



Think Globally, Act Locally: Case Studies in Personalized Population Health Management

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Agenda

- Introduction
- Data Driven Medicine and Interoperability
- Case Studies
- Summary, Discussion, Q&A



Introduction



Global Healthcare Imperatives

- Create high value, sustainable health & care systems
- Enhance population health through empowered individuals
- Deliver safe, evidence-based care, efficiently & cost effectively
- Leverage information & technology
- Unleash innovation



Data-Driven Medicine and Interoperability



Data Driven Medicine

Today – well beyond tipping point of EHR installation

Challenges:

- interoperability “gaps”
- too much data, not enough information
- gaps in communication
- population health needs to happen where it matters

How do we...

- Get to what matters?
- Extract and deliver value from the electronic health records and systems?
- Keep promise to clinicians - *“it will be worth it”*



Personalized Population Health Management

Population health management takes place one patient at a time, in the context of a learning health system





“People actively involved in their health and health care tend to have better outcomes – and, some evidence suggests, lower costs”

Health Affairs

http://www.healthaffairs.org/healthpolicybriefs/brief.php?brief_id=86

“Importantly, the Government should be clear with the public that access to the NHS involves patient responsibilities as well as patient rights.”

Report to the House of Lords on the Long-term Sustainability of the NHS and Adult Social Care, April 2017

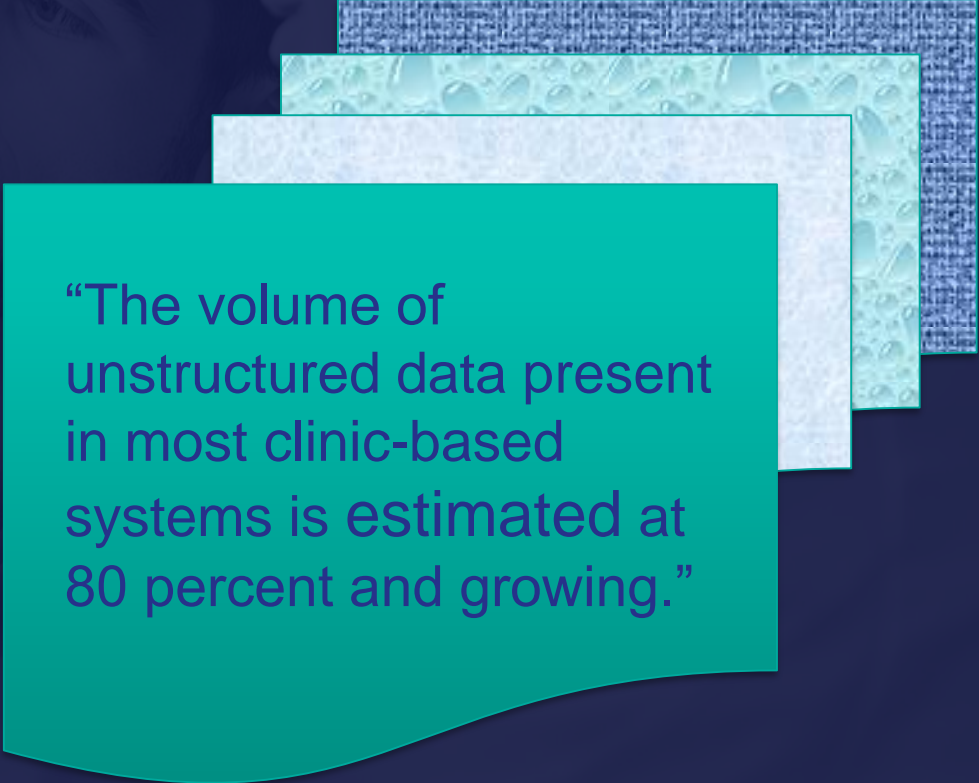
“Care should be provided by the most decentralized unit in the system: the patient. Policy makers should also invest in the development and diffusion of technologies that extend the patient’s capacity for self-care.”

Health Affairs <http://content.healthaffairs.org/content/32/4/653.full.html>



Data Driven Medicine: Data, Data and More Data

- Disparate data sources
- Structured & unstructured data
- Information overload vs. “What am I missing?”
- Expanding access to patient records
- Clinicians must consider increasing volumes of clinical research data
- Important information may be unstructured



“The volume of unstructured data present in most clinic-based systems is estimated at 80 percent and growing.”

Source: FY16 HIE inPractice Task Force (2016). *Blending Structured and Unstructured Data to Develop Healthcare Insights.*



Where can data be leveraged to make a difference?

- Providers and healthcare organizations need
 - Right information
 - At the right time
 - In the right format
- Provide relevant knowledge at the point of care
- Improve patient care delivery, increase efficiency
- Meet organizational goals and regulatory requirements
- Support population health initiatives

How do we enable providers to achieve these goals?

