



SnapShots

Immunization Information System News From the American Immunization Registry Association

FROM THE PRESIDENT

With the advent of the H1N1 novel influenza epidemic and the volume of H1N1 vaccine administered, the capability of immunization information systems (IIS) throughout the nation to innovate and respond to public and community health provider needs' has been profound. The focus of this special issue of *Snapshots* is to provide some examples of how IIS have been able to work with immunization programs to implement changes in their electronic system and operational processes to respond to this gargantuan effort. In reality, we could create a book on how IIS have been used in to track, monitor and report H1N1 vaccine usage and patient follow-up. For the many IIS that were not able to submit a 'snapshot' of how their system was involved in H1N1 activities over the last six months, I invite you to submit your lessons learned and best practices to AIRA so that we can continue to learn from each other and ensure that our systems grow and flourish. Meanwhile, please enjoy reading this special *Snapshots* issue and learning about each of these IIS experiences and insights in regards to their H1N1 novel influenza vaccine tracking and management activities.

On a different note, by the time you receive this issue, the AIRA President's gavel will have been passed back to Sherry Riddick, AIRA past-president as I have taken another position out of the IIS management community. It has been an honor for me to serve you as President over this brief period and I am certain that another very capable AIRA board member will be chosen by you to lead the association. Thank you for putting your confidence in me and allowing me to be a part of the highly competent and responsive AIRA Board. I have made many friends and gained valuable knowledge and insights throughout my involvement on AIRA committees, the Board and during my short tenure as President. I wish you all the best success in your continued IIS efforts!

Warmest regards,

Anne Cordon (San Diego), AIRA President

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Alaska VacTrAK Sees Success and Lessons Learned in H1N1 Vaccine Campaign

INVENTORY TRACKING ISSUES WITH EMRS

VacTrAK (Alaska's Immunization Information System) was implemented in 2009. As part of H1N1 Influenza activities that year, Alaska elected to track all H1N1 influenza vaccine inventory using their IIS.

To accomplish this goal, all 337 of our registered providers receiving H1N1 influenza vaccine were required to report their administration data at the patient level. Immunization staff entered all H1N1 influenza vaccine inventory received in Alaska into VacTrAK and then doses were distributed in the system to each provider's inventory.

This set-up worked well for the 81% (n=272) of facilities that entered their data manually into VacTrAK. These providers could choose from the pre-populated list of their available lots when entering data. The challenge was working with the data imports from Electronic Medical Record (EMR) systems. There were 19 (6%) providers sending their data by HL7 and 46 (14%) submitting by flat text file. In VacTrAK, the imported vaccine has to exactly match the lot number, manufacturer and expiration data in the provider's inventory for that vaccine to decrement.

We devoted three full time staff to quality assurance to identify and clean the inaccurate data importing from the EMRs. Almost all of the issues resulted from mistakes and/or typos within the provider's EMR system for these three crucial components. The most problematic EMRs were ones that would not let the provider enter the lot once to populate a drop-down list, but instead required the provider to enter all of the vaccine lot information into a text box for each vaccine administered.

From this experience, we have learned that our IIS demands perfection when matching up vaccine lots to decrement. While we experienced successful results with the manual data entry, the problems experienced with the electronic imports has forced us to reassess our future plans for inventory management for all publicly supplied vaccine. As

more providers implement EMRs and elect to electronically submit their immunization data, this will become a larger issue.

MASS PROVIDER TRAINING

VacTrAK was implemented with 65 facilities submitting data on all administered immunizations. For the H1N1 influenza vaccine campaign, Alaska decided to track all H1N1 influenza vaccine doses administered in the mass immunizations module of VacTrAK by requiring all providers to report their administration data within 48 business hours to VacTrAK by manual data entry, paper form or electronic import. This amounted to a significant number of Alaskan providers that would need training on VacTrAK in order to enter their H1N1 influenza vaccine administration data.

A total of 337 providers registered to receive H1N1 influenza vaccine in Alaska. Of these providers, there were 218 (64%) new facilities to train on VacTrAK manual data entry. Due to the limited time to train this large number of providers in our vast geographic area, we elected to use alternative methods of training. We utilized Go To Meeting software to record and archive a short training (14 min) for the mass immunizations module of VacTrAK. A step-by-step user guide and troubleshooting tips guides were also created and posted on the VacTrAK homepage for users.

