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No Pain, No Gain: Using Quality Improvement Processes to Improve Onboarding Efficiency

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Department of Public Health & Environment

Outline

- Background
- Quality Improvement Project
  - Logistics
  - Process
- Results
- Lessons Learned

CIIS Background

Confidential, secure, population-based, web-based system that:

- Consolidates immunization records for Coloradans of all ages.
- Recommends the vaccines a patient needs based on history and age.
- Supports activities to increase and sustain high immunization coverage rates.

CIIS by the numbers:

- Total Patients: 4.88 million
- Total Vaccinations: 53.4 million
- Active Users: 4,638

QI Process Participants

Colorado Department of Public Health and Environment (CDPHE):

- Director of Planning, Partnerships and Improvement
- Public Health IT Director
- Immunization Branch Chief
- Deputy Immunization Branch Chief
- IIS Program Manager
- IIS Data Interface Specialist
- IIS Interoperability Coordinator
- IIS Data Quality Coordinator
- Program Coordinator

Contractors:

- Managing Director of Health Informatics, Atlantic Management Center
- Project Manager, Point B

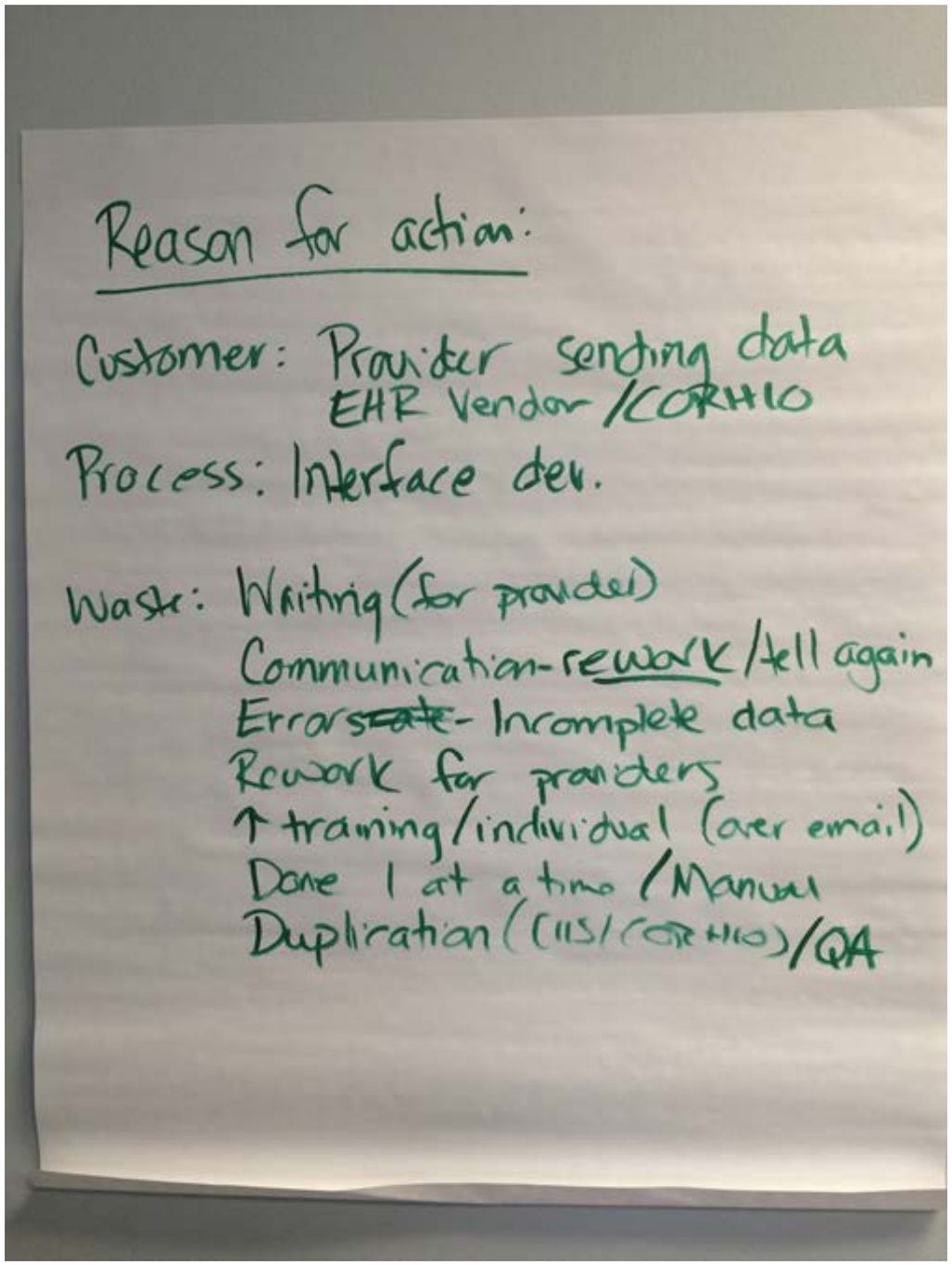
Colorado Regional Health Information Organization (CORHIO):

- Senior HIE Program Director
- Data Validation Analyst

QI Process Timeline

DATE	PROJECT FOCUS
May 2015	Initial Kickoff Meeting • Reason for action • Baseline data review • Process mapping • Identify waste • Start completion plan
June 2015	Smaller Workgroup Meetings • Possible solutions Full Group Meeting • Rapid experiments • Continue development of implementation plan
July 2015	Full Group Meeting
August 2015	30-day Check-In
September 2015	60-day Check-In
October 2015	90-day Check-In
November 2015	120-day Check-In

