LESSONS LEARNED ON WORKFLOW FROM SCALABILITY PILOT

Vaccine 2D Barcode Scanning
Implementation Toolkit

National Center for Immunization and Respiratory Diseases (NCIRD)
Centers for Disease Control and Prevention (CDC)

2D Vaccine Barcode Scalability Pilot

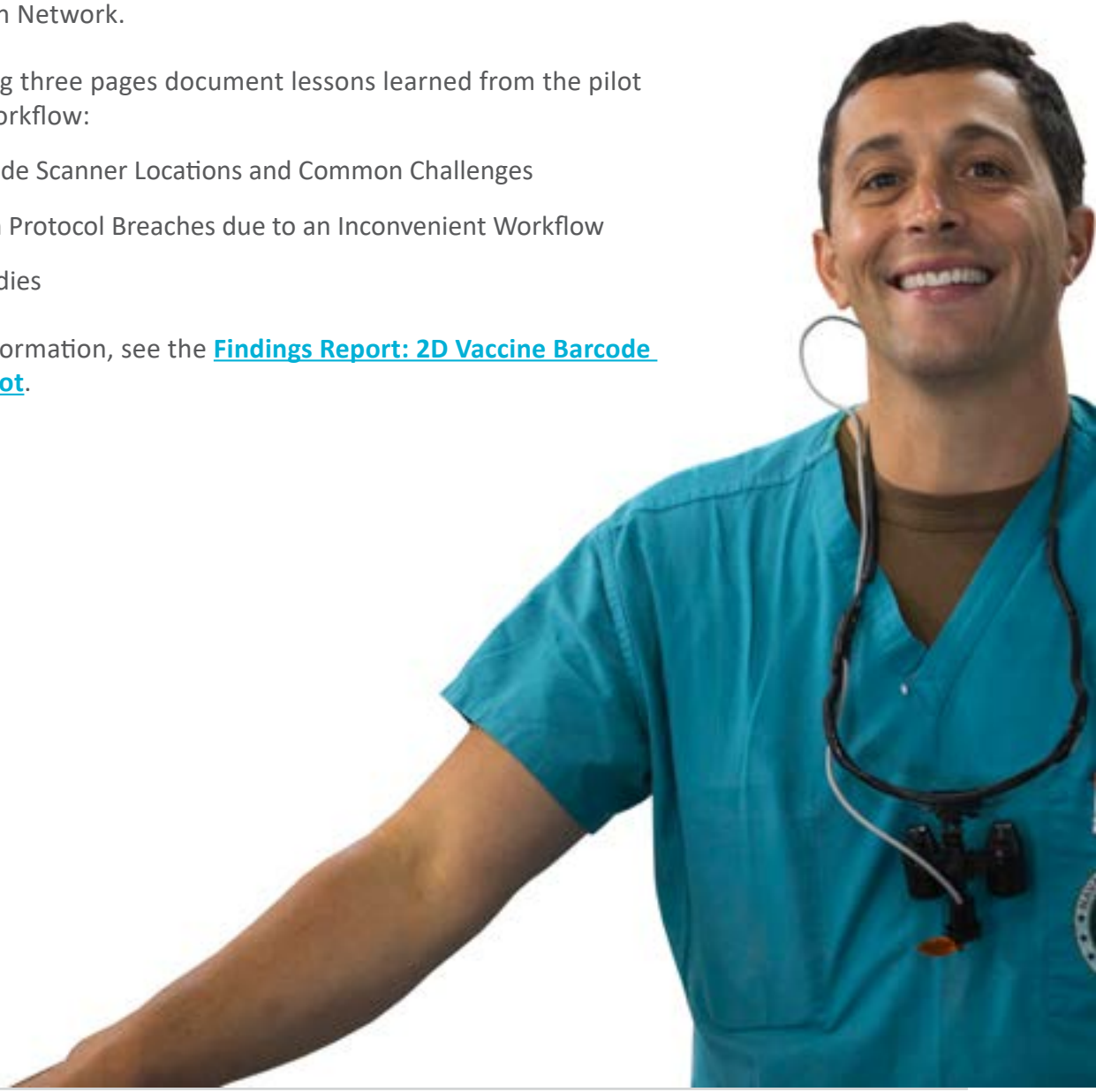
In 2016 to 2017, CDC conducted a pilot that assessed the impact and scalability of scanning 2D barcoded vaccines in a large health system. This project investigated the information technology needs and clinical workflow practice adjustments when implementing 2D barcode scanning of vaccine unit of use (UoU) products in health care practices. Additional considerations included an evaluation of staff adherence to vaccine 2D barcode scanning, the identification of workflow processes used for scanning across different health care practices, recognition of challenges experienced, and an assessment of the institutional impact of scanning.

Sutter Health, "a family of doctors and hospitals serving more than 100 communities," and consisting of different health care practice settings (pediatric, family medicine, internal medicine, and vaccine clinics), was selected to participate based on the recruitment criteria. Vaccine 2D barcode scanning was implemented at 27 sites in the Sutter Health Network.

The following three pages document lessons learned from the pilot regarding workflow:

- 2D Barcode Scanner Locations and Common Challenges
- Common Protocol Breaches due to an Inconvenient Workflow
- Case Studies

For more information, see the **Findings Report: 2D Vaccine Barcode Scanning Pilot**.

