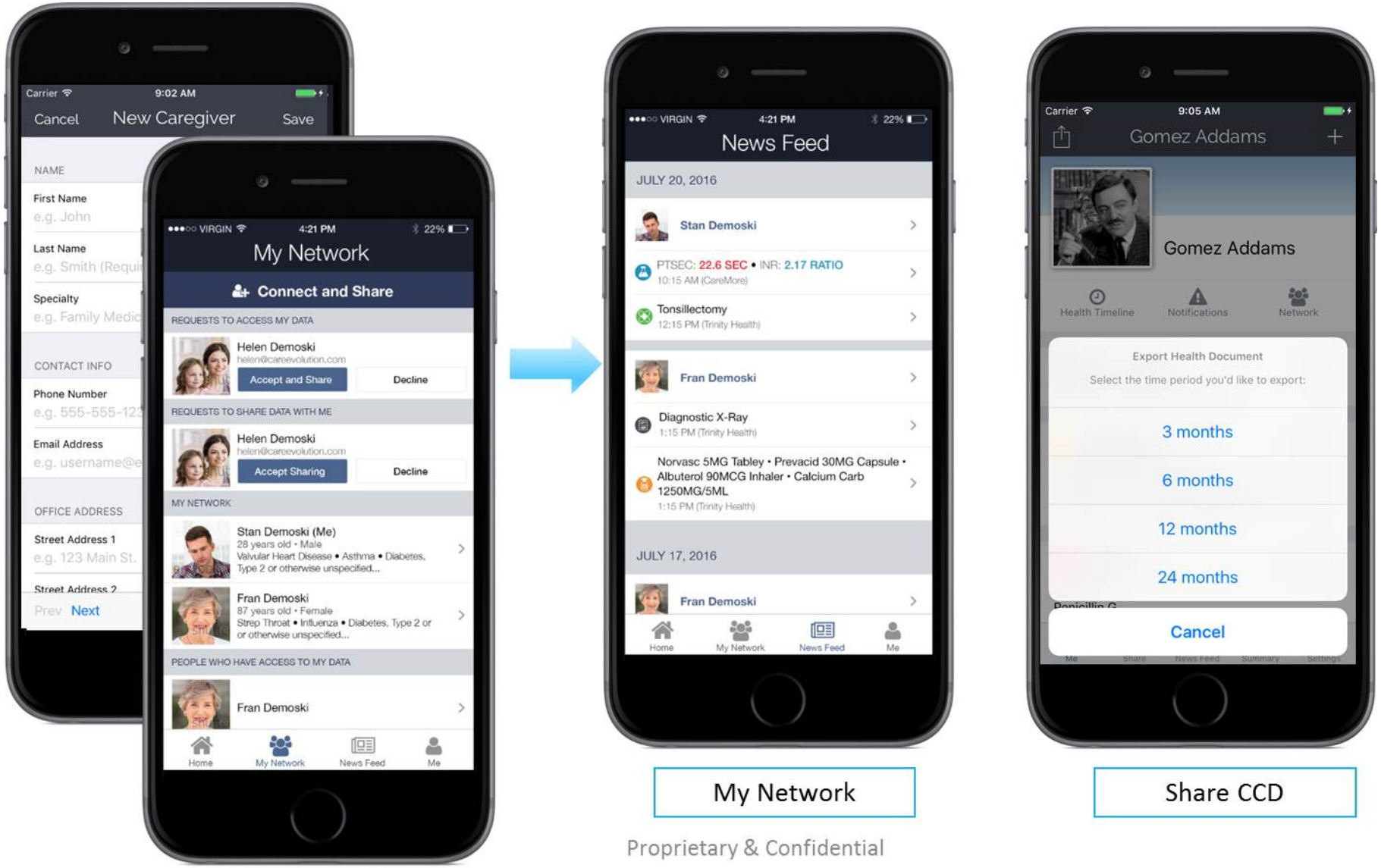


Edit Meds



Add Meds

Advanced Capabilities to Share Record With Family and Caregivers using FHIR, CCD, Secure Mail, or in-App Notification



My Network

Share CCD

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For Members With Apple Watch – Extends Information, Alerts and Data to Wearables

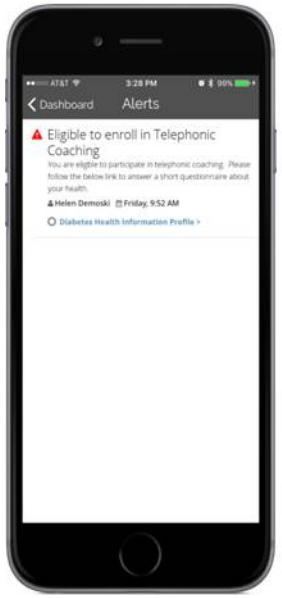
Full Connectivity to Enterprise (Provider/Payer) to Engage with Patient/Member Across Platforms

