An Update on Two-Dimensional (2D) Vaccine Barcoding

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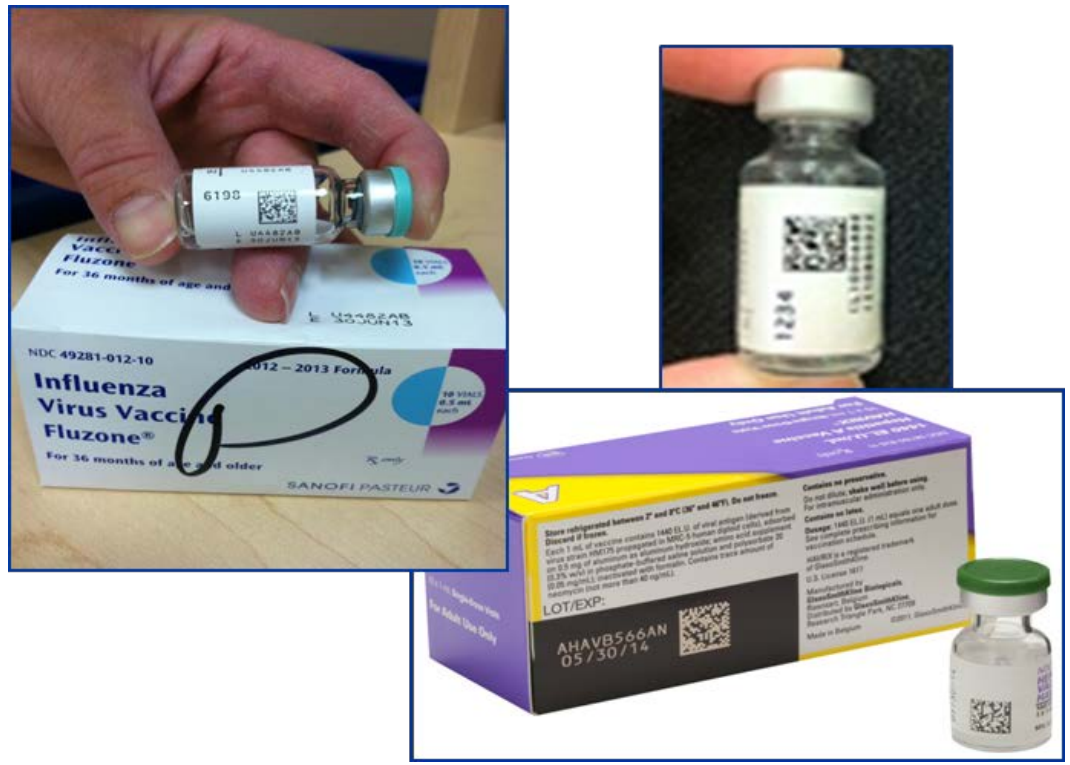
Session Outline

- Background
- Previous Pilots and Findings
- Pilot Description
- Feedback from the Field
- Next Steps

