

HEALTH INFORMATION TECHNOLOGY

Healthcare Innovation Steering Committee
State Innovation Model
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HIT in News – Pace of change

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□ On 6/2/2014 Apple announced

On Monday, Apple announced HealthKit in partnership with Epic Systems and Mayo Clinic at their annual World Wide Developer Conference (WWDC). HealthKit isn't an app itself – but a software framework that's now included in Apple's latest release of their mobile operating system – iOS 8. The framework is built into iOS 8 as a way to collect, store and then present health information from apps that are designed to communicate with it. Those apps (often associated with wearable sensors for capturing health or fitness data) can be ones built by Apple or independently by 3rd party developers.

- <http://www.forbes.com/sites/danmunro/2014/06/03/apple-gives-epic-and-mayo-bear-hug-with-healthkit/>
- <http://www.imedicalapps.com/2014/06/apple-partnership-epic-game-changer/>

Management

Behind the scenes at the HealthCare.gov tech surge

Feb 27, 2014

"Nothing I saw was beyond repair. Yes, it was messed up. Software wasn't built to talk to other software, stuff like that. A lot of that was because they had made the most basic mistake you can ever make. The government is not used to shipping products to consumers. You never open a service like this to everyone at once. You open it in small concentric circles and expand, so you can watch it, fix it and scale it," Abbott said.

[Click here](#) to read the full article.

<http://fcw.com/Articles/2014/02/27/HealthCaredotgov-Brill-recap.aspx?Page=2>

Jeff Zients, the management consultant who has subsequently taken over as director of Obama's National Economic Council, was tapped in mid-October to lead a team to fix the site by the end of November. The effort eventually included:

- Todd Park, who told Time, "On Oct. 17, I went from White House CTO to full-time HealthCare.gov fixer."
- Marty Abbott, former CTO of eBay
- Gabriel Burt, CTO of Chicago firm Civis Analytics, which built some of the analytics tools used by Obama's 2012 reelection campaign.
- Mike Abbott, a partner at the Silicon Valley venture capital firm Kleiner Perkins Caufield & Byers, who is credited with fixing Twitter's technology when it suffered from frequent outages.
- Mikey Dickerson, an engineer on leave from Google.
- White House innovation fellow Ryan Panchadsaram.

The group set up shop in Columbia, Md., in the offices of HealthCare.gov general contractor Quality Software Service, Inc. Their first task was to build a dashboard, the absence of which astonished veteran engineers, to monitor traffic on the site. Abbott, who took on the role of project manager, said engineers at the contractors were eager to fix the site, even if executives were dodging ownership and accountability.

Related Coverage from FCW

Did it have to be this hard?

What went wrong with HealthCare.gov, and what can be done differently next time?

Can IT procurement be saved?

The problems with larger federal IT projects are deep, broad and mostly immune to quick fixes. So what's to be done?

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Potential Conceptual Model

Potential Conceptual Model – State Innovation Model

State Population Demographics (select)

Gender
Age
Race
Ethnicity

Social Determinants

Early Childhood
Development
Education
Town/geo-location
Income
Access to HC
Housing
Social Support

Diseases

Congestive Heart Failure
COPD
Diabetes
Asthma
Behavioral Health
Pneumonia

HIT Interventions at Person Level

Personal Health Records/Patient portal to provide patient access to EHRs (Use Blue Button)
Self-management programs
Use of mobile technology

System level

Use of ADT Feed
Identifying High-risk population using LACE Index/care analyzer
Predicting readmissions using disease specific algorithms
Clinical Repository
Disease Registry
EMPI
Provider Directory
Monitoring system health through Performance Measures

Provider Level

Alert Notification based on Dx to PCP
Social Support network
Medication Reconciliation
Care Coordination - Use of Secure messaging for document transport (Direct