All 218 new facilities were able to successfully enter their H1N1 administration data. From the providers we spoke with, we received positive feedback of how easy the system was to use. While this limited training is not ideal for the full system, we are considering creating more short archived training videos on various topics for VacTrAK users to watch on demand.

Mara Ohrt and Geri Yett (AK)

KIDSNET's Response to H1N1

KIDSNET is a children's preventive health registry that includes immunizations administered to individuals 0 through 18 years of age. KIDSNET had two goals for its H1N1 response:

1. Rapid inclusion of child-specific H1N1 data into the registry.
2. Provision of tools for healthcare providers to determine which children in their practice needed either an initial or a second dose of H1N1 vaccine.

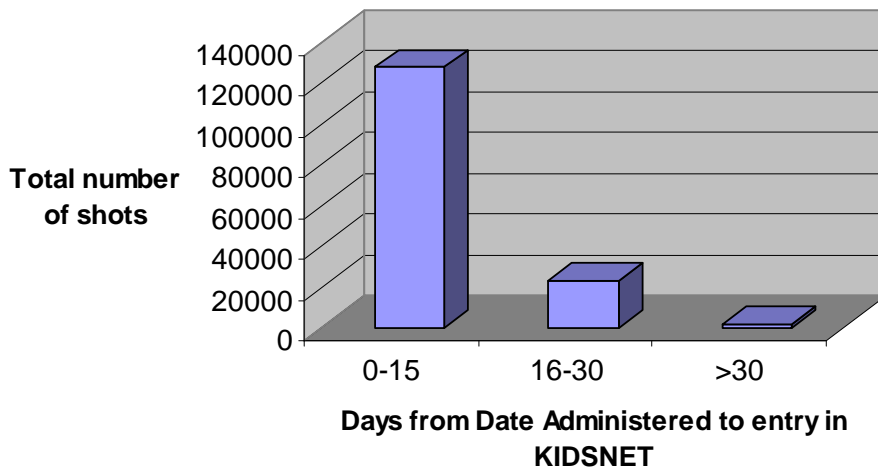
which did not require many of the data elements usually obtained with other immunizations, was created specifically for H1N1. With the addition of extra data entry staff, almost all H1N1 forms were entered within 24 hours of receipt. Staff contacted practices that submitted incomplete forms via telephone for additional data rather than returning incomplete forms by mail.

Rhode Island conducted H1N1 clinics in all public and private schools in the state. A single contractor recorded data from all of these clinics. KIDSNET worked with the contractor to develop an HL7

interface with KIDSNET for the submission of data from the school clinics. This single source accounted for 75% of all H1N1 data recorded in KIDSNET during this time period and was critical to assuring the rapid inclusion of data.

Two reports were developed and made available to providers on the KIDSNET web interface:

**Timeliness of H1N1 vaccination documentation in KIDSNET
Rhode Island September - December 2009**



By December 31, 2009, Rhode Island had recorded 151,604 doses of H1N1 vaccine administered in KIDSNET. Ninety-nine percent of the H1N1 vaccinations were recorded in KIDSNET within 30 days of vaccine administration, and 84% were recorded within 15 days. Less than 1% was recorded 30 or more days after the date of administration. Eighty-four percent of all H1N1 data submitted to KIDSNET were transmitted using HL7 immunization messaging. The remaining data were submitted either in an electronic flat file or on paper for data entry.

To ensure the rapid inclusion of H1N1 data for providers who submitted data on paper forms, a separate pink data sheet was created exclusively for H1N1. These brightly colored data sheets were easily separated from other data entry sheets and prioritized for data entry. A rapid data entry screen,

A listing of patients in the practice eligible for a first dose of H1N1 vaccine.

A listing of patients in the practice who needed but had not yet received a second dose of H1N1 vaccine.

Providers could also view an individual patient's H1N1 vaccine history. Since 99% of the data were incorporated into KIDSNET in less than 30 days, information was available in a timely manner for utilization during office visits and for scheduling office visits for initial or second H1N1 dose administration.

Kim Salisbury-Keith (RI)

Using the North Carolina Immunization Registry (NCIR) to track H1N1 vaccinations

The North Carolina Immunization Registry (NCIR) is not yet fully deployed to our private provider sector but is fully deployed in all 100 local health departments (LHDs) across the state. Seventy-three of these LHDs chose to enter their H1N1 doses in the NCIR. Approximately 30 - 40% of private provider offices in North Carolina choose to use the North Carolina Immunization Registry to report H1N1 doses administered electronically. The immunization registry is a secure web-based clinical tool that serves as the state's key method for collecting vaccinations data. North Carolina did not require the use of the Registry for H1N1 doses administered; many providers still chose to enter into the system. Use of the registry helped many divisions in North Carolina facilitate the tracking of H1N1 vaccinations and disseminate information in a timely manner.