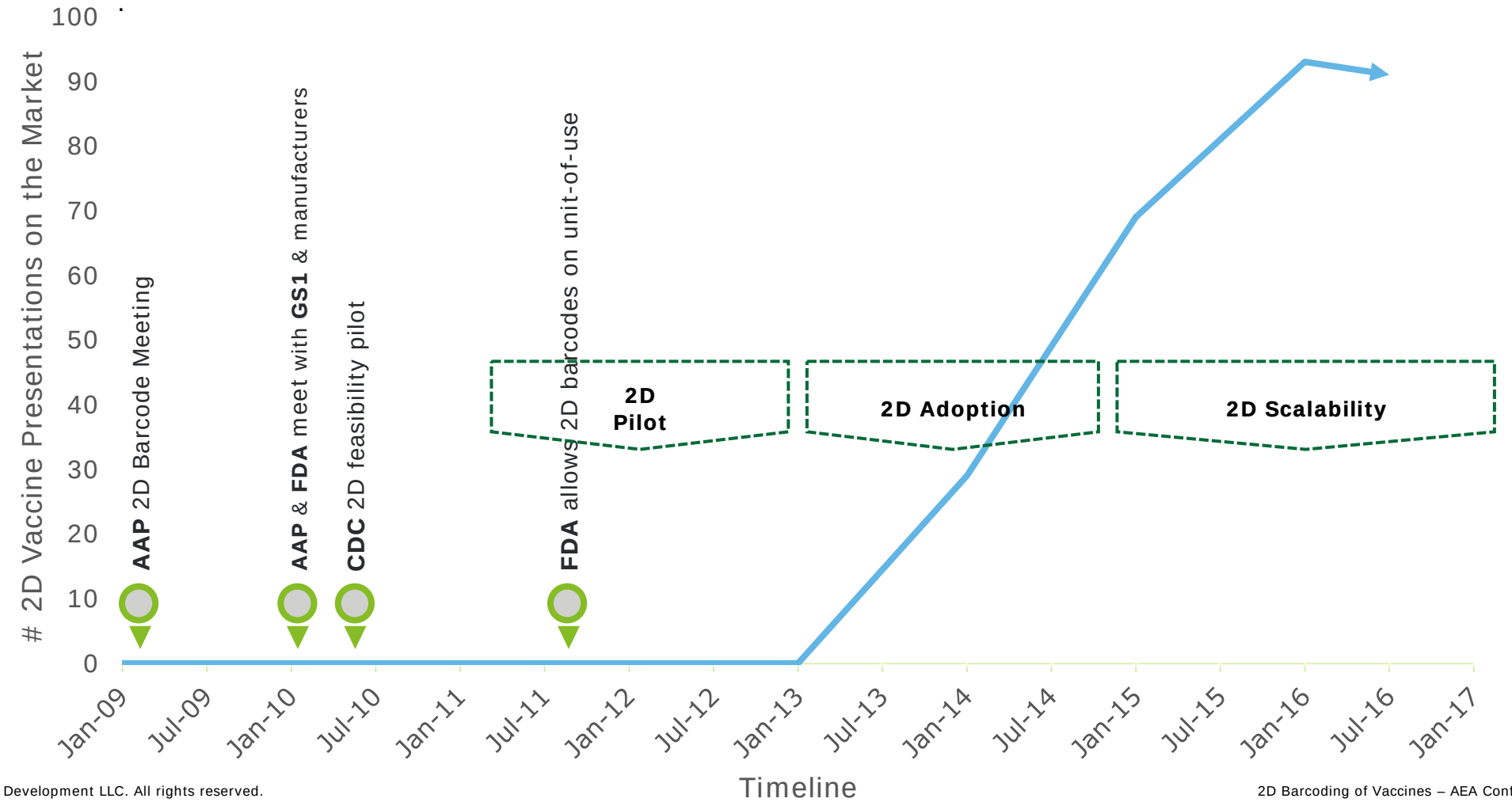


Background

2D Barcoded Vaccines Timeline

Key events & number of 2D vaccine presentations on the market

2003 - FDA requires linear barcode on the vaccine unit-of-use



CDC 2D Barcoded Vaccine Initiatives

*2D Pilot (2D) : Assess Impact (2011 – 2013)**

Objectives

- Assess 2D impact on vaccination data quality
- Assess 2D workflow impact
- Identify 2D scanning opportunities and challenges
- Implement 2D barcodes

Participants

- 217 healthcare practices
- 10 Immunization Awardees
- 2 Vaccine manufacturers

2D Adoption : Facilitate Adoption (2013 – 2015)

Objectives

- 2D Pilot Objectives
- Broaden observations of the initial pilot
- Facilitate the adoption of 2D barcode scanning

Participants

- 87 Diverse practices
- 7 Immunization Awardees
- 3 Vaccine manufacturers

2D Scalability (2015 – 2017)

Objectives

- Assess 2D impact in a large healthcare system
- Assess compliance with scanning and interventions
- Identify and develop solutions to address remaining challenges

Participants

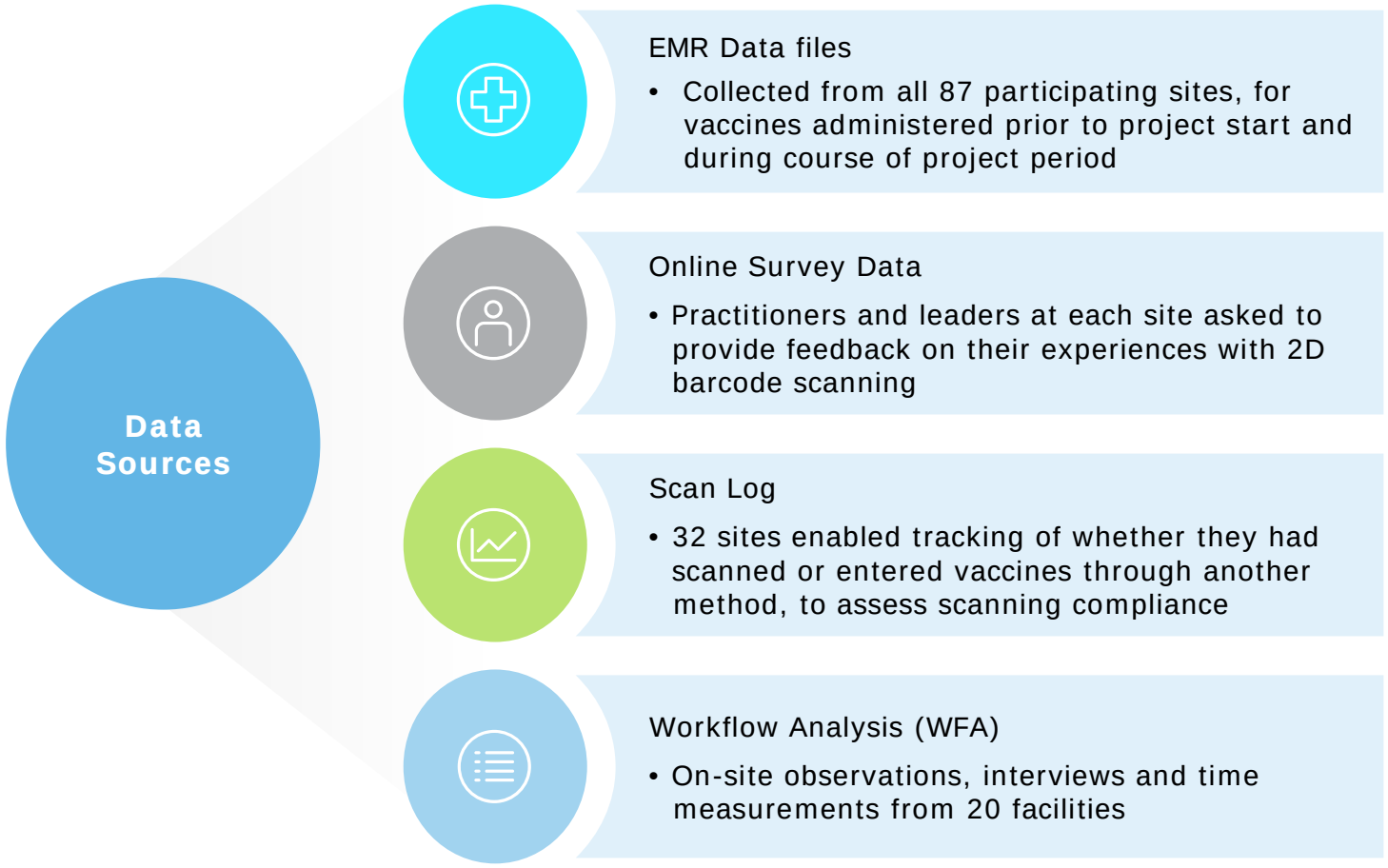
- 1 large healthcare system
- 29 care centers