Ex. Care Mgmt Enrollment Alert/Message

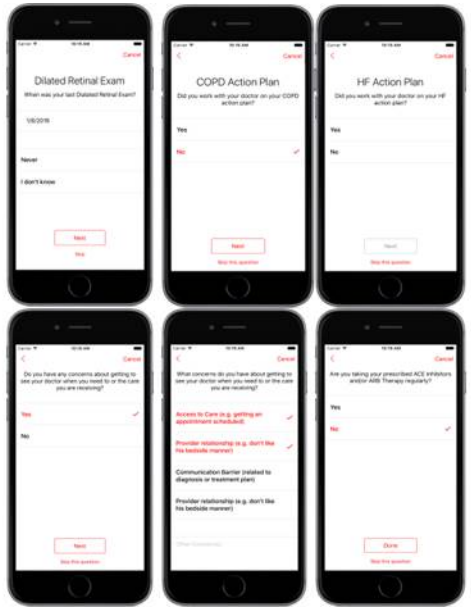
Consumer Completes the Health Information Profile via web or mobile app

Call to Enroll or make a Provider appt

HIP available for Payer or Providers to view in **M**360 & **P**360

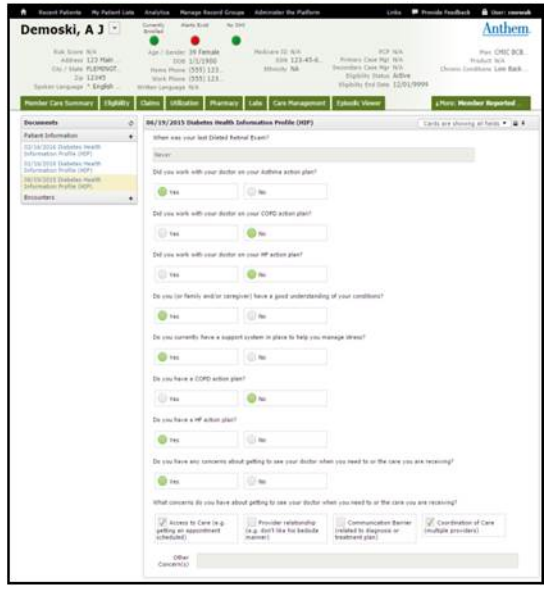


Message to include Program details



Patient / Member Specific HRAs and Gaps in Care Information Requests

Link to call or to schedule an appointment



HIP available for Provider to see in **Patient360**

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HealthIT.gov

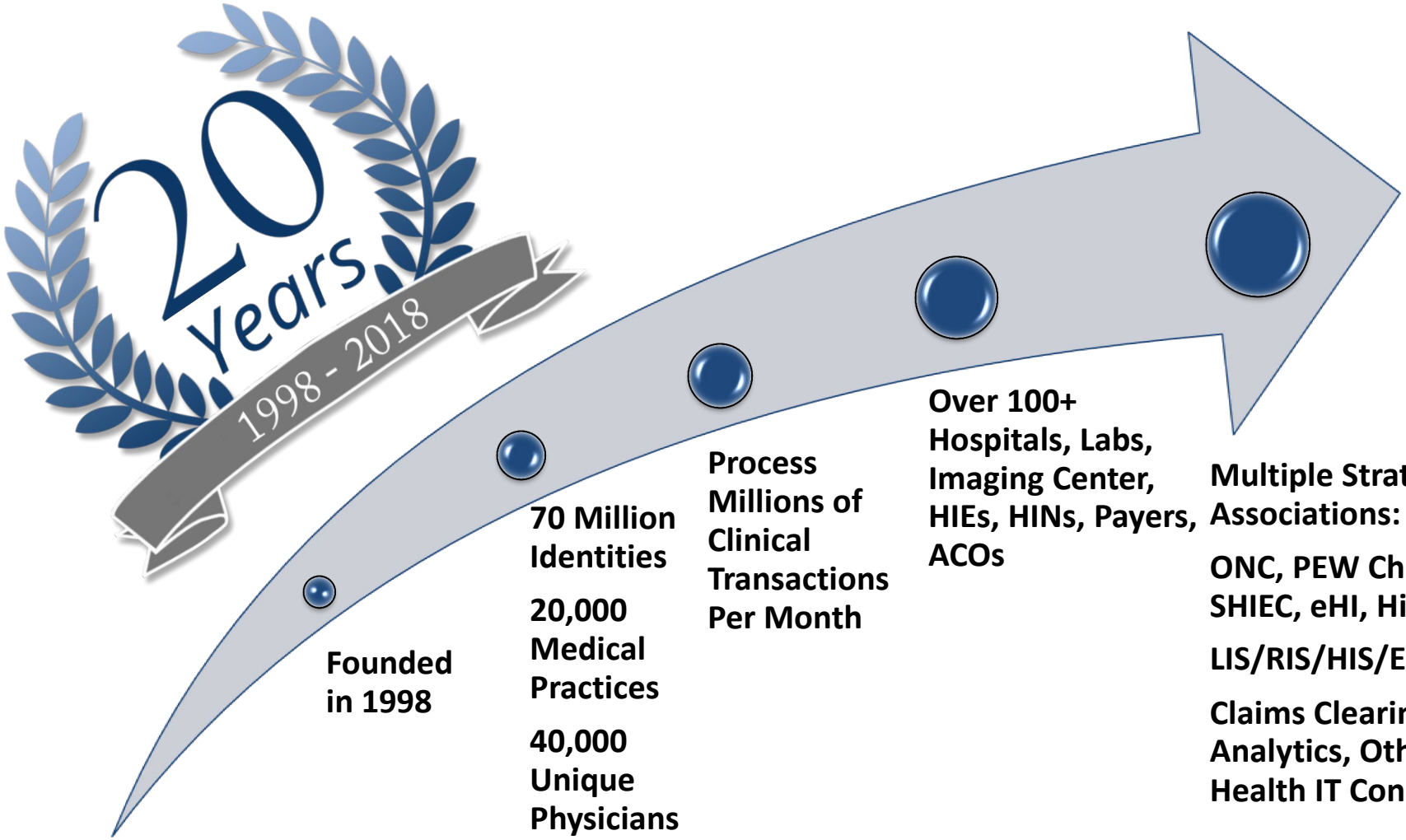
One Patient…One Record

4medica®
One Patient...One Record

Achieving Real-Time Care Coordination by Linking Clinical & Claims Data

Presented by: Gregory Church, President

About 4medica



Founded in 1998

70 Million Identities

20,000 Medical Practices

40,000 Unique Physicians

Process Millions of Clinical Transactions Per Month

Over 100+ Hospitals, Labs, Imaging Center, HIEs, HINs, Payers, ACOs

Multiple Strategic Partners & Associations:

ONC, PEW Charitable Trusts, SHIEC, eHI, HiMSS, AHIMA

LIS/RIS/HIS/EMR/PMS Vendors

Claims Clearinghouses, CRM & Analytics, Other Strategic Health IT Consultants

What We Do for Real-time Care Coordination

4medica Big Data MPI™

- Real-Time Precision Matching & Scoring
- Unlimited Data Sources
- Normalized Attributes
- Scalable to Hundreds of Millions of Identities
- Cloud-based SaaS Solution

4medica Big Data Identity Enrichment™

- Enriched Master Records (current & unlimited historic data)
- Referential Data Matching (using sophisticated external data sources)

4medica Big Data CDR™

- Unified View: Single Patient Record
- Real-Time Clinical Decision Support & Analytics
- Advanced Care Coordination Platform (portal for providers, patients & payers)

4medica ClinXdata® (Clinical Data Exchange)