Methodology

Providers were asked to have all H1N1 doses in the NCIR or to fax back their aggregate forms to the state by Monday at noon for the week's prior administration. (Those providers that do not currently use NCIR or choose not to enter H1N1 vaccination information electronically convey the data via a paper report). After the first three weeks of H1N1 vaccinations, the state also called back providers that had not reported to make sure they could capture all possible doses administered.

Every Tuesday afternoon, the Registry Unit ran a query from the system for H1N1 doses administered as well as from our paper-based Access database. These queries from the two sources were imported to Vacman to produce summary counts. The state then inputted those reports into the CRA system as option 2. Providers that did not report their data went on a non-responder list; if no data was reported for a two-week period, no additional vaccines were allocated to these providers.

The state also developed a Mass Vaccination Screen in the registry to help streamline data entry when dealing with a large volume of patients, particularly during mass vaccination clinics. Providers can input information for 10 patients and

two vaccinations at a time. A focus group convened before implementation of the screen provided valuable input and allowed the state to create an enhancement to their IIS that was most suitable for the end user. The state also created a training module to assist providers in using the screen easily and effectively. The State continued to receive feedback from many nurses who used the mass vaccination screen during mass immunization clinics and found it very beneficial.

How was the use of the NCIR to track vaccinations beneficial?

Using the NCIR to document H1N1 doses was helpful to the state because the information we needed for CRA reporting was already entered in the NCIR. All that was needed was to query the system to obtain the data. With paper reporting, a great deal of data entry was required before we could assemble the information needed. We did hire approximately four additional H1N1 Help Desk Staff to accomplish this. Our system also monitors inventory, and this was very helpful for us and our providers using the registry when H1N1 vaccine was recalled or the expiration date shortened.

Use of the NCIR to record H1N1 doses benefited the LHDs also. It required slightly more effort at the time of administration, but when it was completed, no further reporting was required and the reminder/recall function could be utilized to track when children needed to come back for their second dose of H1N1 vaccine. Also, the mass vaccination screen that was developed specifically for the H1N1 campaign allowed providers to document by presetting some fields such as the clinician ordering the vaccine and the person administering the vaccine. LHDs seemed very pleased with this additional feature and it can be used for other mass clinic situations such as large seasonal flu vaccine clinics and back to school clinics. The only downside to the mass vaccination screen was that it seemed to result in many duplicate client records in the NCIR. Therefore, we instituted further changes to reduce the chance of this occurring and hired two additional temporary staff to go back and remove duplicate records.

Links: <http://www.immunizenc.com/NCIR.htm>

Jammie Johnson (NC)

Sacramento County – A Community-Wide Response to the H1N1 Epidemic

On November 3, 2009, a state of emergency was declared in Sacramento County by the Department of Health and Human Services. The declaration was a result of more than 300 residents being hospitalized with H1N1. Lynnann Svensson, Immunization Program Coordinator for Sacramento County, reached out to the community to address the issue. Among several responders were the California Immunization Registry of Greater Sacramento (CAIR) and 2-1-1 Sacramento, programs of the Community Services Planning Council (CSPC).

Sacramento County held 35 H1N1 clinics from November 2009 through January 2010. The high volume of people attending these clinics made it impossible for clinic staff to manage traffic, vaccinate, and enter data into CAIR all at once. CAIR partnered with the Sacramento County Immunization Assistance Program (IAP) during the H1N1 epidemic. The partnership enabled Sacramento IAP to focus on vaccinating patients.

CAIR of Greater Sacramento serves El Dorado, Nevada, Placer, Sacramento, Sutter, Yolo and Yuba counties. The original plan was to enter data into the registry immediately as vaccinations were given. Instead, to save time and space, Sacramento County IAP and CAIR administrators determined data entry would be done later at a separate location. The patient would sign a disclosure form, which included the vaccine and lot number. After each individual clinic, the disclosure forms were collected and sent to one centralized location where the records would be added to the registry. This workflow allowed the nurses and clinic volunteers to streamline the vaccination process.