***** Periods of primary data collection and project activities provided

2D Adoption (2DA) Pilots and Findings

2D Adoption Evaluation Questions and Data Sources

- Data Quality and Compliance – 5 questions
- Time Savings – 4 questions
- User Experience – 2 questions



Data Quality

EMR Data Files

Evaluation Question

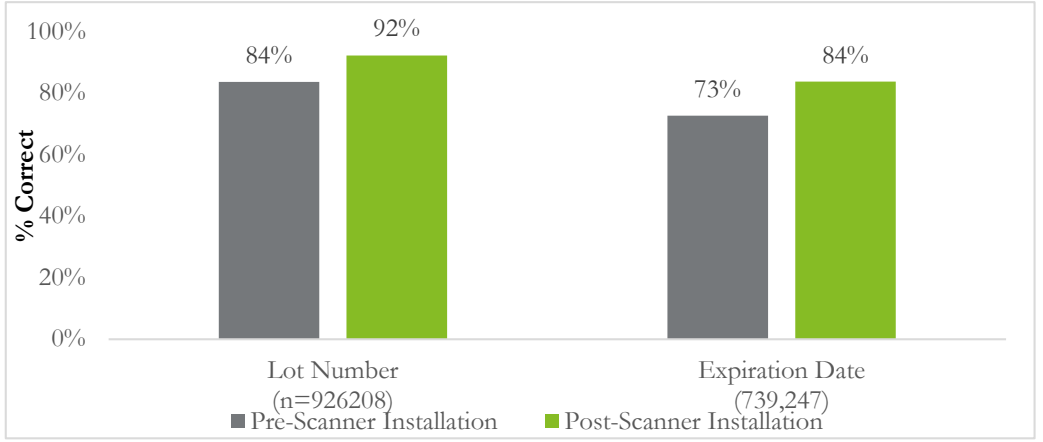
To what extent does vaccine administration data quality change with the introduction of 2D barcode scanning?

Data

- 1,424,877 vaccination records analyzed from EMR data files (87 sites)
- 18% of vaccination records were 2D barcoded after installation

Finding

- Data Quality Improves after Installation of 2D Barcode Scanners
- Lot Number improved 8%* and Expiration Date improved 11%* after installation of scanners



* Lot number (correct) difference statistically significant at an alpha of 0.05 (t(893761)=142.7, p=0.001); Expiration date (correct) difference statistically significant at an alpha of 0.05 (t(690111)=116.7, p=0.001).

Time Savings

Workflow Analysis (WFA)

Evaluation Question

Does the use of 2D barcodes to record data about vaccine administrations change the amount of time it takes to record vaccine information?

Data

- 1,026 time measurements collected on-site from 16 facilities
- 495 (48%) entries used 2D barcode scanner; 531 (52%) used a traditional entry method (manual entry, drop-down menu, combination)

Finding

- Time Savings Improves with 2D Barcode Scanning
- Average time to record vaccine administration data:

Entry Method	Average Time to Record	# of Recordings	SD
With 2D barcode scanning	6.86 seconds	495	8.14
Without 2D barcode scanning	10.30 seconds	531	8.07

- Average time savings of 3.44 seconds per entry with 2D barcode scanning (versus traditional methods)*

*difference statistically significant at an alpha of 0.05 ($t(1,024)=30.91$, $p=0.001$).

User Experience

Online Survey Data

Evaluation Question

What is the experience of the end user when adopting 2D barcodes to record vaccine data?