Primary Aims Improving quality of care

Reducing Hospital Readmission Rate from 12.8% to 10.8%

Improve Patient Safety

Reduce cost

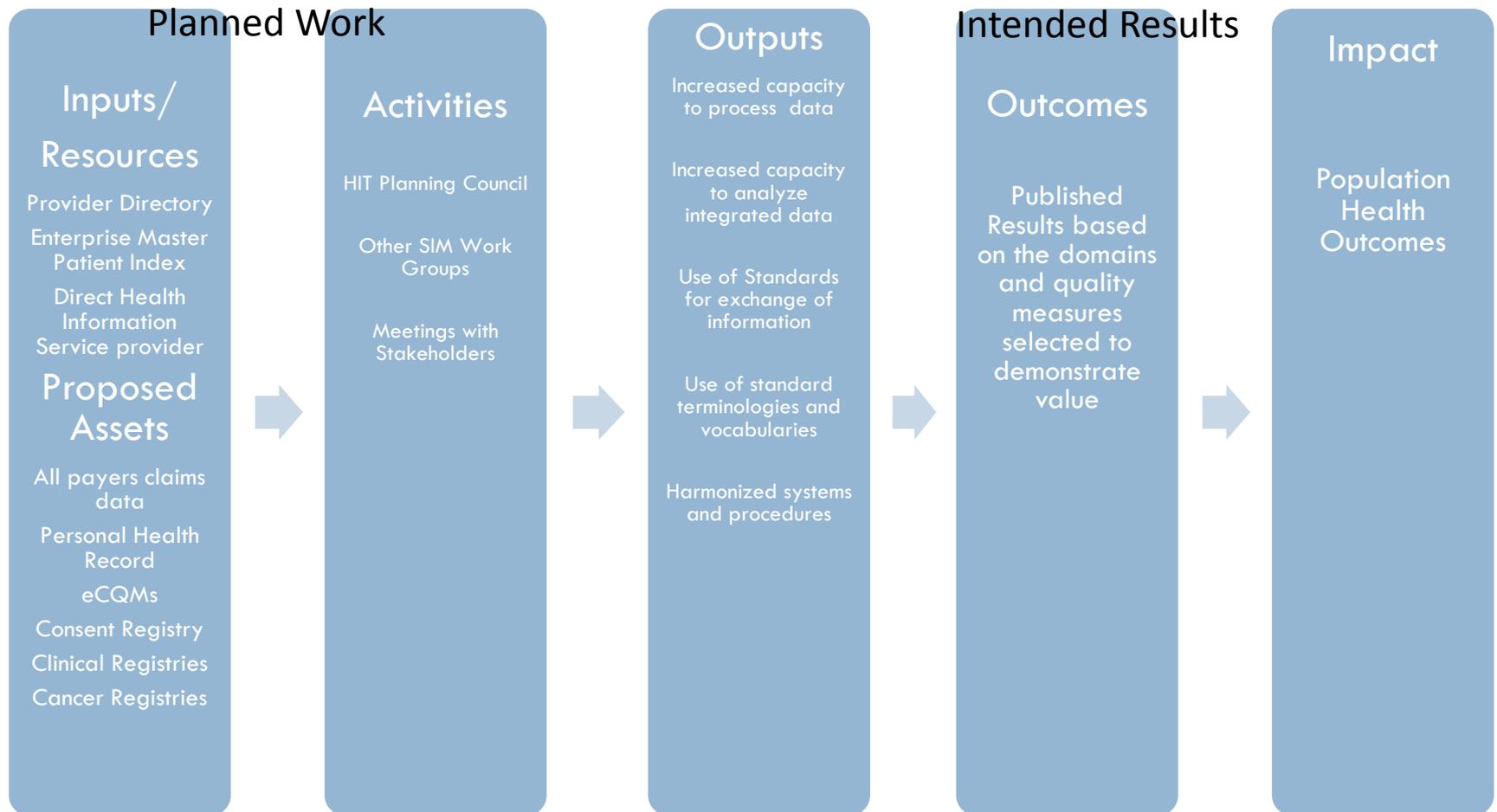
Secondary Aims

Tertiary Aims

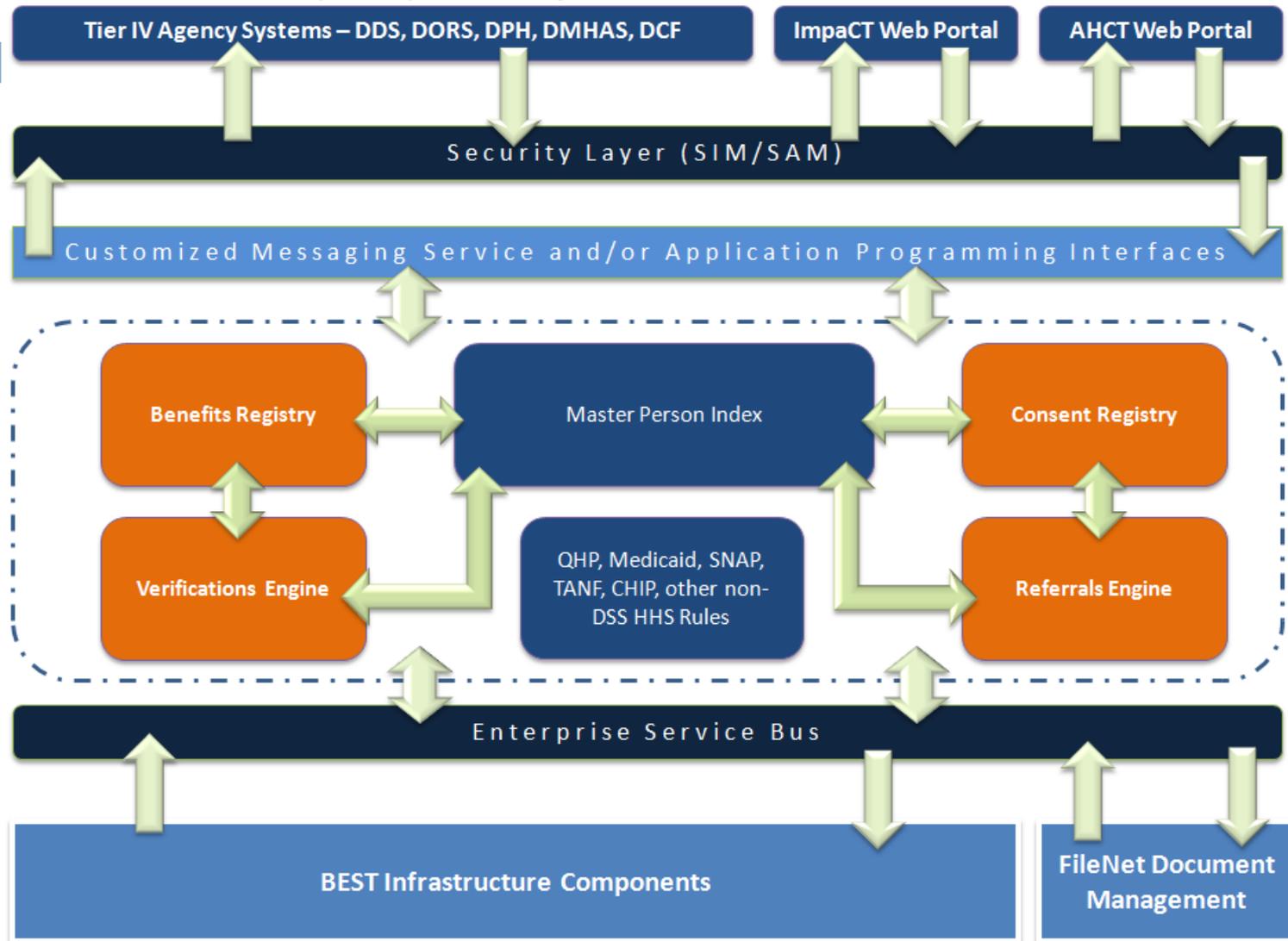


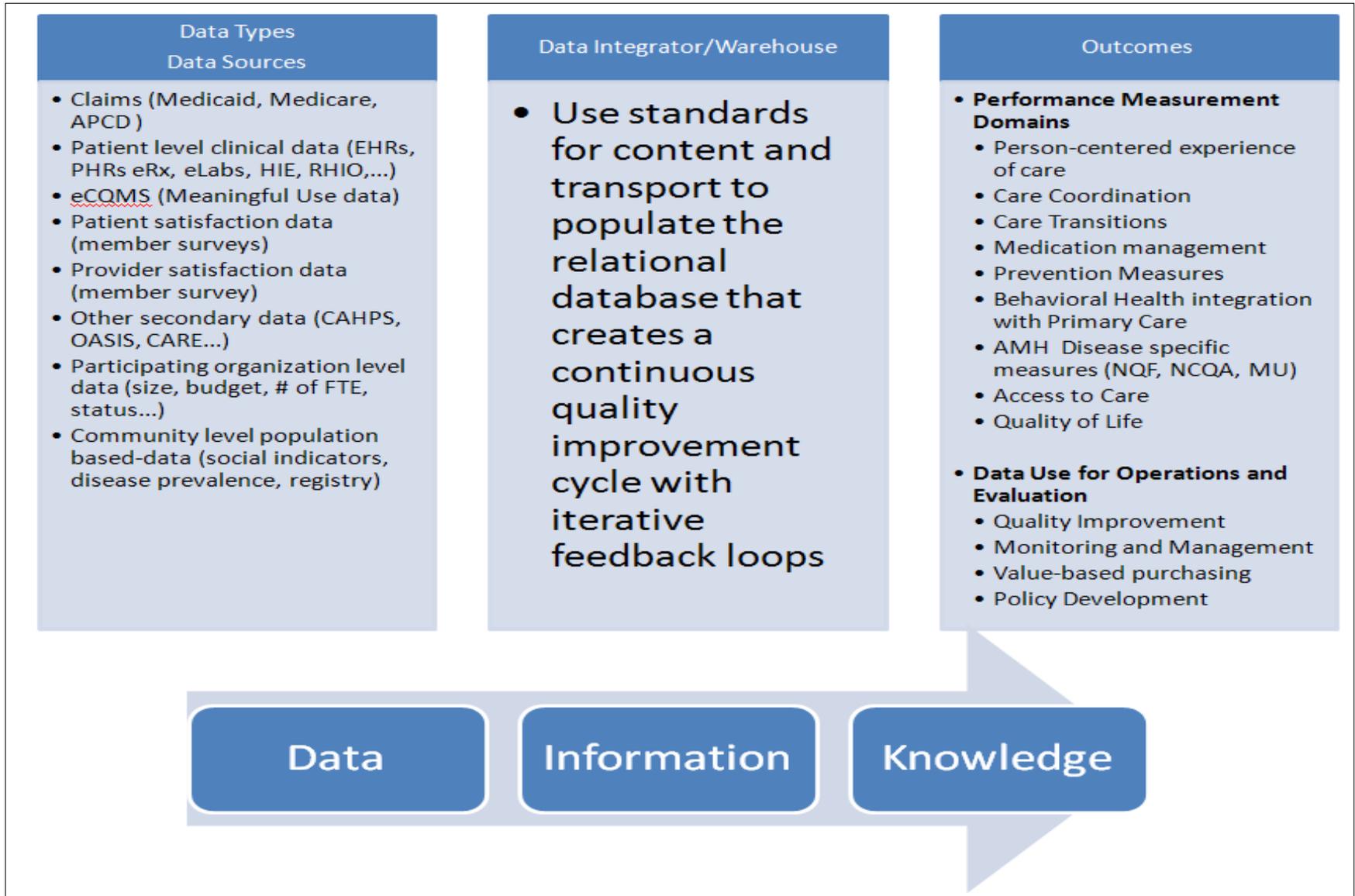
Potential HIT Logic Model (awaiting the design model)