- Clearinghouse for Real-time Exchange of Laboratory, Radiology & Other Clinical Data

Why Big Data Architecture?

- 4medica utilizes deterministic, probabilistic, referential and machine-learning (ML) for precision matching
- 4medica uses a patented inverse document frequency index (IDFI) to perform searches across the millions of identities that belong to a health organization
- This is at the heart of the search relevancy model; similar model Google used when its search engine technology came to market
- 4medica utilizes in “standard configuration” fourteen (14) data attributes and has ability to ingest unlimited custom attributes for scoring
- Scoring can be performed for synonym, phonetic, transpositions and single character mismatches; as well as edit distance mismatches and partial match scenarios
- Scoring is real-time and can be done in production mode without downtime
- Updating is immediate with the next manual merge or API transaction
- Because, scoring updates are immediate and iterations are saved, any unwanted updates can be immediately terminated and a previous iteration can be restored

Today's Challenges: Linking Clinical & Claims Data

- Lack of high volume, real-time transactional systems across the continuum of care
- No 'Universal Patient ID'
- Lack of data standards for normalizing patient demographics (such as postal addresses, phone numbers, email addresses, etc.)
- Too many legacy MPIs that lack increased speed, precision & simplification of the patient matching process
- Lack of a frictionless interoperability platform to facilitate the exchange of complete clinical & claims data
- Too many legacy health management systems that are expensive to acquire, maintain and **do not** solve the matching and clinical data integration problem

What do we need to do as a Health IT Community to solve this challenge?

