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OVERVIEW OF VACCINE BAR CODING REPORT

"Reviewed April 2013"

Findings from Impact of a Two-Dimensional Barcode for Vaccine Production, Clinical Documentation, and Public Health Reporting and Tracking

Summary Results Review

Manufacturers' Forum
Atlanta, GA

Alan C. O'Connor

January 26, 2012

RTI International is a trade name of Research Triangle Institute.

Project Overview and Scope

- Project information
  - Contract: GS10F0097L
  - Period of performance: October 1, 2010, through March 31, 2012, with the majority of research completed November 2010 through August 2011
  - Project Director: Alan C. O'Connor; Task Leads: Saira Haque, Christine Layton

- Three goals, organized into tasks:

  1. Analyze, document, and provide technical guidance for stakeholders engaged in electronic exchange of immunization data—compare barcode data fields to relevant health information data standards

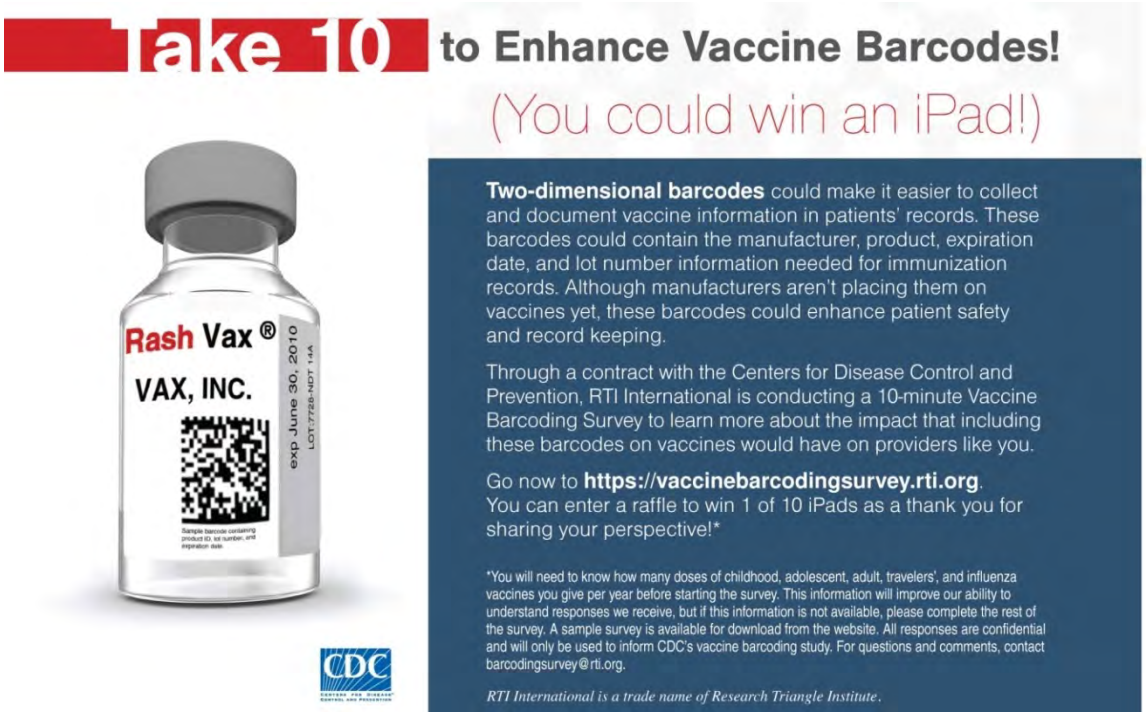
  2. Document the knowledge, attitudes, and beliefs of vaccine manufacturers, vaccine end users (principally primary care providers and health departments), and immunization data users

  3. Quantify the economic benefits and costs of adding a 2D barcode containing product, expiration date, and lot number data to vaccine product labels

Summary Results

- 2D barcodes are expected by all stakeholders to enhance safety via automated product verification (right product, right patient) and improve accuracy and completeness of records
- Scanning barcodes is expected to save about 35 to 39 seconds per dose for documentation
- When made aware of estimated scanner, workflow redesign, and training costs,
  - 79.5% of pediatric practices said they would use the barcode or would use it if they had an electronic health record (EHR) system
  - 69.8% of family medicine practices agreed
- Estimated net economic benefits to primary care providers (PCPs), local health departments (LHDs), manufacturers, and some public-sector organizations:
  - $326M to $349M, accruing between 2011 and 2023
  - Net present value (NPV) of $176M to $197M (7% discount rate)
  - Benefit-to-cost ratio of 2.7 to 2.8
  - Internal rate of return of 43% to 49%
- Lower-bound estimates exclude reductions in inventory carrying costs, extraimmunization, and wastage as well as enhancements in surveillance due to data unavailability; plus pharmacies, RBCs, and other immunization providers were not included in the quantitative analysis