Reason for Action



- Backlog of providers that need to have an interface developed
- Time it takes to set up an interface varies considerably
- IZ program received additional funding to address backlog
- Want an efficient process before onboarding new staff
- Working with CORHIO (also building interfaces from Electronic Health Records to CIIS)
- Backlog of providers is causing gaps in data contained in CIIS

Baseline Data

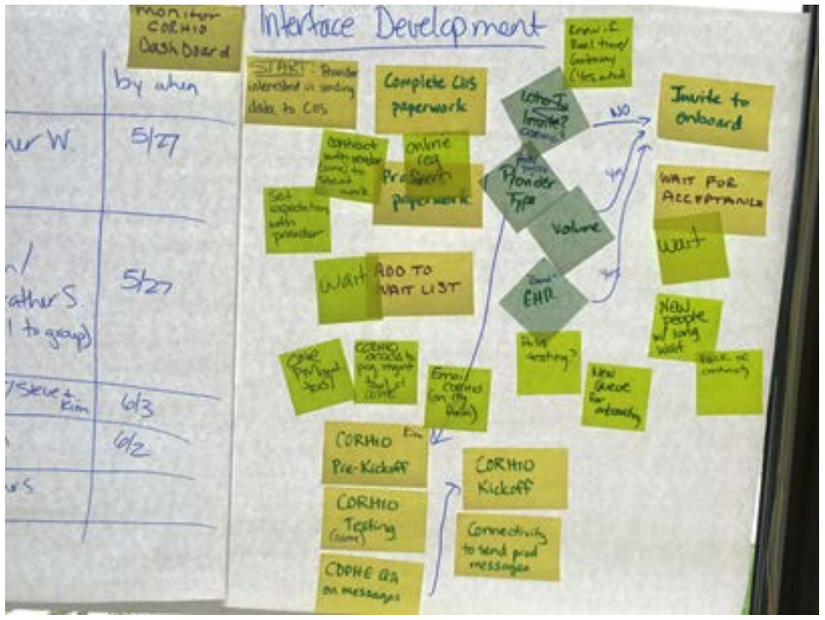
CDPHE Interface Implementations		
Year	**Number of clinics**	**Average project duration**
2011	132	6.2 months
2012	96	9.2 months
2013	101	14.0 months
2014	71	19.8 months
2015	172	7.5 months

Baseline wait list: 637

- **43% family practice**
- **9 EHR vendors account for 63% of sites on wait list**
- **75 individual EHR vendors**

Completed Connections by Provider Type		
Provider Type	**n**	**Percent**
Community Health	66	16%
Community Vaccinator	4	1%
Family Practice	158	39%
Health Fair	3	1%
Hospital	18	4%
Indian Health Services	3	1%
Internal Medicine	13	3%
OB/GYN	10	2%
Other	2	0%
Pediatrics	77	19%
Public Health	10	2%
Rural Health Center	9	2%
SBHC	20	5%
Specialty Clinic	5	1%
Urgent Care	8	2%
TOTAL	**406**	