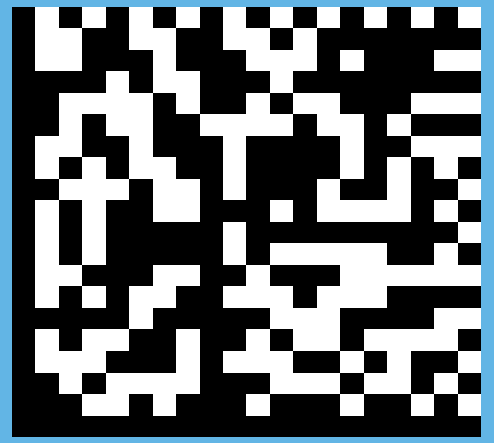
Data

- Online surveys of practitioners/users (n=116) and leaders (n=67) at participating sites (77% and 82% response rates, respectively)

Finding

- 75% of users (and 86% of leaders) agree – 2D scanning improves accuracy
- 60% of users agree – easy to integrate 2D barcode scanning into their usual process of recording data
- 60% of users agree – 2D barcode scanning is easy to use
- Challenges identified - inconsistencies with scanning and scanners, faded barcodes, incorrect entries after scanning
- Benefits identified - improved accuracy, improved efficiency, less manual entry of vaccine data

And something else…

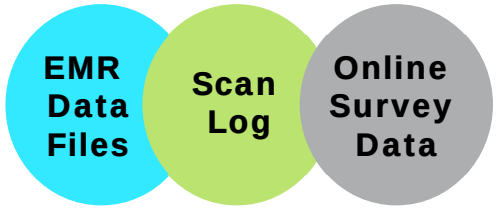


Compliance

Determining whether a 2D barcoded vaccine was actually scanned by the user

New area of exploration

- Limitations based on technology to directly measure at all sites
- Limited data, uncertain analysis options until end of project
- Two evaluation questions explored:
  - variation of compliance rates across the sites (32 sites), and
  - comparison of measured compliance rates with self-reported survey data (26 sites)



Compliance… or lack thereof

Findings and informed decision-making

Findings:

- Practitioners self-reported scanning frequently, but tracking scans at site-level said otherwise (50+% time vs. ~20%)
- Compliance quite low, decreased over time, differed by vaccine type, time of year
- Survey responses identified challenges impeding scanning
- To truly realize 2D scanning benefits: technology needs to work as expected and people need to scan regularly (high compliance)

Use of findings to inform decision-making:

- Current phase directly measures scanning compliance at all sites (and for individual practitioners)
- Interventions to test changes in compliance
- Solution development to address remaining challenges

2D3 Pilot

Pilot Overview - Recruitment

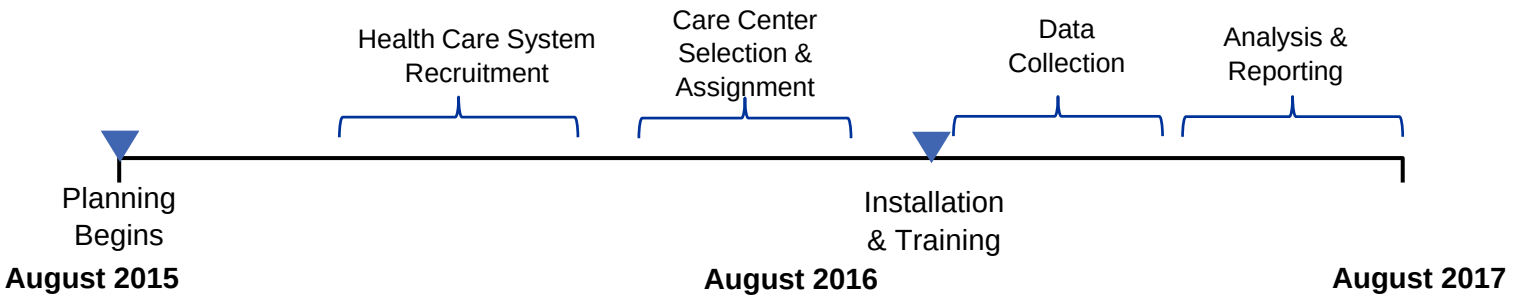
Selection of Health Care System

- Recruitment Criteria for Health Care System
  - Sutter was selected based on:
    - Interest and willingness to participate
    - Participation of care center in previous pilot
    - Use of a single EMR system that supported scanning