Presentation Overview



- Results from data exchange analysis and standards mapping
- Summary manufacturers' analysis results
- Take 10! survey results
- Summary economic benefit-cost measures
- Questions and answers

Data Collection with Stakeholders to Assess Impacts

Manufacturers (FDA-Licensed Producers)	End Users (Professional Association)	Data Users and Other Stakeholders
Crucell/Berna Products CSL Emergent BioSolutions GSK Intercell MassBiologics MedImmune Merck Novartis Pfizer (Wyeth) Sanofi Pasteur	Pediatricians (AAP, AMA) Family practitioners (AAFP, AMA) Internists (AMA, ACP) Ob-gyns (ACOG, AMA) Physicians in general (AMA) Large health systems 317 grantees (AIM) VFC coordinators Pharmacists (APhA) Retail-based clinics (CCA) Hospitals (AHA) Visiting nurses (VNAA) Local health departments (NACCHO)	Immunization information systems CDC IIS Support Branch Amer. Imm. Registry Assn (AIRA) EHR vendors America's Health Ins. Plans (AHIP) HIMSS HL7 GS1 Healthcare US
Methods: Site visits, telephone interviews, economic analysis	Methods: Internet survey, group discussions, telephone interviews, site visits, economic analysis	Methods: Telephone interviews, standards mapping and validation, economic analysis
7 of 11 participated	>30 interviewees 3,669 valid survey responses	>30 interviewees

AAP = American Academy of Pediatrics; AMA = American Medical Association; AAFP = American Academy of Family Physicians; ACP = American College of Physicians; AIM = Association of Immunization Managers; APhA = American Pharmacist Association; CCA = Convenient Care Association; AHA = American Hospital Association; VNAA = Visiting Nurse Associations of America; NAACHO = National Association of County and City Health Officials

Expected Benefits of 2D Barcoding for Vaccines

Expected Benefit	Description
Enhanced patient safety	Ensure right patient, right product Avoid administration of invalid or unnecessary doses
Streamlined documentation	Use imaging technology to rapidly populate electronic records
More accurate and complete records	Eliminate inaccurate record keeping and manual entry
Avoidance of billing errors	Ensure that claims submitted to third-party payers are correct
Better data coverage and quality for downstream users	Reduce barriers to IIS participation and improve quality of records entered into IIS, VSD, VAERS, and other systems
Enhanced product recalls and withdrawals	Help public health authorities and providers rapidly locate patients having received recalled products
Improved inventory management	Allow providers to open saleable package and scan one unit to debit inventory

IIS = immunization information system (registry); VSD = vaccine safety data link; VAERS = Vaccine Adverse Events Reporting System