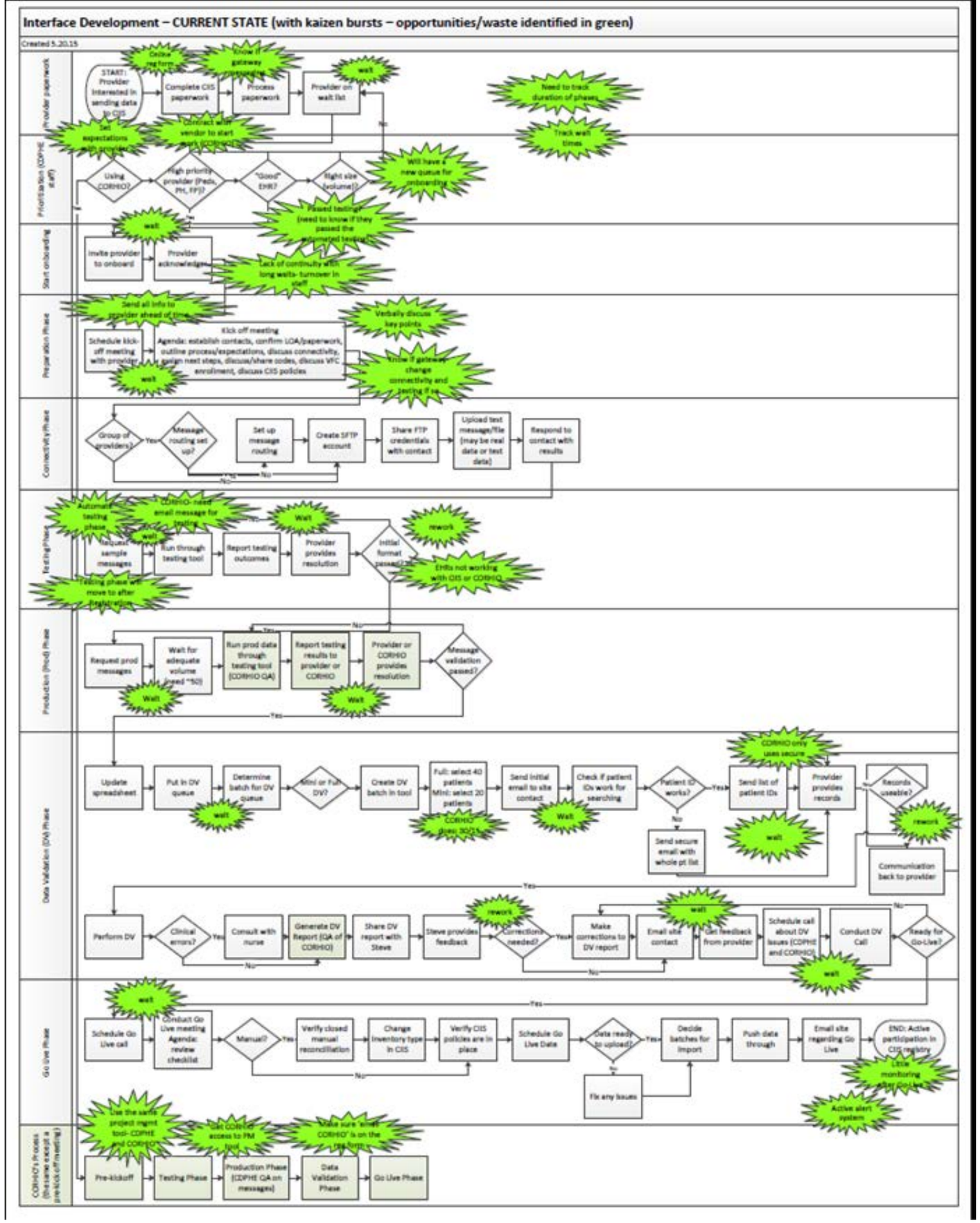
Current State – Process Mapping



Current State

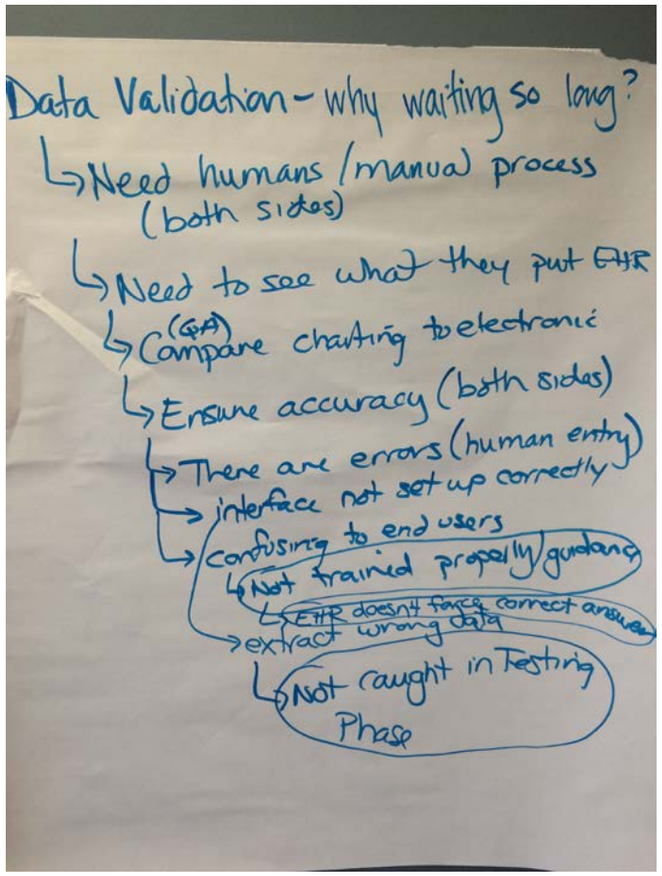
of handoffs = 13
# of waiting periods = 13
# of main phases = 9
# of steps in the process = 52
# of decision items = 16