- Make it part of the normal workflow:
Within the comprehensive community care record
- Provide relevant, actionable insight and value
- “Tell me something I didn’t know / need to know”



Case Studies



Leveraging Ontologies: Decision support when and where it counts

- Consolidated views of clinical data
- Building out clinical alerts (for gaps in care, missed procedures, vaccinations, labs, missing diagnoses, etc.)
- Clinical Inferences

Integration at Point-Of-Care

PHINCONNECT

Patient Summary

Allergies (Last 5)

DA	Medication	Strength	Start Date
NKA	dexamethasone	0.5	05/05/2014
No Known Medication Allergies	ciprofloxacin-hydrocortisone otc		05/05/2014
	amoxicillin-clavulanate		05/05/2014

Medications (Last 5)

DA	Medication	Strength	Start Date
	dexamethasone	0.5	05/05/2014
	ciprofloxacin-hydrocortisone otc		05/05/2014
	amoxicillin-clavulanate		05/05/2014

Diagnoses (Last 5)

Working	Diagnosis	Date
Cough	Working Cough	06/10/2014
Extrinsic Asthma with Status Asthmaticus	Working Extrinsic Asthma with Status Asthmaticus	06/10/2014

Problems (Last 5)

Problem	Status	Location
Asthma	Active	(55561003_118), CHRM
Heart transplanted	Active	(55561003_118), CHRM

Documents (Last 5)

Document	Date
Attending Psych Progress Note	08/26/2014 12:59

Laboratory Results (Last 5)

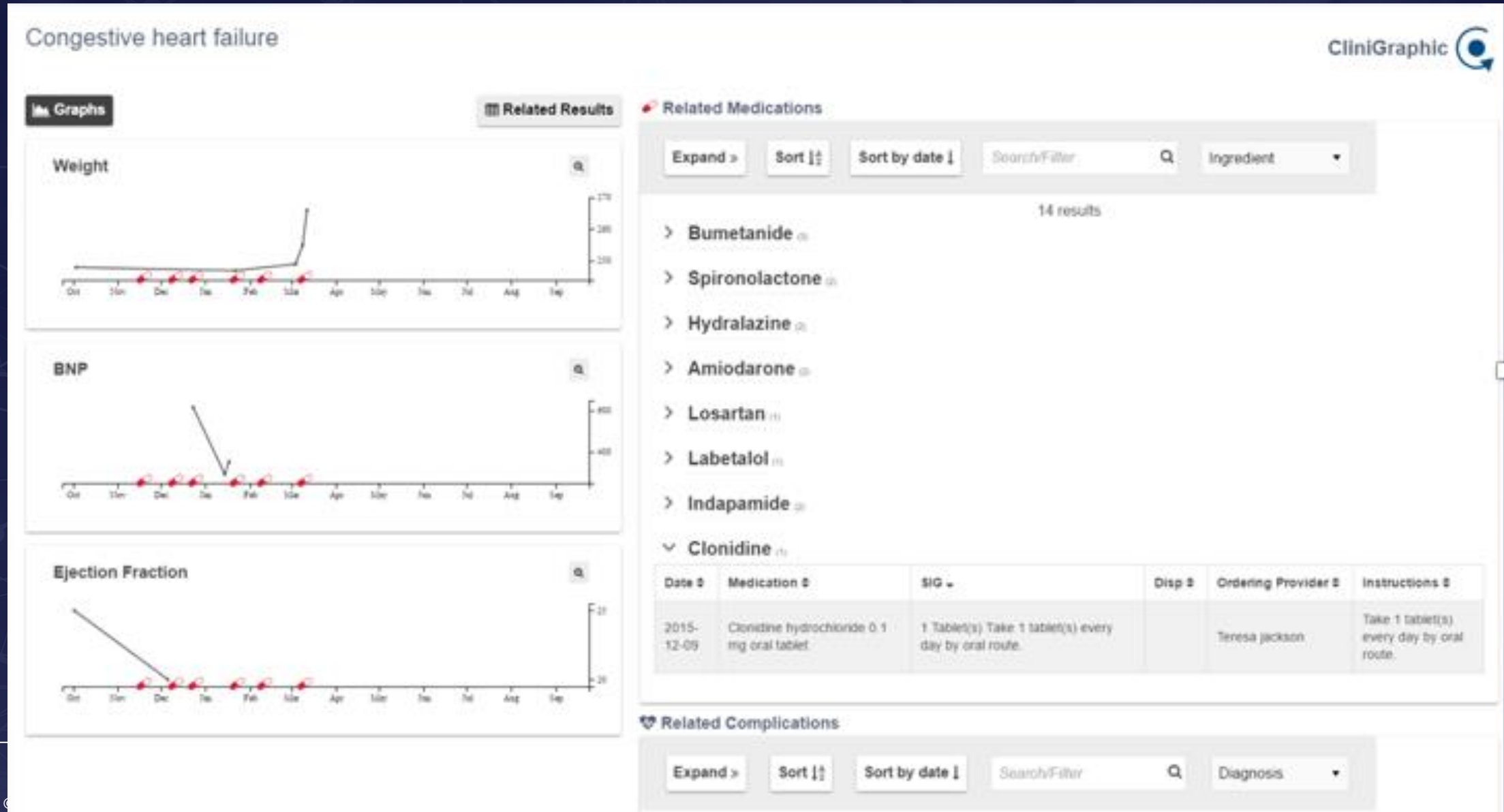
Test	Date
LD	08/26/2014 12:59
CREAT	08/26/2014 12:33
BUN	08/26/2014 12:33
AST	08/26/2014 12:33
CA U	08/26/2014 11:53

Radiology & Other Results (Last 5)

Test	Date
US Renal Sonogram Complete	08/26/2014 13:23
IR Myelogram	08/26/2014 13:09



CliniGraphic Presentation: CHF



Clinical Inference: CHF

HealthShare Management Home Patient Search View Summary Send Summary Download Summary Messages (0) Subscriptions Relationships My Account Logout