CAIR of Greater Sacramento managed all data entry activities. Over 40,000 shot records were entered. A CAIR team was responsible for providing access, training, and ongoing support to the data entry employees of Sacramento County. A requirement of the State of California is that all shot records from the clinics be entered into the registry within a week after the shot is given. In order to meet this requirement, several steps were made. Sacramento County centralized all data entry

activities to one office location. The disclosure forms were organized in boxes by clinic day. Records were added one box at a time; this helped staff add shots quicker because they did not have to look at the date for each shot. While the patient records were added, CAIR staff regularly managed the vaccine inventory. Sacramento IAP provided weekly emails which included vaccine lot information to input.

After a majority of the records were entered, Sacramento County determined it would be beneficial to utilize some of the advanced features of the registry. They wanted to use the registry to send postcards, reminding people about their 2nd dose, and run reports that illustrate demographic populations the H1N1 clinics reached. A lesson learned during this event is to determine all information that should be entered by anticipating possible reports that would be useful in the future.

Since the epidemic began, 2-1-1 Sacramento, a program of CSPC, provided phone support for the local public health departments addressing the community's questions regarding H1N1. 2-1-1 acted as the first line of responders and took the load off local public health departments. Sacramento County Public Health Department provided a question and answer script to deal with common questions people may have. This allowed the public health departments to deal with bigger issues. Each caller's basic information is stored in a database; this allows 2-1-1 administrators to pull reports that illustrate who they serviced.

During the H1N1 emergency, CAIR and 2-1-1 Sacramento put other priorities aside to assist in a community-wide response. From January 2010 to the end of February 2010, there were 11 confirmed cases of H1N1 in Sacramento County, a significant drop from the previous seven months. The partnerships between CSPC programs and local public health departments, enabled health officials to focus on protecting the community through H1N1 clinics. CAIR learned that establishing clear communication channels and assigning leadership allowed for a successful response. H1N1 highlighted the importance of community partnerships and strengthened the awareness and capabilities of an immunization registry.

Abraham Daniels and Jeanine Butler (CA)

Hawaii Immunization Registry Realizes Expanded Patient Record Database in Wake of H1N1

The Hawaii Immunization Registry (HIR) was initially implemented in September 2008 with the enrollment of seven providers entering data via the user interface. Because HIR does not receive comprehensive population-based data, such as birth information from vital record feeds, the State did not anticipate a significant number of patient records would be entered into HIR during this initial implementation period.

As a condition stipulated in the 2009 H1N1 influenza vaccine provider agreement, immunization providers were required to report 2009 H1N1 vaccine administration data to the Hawaii Department of Health (HDOH). By capitalizing on the availability of large amounts of data from the 2009 H1N1 influenza vaccination program and by utilizing a variety of mechanisms to capture these data, Hawaii has been able to significantly increase the population of its registry within a relatively short time frame.

Providers were given a choice of the following mechanisms to meet this reporting requirement.

- enter data directly into HIR via the user interface or electronic data transfers;
- submit hardcopy forms to then be manually entered by HDOH staff; or
- enter data into another web-based HDOH system, which would then regularly transfer the data to HIR.

Providing several mechanisms for providers to comply with the reporting requirement resulted in increased reporting, which in turn has supplied the State with data needed to monitor vaccine usage and identify demographic and geographic pockets of need.

Before the 2009 H1N1 influenza vaccination program, HIR contained the immunization records of 1,900 patients, all entered via the user interface. As of March 8, 2010, over 284,000 patient records have been created in HIR (approximately 24% of the State's total population), appreciably populating the registry in a matter of months rather than years. Having this expanded database available in HIR has

allowed HDOH to monitor 2009 H1N1 influenza vaccine usage and will assist in encouraging providers to integrate the registry into their practice as participation in HIR becomes available statewide.

Gail Ogawa (HI)

Ohio's ImpactSIIS Rises to Meet the H1N1 Challenge

IMPACTSIIS H1N1 PATIENT PRE-REGISTRATION SYSTEM

The Ohio Department of Health was challenged by the need to quickly add a module to our IIS, ImpactSIIS, that would enable the collection and usage of data for a variety of functions related to H1N1 vaccination. There were numerous goals that needed to be accomplished including creating a database that could enable clinic notifications and reminders for patients, reporting doses administered through CRA, and fulfilling other information needs and requests. The result was that the H1N1 Vaccine Application was created to add this functionality to ImpactSIIS in a matter of months.