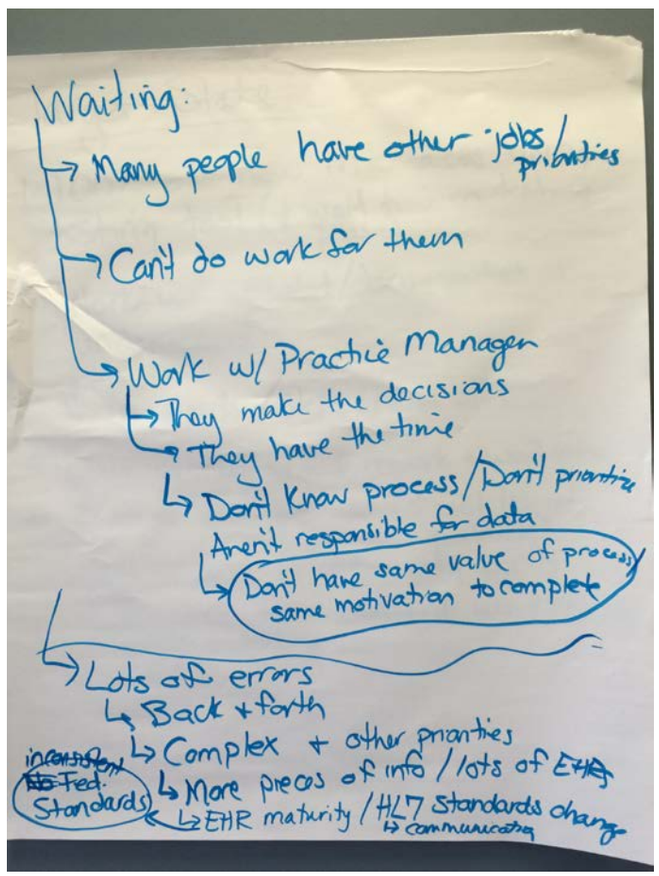
WAITING or REWORK



Cause and Effect Investigation

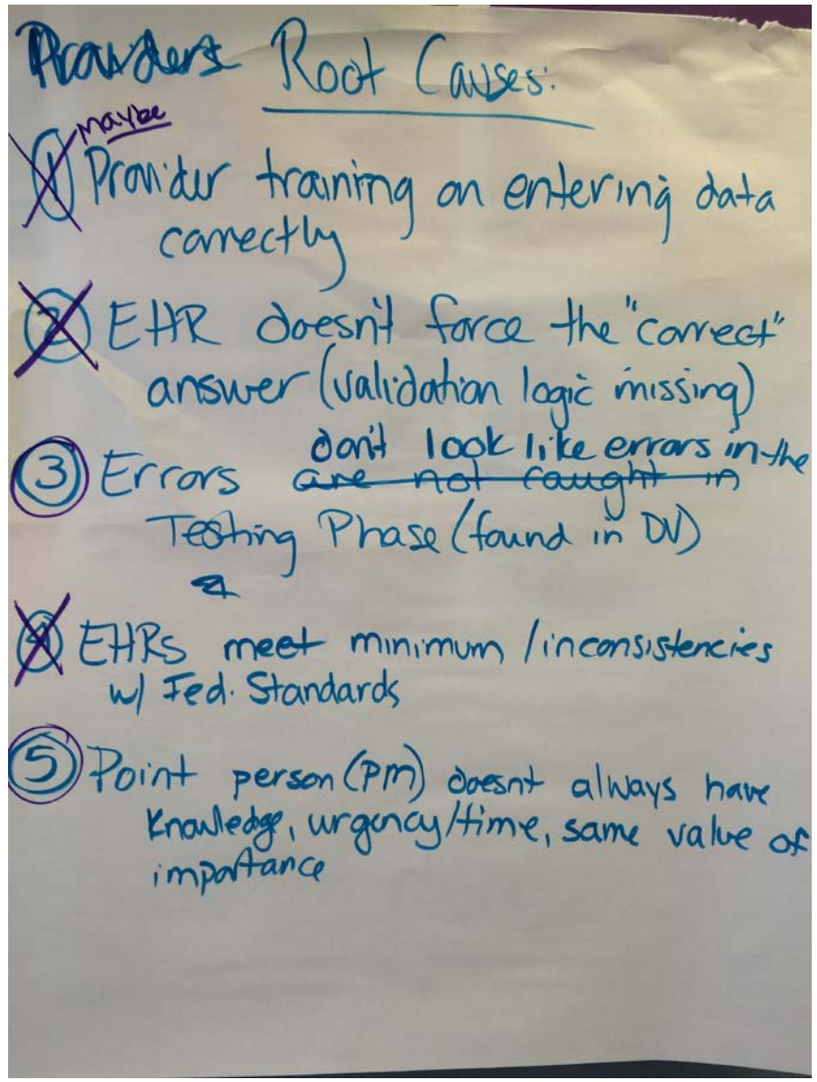
- Why is the Data Validation Phase taking so long?
- Why is there so much waiting throughout the interface process?
- Why are there so many errors in data (leading to back and forth with EHRs/providers)?





Root Cause Analysis

1. Providers need more effective training on entering data correctly into their EHRs.
2. The Data Validation Phase takes longer because errors don't look like errors in the initial testing phase.
3. Clinical point of contact for interface project doesn't always have the knowledge, sense of urgency/time, and same value of importance as CIIS staff.
4. (out of scope) Validation logic in EHRs.
5. (out of scope) Requiring EHRs to meet minimum Federal standards.



Target State

1. 100% of new interfaces using self-serve testing tool (decrease wait time in testing phase).
2. Workflow updated, documented and understood by interoperability staff.
3. Decrease waiting times, steps and hand-offs of entire interface process.
4. Data Validation Phase: Decrease rework and wait time.
5. Increase the number passing initial self-serve testing phase.
    - Increase percentage moved to active onboarding queue.
    - Increase percentage moved from current wait list to active self-serve testing.

Target State

of handoffs = 11 (2 fewer)
# of waiting periods = 10 (3 fewer)
# of main phases = 9
# of steps in the process = 47 (5 fewer)
# of decision items = 16

Solution Options

Provider training on entering data correctly into EHRs		
	Impact	**Level of Effort**
Discussion with EHR vendors	H	L
Development of FAQ/Tip Sheet	H	H
System enhancements	M	M
Kick-off meeting changes	M/H	L
Webinar for practices on same EHRs	L/M	H

Solution Options

Errors don't look like errors in the Testing Phase (found in Data Validation Phase)		
	Impact	**Level of Effort**
Template for vaccination lists (at project kick-offs)	H	L
CVX list is mapped and pulled from EHR	M/H	M
2 Reports: Vaccine Parameter and Data Quality **• De-identify (anonymizer) and send examples to clinic** **• Expose reports thru the portal** **• Enhance each report (provider profiles and vaccine frequency)** **• Automate reports**	H/M H H M	L/M M/H L H
System enhancements to incorporate anonymizer within testing tool	H	M/H