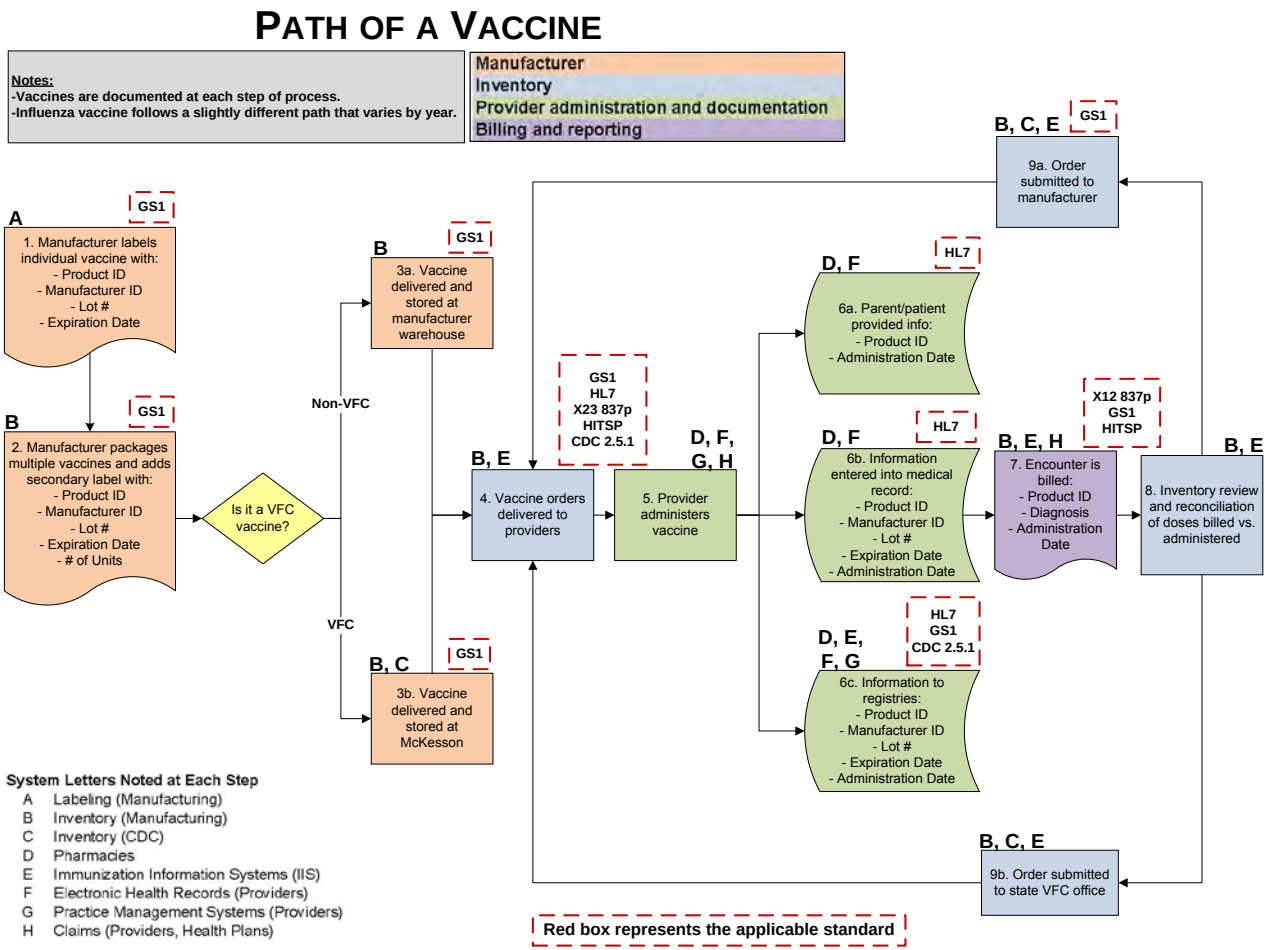
Expected Costs of 2D Barcoding for Vaccines

Stakeholder Groups	Major Costs
Manufacturers	Upgrading printing and imaging functionalities of vaccine product packaging and labeling lines
Immunizers (PCPs, LHDs, pharmacies, retail-based clinics, etc.)	Purchasing scanners, adapting immunization workflows, and training staff
Data users and the public health community • CDC, other HHS agencies • 317 grantees, IIS • AAP and other associations • IT vendors	Developing functionalities for information systems to ensure that product , lot, and expiry data are interpretable and can be exchanged across standards Providing educational, training, and troubleshooting support to more than 30,000 pediatric, family health, internal medicine, and ob-gyn practices and nearly 4,000 health departments across the United States Feasibility assessments, pilots, and infrastructure support

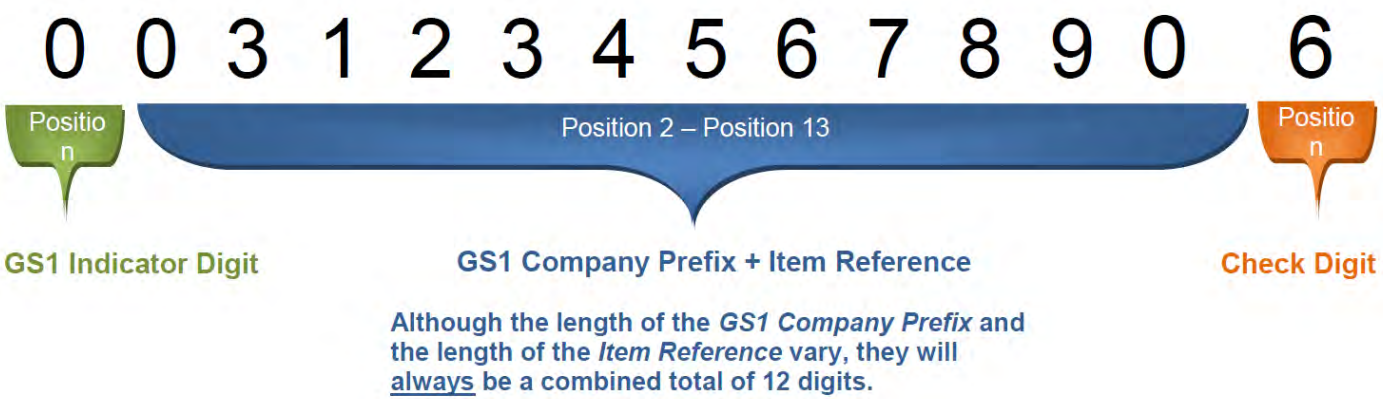
PCP = primary care provider; LHD = local health department

Product Data Passes through Different Systems

Different data standards govern different information systems, yet the data elements reflect the same contents. Thus, it is imperative to ensure that standards—in this case, GTINs—introduced into the data flow map accurately.