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Envisioned Potential Tier IV Architecture (source - KPMG presentation on 4/25/2014)

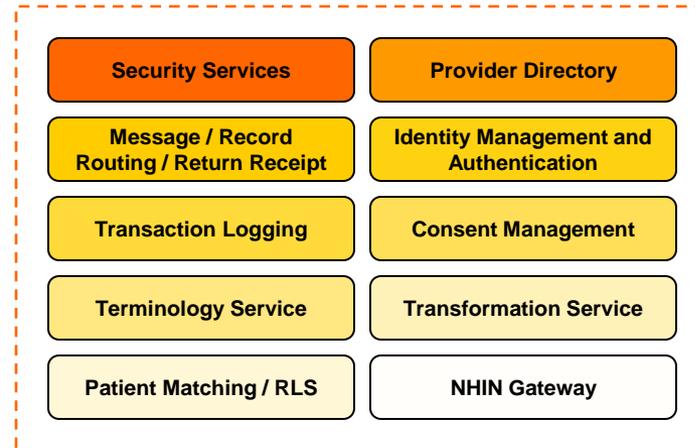




Example of Services offered by North Carolina

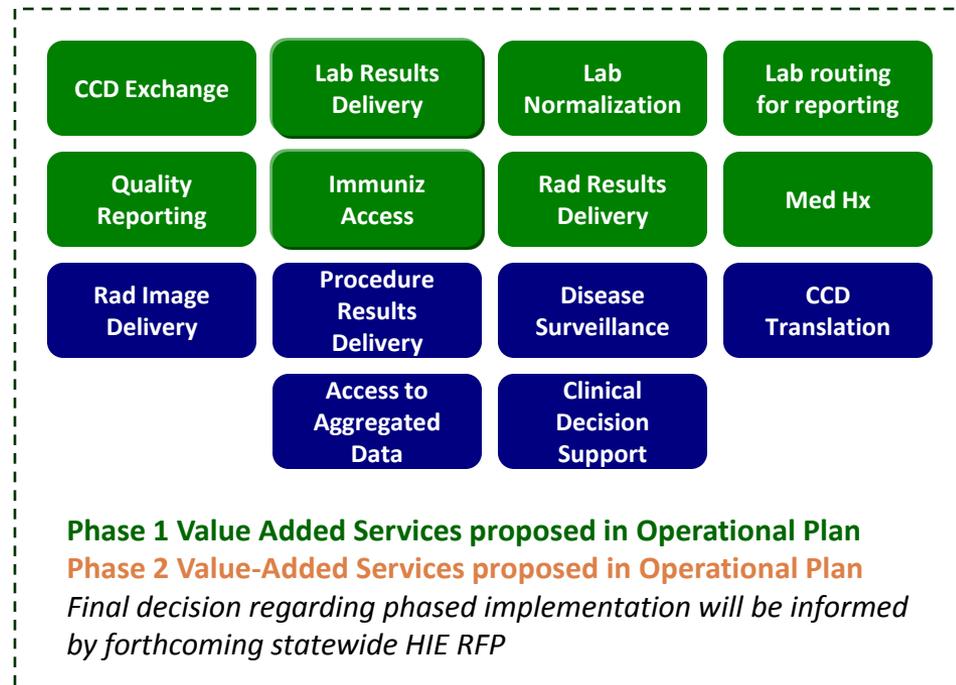
Core HIE Services

- Foundational services hosted by NC HIE that facilitate exchange health information across organizational boundaries, such that multiple entities can:
 - Identify and locate each other in a manner they both trust;
 - Reconcile the identity of the individual patient to whom the information pertains;
 - Exchange information in a secure manner



Value-Added HIE Services

- Services that support the clinical priorities and use cases to help providers, patients, and care givers improve the safety, quality, and cost effectiveness of health care.
- Value-added services will be accessible via core services
- Value-added Services can be offered at the state, regional, or enterprise level.
- Value-Added services will be incrementally deployed based on feasibility, cost, and magnitude of benefits



Current HIT landscape In Connecticut

HIT Tools/Assets

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- Current Assets
 - Provider Directory
 - Enterprise Master Patient Index
 - Direct Health Information Service provider
- Proposed Assets
 - All payers claims data
 - Personal Health Record
 - eCQMs engine
 - Consent Registry

Complexity theory postulates that

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- “Complex adaptive systems (CAS) are fluidly changing collections of distributed interacting components that react to both their environments and to one another. Examples of complex adaptive systems include the electric power grid, telecommunications networks, the Internet, biological systems, ecological systems, social groups, and even human society itself.
- Many of the multidisciplinary and interdisciplinary problems found within these systems are of such great complexity that traditional modeling methodologies are often considered inadequate.”
(<http://www.dis.anl.gov/exp/cas/index.html>, downloaded 10/14/10).