The application included a feature that enabled Ohioans who were interested in vaccination to pre-register online. This involved patients entering demographic data for themselves and family members, as well as information regarding Tier 1 risk factors. Over 1.5 million Ohioans pre-registered in the application. Local health districts could use the patient pre-registration information entered to generate e-mail notifications to interested patients regarding upcoming clinics (e.g., notify all pre-registered Tier 1 patients of a clinic time and location). Additionally, when providers entered doses administered data, they did not need to enter demographic data (e.g., name, date of birth, Tier 1 risk factor) for patients who pre-registered, which streamlined both the registration and data entry processes for many clinics.

ImpactSIIS uses vital statistics data to populate some demographic data for infants born in Ohio; however, the ability to allow for patient pre-registration was a concept that had not been used in

the past. Allowing patient pre-registration offered significant benefits to both interested Ohioans and participating providers. By allowing individuals who self-selected themselves as interested in vaccination, local health districts could easily notify interested individuals of upcoming public clinics. Additionally, because of the massive efforts required to vaccinate millions of Ohioans, the ability to streamline the registration and data entry processes was welcomed by many providers. Immunization providers who did not have adequate resources to enter large amounts of doses administered data quickly appreciated having the ability to have patients pre-register prior to vaccination. The pre-registration system enabled pre-registered individuals to print a form with a unique ID number to the health care provider, which streamlined the registration process and reduced waiting time for patients in some clinic settings.

Anecdotally, the inclusion of the patient pre-registration component did simplify the registration and data entry processes for some immunization providers, although the degree of success is difficult to measure.

IMPACTSIIS AND H1N1 VACCINE ALLOCATION DATA

The Ohio Department of Health was challenged by the need to quickly add a module to ImpactSIIS (Statewide Immunization Information System) that would enable the collection and usage of data for a variety of functions related to H1N1 vaccination. This included data that could be used for vaccine allocations. The result was that the H1N1 Vaccine Application was created to add this functionality to ImpactSIIS.

In order to complete an equitable vaccine allocation method for 88 counties and over 3,000 providers during the weeks in which demand for vaccine far exceeded available supply, a significant amount of data was necessary. The application included population data which was specific to each Ohio county and included detailed population data according to ages and other risk factors (e.g., pregnant females). This enabled the first level of the allocation process to apportion a percent of the vaccine according to the proportion of those

residents in each county who were in the Tier 1 risk group. Providers within each county were enrolled in the application according to pre-defined provider types (e.g., pediatrics, family practice, internal medicine, local health district, hospital, OB/GYN, pharmacy). Each week, provider specific data was extracted according to the provider types for which vaccine orders would be placed that week. Each provider was required to enter data into the application indicating the estimated number of doses of vaccine needed for Tier 1 and non-Tier 1 patients. This additional provider level data was used to assist in apportioning each county's doses amongst individual providers. The outcome was measured by the ability to equitably direct vaccine shipments to those able to vaccinate Ohioans in the Tier 1 risk group. As more vaccine became available, providers were asked to revise their estimated numbers, to ensure that vaccine would be directed to providers who would best be able to use additional vaccine.

The ability to incorporate county-level population data into the application to use for vaccine allocation was unique to the H1N1 event. In past vaccine shortage situations (e.g., Hib vaccine shortage), vaccine was apportioned to each individual Vaccines for Children profile based on their provider profile data. Because of the nature of the H1N1 event and the limited quantities of vaccine initially available, the ability to incorporate population data contributed to a more equitable allocation process.

Inclusion of population data did contribute significantly to an equitable weekly vaccine allocation. During the initial weeks and months of vaccine distribution, vaccine allocation staff could analyze population and vaccine distribution data to ensure that each county was receiving an equitable proportion of vaccine, per the estimate number of residents in each county who were in the Tier 1 risk group. This enabled us to better work with local health districts and media outlets around Ohio to demonstrate that each county in the state was receiving an equitable amount of vaccine and that residents in each area of Ohio had relatively equal access to vaccine.

Amy Bashforth (OH)

Washington State's Immunization Registry Provides Timely Child Health and Safety Information to Parents

CHILD Profile, Washington State's Immunization Registry, has a Health Promotion component which functions as a centralized enhanced reminder system for children birth to age 6. The Health Promotion mailings are sent to parents at 17 age-specific intervals with reminders of immunizations and well-child visits due. The mailings are timed to be received 30 days before each AAP-recommended well-child visit, and list the immunizations parents should expect at each visit. The materials also contain information about nutrition, growth, development, safety and other important issues.