My Account Show Connection Details

Patient Record

SCHILLING, MARK

Male · 47 Years (1968-10-20) · 508 FAKE AVE, KNOXVILLE, TN 37203 · (999)555-1212 · (SessionId=0ojTPeT9ST, AgKey=T30)

Summary Demographics Allergies

Page size: 10 Results: 1 Page: < < 1 > > of 1

Clinical Inferences to be Adjudicated (click a row to edit):

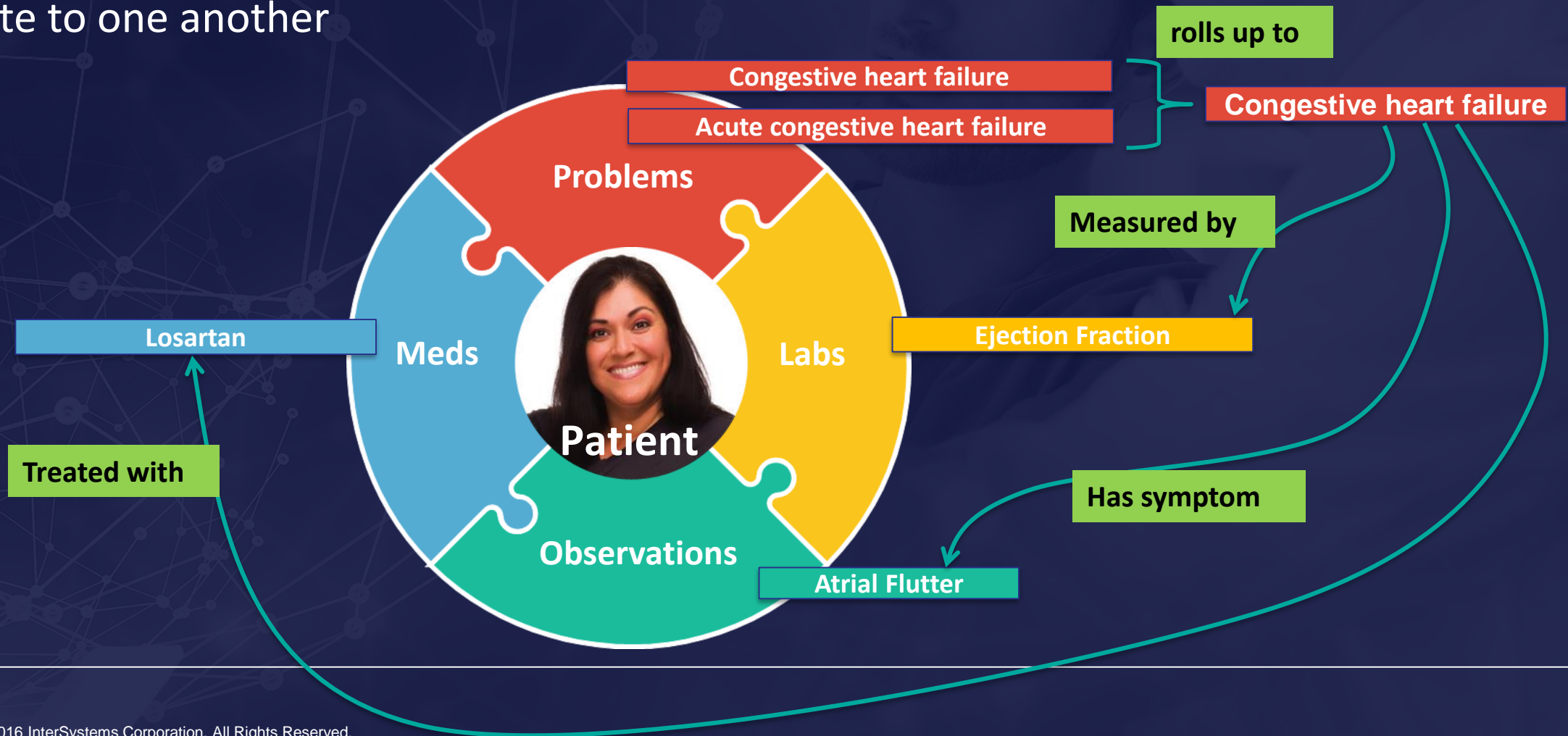
PatientId	Category	Inference	CreatedOnTime
		<p>Losartan is commonly associated with CHF. Reported on 1-Sep-2015. Associated Symptom: Dyspnea was reported on 2-Sep-2015. Associated Symptom: Chest pain was reported on 15-Sep-2015. Natriuretic peptide.B Ser/Plas MCnc Pt Qn value of 354 pg/mL on 16-Jan-2016. Natriuretic peptide.B Ser/Plas MCnc Pt Qn value of 294 pg/mL on 13-Jan-2016. Natriuretic peptide.B Ser/Plas MCnc Pt Qn value of 617 pg/mL on 22-Dec-2015. Left ventricular ejection fraction value of 35 % was recorded on 8-Mar-2016. Left ventricular ejection fraction value of 20 % was recorded on 5-Dec-2015. Left ventricular ejection fraction value of 25 % was recorded on 1-Oct-2015.</p>	2016-09-27 13:29:10