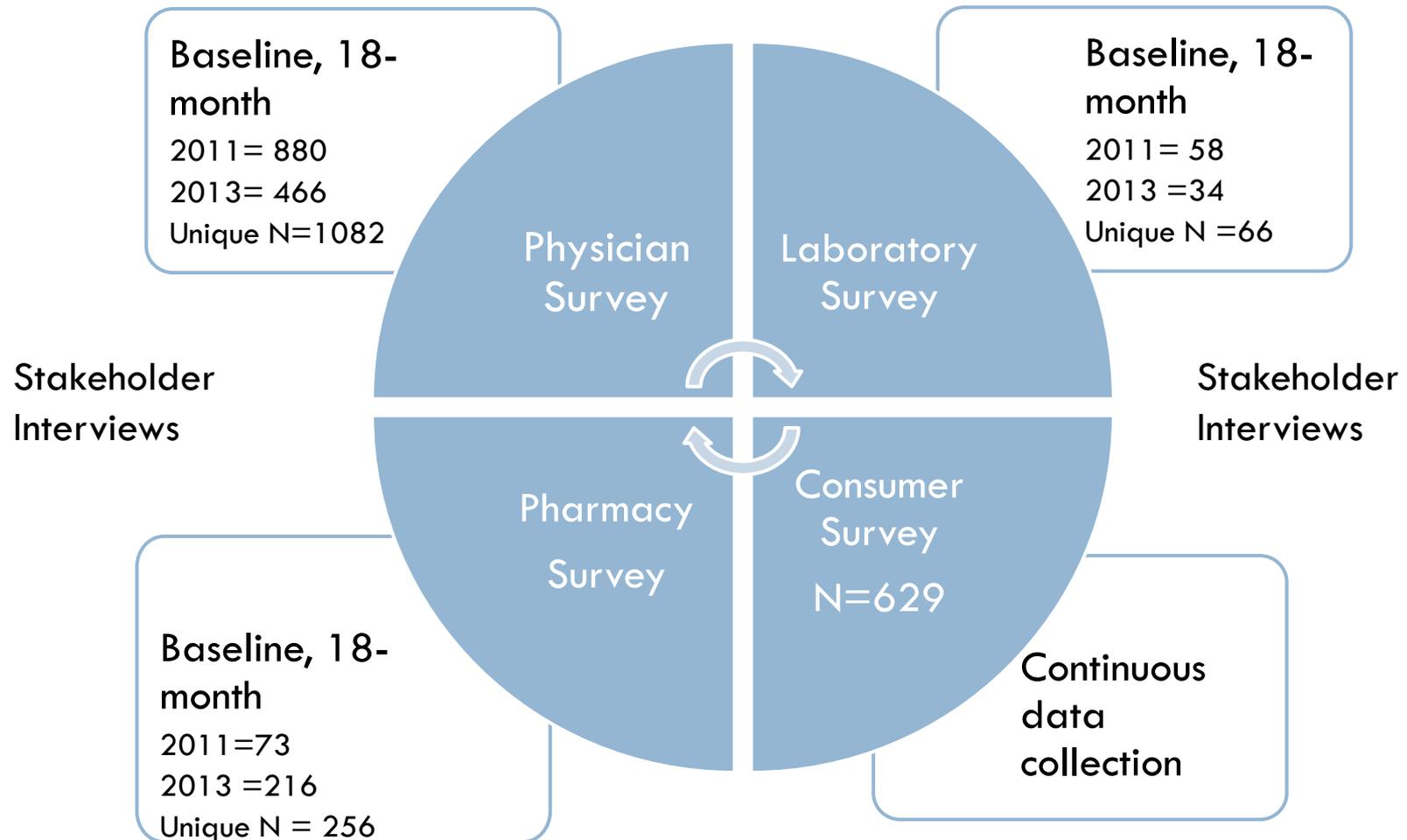
Complexity Theory and our grant

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- We propose that interaction between the health systems, HIEs, health care practices, and the individual is a complex adaptive system; and that both inter- and intra-organization environments will impact health outcomes.
- We need to explore the relationship between these complex systems, which must interoperate successfully to deliver seamless care with improved treatment outcomes.
- These complex systems (hospitals, physician practices, ancillary services, etc.) create, through interaction, **unknown emergent properties that influence consumers' outcomes.**

A mixed-method design is used for the HIE evaluation in Connecticut

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Consumer Survey

N=629

Current Health, Health Care, and Satisfaction with Care

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- 54% of participants described their health as excellent or very good.
- 34% of participants said they had a chronic health condition.
- 24% of the participant reported 1-2 visits, 25% reported 3-4 and 36% reported more than 4 visits to a doctor or physician's assistant in the last 12 months.
- 89% of participants were satisfied with the care they received from their doctor or physician's assistant.
- 49% of participants reported that their physician's office had implemented an electronic medical record system and a third said they were not sure.

Health Literacy and Sources of Health or Medical Information

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- 63% of participants said they read the printed health-related information they received from their physician and most participants said the material was not difficult to understand (61%) and did not contain words they were unfamiliar with (56%). However, when words in the printed materials were unfamiliar, fewer than half (42%) asked for an explanation.
- 87% of participants said they understood what their doctor said to them during their last visit and most (80%) participants who did not understand something their doctor said to them reported receiving an explanation.
- 79% of participants reported having ever looked for information on health or medical topics. The most common source of information was the Internet (87%) followed by a physician (15%).
- 48% had used the Internet to find health-related information in the past month.

Awareness of HIE and HIT

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- 83% of participants had heard about electronic medical records.
- 65% of participants had heard about the electronic health information exchange.
- 50% of participants had heard of personal health records.
- 83% had never heard of the Connecticut Health Information Exchange.
- Demographic (education, gender) and individual characteristics (online experience, having a chronic health condition or a doctor with an EMR) were associated with increased awareness of HIE and HIT.

Attitudes toward HIE

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- 72% supported a national HIE that was driven by patient consent.
- 57% reported that concern about privacy was the single most important barrier that was likely to get in the way of a national HIE.
- 64% expressed support for an “opt-in” and 21% supported “opt-out” consent model.

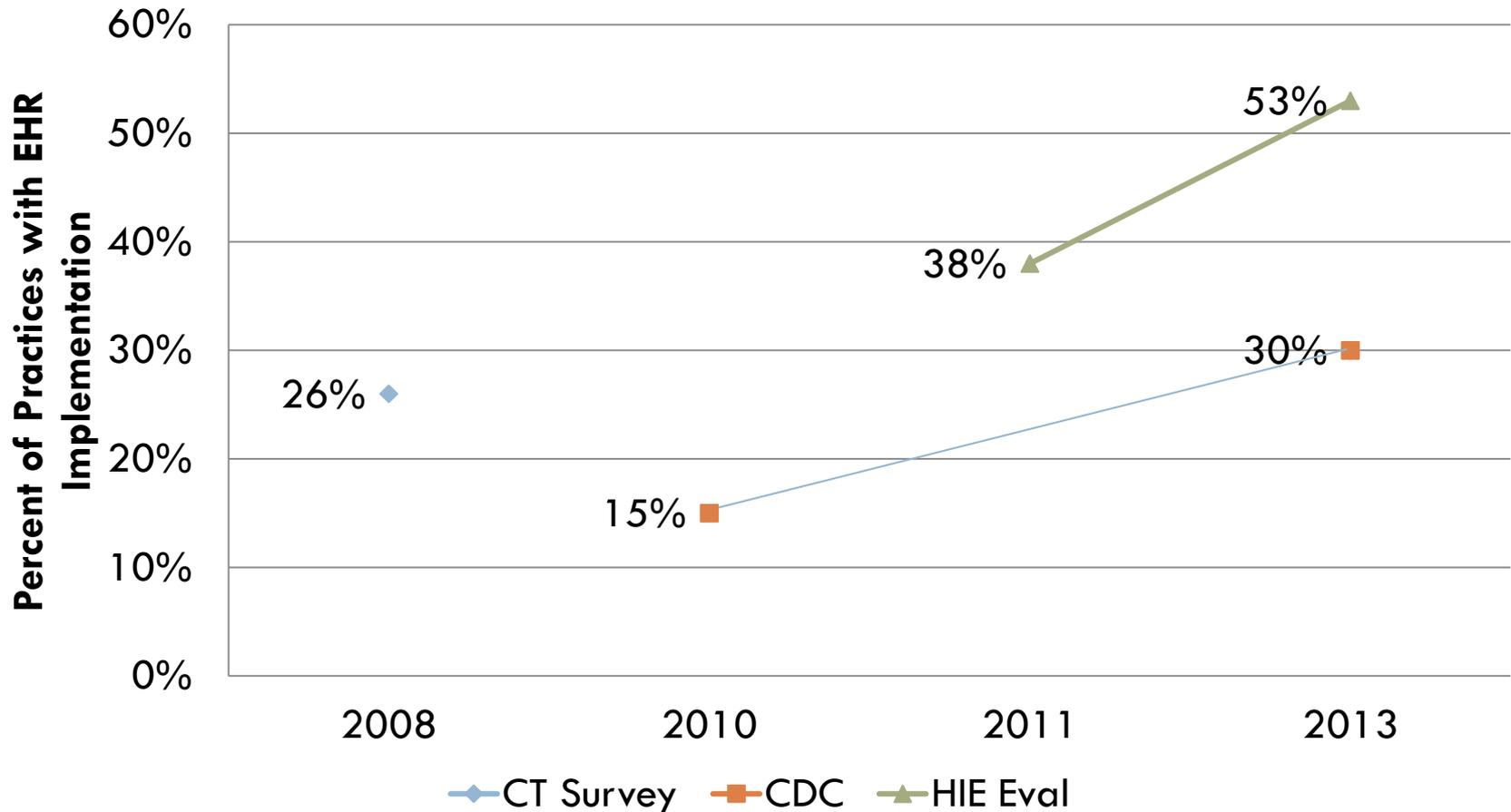
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Physician Survey Results