Solution Options

Point person doesn't always have knowledge, urgency/time, same value of importance		
	Impact	**Level of Effort**
Set an expectation for the total duration of the integration	L	M
Track response timelines	H	H
Confirmation email and response needed to serve as documentation of acknowledgement of what's required by the provider	L/M	L
Create templates from every EHR we've worked with to share very early in the process - to be shared during registration	H	H
Understand provider resources (e.g. Numbers, and EHR Champion?) How will they handle turnover?	M/H	L/M
Review current data validation reports to ensure language can be better understood by clinics	H	H

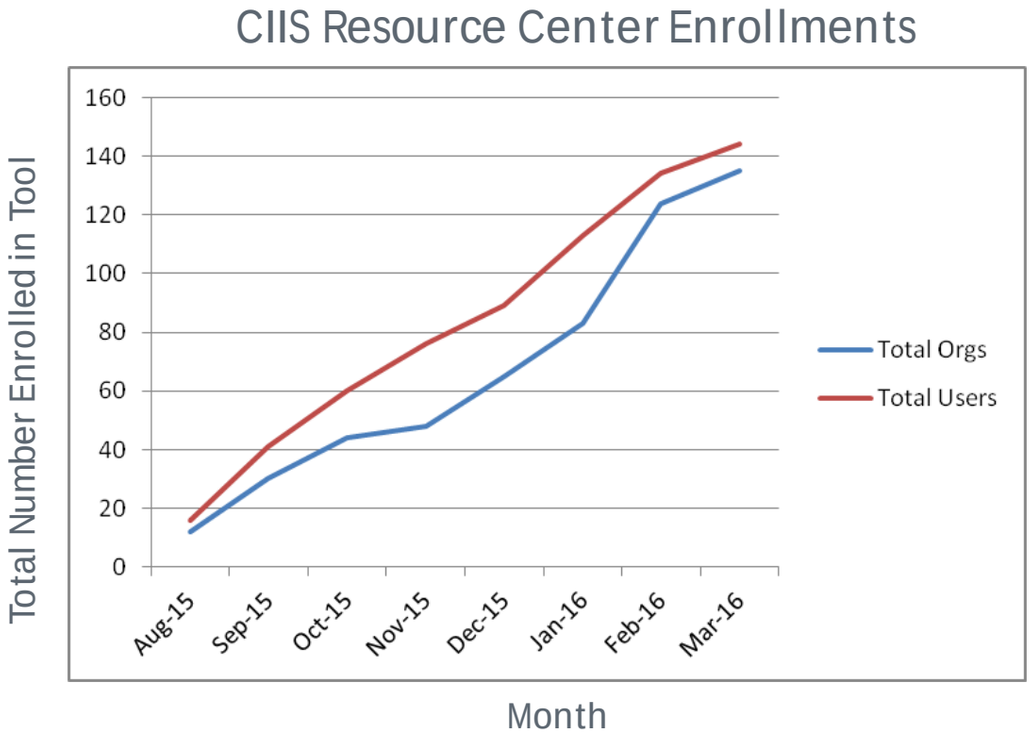
Implementation Plan

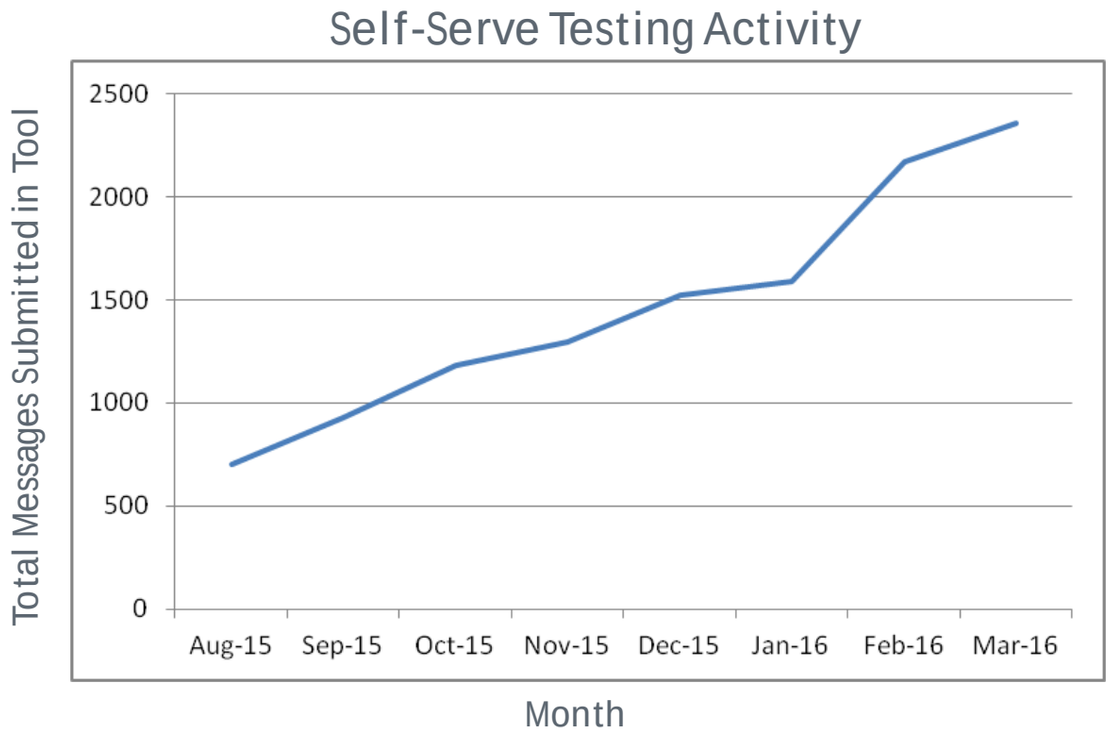
Task #	Task	Status
1	Update A3 and create process maps in Visio	**done**
2	Collect additional measures and share with team on: 1) # CORHIO sites live/year, 2) # in progress by provider type on wait list, 3) completed by provider type, 4) # in testing or data validation phase	**done**
3	Pilot the testing tool	**done**
4	Show the project mgmt tool to CORHIO	**done**
5	Explore options with CORHIO and ISIIS	done
6	Explore provider training options (ex. webinar, EHR)	**done**
7	EHR vendor meeting (new and existing vendors) incorporated into kick-off meetings	**done**
8	Develop a FAQ/Tip Sheet	**done**
9	Kick-off meeting changes (use WebEx and get a EHR demo at kick-off meeting)	**done**
10	Explore how we "catch" errors earlier	**done**
11	Create template for vaccination lists (at kick off)	**done**
12	Incorporate the ask for a mapped CVX list pulled from EHR into kickoff	**done**
13	Updates to the 2 Reports: Vaccine Parameter and Data Quality (see above for details)	In progress
14	Talk with AMCI about: integrating the anonymizer, ways to track time and product enhancements	**done**
15	Explore how to get the "point person" to be: knowledgeable, accountable, prioritize	**done**
16	Set an expectation for the total duration of the integration (after one DV cycle is completed)	**done**
17	Draft the confirmation email and response needed to serve as documentation of acknowledgement of what's required by the provider.	**done**
18	Create templates from every EHR we've worked with to share very early in the process - to be shared during registration	Ongoing
19	Understand provider resources e.g. Numbers, and EHR Champion? How will they handle turnover?	**done**
20	Update the target state process map	**done**
21	Compare baseline process map with target state process map: handoffs, phases, etc.	**done**
22	Create and share report out of QI project with EL; explore venues for sharing.	done