- Private and public sectors needs to agree on how we handle the lack of a 'Universal Patient ID' and making such an ID readily available (in real-time) for all types of healthcare organizations
- The ability to quickly & securely search for the ID of each patient and not be limited to basic demographic attributes to further increase the overall match rate in our disparate data silos
- We must have access to standardized demographics to further match and integrate clinical & claims history
- We must create a frictionless platform to securely exchange clinical & claims data for each patient identity

Why Care Coordination Fails Today

- Discrepancies in patient name, DOB, address, SSN, IDs and other unique patient attributes
- Multiple information systems and databases – too many silos (HIS, EMR, Lab, Rad, etc.)
- Poor system integration, or absence of integration (time is of the essence, lack of resources)
- Prior data conversions (hospital systems merging, multiple EMRs)
- Current ineffective Patient Matching or lack thereof (relying on providers of care)

The Data Integration Challenge

Overlaps

Patient records in more than one data source/location

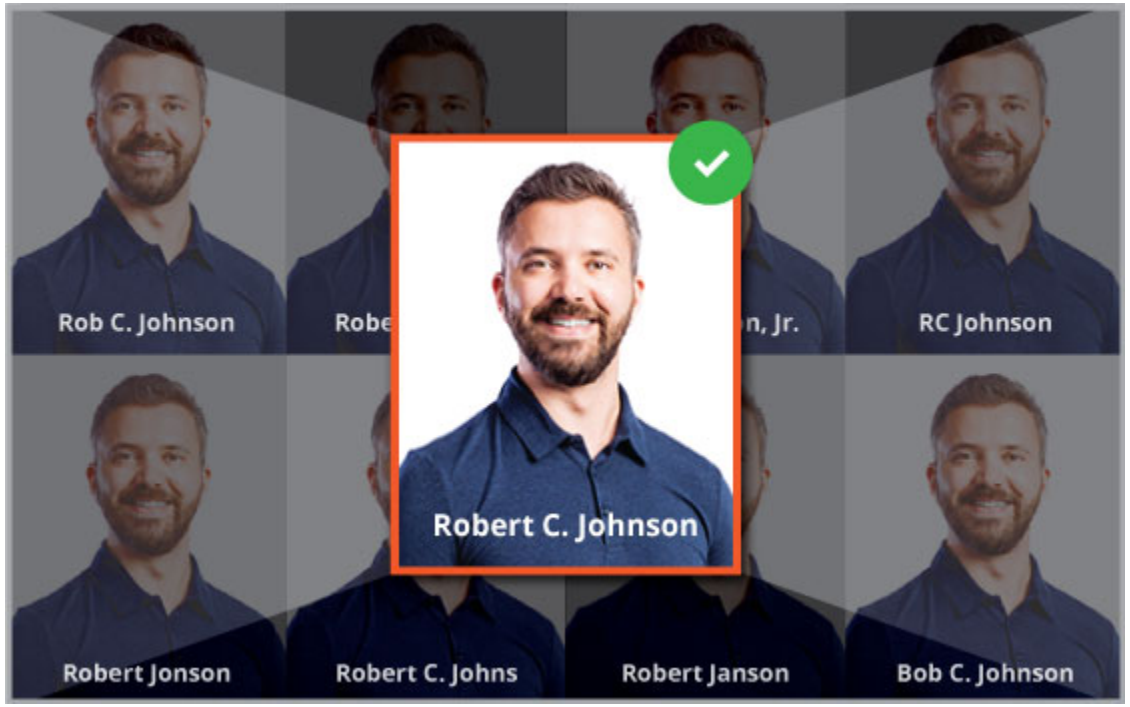
- Dangerous; reviewing treatment plans and coordinating care with missed important clinical information (blood types & allergies)
- Tests repeated; major financial impact on Payers & ACOs
- Delayed treatment

Overlays

Two or more patients have the same MRN in same data source/location

- Very dangerous; huge patient safety risk – treating one patient with another person's record
- Quality of care problems numerous and extremely dangerous
- Especially Pediatric patients; who can't speak for themselves
- Did you know? It can take as much as 500 hours to fix one electronic record overlay?

What is the End-Game?



One Patient…One Record

Use Case #1

Profile:

- One of the country's largest and most successful health information networks (HINs) with over 9M patient identities failed accurate patient matching and data integration after multiple attempts to use legacy relational database MPI products in batch mode.

The Performance Challenge:

- HIN could not find an MPI engine that could scale to their volume of identities (>15,000,000) and transactions (>50,000,000 monthly).
- Prior MPI engines could not handle unlimited data sources in real-time processing mode throughout the state.
- 4medica's multi-patented Big Data matching algorithms, significantly reduced duplication issues while further automating the identity matching, resolution workflow and integration requirements with their internal clinical & claims data management systems.

The End Result:

- Verified precision matching, real-time transaction processing, scaling to millions of identities and transactions (in millisecond latency), and lower processing costs.

Use Case #2

Profile:

- Another large successful HIN, on the East Coast, connected to multiple health reporting agencies, 50+ hospitals and thousands of providers using a legacy relational data base MPI in batch mode.