Over 45 individual health promotion materials are sent to Washington parents. Materials are:

- based on best practice guidance from professional child health and safety organizations, with extensive input from parents and health professionals;
- developed according to health education theory and comprehensive, formal evaluation;
- updated annually to provide the most current recommendations; and
- written at a 6th grade reading level, and translated into Spanish, to increase their accessibility.

All materials can be viewed and downloaded at www.childprofile.org.

The mailings are initiated from a weekly download of birth certificates. Mailings to children residing but not born in Washington can also begin once a provider or health plan submits demographic information. Language preference is provided via several data sources. Parents may also call to initiate mailings in Spanish.

Currently, 86% of parents of children birth to age 6 are sent the series of mailings, with a goal of increasing to 90%. As of 2/28/10, over 460,000 children under age 6 were on the mailing list, and 1.4 million mailings are anticipated to be sent in 2010. Each week, about 28,000 are sent to parents of children in the eligible age range. The 17 age-specific mailings contain many messages and

materials focus on educating parents about the importance of timely immunization for their child. Immunization content of the materials includes the recommended immunization schedule, diseases vaccines prevent, comforting a child during and after immunization, vaccine safety and more.

This year, as the H1N1 pandemic struck and messaging changed often in response to new information, CHILD Profile looked for ways to provide parents with the most up-to-date information. While an insert was being developed, it was understood that there was an immediate need to respond to the crisis. It was determined that printing a message onto the front of each envelope was a cost-effective and flexible solution. We were able to print this message: "It's flu season. Cover your cough. Stay home when you're sick. Get vaccinated. Stop the flu. www.doh.wa.gov/h1n1" onto 472,000 mailings in both English and Spanish. In this way, CHILD Profile was able to provide parents with a resource for up-to-date information on this urgent public health topic. Among other information, the website provided parents with up-to-date information on where to find H1N1 vaccine for children.

As flu season wore on, the message was changed to remind parents that two shots may be needed: "It's still flu season. Children under 10 need two doses of H1N1 vaccine. Talk to your doctor or clinic. Get vaccinated. Stop the flu. www.doh.wa.gov/h1n1"

An insert was also created, in both English and Spanish, to educate parents about H1N1. The topics covered on the insert were:

- At-risk groups
- Symptoms
- Vaccine types
- Care instructions
- General health and safety tips

This material was inserted into all mailings to the parents of children 6 months to 6 years old. We currently plan to stop mailing the insert in early April and expect that 363,900 inserts will have been sent to parents by then.

Laura Hutchinson (WA)

The Use of the Mississippi Immunization Information eXchange (MIIX) in the 2009 H1N1 Activities

In October 2009, the Mississippi State Department of Health (MSDH) Immunization Program implemented a new Statewide Immunization Registry in preparation for the rapidly progressing 2009 H1N1 vaccination campaign. The deployment of the 2009 H1N1 Mass Immunization Module, a component of the Mississippi Immunization Information eXchange (MIIX), was necessary to be able to conduct the required activities for vaccine administration and reporting for 2009 H1N1 vaccinations. MIIX is a product of Scientific Technologies, Inc. (STC).

The 2009 H1N1 Mass Immunization Module is a user friendly web-based application that allows 2009 H1N1 vaccinators to record immunizations, track vaccine inventory, generate reports, measure immunization coverage rates and issue reminder/ recall. The application was made available to all the MSDH 97 county health departments and all providers that were planning to administer the 2009 H1N1 vaccine. A quick reference guide and a MIIX Mass Immunization Module Tutorial were available on the MSDH website for all providers to access. In addition, training was available through a 1-800 help desk number.

Providers were required to complete the MSDH 2009 Influenza A (Novel H1N1) Provider Agreement Form as well as the MIIX User Agreement Form in order to administer the 2009 H1N1 vaccine. Information about the enrollment process was included in the Mississippi Morbidity Report which is distributed monthly to over 5,000 physicians statewide. Also, a message was sent out through the Health Alert Network as a Health

Advisory notice to direct providers to the agency website to obtain the forms. The forms could be submitted by fax or mail. A total of 1,254 providers submitted agreements. Once the agreements were approved, a packet of information was mailed to the providers to include vaccine order forms and vaccine information statements. Of the 1,254 providers that submitted agreements, 320 were current VFC Providers and 682 were new to the Immunization Program.

Vaccine orders were organized by provider type and processed based on the priority groups established by the CDC. Orders were entered through the MIIX system and then electronically uploaded to VACMAN and transmitted to McKesson for all quantities greater than 100 doses. All vaccine orders of less than 100 doses were processed through the MSDH Pharmacy.