NDC within the GTIN Format



Courtesy of GS1 Healthcare US

Possible hypothetical NDCs (labeler, product, package codes) when parsing NDCs:

- 12345-678-09
- 1234-5678-09
- 12345-6780-9

NDC = National Drug Code; GTIN = GS1 Global Trade Identification Number

1:Many Relationship between GTIN and Other Standards

GS1	FDA NDC Components	HL7—Barcoding Message Segment	2.5.1 Implementation Guide	X12—837P Transaction	HITSP Immunization Messages	NCPDP
Global Trade Item Number (GTIN), including NDC as a consecutive string[d]	Labeler code	Administered code	Substance manufacturer name	Labeler code	Substance manufacturer	Labeler code
	Product segment	Substance manufacturer name	Administered code	Product segment	Administered code	Product segment
	Package segment	Administered barcode identifier	Administered drug strength volume	Package segment		Package segment
			Administered drug strength volume units			
Expiration date (YYMMDD)		Substance expiration date	Substance expiration date			
Batch or lot number		Substance lot number	Substance lot number		Substance lot number	

[a] The yellow cells denote how the GTIN is mapped, green denotes the expiration date, and orange denotes the lot number.
[d] The NDC within the GTIN is the information source for the other standards.

Mapping GTIN for Legacy Systems

- Reviews of standards for immunization messaging identified
  - 1-to-1 relationships for lot number and expiration date
  - 1-to-many relationship for product identification data (GTIN)

- Constraints
  - NDC originates vaccine product data for many systems
  - NDC components do not have defined character length (i.e., 4-4-2, 5-3-2, 5-4-1)
  - Many systems already rely on parsed NDC components to map to MVX and CVX (legacy manufacturer and product codes) using CDC-maintained tables

- Mapping of GTIN to NDC to MVX and CVX is needed:
  - *RTI recommended that CDC maintain this mapping; however, our recommendation is nonbinding, reflects only our view, and reflects our knowledge as of November 2011*
  - Is consistent with CDC's HL7 role for immunization messaging
  - Lowers social costs by avoiding duplicated mapping activity by vendors
  - Maintains availability, data quality, accuracy, and transparency

MVX = legacy CDC manufacturer identifier; CVX = legacy CDC vaccine product identifier

Impact on Vaccine Production

- 7 of 11 manufacturers, producing >90% of FDA-licensed vaccine products in the United States, participated in site visits and telephone interviews between November 2010 and April 2011

- Manufacturers' representatives provided information on
  - Perceptions of downstream benefits for patients and vaccine end users
  - Assessments of technical feasibility and any implementation plans
  - Key operational considerations
  - Capital requirements and estimated costs
  - Probable timelines for upgrading packaging and labeling lines

- Manufacturers' reviews of key market drivers
  - AAP leadership in conjunction with GS1 standards
  - Immunizers' increasing familiarity with health care technologies
  - Federal legislation supporting EHR adoption
  - Market demand from vaccine purchases, especially large integrated health systems and providers with EHRs

Summary Views

- 2D barcoding is technically feasible and will enhance patient safety while offering providers efficiency
- Must print variable lot number and expiry data in real time
- One-time implementation cost, with negligible incremental ongoing operating costs or benefits
  - Capital expense to upgrade packaging and labeling lines with printing and vision system technologies
  - Online barcode printing instead of off-site printing by vendors
  - Current production rates maintained, although for some packaging two printers will be required to maintain line speeds of 400 to 600 units per minute or more
  - No increase in reject rates expected
  - Elimination of peel-off labels from those products that did have them because they are incompatible with online printing
- FDA's pathway for requesting and receiving waivers unclear; desire a step-by-step protocol to follow, including information on required documentation for waiver request