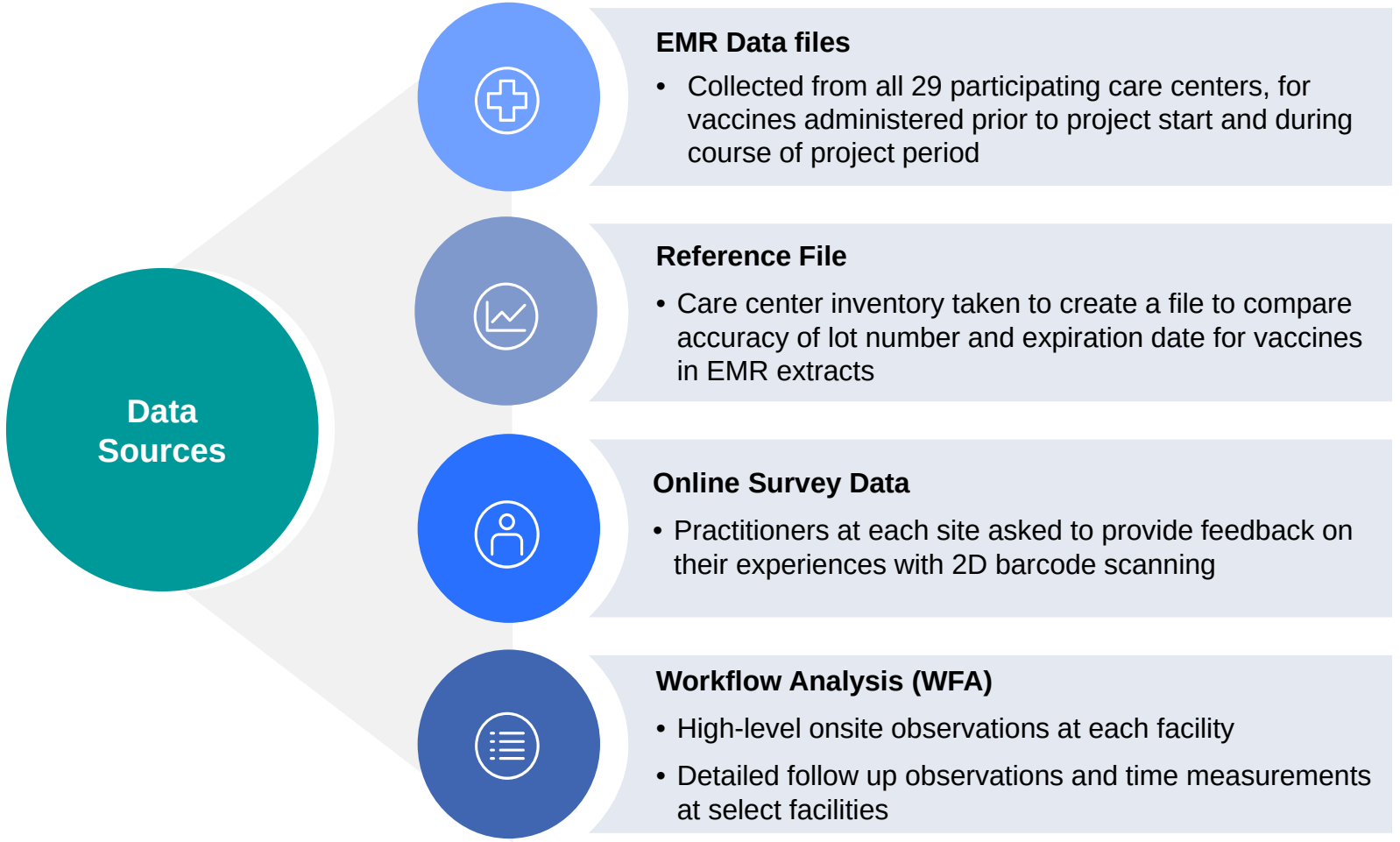
Sutter Health
Sutter Medical Foundation

Selection of Care Centers

- Selection of 29 Care Centers
  - Centers were selected based on:
    - Interest and willingness to participate
    - Diversity of centers administering vaccines (e.g., pediatrics, vaccine clinic, family medicine)
    - Agreement to installation and use of scanners
    - Agreement to data collection and use of adherence strategy



Data Sources



EMR Data files

- Collected from all 29 participating care centers, for vaccines administered prior to project start and during course of project period

Reference File

- Care center inventory taken to create a file to compare accuracy of lot number and expiration date for vaccines in EMR extracts

Online Survey Data

- Practitioners at each site asked to provide feedback on their experiences with 2D barcode scanning

Workflow Analysis (WFA)

- High-level onsite observations at each facility
- Detailed follow up observations and time measurements at select facilities

Overview of Adherence to Scanning Protocol

Care Centers were stratified and randomly assigned to an adherence strategies

Training Only

Use of scanners and protocol for 2D barcode scanning

- No other steps

Commitment Card

Written personal rationale for scanning & signed commitment to scanning

- Training + Commitment Card

Adherence Report

Publically posted report – compares individuals at center and center to other centers

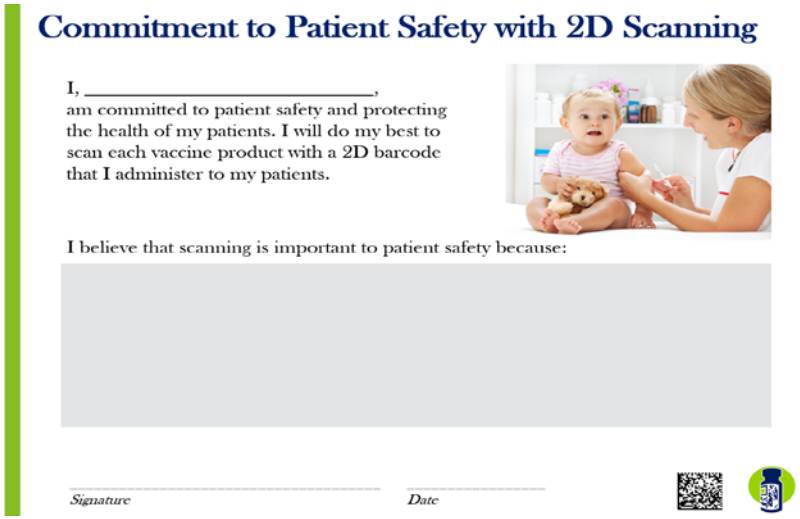
- Training + Adherence Report

Combination

Combination of all strategies:

- Training + Commitment Card + Adherence Report

Sample Scanning Commitment Card



Commitment to Patient Safety with 2D Scanning

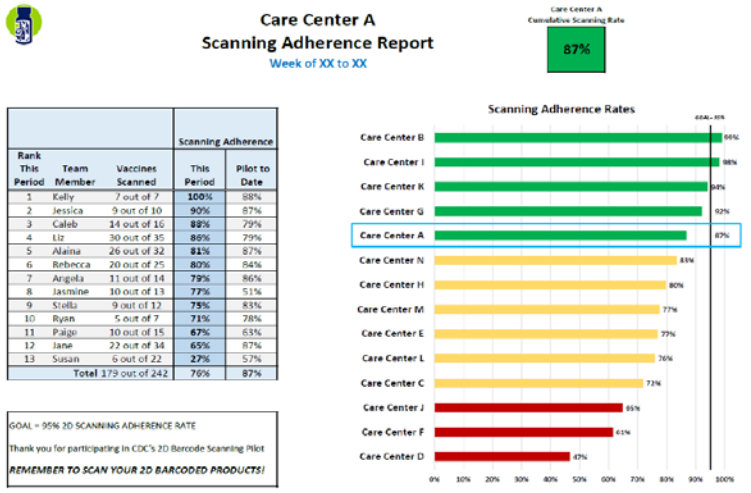
I, _____,
am committed to patient safety and protecting the health of my patients. I will do my best to scan each vaccine product with a 2D barcode that I administer to my patients.

I believe that scanning is important to patient safety because:

Signature

Date

Sample Scanning Adherence Report



Care Center A
Scanning Adherence Report
Week of XX to XX

Care Center A Cumulative Scanning Rate: 87%

Rank This Period	Team Member	Vaccines Scanned	Scanning Adherence This Period	Scanning Adherence Pilot to Date
1	Kelly	7 out of 7	100%	88%
2	Jessica	9 out of 10	90%	87%
3	Caleb	14 out of 16	88%	79%
4	Liz	30 out of 35	86%	79%
5	Alaina	26 out of 32	81%	87%
6	Rebecca	20 out of 25	80%	84%
7	Angela	11 out of 14	79%	86%
8	Jasmine	10 out of 13	77%	51%
9	Stella	9 out of 12	75%	83%
10	Ryan	5 out of 7	71%	78%
11	Paige	10 out of 15	67%	63%
12	Jane	22 out of 34	65%	87%
13	Susan	6 out of 22	27%	57%
	Total	179 out of 242	76%	87%

GOAL = 95% 2D SCANNING ADHERENCE RATE

Thank you for participating in CDC's 2D Barcode Scanning Pilot

REMEMBER TO SCAN YOUR 2D BARCODED PRODUCTS!

Scanning Adherence Rates

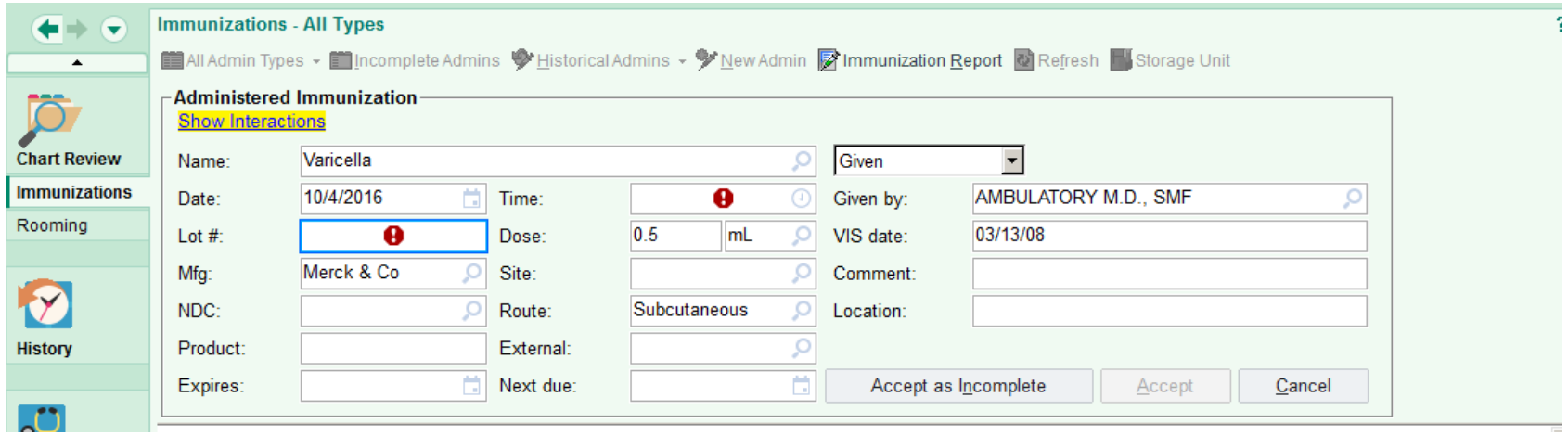
Care Center B
Care Center I
Care Center K
Care Center G
Care Center A
Care Center N
Care Center H
Care Center M
Care Center E
Care Center L
Care Center C
Care Center J
Care Center F
Care Center D