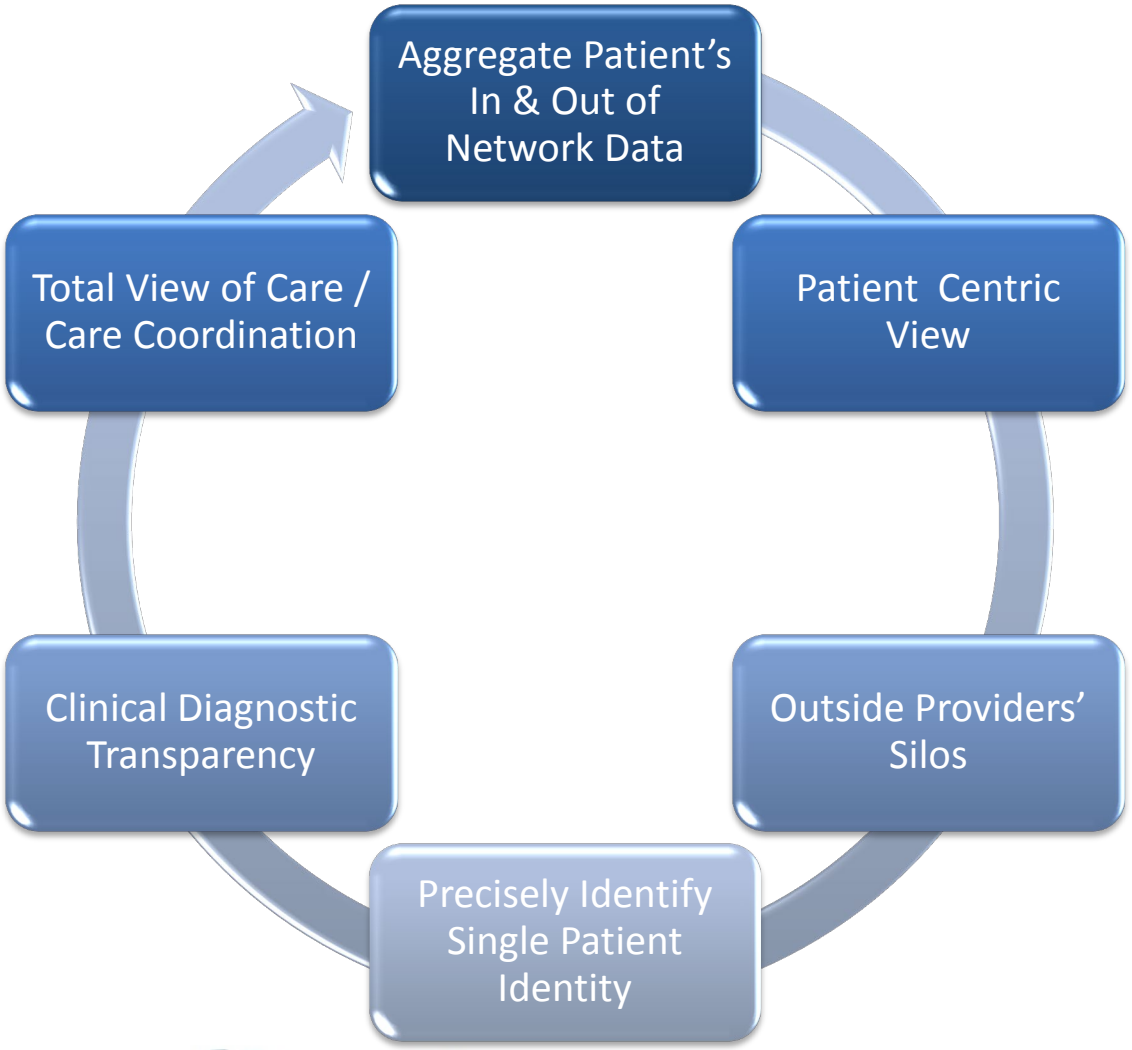
The Performance Challenge:

- HIN couldn't manage MPI data management requirements without loss of performance, speed and matching accuracy.
- 4medica Big Data architecture and its multi-patent MPI implemented as a "Pilot Use Case" reviewing 1.2 million identities that had been previously matched in the existing MPI engine.
- The multi-patented Big Data matching algorithms, and real-time scoring, quickly identified a high duplication rate on the initial data sources provided during the pilot.
- After less than (6) months, results of matching precision, combined with assigning a Unique Patient ID, were conclusive and the selection committee emphatically selected 4medica Big Data MPI.

The End Result:

- Processing multiple state health agencies and other clinical and claims data sources on 6+ million identities and the results are even more resounding for the client. Patient matching and data integration resolution success.