Results

TARGET 1: 100% of new interfaces using self-serve testing tool (decrease wait time in testing phase).

Status: MET. All new interface projects are required to complete self-serve testing through automated tool.





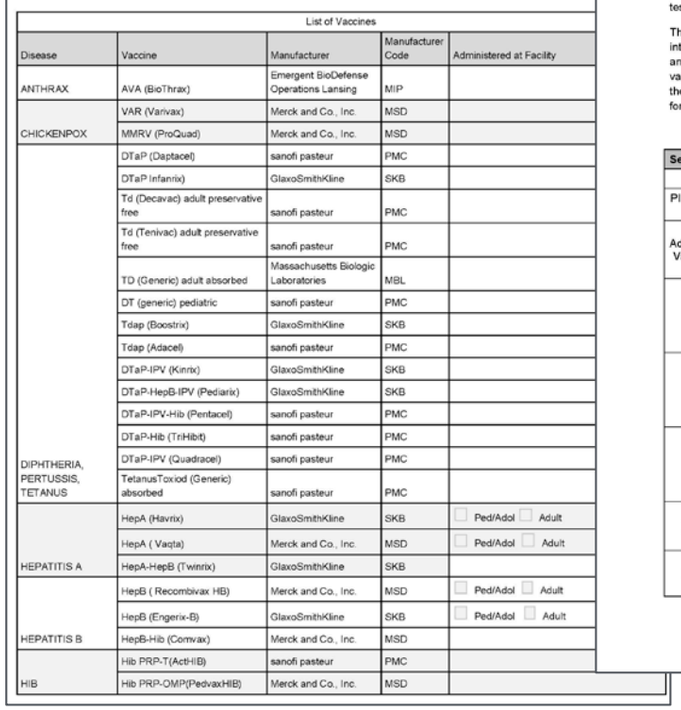
**Numbers are cumulative*

Results

TARGET 2: Workflow updated, documented and understood by interoperability staff.

Status: In process.

- Target state process map is complete.
- Documentation for new workflow is complete.
- Development of formal standard operating procedure is underway.



List of Vaccines

Disease	Vaccine	Manufacturer	Manufacturer Code	Administered at Facility
ANTHRAX	AVA (BioThrax)	Emergent BioDefense Operations Lansing	MIP	
CHICKENPOX	VAR (Varivax)	Merck and Co., Inc.	MSD	
	MMRV (ProQuad)	Merck and Co., Inc.	MSD	
DIPHTHERIA, PERTUSSIS, TETANUS	DTaP (Daptacel)	sanofi pasteur	PMC	
	DTaP Infanrix)	GlaxoSmithKline	SKB	
	Td (Decavac) adult preservative free	sanofi pasteur	PMC	
	Td (Tenivac) adult preservative free	sanofi pasteur	PMC	
	TD (Generic) adult absorbed	Massachusetts Biologic Laboratories	MBL	
	DT (generic) pediatric	sanofi pasteur	PMC	
	Tdap (Boostrix)	GlaxoSmithKline	SKB	
	Tdap (Adacel)	sanofi pasteur	PMC	
	DTaP-IPV (Kinrix)	GlaxoSmithKline	SKB	
	DTaP-HepB-IPV (Pediarix)	GlaxoSmithKline	SKB	
	DTaP-IPV-Hib (Pentacel)	sanofi pasteur	PMC	
	DTaP-Hib (TriHibit)	sanofi pasteur	PMC	
	DTaP-IPV (Quadracel)	sanofi pasteur	PMC	
	TetanusToxiod (Generic) absorbed	sanofi pasteur	PMC	
HEPATITIS A	HepA (Havrix)	GlaxoSmithKline	SKB	☐ Ped/Adol ☐ Adult
	HepA (Vaqta)	Merck and Co., Inc.	MSD	☐ Ped/Adol ☐ Adult
	HepA-HepB (Twinrix)	GlaxoSmithKline	SKB	
HEPATITIS B	HepB (Recombivax HB)	Merck and Co., Inc.	MSD	☐ Ped/Adol ☐ Adult
	HepB (Engerix-B)	GlaxoSmithKline	SKB	☐ Ped/Adol ☐ Adult
	HepB-Hib (Comvax)	Merck and Co., Inc.	MSD	
HIB	Hib PRP-T(ActHIB)	sanofi pasteur	PMC	
	Hib PRP-OMP(PedvaxHIB)	Merck and Co., Inc.	MSD	