User Feedback:

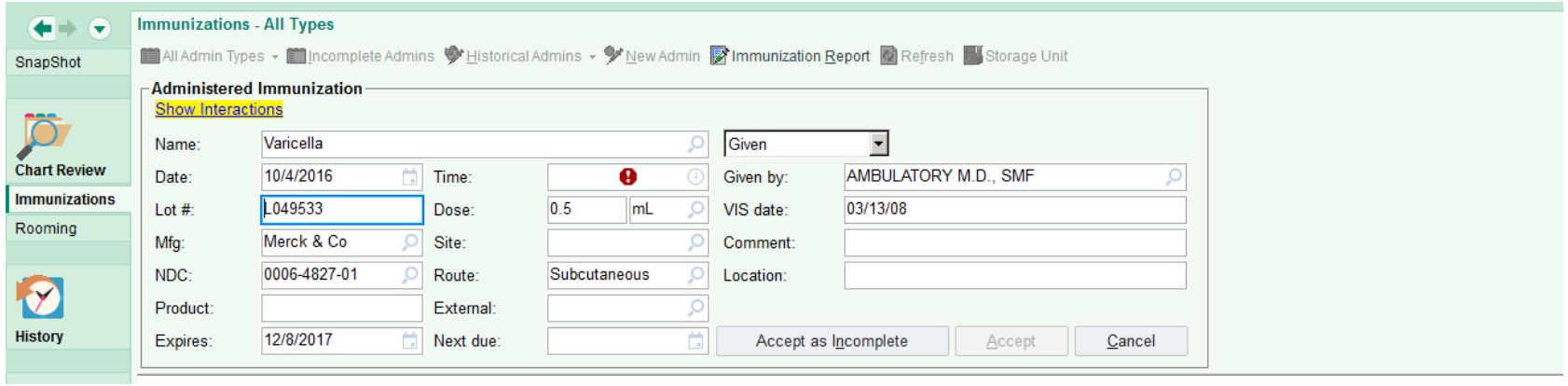
Dr. Judi Vallero

Sutter Scanning Implementation

Prior to Scan-



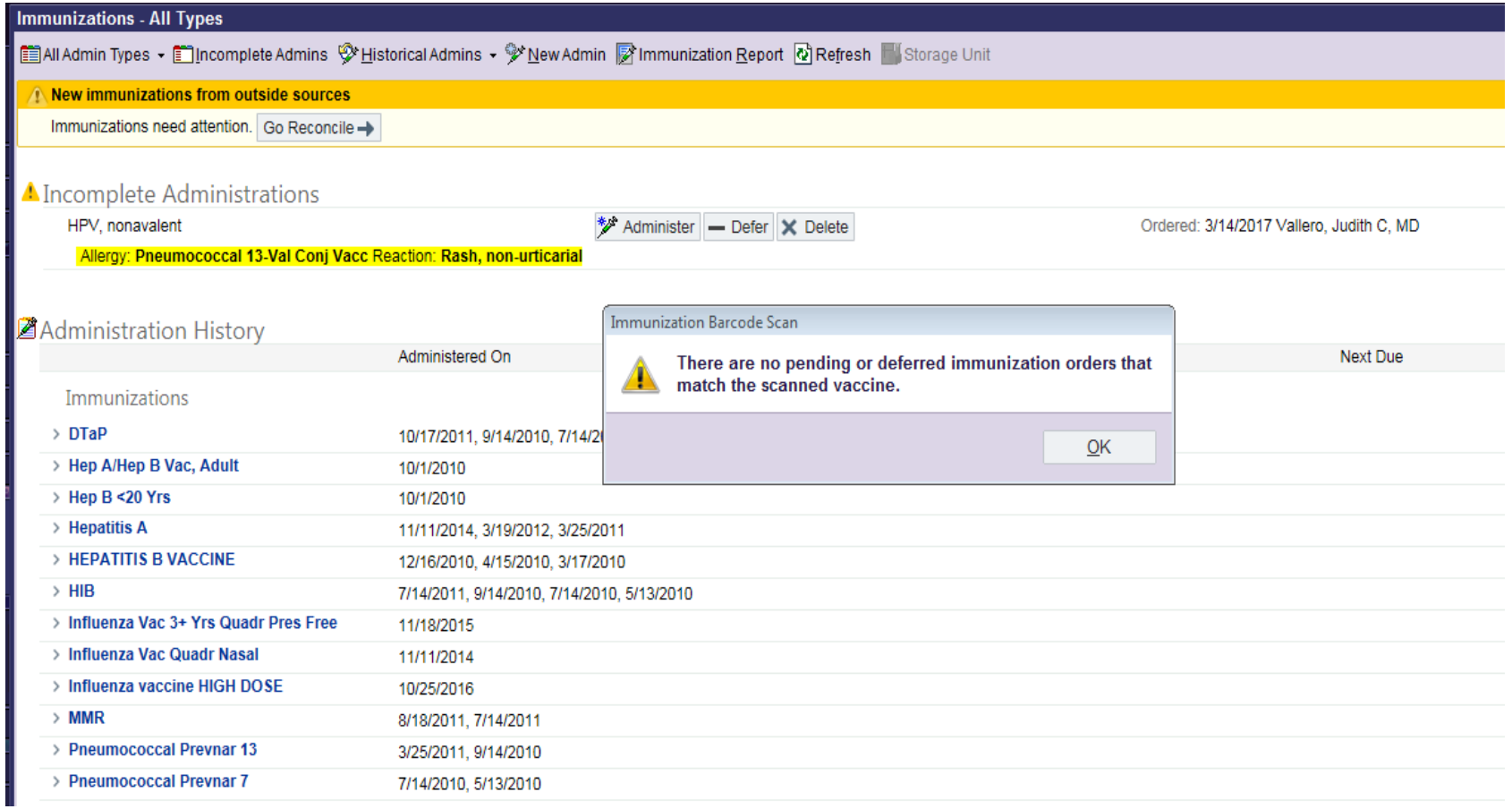
After Scan-



Screenshots are notional only (not real patients) and do not contain any Patient Identifiable Information.

Sutter Scanning Implementation

Sample Error Flag:



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Next Steps

Next Steps

- Promote pilot educational materials
- Continue to monitor 2D Barcoded Vaccines in the supply chain and encourage addition of 2D barcodes to new products
- Continue to Maintain NDC Crosswalk Table as a resource for Health Information Systems (HIS)
- Monitor Drug Supply Chain Security Act (DSCSA)
- Encourage HIS vendors to incorporate 2D barcode functionality
- Explore opportunities to improve compliance

CDC 2D Barcoded Vaccine Initiatives

Where to find more information

Where can I find additional information?

Visit the CDC 2D barcode page for 2D vaccine resources