What We Have Accomplished – a Real-time 360° View

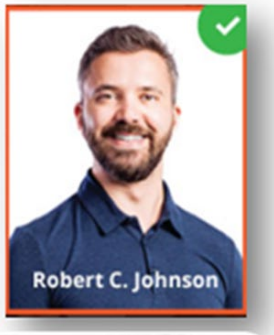


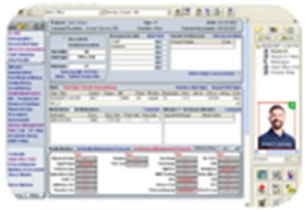
Patient Centric Care…360° Real-time View

Share Clinical & Claims Data Transparently in Real-time

Promote Informed Patient-Centric Care Coordination

Segregate & Identify Clinical & Claims Information from Each Data Source





4medica®

www.BigDataMPI.com

One Patient…One Record

Real-time Care Coordination Platform

HIS

EMR

Hospitals/Health Systems

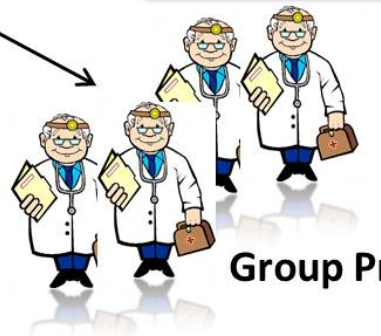
Population Health
HIEs/HINs

Patient Access
(Community PHR)

Real-time Care
Coordination
Platform

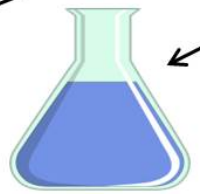
Smaller Practices

EMR Data



Group Practices

Imaging Centers



Laboratories

Payers/ACOs
Claims Data


Questions ?
Answers !

pokitdok

DokChain

- Blockchain Intro
- Quick Use Case Example
- What's Next

Blockchain ≠ Cryptocurrency

Blockchain ≠ Magic

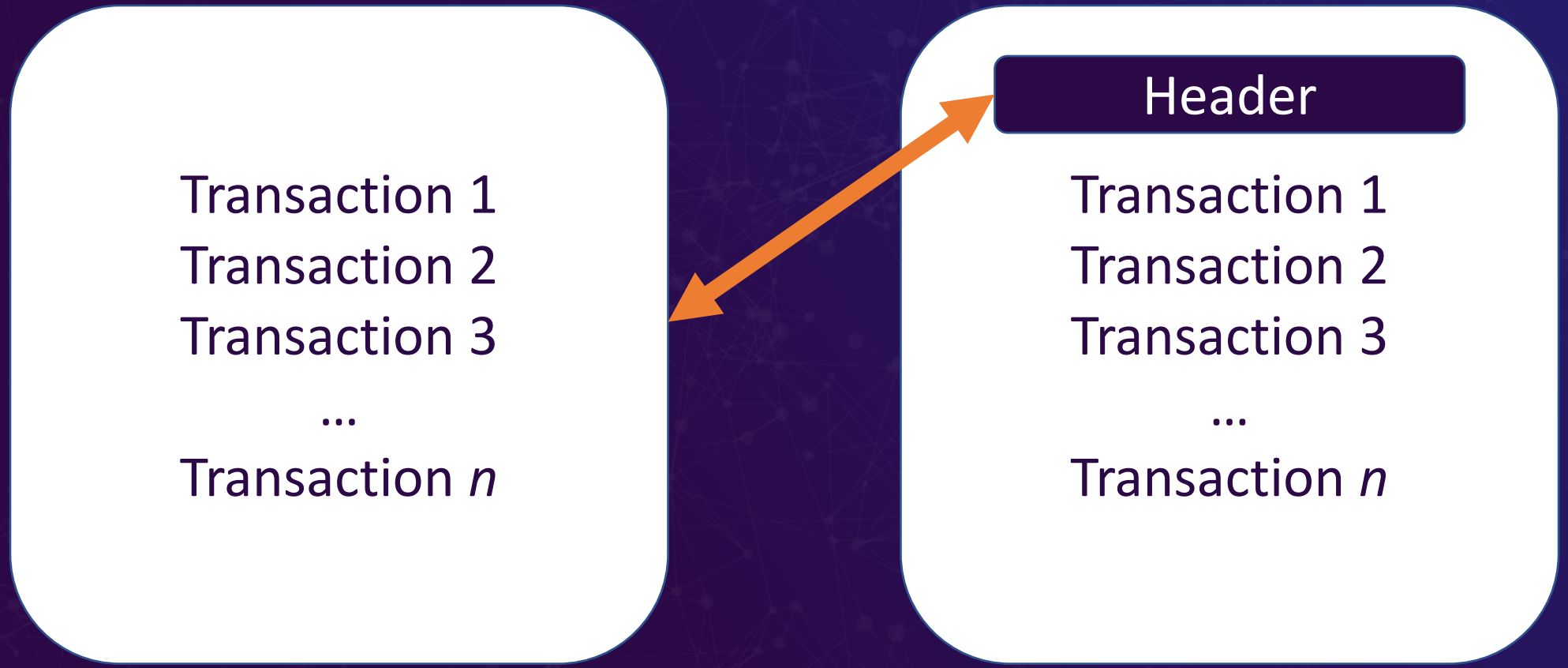
Blockchain ≠ Solution

Blockchain = Technology

"Blockchain allows possibly adversarial entities to obtain provable consensus with computational governance as a function of a trusted distributed network utilizing secure autonomous agents."