Summary Manufacturer Analysis Results

Parameter	Value
Number of manufacturers included in the model	7 of 11 firms
Number of manufacturers with active implementation plans	5 of 7
Number of packaging and labeling lines to be converted	25 lines (15 U.S., 10 ex-U.S.)
Average implementation cost per packaging and labeling line	$1.22 million
Capital budget component	25–40%
Labor budget component	60–75%
Implementation time	12–24 months
Time frame of code appearance	2012–2013 (model set at 1/1/13)
Total implementation costs (2011–2013 total)	$30.6 million
Savings from eliminating peel-off labels (2013–2023 total)	$54.8 million
Weighted average savings per dose from elimination of peel-off labels (weighted by volume of syringes and single-dose vials)	$0.057 per dose
Net present value @ 10% (industry cost of capital)	$0.17 million

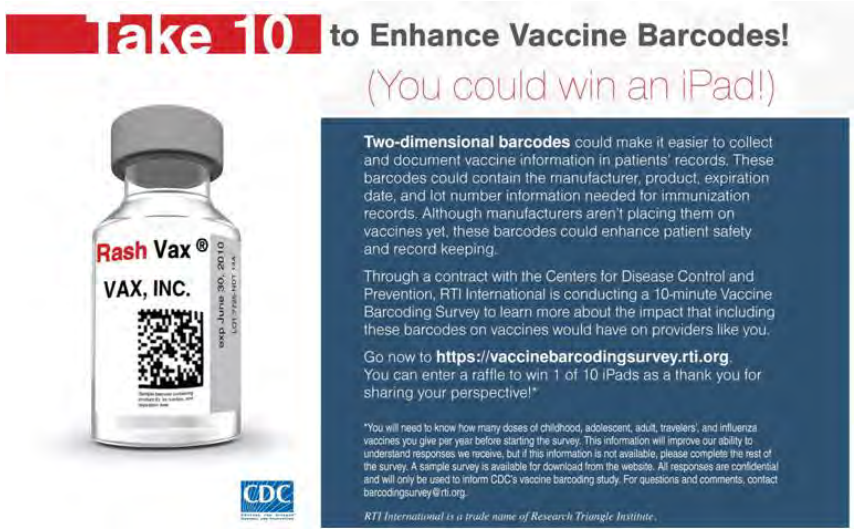
Note: Data are as of April 2011

Approach for Assessing Impacts on Immunizers

- Survey data collection to understand
  - Stated preference for using 2D barcodes
  - Technology usage (i.e., EHRs, other software systems, barcoding use)
  - Volume of immunizations performed
  - Workflow (staffing, labor utilization, practice layout)
  - Perceptions of technical assistance needs
- Analyses of time–motion studies to estimate cost savings of scanning 2D codes instead of manual record-keeping methods
- Analyses of analogous efforts and acquiring secondary market data
  - Costs for scanners and typical training time
  - Labor rates
  - IT requirements
  - Workflow redesign
  - Implementation decision factors

Internet Survey of PCPs and LHDs

- Fielded April 19–June 1, 2011
- Survey partners raised awareness using materials produced by RTI
  - AAP
  - AAFP
  - ACOG
  - NACCHO
  - VFC coordinators
- Raffled 10 iPads to respondents
- Providing results to VFC coordinators
- Not a representative sample, yet received 3,669 valid responses (of 4,568)
  - 2,816 primary care practices
  - 853 LHDs



Estimated Survey Coverage Rate

Respondents' Specialty	Size	Number of Responses	Percentage of Responses	AMA Masterfile Data (Practices)	Percentage of Practices in AMA Masterfile	Estimated Survey Coverage
Pediatrics	1–1.5 physicians	408	28.3%	1,392	28.2%	29.3%
	2–9 physicians	889	61.7%	2,582	52.3%	34.4%
	More than 10 physicians	145	10.1%	963	19.5%	15.1%
	Total	1,442	100.0%	4,937	100.0%	29.2%
Family practice	1–1.5 physicians	362	37.4%	3,146	32.9%	11.5%
	2–9 physicians	497	51.3%	5,173	54.1%	9.6%
	More than 10 physicians	109	11.3%	1,243	13.0%	8.8%
	Total	968	100%	9,561	100%	10.1%
Ob-gyn	Total	101	100%	5,725	100%	1.8%
Internal medicine	Total	57	100%	12,462	100%	0.5%
All practices		2,816		32,685		
LHDs		853				
Total		3,669				

Practice count was developed from the AMA Masterfile (2011) and NAACHO (2011). A representative survey was not possible in the period of performance allotted the project; the survey was distributed through VFC, AAP, AAFP, ACOG, NAACHO, AIM, and other channels via e-mail, blast fax, newsletters, blogs, and direct links to the RTI survey web site.