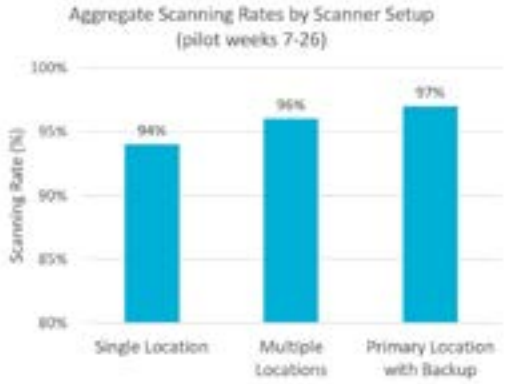


2D Barcode Scanner Locations and Common Challenges

2D barcode scanner locations at pilot sites were arranged in one of three setups:

1. **Single location:** Individual desk, shared desk, or refrigerator/draw/prep.
2. **Multiple location:** Refrigerator/draw/prep and other location used equally.
3. **Primary and backup:** Refrigerator/draw/prep as primary, with backup option.

Pilot findings indicated that, in aggregate, scanners at more than one location (setups 2 and 3) had higher scanning rates than at a single location (setup 1). The refrigerator/draw/prep area paired with another location (used equally or as primary with backup) had the highest scanning rates. The refrigerator/draw/prep area as the single scanner location had the lowest scanning rates.



However, scanning rates (starting in week seven, when onsite observations took place) for all pilot sites show variation among all scanner setup types for the remaining pilot period, indicating **no one setup type is ideal**.

Pilot participants identified challenges experienced through multiple data collection methods. Several themes emerged, including challenges with scanner location, low engagement, and confusion regarding scanning protocol. Many of these issues can be anticipated, and prevented, through early communication with staff, increased efforts toward buy-in, and clearly understood training.

Challenge Type	Challenge	Data Source(s) in Which Challenge was Identified[1]		
		User Survey	Group Discussions	Ongoing Observations/ Challenge Log
Scanner Location/ Issues	Location of scanner/setup did not work	●	●	●
	Needing additional scanners	●		●
Low Engagement	Limited buy-in and understanding of scanning importance	●	●	●
Unclear on Scanning Protocol	Workarounds developed that do not align to scanning protocol (e.g., entering data in one step before or after administering vaccine)		●	●
	Unsure if staff is scanning	●	●	●

[1]Evanson, H. V., Huddleston Reed, J., Cox, R. "Improving Staff Experience with Vaccine Data Entry with 2D Barcode Scanning." https://journals.lww.com/jncqjournal/Abstract/9000/Improving_Staff_Experience_With_Vaccine_Data_Entry.99369.aspx.

Common Protocol Breaches due to an Inconvenient Workflow

An inconvenient workflow can deter health care providers from practicing vaccine 2D barcode scanning. In the 2016 to 2017 pilot, two common workarounds to inconveniences were identified, which can both provide potential for error.

Workaround to Inconvenience	Potential for Error
Health care providers entered data not yet confirmed prior to administration.	Certain data fields, such as completion of the vaccination and site of injection, cannot be confirmed until after vaccine administration is complete. Entering this data prior to administration can lead to incorrect records. For example, the patient may request a different arm than the clinician assumed in the record.
Health care providers waited until after administration to scan, when all data (e.g., site of injection) was available for entry.	Scanning after administration does not take advantage of safety measures, including alerts to confirm that the scanned vaccine matches the vaccine order, if the vaccine is expired, or if the patient has already received the vaccine.

A convenient scanner location and carefully planned workflow can encourage health care providers to scan prior to administration. A clear protocol that includes scanning as a mandatory step can also help avoid the potential for error.

Additionally, it is important to remind all staff that, to fully realize safety benefits of scanning, vaccines should be scanned prior to administration.

During the pilot, one medical assistant defied protocol by scanning the vaccine after administration, and therefore experienced an immunization error. Upon scanning the vaccine, the EMR alert displayed "vaccine not ordered" because they had prepared—and administered—Hep B instead of Hep A. If the medical assistant had scanned the vaccine prior to administration, the immunization error could have been prevented.

"It saves time, ensures accurate and consistent data entry, and provides an extra safety step prior to administration."

—Survey respondent

"Provides an additional safety check before vaccine administration."

—Survey respondent

Case Studies

No "one-size-fits-all" workflow

One site initiated the pilot period with 2D barcode scanners placed in the patient rooms. The site then experienced a sharp decline in scanner use when the scanner was moved to another location, and this use remained low to the end of the pilot. While overall findings showed that scanners located in the refrigerator/draw/prep area paired with another location (used equally or as the primary with a backup) had highest scanning rates, in this case the site had the greatest success when the scanners were placed in patient rooms. The experience at this site demonstrates that there is no "one-size-fits-all" workflow.

"When the scanner was in the room, it was useful and great. When it was moved to a desk outside the lab requiring additional logon, it was not used at all. If the scanner could be at each medical assistant (MA) desk or each exam room, depending on MA preference, it would eliminate a lot of errors."

—Survey respondent

Formalize protocols for all stakeholders

Discussions with staff and leaders at pilot sites identified the ways they had improved their own scanning rates. These ways can help others scan more consistently, including by, for example:

- Formalizing the protocol of scanning within the workflow.
- Making scanning mandatory and communicating this from the start.
- Adding a step to the vaccine verification process to ensure vaccines are scanned prior to vaccine administration.
- Having specific staff do all tray verifications to add consistency and accountability (if applicable).

To aid in scanning efficiency, protocols may be developed for physicians too. For example, if a physician orders a vaccine while still in the patient room, then the health care provider can utilize that time to scan, verify, and prepare the vaccine, and alert the physician if necessary.

"You can't train someone to a standard process and then not audit them and not follow up to make sure. Just because someone has been trained doesn't mean that it's not still going to fall to the wayside."

—Discussion participant

For more information, contact CDC
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