Conference room becomes H1N1 command center.

MSDH used Public Health Emergency Response (PHER) funds to renew and strengthen partnerships with the Mississippi Department of Education (MDE), local public education school districts, and private schools throughout the state. Through these partnerships, MSDH developed a new initiative to target 2009 H1N1 vaccinations for children within the schools called the “Adopt-a-School Program”. Through this initiative, providers were encouraged to adopt-a-school in their local area, enter into a contractual agreement with MSDH, provide free vaccinations at school based clinics and enter the doses administered into the MIIX system for a \$5.00 reimbursement per dose administered. The goal of the Adopt-a-School program was to reduce the incidence of this new virus among school-age children throughout Mississippi. A total of 102 Private Providers and 92 county health departments enrolled in the program and adopted schools. A total of 859 schools were adopted.

MSDH provided the consent forms and Vaccination Information Statements for the school to disseminate to parents. The healthcare provider administered the vaccinations and entered the information by school into the MIIX system. The 2009 H1N1 Mass Vaccination Module provided an avenue to capture the name of the school within the provider’s access level and to run reports based on doses administered in each school, by provider, and to serve as a quality assurance method for payment of invoices.

Information obtained from the MIIX system allowed MSDH to report to the CRA weekly. The CRA reports were exported out of MIIX and uploaded every Tuesday to CDC without incident. Many of the reports that have been accessed from MIIX were used to assist us with providing up to date information about vaccine and vaccine availability for the general public and the media.

Several challenges were faced with the implementation of a new system for this mass vaccination campaign. Just in time training had to be conducted for the Immunization staff, the local Public Health District and county health department staff, and the private providers. Training continued as an ongoing process throughout the campaign. Procedures for testing, and quality assurance of a new system were required weekly to determine if the system met the requirements of MSDH before progressing to a production system.

The MSDH Immunization Program became a distribution center for processing agreements and entering vaccine orders for all 2009 H1N1 providers into the MIIX system. The Immunization conference room was turned into “The 2009 H1N1 Headquarters”, in an effort to keep all communication open and to offer a close training environment for staff using the system. The H1N1 team consisted of Registry and VFC employees; most housed within the conference room for four months. Laptops and extra phones lines were placed in the headquarters room to assist with the high demand of phone calls and inquiries regarding 2009 H1N1. Several temporary employees were hired at the state level as well as the district level to assist with the 2009 Novel H1N1 Campaign. STC staff worked directly with the Immunization staff in the headquarters during this campaign to make sure hands on training was available on an as needed basis.

The Immunization Program is currently conducting a statewide readiness survey to capture feedback from providers about the 2009 H1N1 Mass Immunization Module, the on-line tutorial and the quick reference guide. The survey also requests information about provider office technology and electronic capability for preparation of the full deployment of MIIX statewide.

Christie Levy (MS)

Sonoma County – Their Attempt to Move from *Experiment* to *Procedure*

Though not considered or discussed in the initial planning stages of Sonoma County’s 2009 H1N1 mass vaccination clinics, the idea of using CAIR (California Immunization Registry) to record and report was met with an openness to trying something new. The State fostered and supported the idea of registry use by notifying providers that information on H1N1 injections and nasal spray applications entered into CAIR would be downloaded directly from the registry and would require no additional reporting. In contrast, providers not using CAIR were required to submit usage reports weekly to the State.

Once the idea was introduced and philosophically accepted, several actions began. Staff:

1. Revised the clinic registration form to include a space to record the CAIR ID number.
2. Re-evaluated Identified clinic sites to determine their Wi-Fi capability.
3. Conducted an inventory of available laptops and wireless cards.
4. Identified and recruited potential clinic “volunteers” from department staff based on their previous usage and familiarity with CAIR.
5. Compiled a registry-related task list, i.e. create unique provider IDs for each site, load inventory, users and shot givers, and train volunteers, if needed.
6. Created a back-up plan if it became necessary to revert from automated to manual.

Our first two clinics were held simultaneously on a Saturday in mid-November. Both locations were area high schools. One site was conducted as a walk-through clinic and the other as a drive-through clinic. Scheduled to start at 10 AM, crowds gathered much earlier, and by the time the lines of cars or people began funneling through, several hundred were waiting. At the walk-through site, individuals were handed paper registration forms on clipboards as they stood in line and asked to complete one form for each person that would be immunized. For logistical reasons, we did not attempt to use the registry at the drive-through site.