Average Number of Doses Administered per Year

Specialty	Vaccine Type	Average Annual Doses Administered by Practice Size		
		1–1.5 Physicians	2–9 Physicians	More than 10 Physicians
Pediatrics (n=1,369)	Childhood vaccines	1,842	5,885	27,409
	Adolescent vaccines	457	1,316	4,267
	Adult vaccines	15	60	745
	Travelers' vaccines	4	9	135
	Flu	417	1,621	5,570
	Total	**2,735**	**8,891**	**38,126**
Family practice (n=925)	Childhood vaccines	416	1,049	4,044
	Adolescent vaccines	151	367	1,096
	Adult vaccines	88	337	1,134
	Travelers' vaccines	6	11	58
	Flu	275	868	2,542
	Total	**936**	**2,632**	**8,874**
Ob-gyn (n=101)	Childhood vaccines	49	23	439
	Adolescent vaccines	72	89	199
	Adult vaccines	48	128	328
	Travelers' vaccines	-	1	-
	Flu	91	323	683
	Total	**260**	**564**	**1,649**
Internal medicine (n=51)	Childhood vaccines	70	982	200
	Adolescent vaccines	59	425	5
	Adult vaccines	159	602	2,783
	Travelers' vaccines	4	26	433
	Flu	265	992	1,350
	Total	**557**	**3,027**	**4,771**

Note: Few internal medicine and ob-gyn practices responded; results for these providers should be interpreted cautiously. A dose is defined for this analysis as a unit of vaccine product.

Current Information Systems Usage

What information systems are in use at responding practices currently?

Specialty (n=practices)	Electronic Health Record System	Practice Management and Billing System	Automated Data Input Devices, such as Weight Scales or Blood Pressure Devices	Barcoding and Barcode Scanning of any Type for Medical Supplies, Encounter Forms, Documentation, etc.	Other Computerized System
Pediatrics (n=1,293)	58.9%	87.6%	27.6%	11.5%	24.1%
Family practice (n=882)	69.3%	86.9%	32.0%	12.6%	20.9%
Ob-gyn (n=96)	66.7%	88.3%	25.3%	20.0%	19.7%
Internal medicine (n=57)	52.6%	83.6%	29.8%	12.3%	22.2%
Health departments (n=804)	35.7%	67.5%	27.5%	7.6%	45.1%

If no EHR system at present, when do they plan on adopting one?

Specialty	By the End of 2011	By the End of 2012	By the End of 2013	By the End of 2014	By the End of 2015	After 2015	Not Sure or Have No Plans to Adopt
Pediatric	11%	13%	4%	1%	0%	1%	11%
Family practice	10%	9%	4%	1%	1%	0%	6%
Ob-gyn	11%	13%	4%	0%	1%	0%	4%
Internal medicine	18%	12%	2%	0%	0%	0%	16%
Health departments	5%	8%	4%	2%	1%	1%	42%

Inventory Management

What methods or systems do you have in place for managing your vaccine inventory?

Specialty (n=practices)	Registry- or Internet-Based Inventory System	Inventory Software System Installed in your Practice	Computerized System that Is Part of your Practice Management and Billing System	MS Excel Spreadsheets or Similar Files Maintained by your Staff	Paper-Based Systems, such as a Ledger	None; We Simply Order When the Stock Looks Low	Other
Pediatrics (n=1,229)	43.0%	14.1%	39.3%	31.3%	58.5%	37.7%	13.2%
Family practice (n=827)	50.5%	12.6%	36.9%	23.4%	53.4%	43.5%	9.2%
Ob-gyn (n=91)	24.4%	18.9%	38.5%	18.2%	50.6%	50.0%	6.3%
Internal medicine (n=52)	25.0%	13.5%	37.3%	28.0%	38.5%	82.2%	25.0%
Health departments (n=792)	69.3%	29.2%	44.5%	32.6%	52.3%	27.3%	9.9%

Note: Respondents were allowed to choose all methods that applied.

Barcode Usage Survey Question

Consider the following: The American Academy of Pediatrics (AAP) is recommending that labels on vaccine vials and syringes have a two-dimensional barcode containing product name, expiration date, and lot number (see Figures 1 and 2).

Rather than have staff read and manually enter this information into records and forms, the information could be automatically scanned into your computer systems (patient records, practice management system, etc.) using an inexpensive handheld or tabletop reader. You could also use barcodes to track and manage vaccine inventory and insure vaccines administered are recorded in your practice management and billing system.

Using barcodes to record vaccine information in patient records may take less time, be more accurate, and ensure the proper vaccine is being administered. Using barcodes to manage vaccine inventory could decrease staff time spent to manually track inventory and could also insure proper billing of all vaccines administered.