- T. Tanner 2018

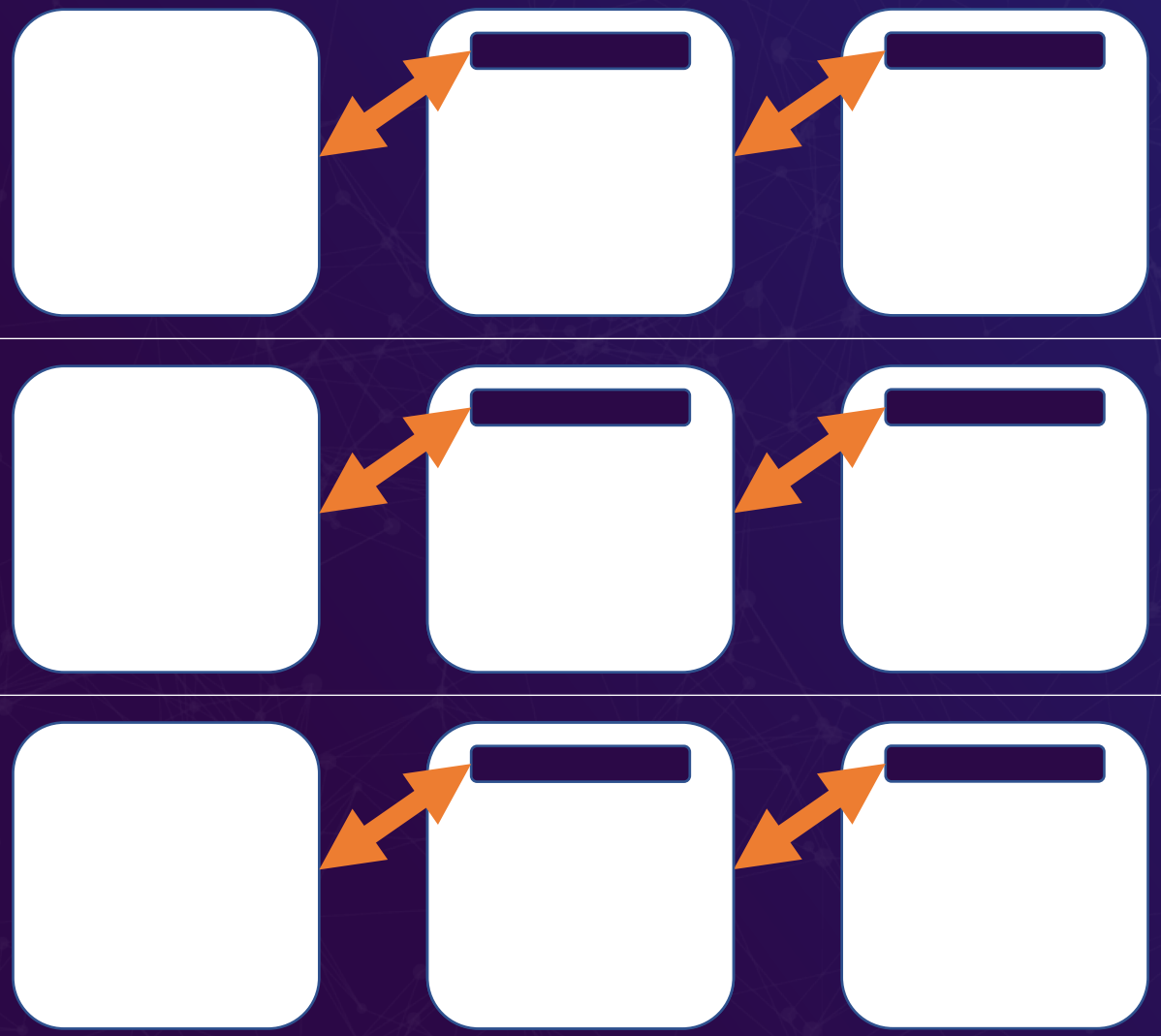
Transaction 1
Transaction 2
Transaction 3
…
Transaction *n*


Transaction 1
Transaction 2
Transaction 3
…
Transaction n
Header
Transaction 1
Transaction 2
Transaction 3
…
Transaction n

Node A
[Health System]

Node B
[Payer]