N = 1,082

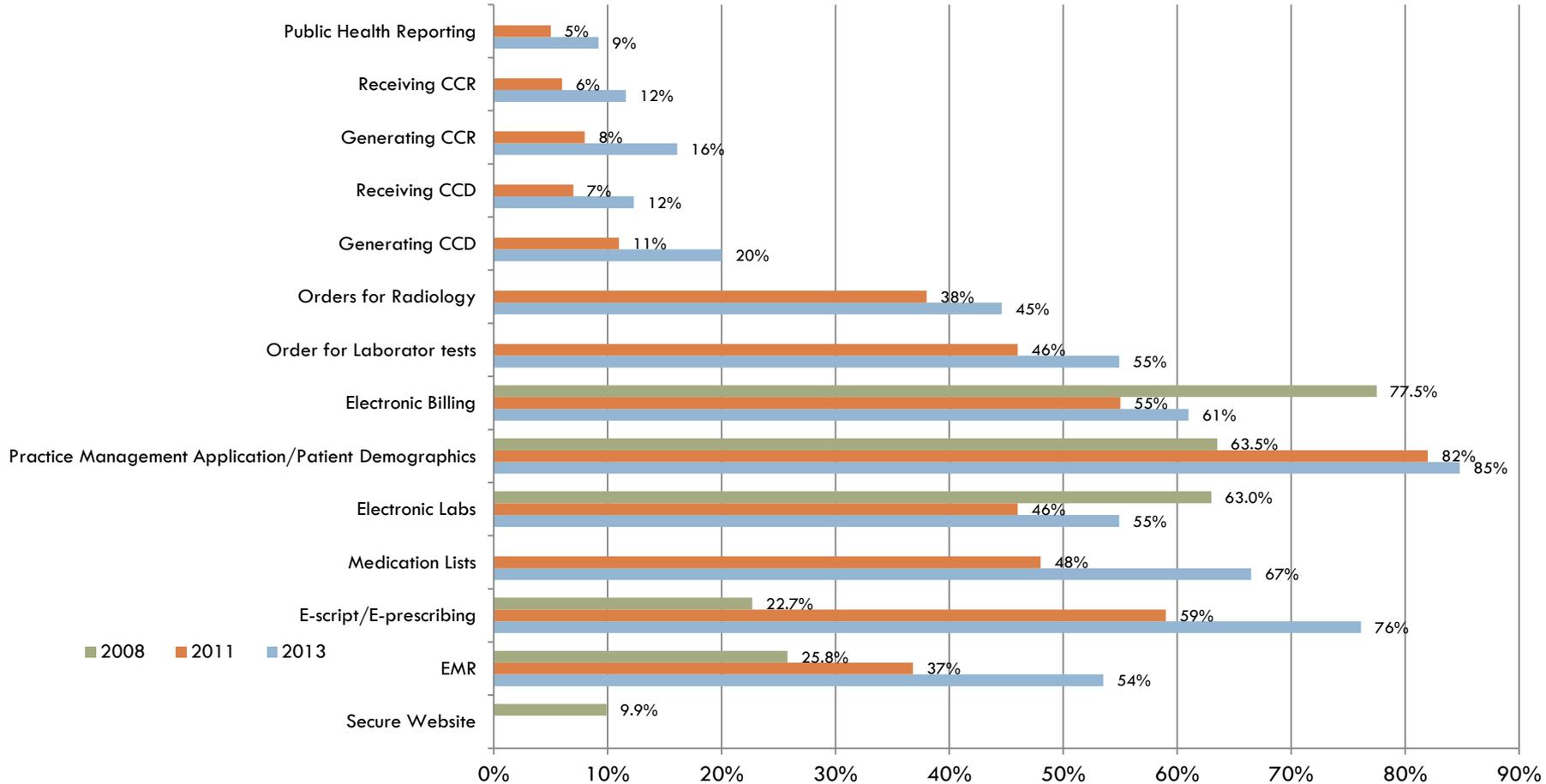
Change in EHR Adoption among Physicians between 2008 and 2013