Confirm Inference Refute Inference

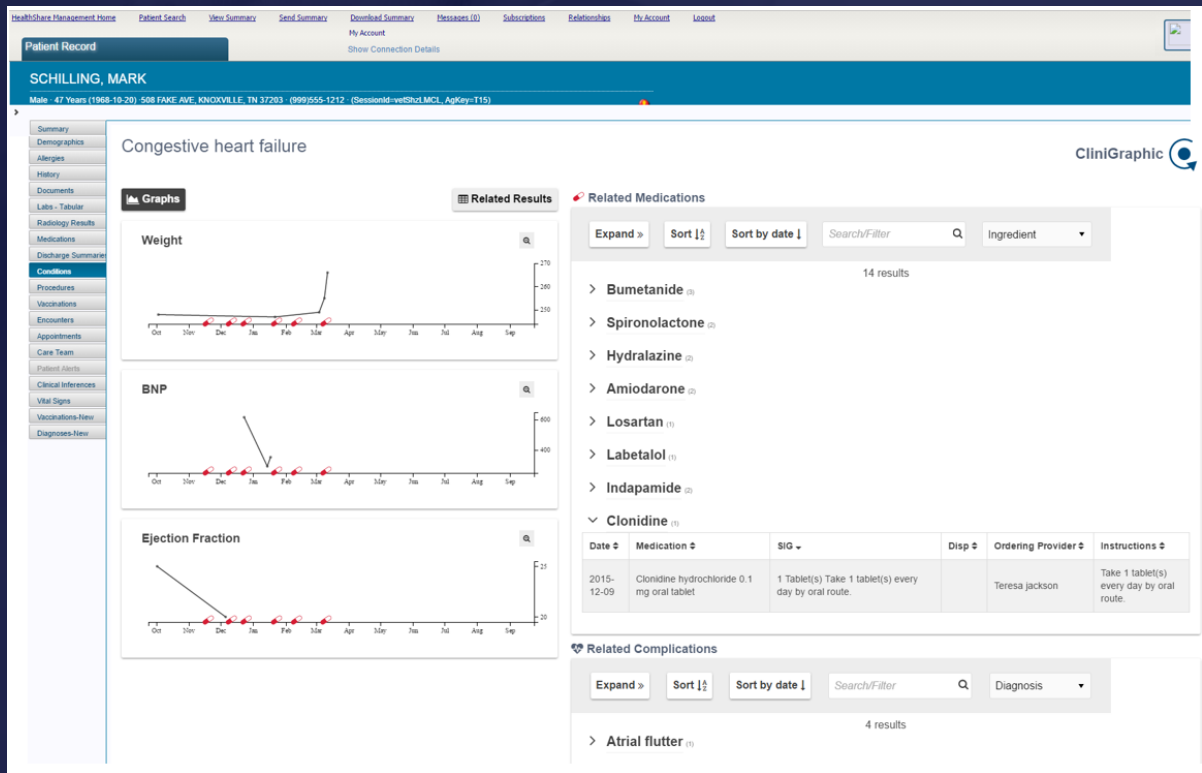
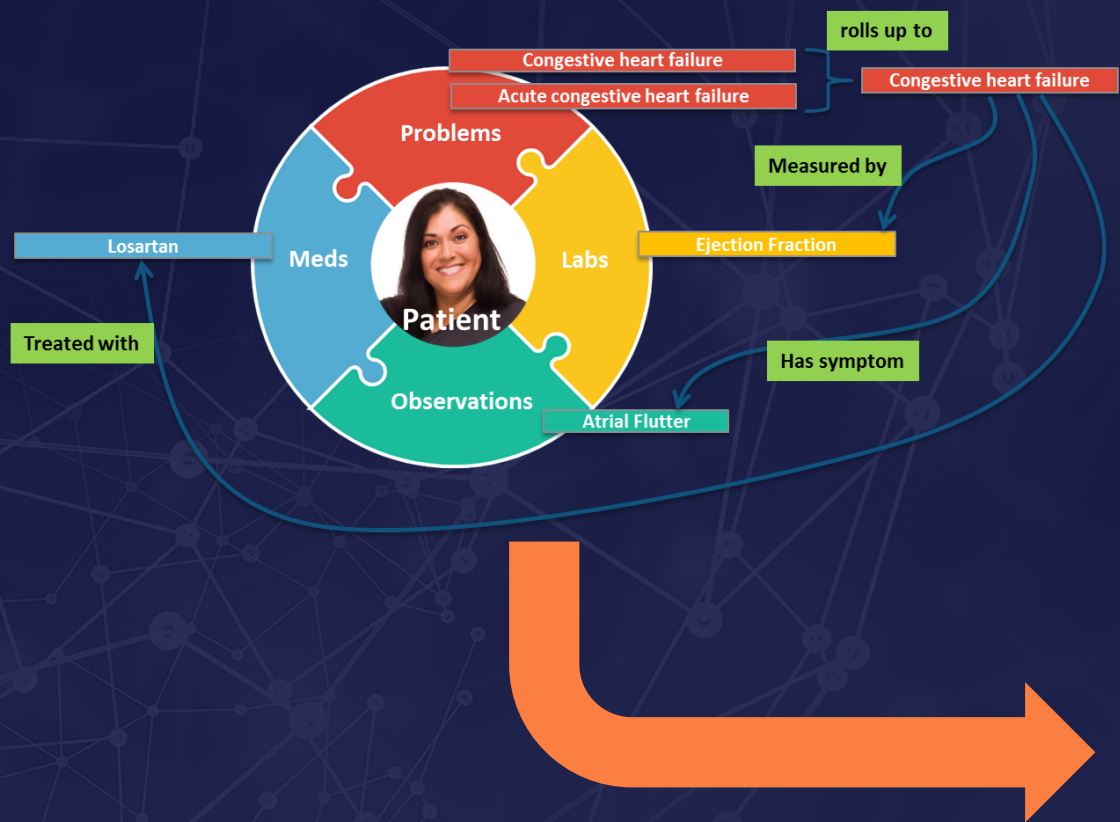