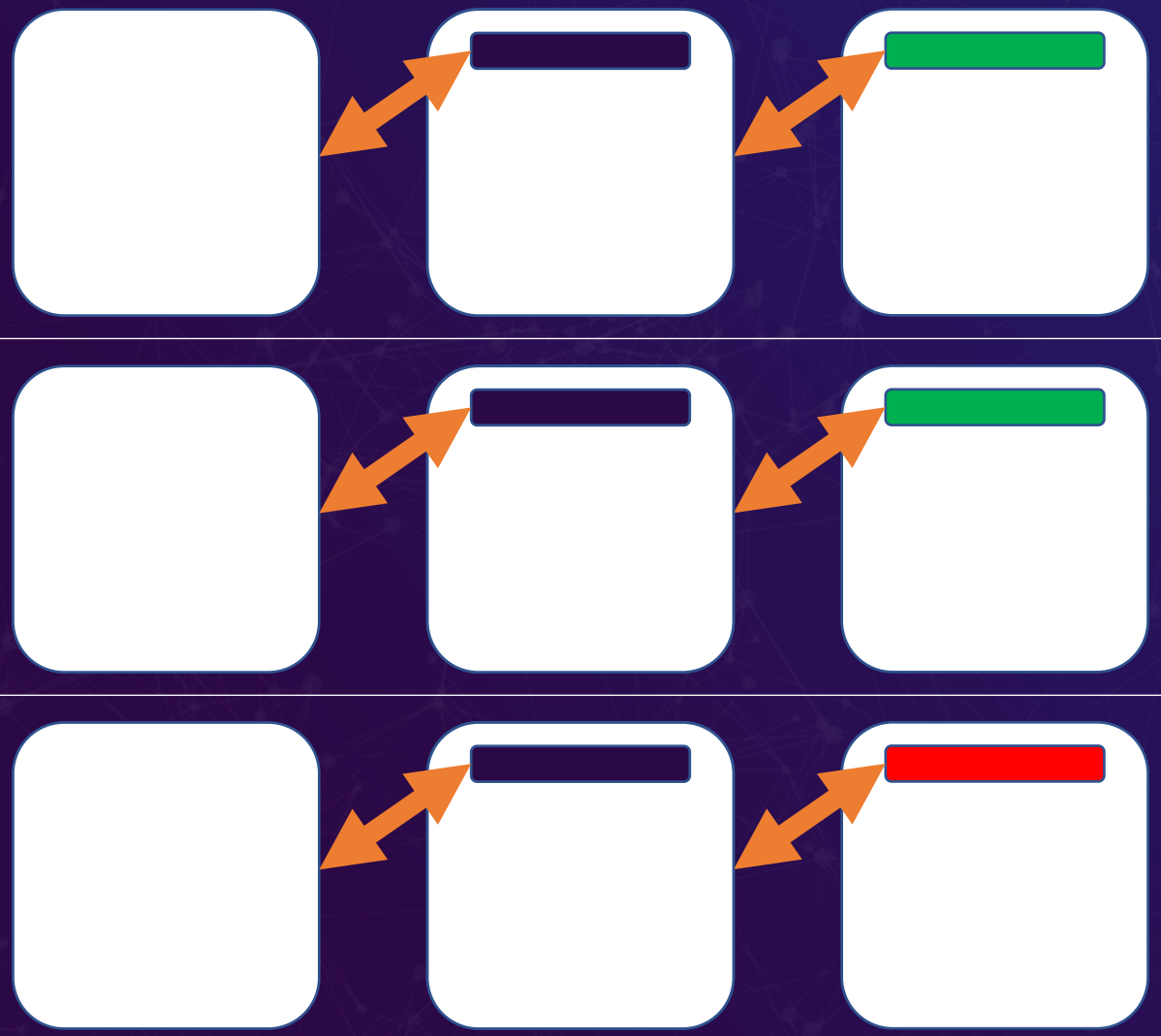
Node C
[Other Entity]



Node A
[Health System]

Node B
[Payer]

Node C
[Other Entity]




SECURE
AUTOMATED
AUDITABLE
CONTROLLED


Claims
Clinical

The Complete Multi-Party Identity

Example Contextual Identities

Health ID

Retail ID

Voting ID

Patient walks in with chronic or new condition

0 1

Current Condition

Tracking course of events

0 2

Patient Health Information

Difficult patient information retrieval

Unclear details of medication or therapy

0 3

Treatment / Medication

08

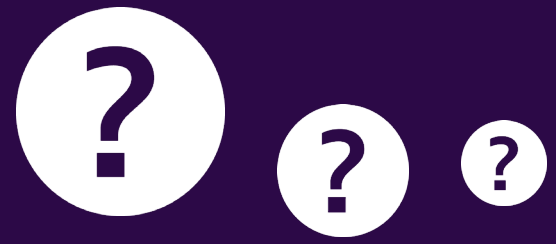
Current Diagnosis

Insufficient understanding of prior care

09

Provided Care

Incomplete care and treatment plan



Patient walks in with chronic or new condition

…and a DokChain app on their mobile phone

01

Current Condition

Patient grants Provider access to historical claims

02

Patient Health Information

Automated, secure patient info retrieval

03

Treatment / Medication

Specific details of medication or therapy

Higher understanding of prior care

08

Current Diagnosis

Better designed care and treatment plan

09

Provided Care

Future

pokitdok