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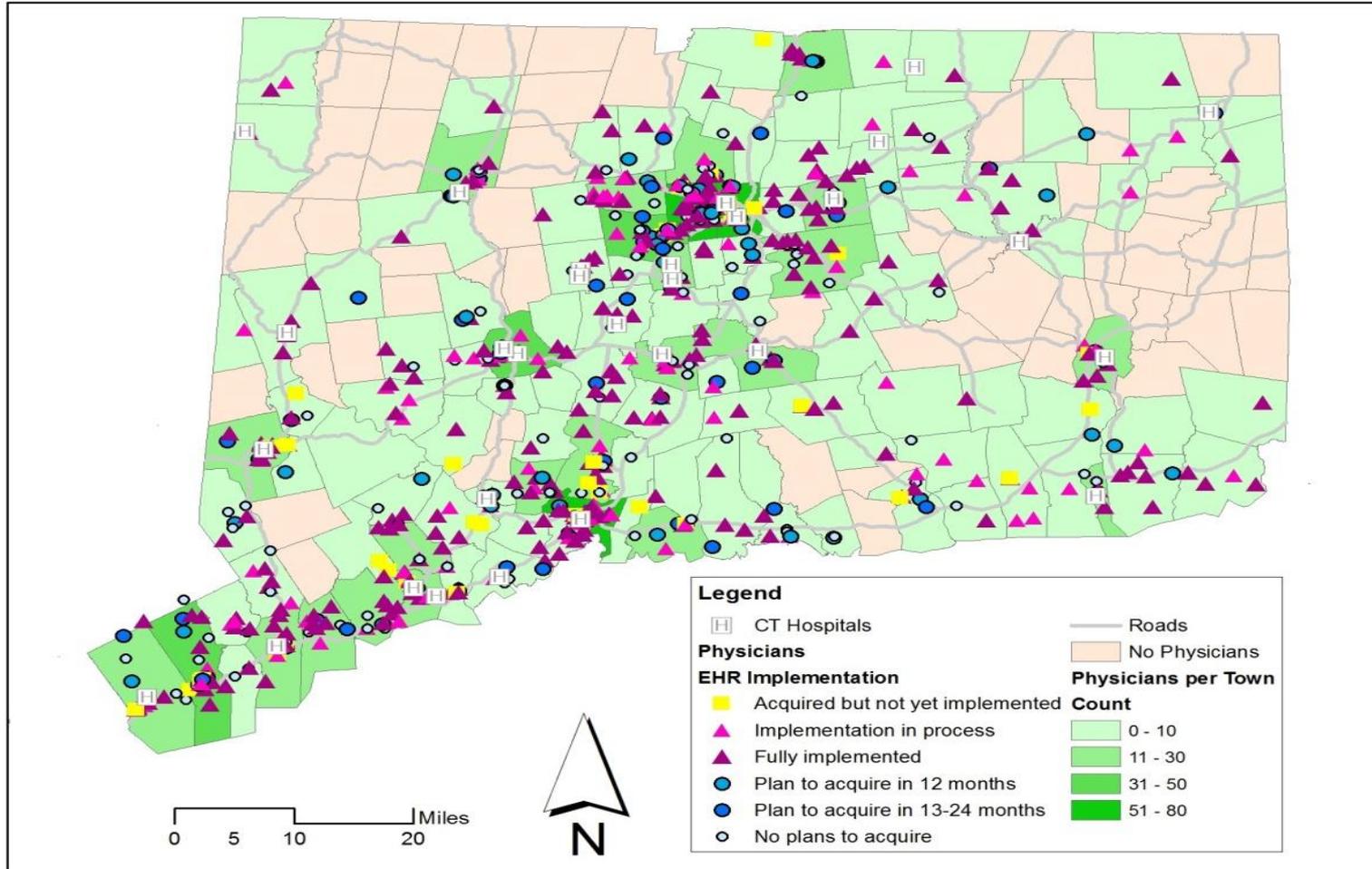
Use of HIT Components

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E H R Adoption among Physicians

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	2011 Cohort 1 (N=616)		2013 Cohort 2 (N=202)		2011 Baseline (N=264)		2013 Follow-Up (N=264)	
	N	%	N	%	N	%	N	%
Submit claims electronically								
Yes, all electronic	358	58.1	133	65.8	146	55.3	160	60.6
Yes, paper and electronic mix	102	16.6	27	13.4	57	21.6	35	13.3
No	64	10.4	15	7.4	29	11.0	33	12.5
Unknown	82	13.3	23	11.4	28	10.6	31	11.7
Missing	10	1.6	4	2.0	4	1.5	5	1.9
Health record system storage¹								
EHR system	250	40.6	119	58.9	105	39.8	141	53.4
Paper records and charts	298	48.4	57	28.2	137	51.9	101	38.3
DIMS²	88	14.3	42	20.8	34	12.9	33	12.5
Other	22	3.6	4	2.0	3	1.1	12	4.5

¹Physicians could select more than one method

²DIMS=A computer based system in which paper records and charts are scanned, and the scanned documents are filed electronically.

	2011		2013		2011		2013	
	Cohort 1		Cohort 2		Baseline		Follow-Up	
	(N=616)		(N=202)		(N=264)		(N=264)	
	N	%	N	%	N	%	N	%
EHR adoption								
Fully implemented	227	37.8	126	62.4	105	39.8	141	53.4
Implementation in process	111	18.0	23	11.4	34	12.9	39	14.8
Acquired but not implemented	36	5.8	12	5.9	11	4.2	6	2.3
Plan to acquire in next year	61	9.9	8	4.0	26	9.9	6	2.3
Plan to acquire in next 2 years	60	9.7	8	4.0	19	7.2	12	4.5
No plans to acquire	102	16.6	20	9.9	64	24.2	56	21.2
Missing	19	3.1	5	2.5	5	1.9	4	1.5
If you have purchased or are in the process of implementing an EHR system, within how many months do you expect to have completed implementation?								
	2011		2013		2011		2013	
	Cohort 1		Cohort 2		Baseline		Follow-Up	
	(N=147)		(N=35)		(N=45)		(N=45)	
	N	%	N	%	N	%	N	%
Within 6 months	53	36.0	11	31.4	17	37.8	11	24.4
Within 7-12 months	37	25.2	8	22.9	11	24.4	9	20.0
Not for a year or more	28	19.1	3	8.6	7	15.6	5	11.1
Missing	29	19.7	13	37.1	10	22.2	20	44.4

Satisfaction with EHR system at main practice site	2011 Cohort 1 (N=227)		2013 Cohort 2 (N=126)		2011 Baseline (N=105)		2013 Follow-Up (N=141)	
	N	%	N	%	N	%	N	%
	Very satisfied	36	15.9	17	13.5	16	15.2	18
Satisfied	109	48.0	53	42.1	45	42.9	55	39.0
Neutral	34	15.0	20	15.9	17	16.2	28	19.9
Unsatisfied	27	11.9	21	16.7	14	13.3	29	20.6
Very Unsatisfied	18	7.9	9	7.1	9	8.6	5	3.5
Missing	3	1.3	6	4.8	4	3.8	6	4.3

	2013 Cohort 2 (N=202)		2013 Follow-Up (N=264)	
Per the standards set forth in the CMS EHR incentive programs, do you...				
Qualify for Medicaid EHR incentive program	29	14.4	33	12.5
Qualify for Medicare EHR incentive program	74	36.6	71	26.9
Don't know if qualified for EHR incentive program	91	45.0	100	37.9

Table 14. EHR adoption barriers related to costs

	2011 Cohort 1 (N=616)		2013 Cohort 2 (N=202)		2011 Baseline (N=264)		2013 Follow-Up (N=264)		
	N	%	N	%	N	%	N	%	
The amount of capital needed to acquire/implement an EHR									
Major barrier	410	66.6	131	64.9	184	69.7	173	65.5	
Minor barrier	112	18.2	30	14.8	45	17.1	47	17.8	
Not a barrier	46	7.5	18	8.9	13	4.9	25	9.5	
Missing	48	7.8	23	11.4	22	8.3	19	7.2	
Uncertainty about the return on investment									
Major barrier	295	47.9	105	52.0	155	58.7	144	54.5	
Minor barrier	171	27.8	42	20.8	47	17.8	58	22.0	
Not a barrier	82	13.3	23	11.4	35	13.3	35	13.3	
Missing	68	11.0	32	15.8	27	10.2	27	10.2	
Concern about the loss of productivity during transition to the EHR									
Major barrier	325	52.8	112	55.4	149	65.4	163	61.7	
Minor barrier	177	28.7	46	22.8	69	26.1	54	20.5	
Not a barrier	65	10.5	14	6.9	21	8.8	23	8.7	
Missing	49	7.9	30	14.8	25	9.5	24	9.1	