Ontological Reasoning

Ontologies allow software to summarize data and understand how the different pieces relate to one another

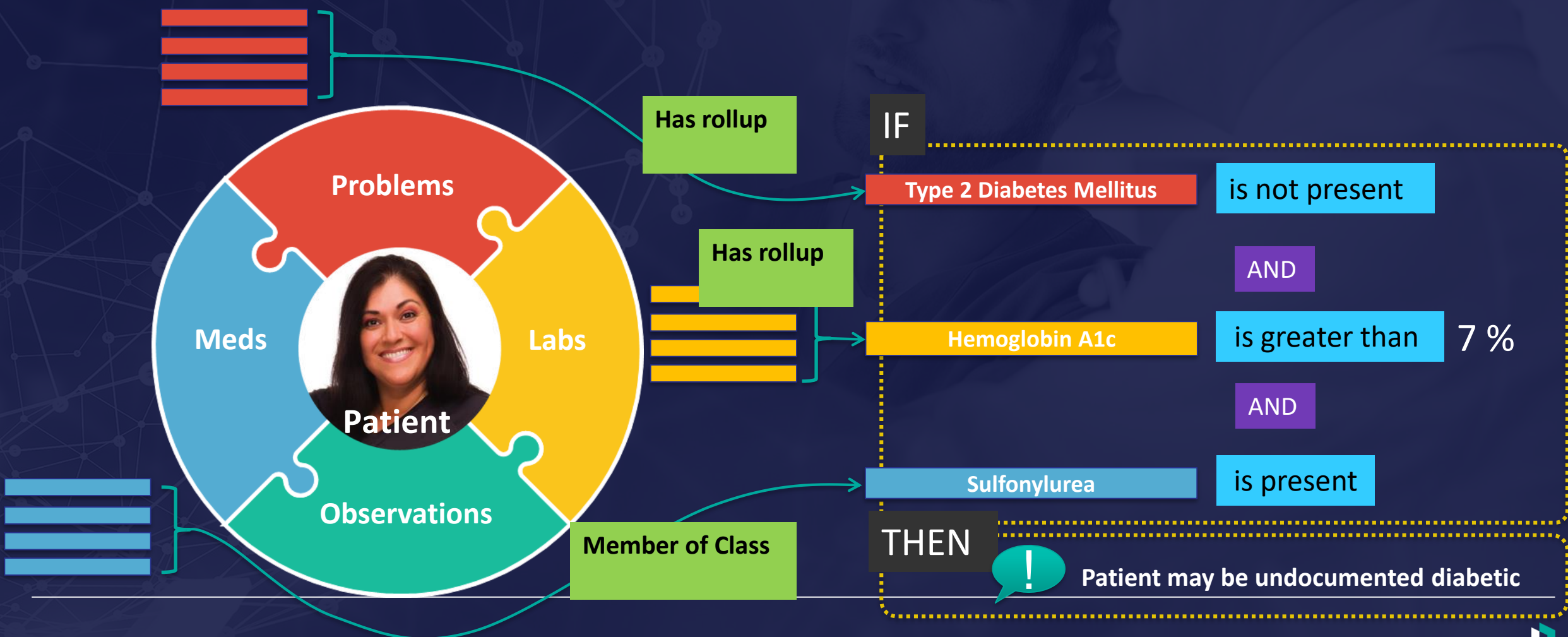


Ontological Reasoning



Inferences

Inferences leverage *patient information, ontologies and logical reasoning* to look for patterns of interest



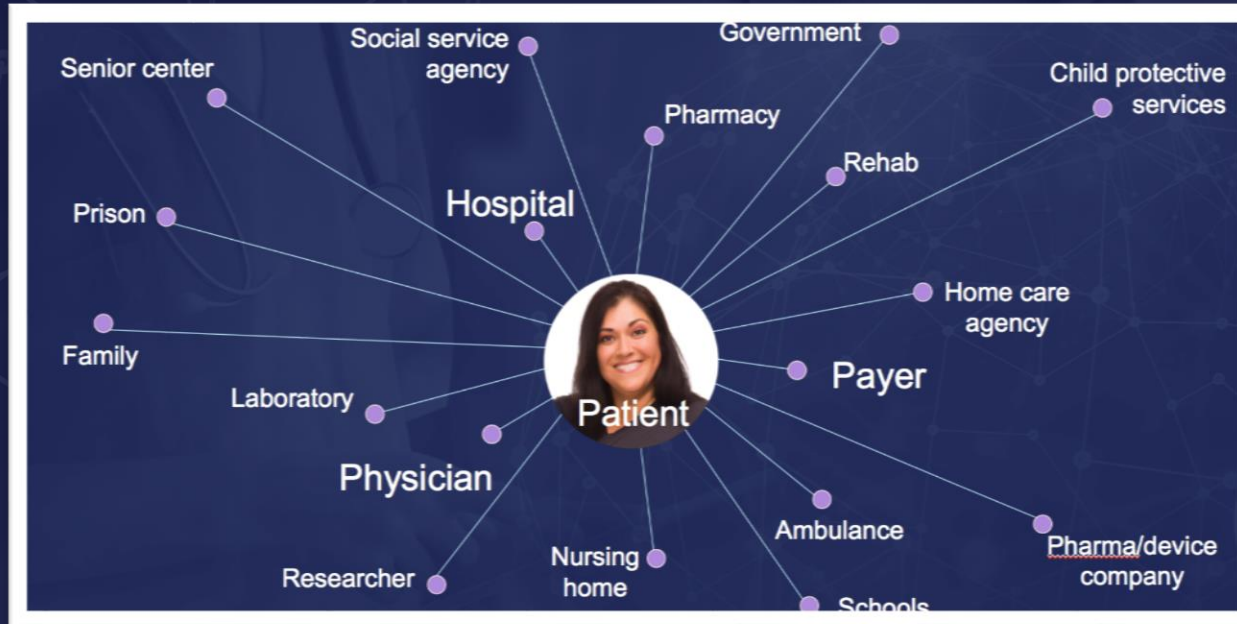
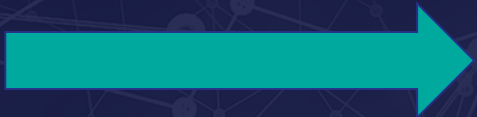
Healthix