CIIS Important and Commonly Overlooked Data Elements

The following listing contains items that are CIIS required elements and some commonly overlooked items. These should be discussed with practices prior to configuring their EHRs for testing with CIIS.

The cause of difficulties of successfully transmitting some of the below items is two-fold. Some interfaces are not configured with the templates needed to pull these data fields from the EHR, and some provider offices are either not entering these values into their EHR or entering these values into the wrong data fields in their EHR (thus preventing the interface from transmitting the correct data). Note: Resolving these issues may necessitate additional EHR-related training for provider offices

Segment	Description/Comment
MSH-4	Clinic code Assigned by CIIS
PID - Patient Fields	Include Patient unique identifier (first value in PID-3), Last name, First name, Date of Birth, Gender, Address, and Phone Number
RXA - Administered Vaccination Fields	Administered vaccinations should include lot number, manufacturer, dosage, , dosage units, expiration date, administering provider (with title/degree in RXA-10.21), administered location (RXA-11.4; same as MSH-4)
PID-3	Social Security Number (SSN): **Full SSN should not be sent**. CIIS can only accept the last four (4) digits of the SSN, or a masked version only showing the last four (4) digits. Examples of masked SSN: XXX-XX-1234; XXXXX1234; 1234; 999-99-9999; 000-00-0000.
NK1	Next of Kin information, specifically indicating **Mother, Father, or Guardian (in field NK1-3) for patients under 18** • Including mother's name in the NK1 segment, along with the proper relationship code in NK1-3, is extremely valuable to the CIIS patient matching process.
RXA-9	**Immunization Information Source** that specifies whether an immunization was administered by the clinic or entered historically for the patient • For systems unable to populate RXA-9, CIIS uses the presence of a lot number in the HL7 message to determine whether the service was administered at the facility indicated in RXA-11.
RXA-20	**Completion Status** – see Code Set HL70322 Completion Status (page **Error! Bookmark not defined.**) • If empty, the assumed value is CP (Complete).
RXA-21	**Vaccination Action Code** – see Code Set HL70323 Action Code (page **Error! Bookmark not defined.**) • This field provides a method of correcting vaccination information

CIIS Immunization Interface
January 20, 2016

Change History

Published/Revised Date	Version #	Author	Section/Revision Description
2/9/2016	1.0	CIIS	Draft for initial implementation

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General Tip Sheet

CIIS Data Validation Tip Sheet

Definitions and Key Terms:

CPT codes	Developed and maintained by the American Medical Association and are intended to support billing for services
CVX codes	Codes that indicate the product used in a vaccination. They are maintained by the Centers for Disease Control and Prevention, Immunization Information System Support Branch (IISSB) for use in HL7 data transmission
EHR	Electronic Health Records
Data File	Electronically submitted immunization data from the facility's EHR
Charted Record	Records printed from facility's EHR
MVX	Manufacturers of Vaccines
VFC	Vaccine For Children

Common Errors Seen During Data Validation

Category	Description	Possible Cause of Issue	Helpful Links/Tips
Vaccine Licensure Date	Administered immunization given before vaccine was licensed in the U.S or given after the vaccine was discontinued in the U.S.	Data entry CVX and CPT codes are mapped incorrectly in EHR	Links to The Pink Book: Course Textbook - 13th Edition (2015) CDC: Discontinued Vaccines in the U.S. CDC: U.S. Vaccines Update CVX code in EHR
Missing Shots	Administered immunization is missing in data file sent from EHR	EHR issue	Consult EHR Vendor
	Immunization sent from EHR came over electronically but the same immunization is missing in the charted record	Immunization record print out is incomplete Immunization was refused Immunization entered by mistake	Staff training
Incorrect Manufacturer's Code	Product name and manufacturer code do not match	CVX and MVX codes are mapped incorrectly in EHR	For correct MVX code go to: Product Name Mapped to CVX code and Manufacturer's code
Incomplete Demographic Information	Patients younger than 19 years of age are missing the parent/guarantor name in data file sent from EHR VFC Eligibility was not listed in the data file sent from EHR	Data entered into fields not exported from EHR Data not entered	Consult EHR Vendor Staff training

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Results

TARGET 3: Decrease waiting times, steps and hand-offs of entire interface process.