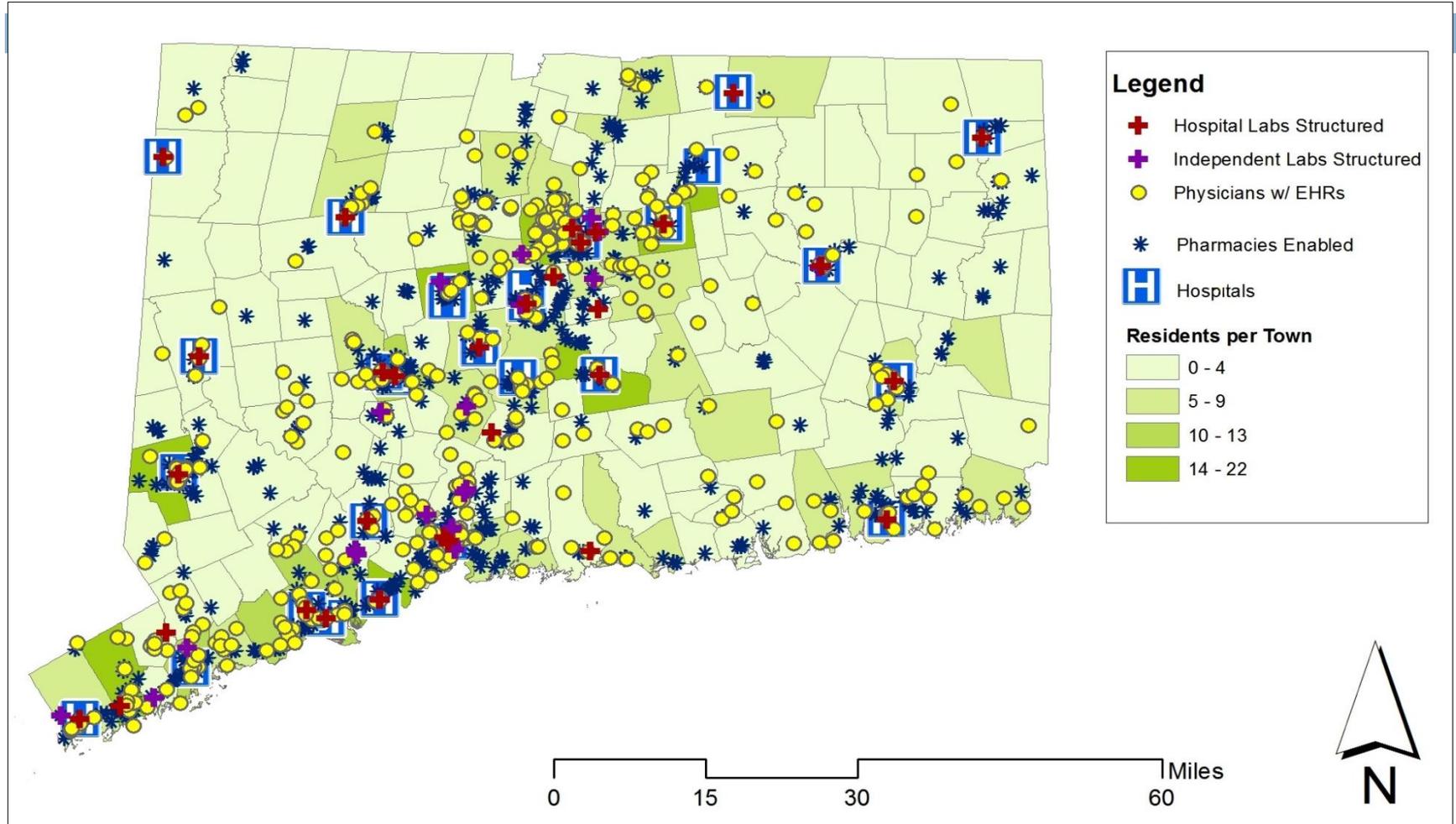
	2011 Cohort 1 (N=616)		2013 Cohort 2 (N=202)		2011 Baseline (N=264)		2013 Follow-Up (N=264)		
	N	%	N	%	N	%	N	%	
Resistance to adoption among physicians									
Major barrier	184	29.9	55	27.2	97	36.7	94	35.6	
Minor barrier	266	43.2	81	40.1	86	32.6	107	40.5	
Not a barrier	114	18.5	36	17.8	54	20.5	44	16.7	
Missing	52	8.4	30	14.8	27	10.2	19	7.2	
Finding an EHR system that meets providers' needs									
Major barrier	346	56.2	102	50.5	143	54.2	153	58.0	
Minor barrier	159	25.8	48	23.8	66	25.0	64	24.2	
Not a barrier	56	9.1	24	11.9	30	11.4	28	10.6	
Missing	55	8.9	28	13.9	25	9.5	19	7.2	
Capacity to select, contract, install, and implement an EHR									
Major barrier	273	44.3	75	37.1	117	44.3	123	46.6	
Minor barrier	221	35.9	67	33.2	84	31.8	79	29.9	
Not a barrier	75	12.2	29	14.4	40	15.2	38	14.4	
Missing	47	7.6	31	15.3	23	8.7	24	9.1	
Concerns that the system will become obsolete									
Major barrier	262	42.5	82	40.6	115	43.6	122	46.2	
Minor barrier	225	36.5	66	32.7	92	34.9	89	33.7	
Not a barrier	76	12.3	25	12.4	33	12.5	32	12.1	
Missing	53	8.6	29	14.4	24	9.1	21	8.0	

	2011 Cohort 1 (N=616)		2013 Cohort 2 (N=202)		2011 Baseline (N=264)		2013 Follow-Up (N=264)	
	N	%	N	%	N	%	N	%
Familiarity with the Connecticut Health Information Exchange								
Very familiar	11	1.8	7	3.5	5	1.9	2	0.8
Somewhat familiar	65	10.5	31	15.3	33	12.5	42	15.9
A little familiar	90	14.6	32	15.8	37	14.0	48	18.2
Not familiar	396	64.3	122	60.4	159	60.2	165	62.5
Missing	54	8.8	10	5.0	30	11.4	7	2.6
Heard of the Connecticut Health Information Exchange¹								
Yes			68	33.7			69	26.1
No			114	56.4			147	55.7
Missing			20	9.9			48	18.2
Used the Connecticut Health Information Exchange¹								
Yes			4	2.0			4	1.5
No			137	67.8			133	50.4
Missing			61	30.2			127	48.1
Satisfaction with the Connecticut Health Information Exchange								
Very satisfied	1	0.2	0	0.0	0	0.0	0	0.0
Satisfied	9	1.5	2	1.0	4	1.5	2	0.8
Neutral	104	16.9	41	20.3	52	19.7	51	19.3
Unsatisfied	16	2.6	1	0.5	2	0.8	3	1.1
Very unsatisfied	4	0.6	2	1.0	2	0.8	3	1.1
Missing	482	78.2	156	77.2	204	77.3	205	77.7

	2011 Cohort 1 (N=616)		2013 Cohort 2 (N=202)		2011 Baseline (N=264)		2013 Follow-Up (N=264)	
	N	%	N	%	N	%	N	%
Heard of the Regional Extension Center¹								
Yes			17	8.4			15	5.7
No			163	80.7			197	74.6
Missing			22	10.9			52	19.7
Used the Regional Extension Center¹								
Yes			1	0.5			8	3.0
No			147	72.8			166	62.9
Missing			54	26.7			90	34.1
Support for widespread adoption of PHR for patients								
Yes	293	47.6	92	45.5	104	39.4	105	39.8
No	58	9.4	17	8.4	31	11.7	32	12.1
Don't know	234	38.0	81	40.1	120	45.4	111	42.0