Largest Public Health Information Exchange in the US

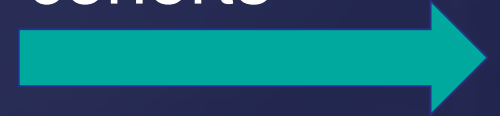


Knowing Where to Focus

Predictive
risk models



Intervention
cohorts



16 million patient records





GONZALEZ, MARLA

Female · 43 Years (1972-09-22) · 40 Great Pain Ave ,Chicago 60290 ·

Summary



Select All
Deselect All
Preferences

Jul 2012

2013

2014

2015

Feb 2016

Summary

Allergies & Alerts

History

Documents

Lab Results

Radiology Results

Medications

Vaccinations

Conditions

Procedures

Discharge Summaries

Physical Exams

Plan

Encounters

Appointments

Care Team

Programs

PATIENT PROGRAMS

FITNESS CHALLENGE	EXERCISE TRACKING FOR OVERWEIGHT PATIENTS
HEART HEALTHY NUTRITION	NUTRITION INFO FOR HTN PATIENTS
HTN AND UNCONTROLLED BP	PATIENTS WITH HTN AND UNCONTROLLED BP

MEDICATIONS

Hydrochlorothiazide 25mg	...	1	11/23/2015
Lipitor 10mg	...	1	11/23/2015
Doxycycline	...	1	10/18/2015
Lisinopril-GA tablet 10mg [30]	...	1	05/04/2015
Multivitamin	...	1	07/20/2012

LABORATORY RESULTS

Lipid Profile	...	02/21/2016 16:00
Fasting Plasma Glucose	...	02/21/2016 16:00
HgA1C	...	02/21/2016 16:00
Lipid Profile	...	11/23/2015 11:00
HgA1C	...	11/23/2015 11:00

PATIENT RISK

Inpatient Admission	3
Emergency Visit	47
Diabetes	32
AMI	0

DOCUMENTS

ER Visit	...	ER Visit
Routine Visit	...	Clinic Visit
ER Visit	...	ER Visit
Discharge Summary	...	ER Discharge
Ortho Consult	...	Orthopedic Consult

DIAGNOSES

Acute	Viral illness
Chronic	Low back pain
Acute	Allergic Rhinitis
Chronic	Disorders of Lipid Metabolism
Acute	Chest pain





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FITNESS CHALLENGE

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HEART HEALTHY NUTRITION

NUTRITION INFO FOR HTN PATIENTS

HTN AND UNCONTROLLED BP

PATIENTS WITH HTN AND UNCONTROLLED BP

PATIENT RISK

Inpatient Admission 3

Emergency Visit 47

Diabetes 32

AMI 0

Elevated risks highlighted in red

- 47% likelihood of ED visit in next 12 months
- 32% likelihood developing diabetes in next 12 months

DOCUMENTS

ER Visit	ER Visit
Routine Visit	Clinic Visit
ER Visit	ER Visit
Discharge Summary	ER Discharge
Ortho Consult	Orthopedic Consult

DIAGNOSES

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Lipid Profile	11/23/2015 11:00
HgA1C	11/23/2015 11:00