Status: MET

METRIC	Pre-Intervention	Post-Intervention	% Decrease
Number of waiting times	13	10	23%
Number of steps	52	47	10%
Number of hand-offs	13	11	15%

Results

TARGET 4: Data Validation Phase: Decrease rework and wait time.

Status: Partially met.

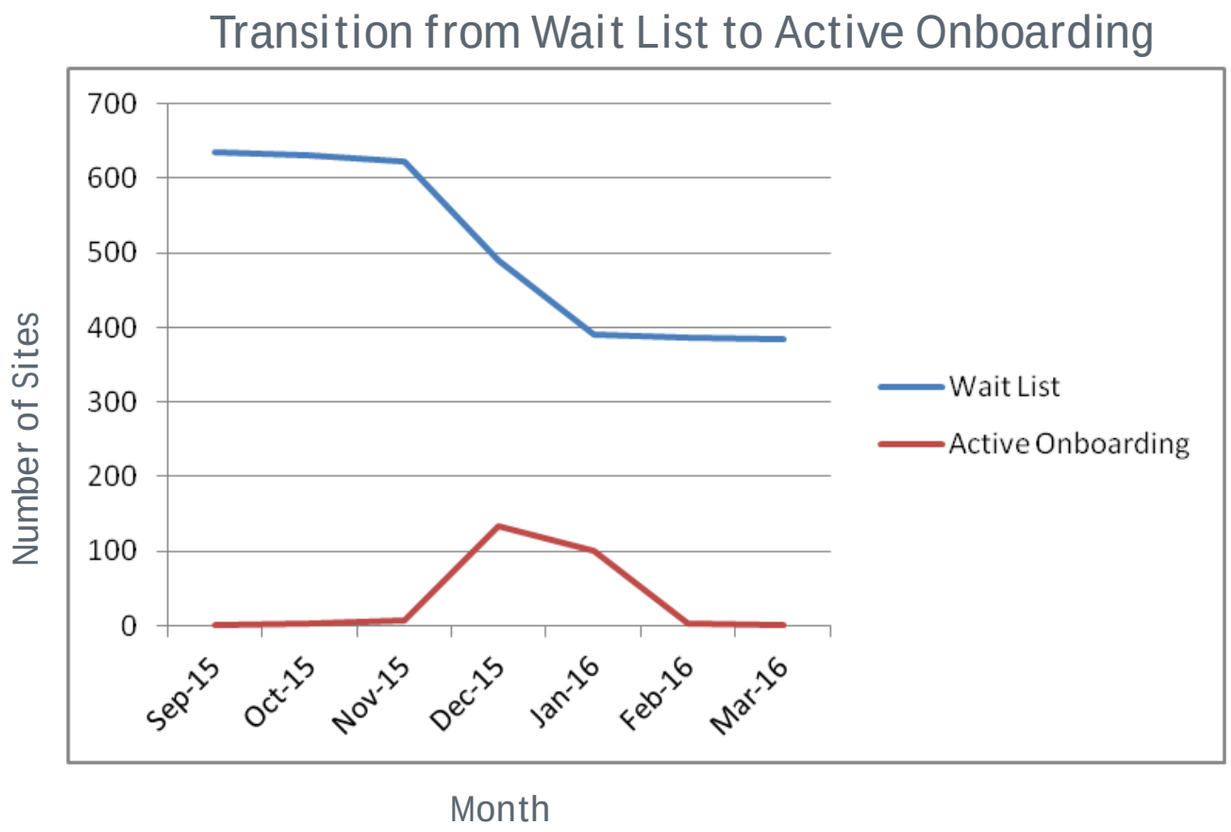
METRIC	Pre-Intervention	Post-Intervention	% Decrease
Number of reworks	2	2	--
Number of wait times	5	4	20%

Results

TARGET 5: Increase the number passing initial self-serve testing phase.
- Increase percentage moved to active onboarding queue.
- Increase percentage moved from current wait list to active self-serve testing.

Status: Met, but Ongoing

TARGET METRICS	Sept 2015	Oct 2015	Nov 2015	Dec 2015	Jan 2016	Feb 2016	Mar 2016
Number of sites on CIIS wait list	635	631	623	490	390	386	385
Number of sites passing initial testing phase through self-serve tool (per month)	2	4	8	133	100	4	1
% of sites on waiting list (n=637) moved to onboarding queue	0.3%	0.9%	2.2%	23.1%	38.8%	39.4%	39.6%
Number of sites engaged in self-serve testing (cumulative)	44	44	73	80	85	125	153



Lessons Learned

- Baseline data analyses give context to problem and potential solutions.
    - Wait list by provider type (43% family practice)
    - Wait list by EHR vendor (9 vendors account for 63% of sites on list)
    - Wait list by provider type and EHR vendor (2 vendors account for 51% of all OBGYN sites on list)
    - Completed sites by provider type
    - Completed sites by EHR vendor/product
    - Interfaces in-process by provider type
    - Interfaces in-process by implementation phase

Lesson: Not all sites on wait list are equal!

Lessons Learned

- Not all root causes can be addressed by proposed solutions.
  - Target energy where you have the power to change outcomes.

- Results do not occur overnight.
  - Be patient and remain consistent with new processes when in the "valley of despair."

- Measuring results of rapid experimentation proves you are on the right course.
  - Collect and analyze metrics post-intervention to see progress, and then make tweaks to processes that are not working.

- External parties can be integral to "internal" quality improvement.
  - Engage stakeholders in QI project to gain greater perspective.

QUESTIONS?

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