http://www.cdc.gov/vaccines/programs/iis/2d-vaccine-barcodes/
Google: “CDC 2D Barcode”

What’s on the site?

- Current list of 2D barcoded vaccines
- 2D Pilot artifacts

For Providers

- Training materials
- AAP guidance

For Developers

- NDC Crosswalk Tables with Global Trade Identification Numbers (GTIN)
- 2D Scanning functional capabilities requirements

For Manufacturers

- Secondary packaging 2D report
- AAP and GS1 2D guidance

“Thank You-Happy Scanning”

For more information please contact Centers for Disease Control and Prevention

1600 Clifton Road NE, Atlanta, GA 30333
Telephone, 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348
E-mail: cdcinfo@cdc.gov Web: www.cdc.gov

Example of Adherence Rate Report

Care Center A
Scanning Adherence Report
Week of XX to XX

Care Center A
Cumulative Scanning Rate

87%

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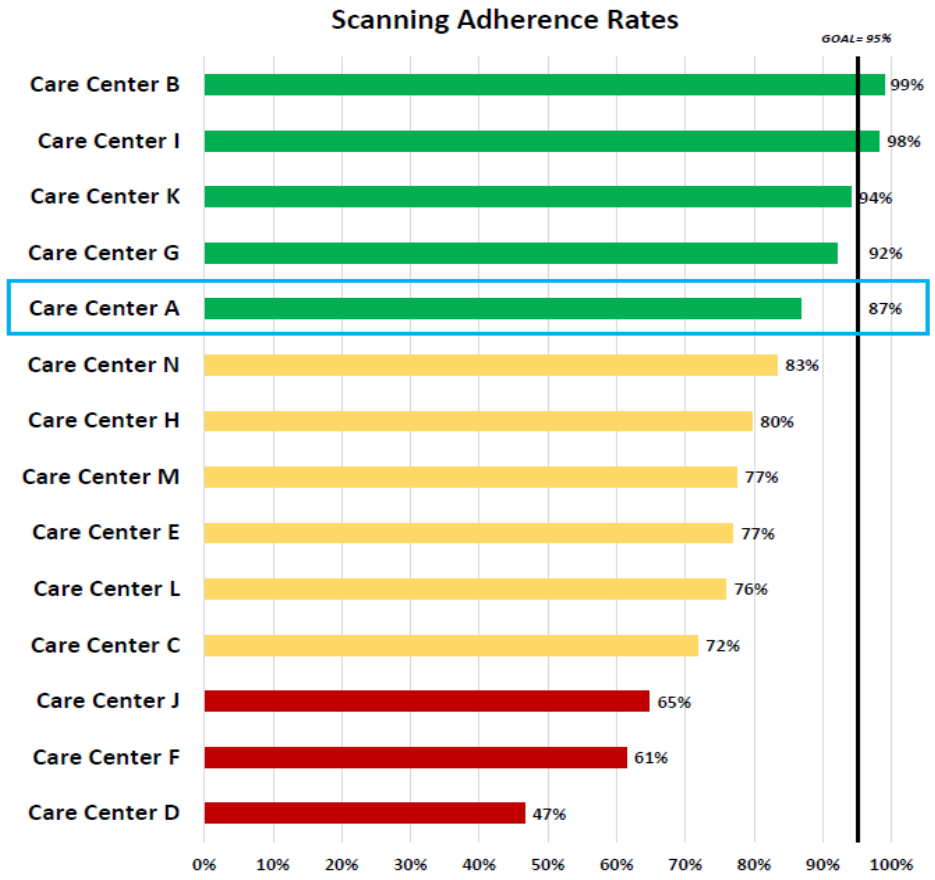

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Signature *Date*