516,257

Clinical event notifications in January 2017

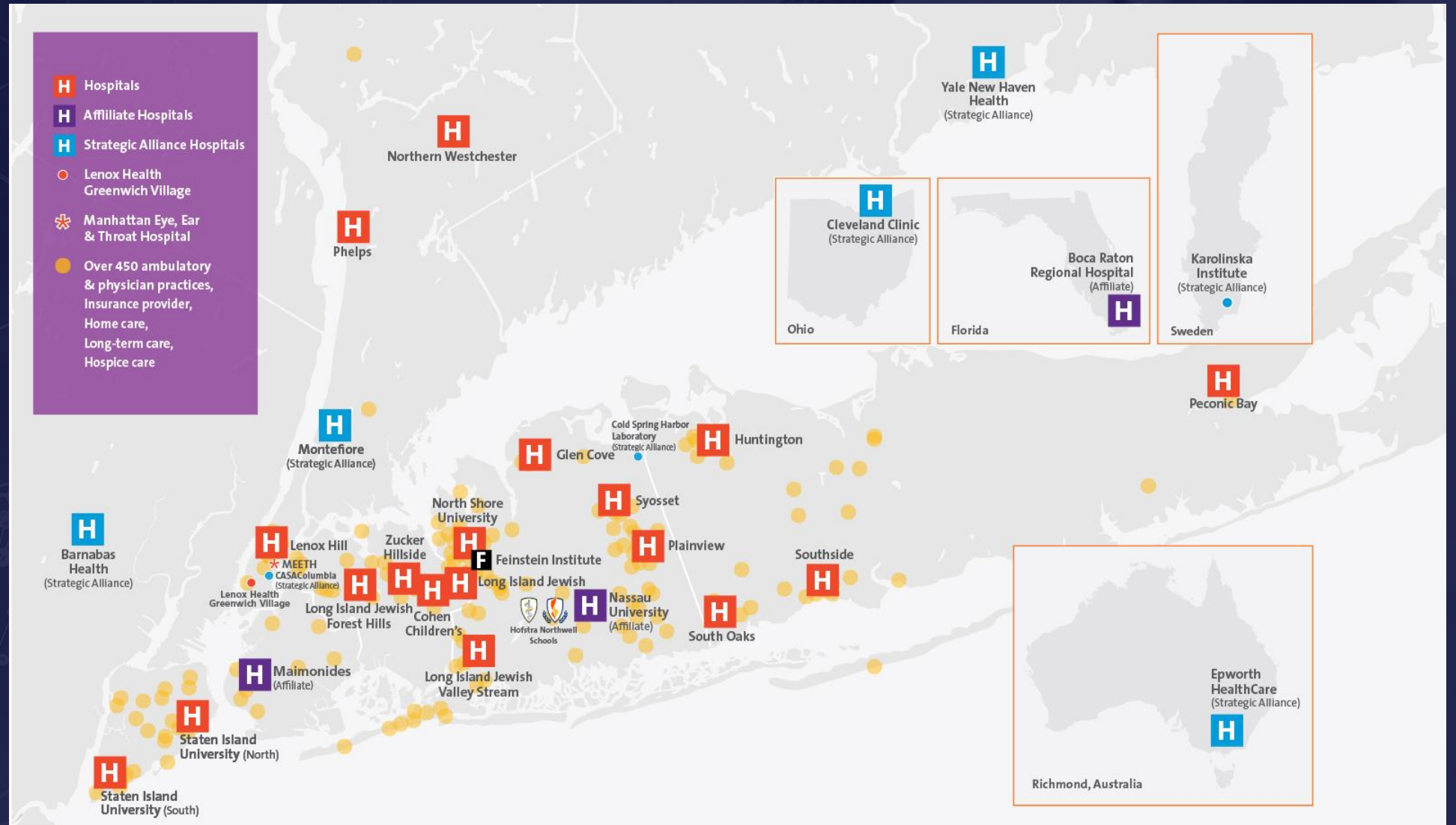
15% → 85%

Patient engagement rates in one IDN



Northwell Health

14th largest
healthcare
system in
the U.S.



Care Tool

Patient-centered care management service model

The screenshot displays the 'Care Management Tool' interface. On the left, a sidebar lists various case lists and filters, including 'BPCI', 'COPD', 'CABG', 'Open', 'NQUH', 'Huntington', 'Source', 'HealthHome', 'New', 'NSLUMS (2468)', 'Outreach (2466)', 'Enrolled (2)', 'UNKNOWN', 'NSLUMS (904)', 'Outreach (904)', 'Outreach (823)', 'Queens', 'NSLUMS (326)', 'Outreach (326)', 'Brooklyn', 'NSLUMS (189)', 'Outreach (189)', 'Manhattan', 'NSLUMS (80)', 'Outreach (80)', 'Bronx', 'NSLUMS (101)', and 'Outreach (101)'. The main panel shows a patient's profile for 'DESCMQA, RHODSCMQA' with details like 'Vidella, Stewart', 'MRN: 2100034', 'Gender: Female', 'Index Admit: 5/17/2013', 'DOB: 10/4/1932', and 'Days in Bundle: 0 Care Day: 0'. Below this, there are tabs for 'Assessment' and 'Contact'. The 'Assessment' tab is active, showing a 'Functional / Social' section with a table for 'Activities of Daily Living' and 'Milestones'. The 'Activities of Daily Living' table has columns for 'Arise', 'Bath', 'Dress', 'Eat', 'Total', 'Transp', 'Comm', and 'Total', with rows for 'Current' and 'Prior'. The 'Milestones' table has columns for 'PT', 'OT', 'SST', 'Speech', and 'Total', with rows for 'Current' and 'Prior'. Other sections include 'Illness Related Changes', 'Readmission Risk', 'Substance Use', 'Skin', 'Social Profile', 'Pain', 'PT initial evaluation', 'Learning', and 'Fall Risk'.