Changes to practices include purchasing scanners (which cost about $300 each), training staff to use the barcode scanners, and modifying your computer systems to accept input from the barcode reader.

Based on this description, do you think your practice would use the barcode? Please select one choice.

- Yes, my practice would likely use the barcode.
- My practice would likely use the barcode if we had an Electronic Health Record system.
- No, my practice would not likely use the barcode.
- I do not know if my practice would use the barcode.

Figure 1: Example of linear barcode
Current linear barcodes required by the FDA contain only the vaccine product identification information.

Figure 2: Example of two-dimensional barcode
A two-dimensional, or data matrix, barcode can include product identification information as well as lot number and expiration date.

Note: Emphasis added for presentation.

Expected Barcode Usage

Specialty (n=practices)	Yes, My Practice Would Likely Use the Barcode	My Practice Would Likely Use the Barcode If We Had an Electronic Health Record System	No, My Practice Would Not Likely Use the Barcode	I Do Not Know If My Practice Would Use the Barcode
Pediatrics (n=1,226)	60.0%	19.5%	4.0%	16.5%
Family practice (n=861)	53.5%	16.3%	7.0%	23.2%
Ob-gyn (n=94)	48.9%	18.1%	12.8%	20.2%
Internal medicine (n=55)	34.5%	23.6%	5.5%	36.4%
Health departments (n=796)	39.2%	26.3%	3.6%	30.9%

Relative Importance of Adoption Decision Factors

Decision factors for barcode adoption (0 = unimportant, 4 = very important)

Rank	Factor	Score
1	Increased accuracy of records	3.657
2	Decreased time spent recording vaccine information and/or documenting immunization	3.631
3	Reliability of the barcodes	3.567
4	Usability of the barcode scanners	3.553
5	More efficient and accurate management of inventory	3.528
6	Readability of the barcodes	3.522
7	Cost of scanner(s)	3.198
8	Potential decrease in the number of vaccines that do not get billed to a private payer	3.182
9	Training	3.068
10	Possible changes to workflow	2.972

Note: Data are for PCPs only; responses for LHDs were not substantially different.

Perceptions of Technical Assistance Needs

Specialty (n=practices)	Software Support for Integration with Electronic Health Record System (Rank)	Software Support for Integration with Practice Management and Billing Systems (Rank)	Software Development for Integration with your State or Local Immunization Registry (Rank)	Guidance for Integration of the Barcode into your Practice's Workflow for Immunization (Rank)	Staff Training (Rank)	Scanner Selection and Installation (Rank)	Other
Pediatrics (n=1,267)	79.9% (2)	62.5% (6)	68.0% (4)	65.2% (5)	80.9% (1)	79.8% (3)	7.7%
Family practice (n=862)	82.3% (2)	59.5% (5)	65.1% (6)	65.2% (4)	84.5% (1)	80.2% (3)	6.5%
Ob-gyn (n=93)	82.8% (1)	68.8% (4)	60.2% (5)	60.2% (6)	79.6% (2)	73.1% (3)	6.5%
Internal medicine (n=55)	74.5% (2)	63.6% (4)	50.9% (6)	52.7% (5)	67.3% (3)	80.0% (1)	5.5%
Health departments (n=789)	62.5% (5)	60.7% (6)	75.2% (4)	78.5% (3)	90.5% (1)	87.1% (2)	9.9%

Other Notable Findings

- 7% (n=113) of all responding PCPs indicated that
  - they do not report to IIS now…
  - …but that their 2D barcode use would make them more likely to do so

- Typical private office will have 3 to 4 scanners; LHDs will have 7 to 8 scanners
  - Depends on number of nurses' stations, laboratories, or immunization rooms
  - Expected to be installed at nurses' stations or in laboratories – adjacent to or near day-use and principal vaccine storage locations

- Staff positions most likely to be involved in preparing vaccines for administration or documenting immunizations are registered nurses, licensed practical nurses, and medical assistants

Modeling Costs and Benefits

- Practice and LHD count data from AMA Masterfile and NACCHO
- Survey data on respondent characteristics
  - Specialty, size (# MDs)
  - Number of immunizers, by labor category
  - Number of doses administered per year
  - Number of locations where vaccines are prepared
  - EHR usage
  - Stated preference to use 2D barcodes
- Interview data with providers, vendors, and practice management experts and secondary data
  - Wage rates, cost of employment multipliers
  - Scanner locations and cost
  - Training and workflow redesign requirements
- Time–motion analysis results