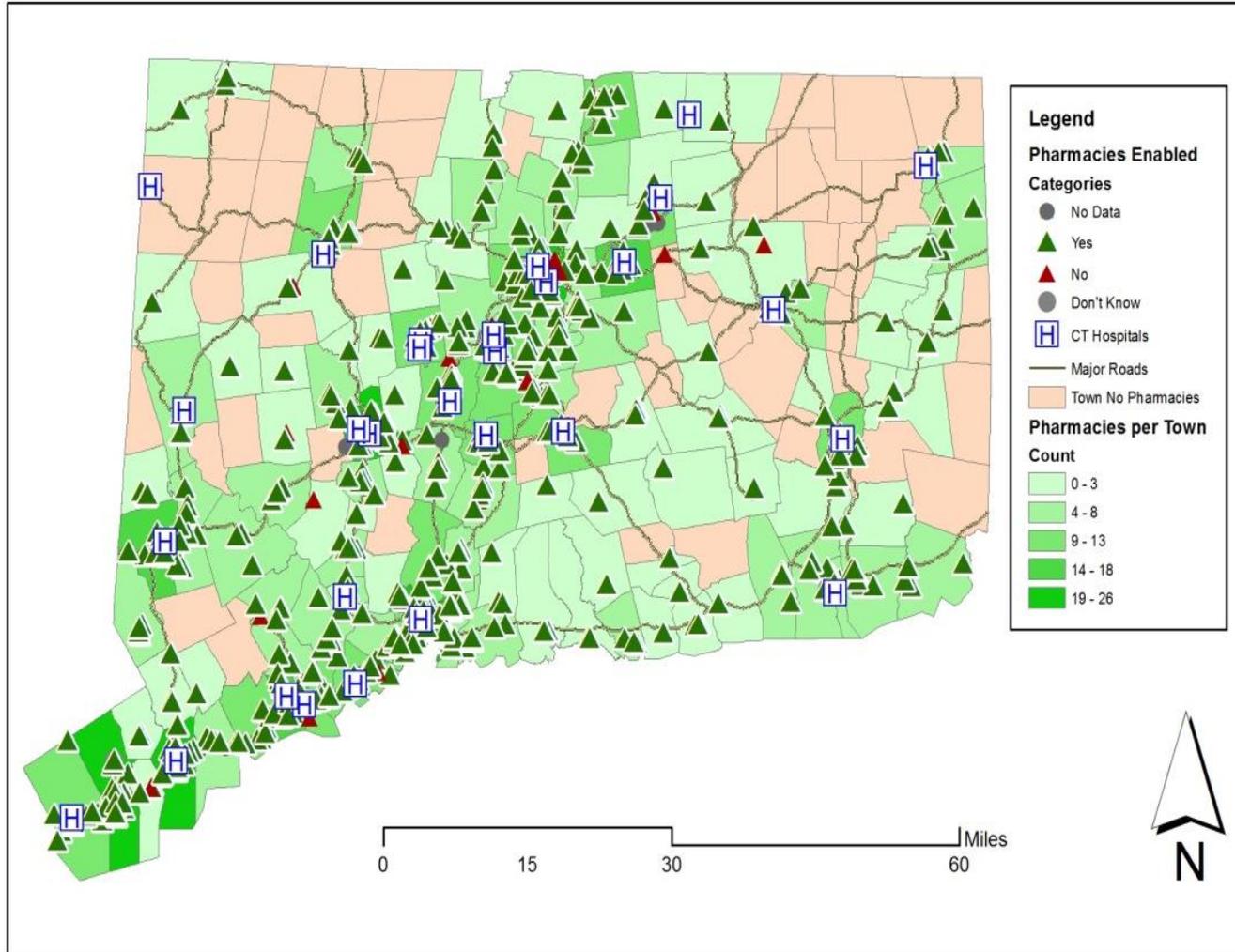
HIT Enabled

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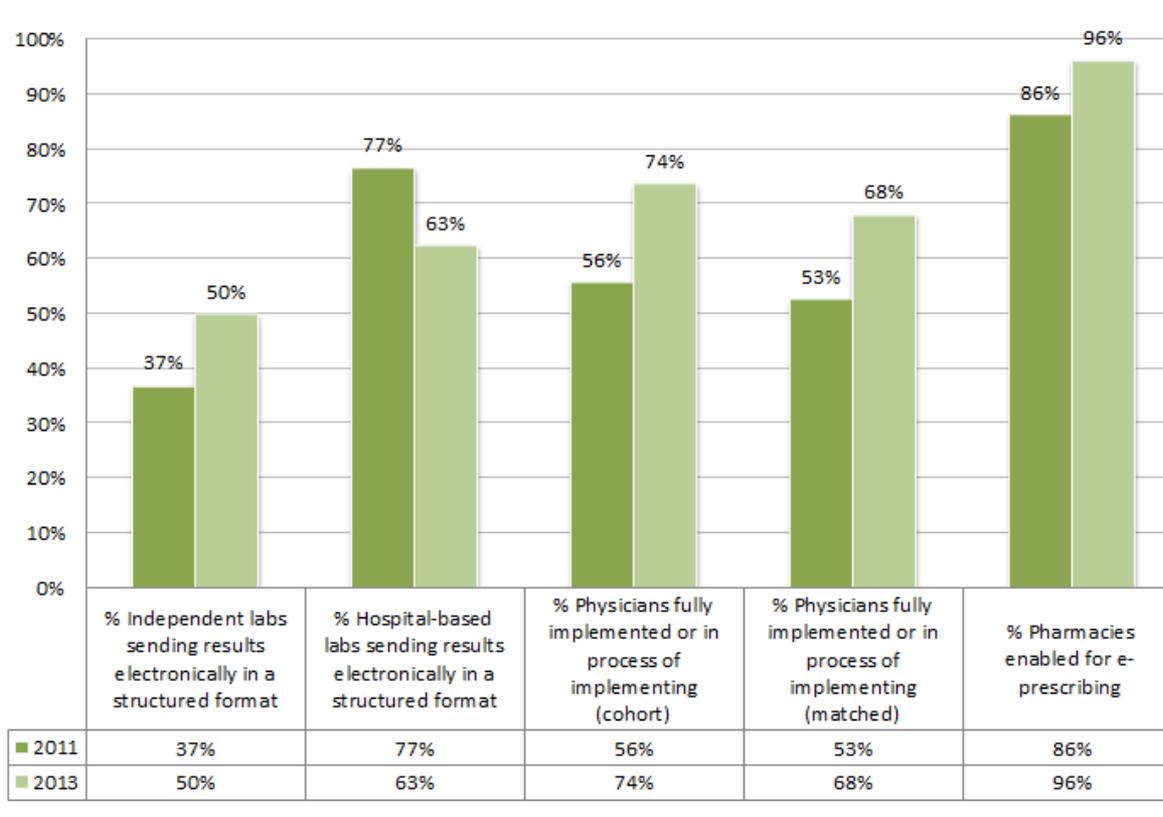
Enabled Pharmacies

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Electronic capabilities of labs, physicians, and pharmacies

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Questions

*“Knowing is not enough; we must apply.
Willing is not enough; we must do.”*
—Goethe