Arise	Bath	Dress	Eat	Total	Transp	Comm	Total
4	4	4	0	4	0	0	0
0	0	0	0	0	0	0	0

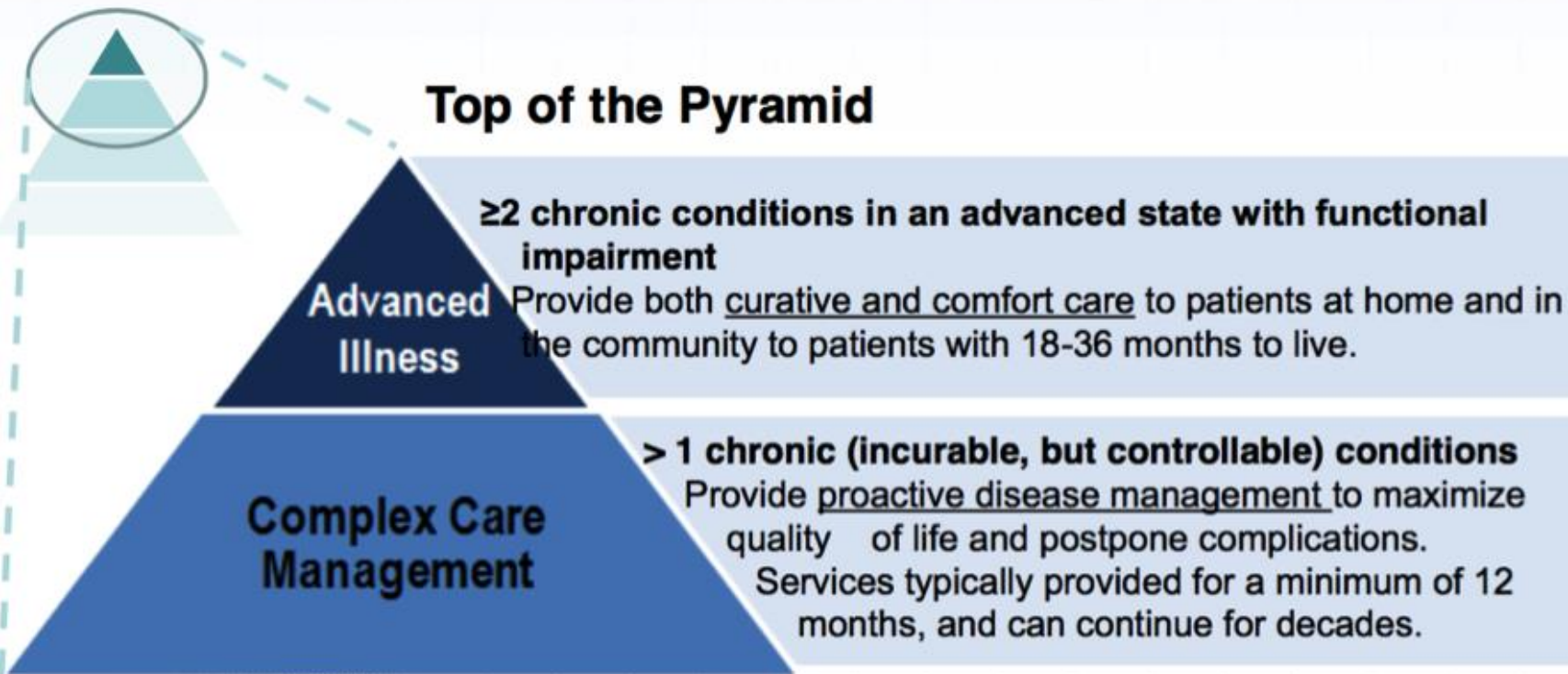
PT	OT	SST	Speech	Total
X	X	X	X	X
X	X	X	X	X

- Clinical resource specialist
- Social worker
- Nurse care manager



Risk stratification

Initial care management programs should be targeted to people with multiple disease conditions, who are at high-risk for unnecessary care, and who have the greatest opportunity for reducing health care costs.



Rule-based
system

Coordinate My Care

Redesigning Urgent Care for Serious Illness



Conversation



Documentation



Communication



Heloisa (Heloisa) RAMSAY

NHS No: 003 030 8445

Born: 31 Oct 1971 (Age 44)

Gender: Female

Address: 3684 Maple Avenue

Swiss Cottage, Greater London N4 5GH



State of Care Plan: **Published, View Only**

Last saved on: 12 Nov 2015 at 13:39



UPDATE CARE PLAN

Last updated: 12 Nov 2015 at 13:39

Last updated by: Kim HumbyClinician at InterSystems GPs

Urgent Care Summary

Patient Consent

Patient Details

Significant Medical Background

Preferences

Cardiopulmonary Resuscitation

Emergency Treatment Plan

Significant Medical Background

Significant Diagnoses

The following table shows only those diagnoses that are active, clinically significant and will provide useful information to urgent care services.

Category	Diagnosis	Additional Details
Cancer - Primary site	Lung	

Awareness of Diagnoses

Verizon

12:57 PM

Overview

Care Plan

?

Belinda RAGON

31 Oct 1971 (Age 44)

NHS: 003 030 8445

Male

Home Access

Living Condition

Lives Alone

Type of Accommodation

Flat, Maisonette Or Apartment (Purpose Built)

Key Code Details

(not specified)



coordinate
my care

mycmc


coordinatemycare@nhs.net
020 7811 8513

?

Home

“With an urgent care
plan, you’ll get your
care, your way.”

Clinical Nurse Specialist



Start your CMC Plan

If you're ready to start creating your plan click here:

View your CMC Plan

If you already have a CMC plan, you can view and update it here:

Email address

Please enter your username

Password

Please enter your password (required)

Visit coordinatemycare.co.ukCoordinate My Care 2016



25,000+

Care plans created

79%

Died in their place of choice

£23.3M

Cost savings



Summary



Actionable insight from patient data

UNCOVER undiagnosed patient conditions / undocumented diagnoses

BROADEN the circle of knowledge

IMPROVE information available to care providers

EXPAND information for population health efforts

- Quality improvement, gaps in care, etc.
- Disease registries
- Care coordination

AVOID unintended consequences

27.8% US diabetics
Undiagnosed

Cost: \$2864/pp/yr



Q&A

THANK YOU!