RTI Analysis of Verden Group Time–Motion Study

Study	Activity-specific time measurements, down to documentation item level 724 doses administered to 302 patients in 33 pediatric practices in 17 states		
Results	221.0 seconds for immunization, of which 62.9 seconds is for documentation		
		With EHR	**Without EHR**
Revised documentation time		23.5 secs	26.4 secs
Estimated savings in documentation time		39.4 secs −63%	36.5 secs −58%

Example Family Practice, 2–9 MDs, Uses EHR

	Technical Measure	Economic Measure	Cost
Workflow redesign	8 hours, lead nurse time	$54.60/hour (loaded)	$437
Scanners and O&M	3.08 scanners	$300/scanner	$924
Immunizer training	7.46 staff (LPN, MA, NP, PA, RN, MD)	$37.76/hour (loaded, weighted by position)	$282
Expected adoption cost			$1,643 (one time)
Expected benefits	39.4 seconds/dose 2,632 doses/year 28.8 hours/year	$32.02/hour (loaded, weighted by position)	$922 (per year)
Expected costs	7% of scanner cost	$21/scanner	$65 (per year)

Wage rate data provided by Bureau of Labor Statistics; scanner costs based on market reviews as of April 2011; workflow redesign and training costs based on vendor assessments of similar technology adoption programs from Wyoming (scanners) and Wisconsin (signature pads). Excludes several benefit categories for which quantitative data were not available.

Provider Benefit-Cost Estimates, 2013–2023 (Scenario 1)

Specialty	Adopting Practices/ Total Practices	Total Benefits ($ million)	Total Costs ($ million)	Net Benefits ($ million)
Pediatrics	3,712/4,937	228.0	22.8	208.2
Family medicine	6,521/7,561	87.8	37.2	50.6
Ob-gyn	3,549/5,725	12.8	13.3	-0.4
Internal medicine	6,639/12,462	42.0	26.1	15.9
LHDs	1,841/3,669	77.1	14.7	62.4
Total		447.8	114.2	333.6

Note: Results for ob-gyn and internal medicine practices should be interpreted cautiously because of the low numbers of survey responses.
Note: Scenario 1 refers to model case in which the rate of barcode usage adoption is established by providers' stated preference to use the barcode and existing IT infrastructure. Scenarios 2 and 3, not presented here, slow the rate of adoption by 50% and 67%, respectively, to assess what the costs and benefits would be should providers' not follow their stated preference.

Quantified Benefit-Cost Estimates, 2011–2023

Measure	Scenario 1, Rate of Adoption Set by Survey	Scenario 2, Rate of Adoption Slowed 50%	Scenario 3, Rate of Adoption Slowed 67%
Total benefits ($ million)	501.87	481.36	460.82
Total costs ($ million)	−153.33	−139.66	−134.53
Net benefits ($ million)	348.53	341.71	326.29
Net present value (7% discount rate)	196.81	188.10	175.97
Benefit-to-cost ratio (7% discount rate)	2.7	2.8	2.7
Internal rate of return	49%	46%	43%

Observations and Limitations

- Analysis is a lower-bound prospective analysis:
  - Costs more easily determined than benefits, given differences in tangibility
  - Excludes benefits for inventory management and reductions in extraimmunization, among others
  - Excludes benefits and costs for pharmacies, retail-based clinics, IIS, and immunization programs, among others
- Only the period from 2011 to 2023 was analyzed
- Results reflect perceptions and plans as of 2011, and market drivers or other issues may affect projections
- Sensitivity analysis used upper- and lower-bound time–motion savings, eliminated internal medicine and ob-gyn practices because of poor coverage rate
  - Benefit-to-cost ratio widens to 2.4 to 3.0 (7% real discount rate)
- Canadian barcoding initiative is most similar; however, many countries have product identification and track-and-trace initiatives underway

Summary Results

- 2D barcodes are expected by stakeholders to enhance safety via automated product verification (right product, right patient) and improve accuracy and completeness of records
- Scanning 2D barcodes saves about 35 to 39 seconds per dose for documentation
- When made aware of estimated scanner, workflow redesign, and training costs,
  - 79.5% of pediatric practices said they would use the barcode or would use it if they had an EHR system
  - 69.8% of family medicine practices agreed
- Estimated net economic benefits to PCPs, LHDs, manufacturers, and some public-sector organizations
  - $326M to $349M, between 2011 and 2023
  - NPV of $176M to $197M (7% discount rate)
  - Benefit-to-cost ratio of 2.7 to 2.8
  - Internal rate of return of 43% to 49%
- A mapping of GTIN to NDC to MVX and CVX is necessary for IT systems

Thank you!

- Questions/Comments:
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QUESTIONS?