Initially entering the registration area, attendees encountered six laptops with wireless cards, a maze of extension cords, six trained registry users and four “manual” registration staff. Since the clinic was set up in the school cafeteria, “workstations” were picnic-style tables with attached benches. With a blind eye to ergonomics, each “user” registered families as a group and individuals singularly. This allowed the screeners to keep family members together and facilitated the ability to use the “create new sibling” feature of CAIR. Fingers flew, unsupported backs ached and by the time the clinic ended at 4 PM, about half of the approximately 1500 attendees had been registered electronically. Not bad for a first try, though the downside was that there were still approximately 750 attendees to register and all immunizations had yet to be recorded.

Feelings were mixed.....those who did the electronic registration felt that they had done a great job “under the circumstances” (they did!) while clinic organizers felt that the data entry slowed down the registration portion (to the extent that users were recommended to stop doing data entry halfway through the clinic.....users refused!). Would the organizers allow electronic registration at the clinics scheduled over the next two upcoming months? They did, but electronic registration was done on-site at only three more clinics.

So what are the lessons learned from this attempt to integrate the immunization registry into a mass vaccination clinic?

In hindsight, it would have helped if the proposed use of the registry had been integrated into the initial planning of ALL phases of clinic, planning not only how the registry would be used for registration, but also

- Identifying a “registry lead” that would recruit trained registry users and/or train new registry users,
- Deciding how/when the immunizations would be entered,
- Assigning responsibility for “loading” all the necessary components of the provider site into the registry, i.e. obtaining a provider ID and loading users, shot givers and vaccine inventory.
- Designating staff to review all forms on-site during clinic, especially those taken at manual registration, for completeness/legibility, and
- Planning for post-clinic registry entry – who/how many/department staff or extra help and how that impacted both department and event budgets.

The advantages of using the registry became more apparent post-clinic. Though required to be kept, we could immediately archive the paper forms, knowing that the data is readily accessible and accurate. As mentioned earlier, the State pulled required reporting of vaccine usage directly from the registry with no need to submit anything additional. Clinic attendees that contacted the department seeking a “record” of receiving vaccine or spray could be serviced within seconds by simply finding the record online and printing out a “yellow card.” Data for each clinic and site remains

available for comparison, analysis and reporting as needs arise.

Will the department use the registry at future clinics? Hopefully, this “experiment” has proven the value of not only using the registry at mass vaccination clinic but also including the registry in all phases of the event, from pre-clinic planning to post-clinic activities and beyond....wherever the statistics can be usefully applied.

Sandra Salas (Sonoma County, CA)

IIS Data Quality Issues Resulting from Collection of 2009 H1N1 Influenza Vaccine Administration Data

It is perhaps not surprising that in pursuing the largest mass vaccination effort in the nation’s history, the rapidity of the response created opportunities for data collection and reporting errors. State Immunization Programs simultaneously managed rapid distribution of a new vaccine, recruitment/training of new providers, weekly aggregated data reporting, and a novel

virus, the behavior of which was not yet fully characterized. As many aspects of state Immunization Program response to the Novel 2009 H1N1 Influenza vaccination efforts are beginning to slow, it provides an opportunity to evaluate some of the important data quality issues, their potential causes and effects, and possible strategies for future improvements.

In March 2010, Scientific Technologies Corporation (STC) surveyed nine of the IWeb client states on the incidence of commonly reported data quality issues resulting from missing data or date entry errors. Six states shared their IIS results on the selected metrics, which are summarized in Table 1 (*H1N1-related Data Quality Metrics – Selected States*). State H1N1 vaccinations captured in the registry were roughly proportional to population.

Patient Address

Patient address is a critical field for states interested in conducting H1N1 reminder/recall initiatives or taking advantage of tools to contact patients as a result of manufacturer/lot recalls. While the percent of records with an address appears relatively high (range: 52% to 99%), an unspecified proportion of these results depended upon address-matching records through deduplication with existing records as opposed to address being captured/recorded at

Table 1. H1N1-Related Data Quality Metrics – Selected States (through 3/19/10)

	State A	State B	State C	State D	State E	State F
Number of total H1N1 vaccinations captured in registry (as of 3/5/2010)	135,889	616,185	307,099	464,454	704,759	343,389
Number and % of those patients with an address	117,530 of 124,047 (94.75%)	485,837 of 548,260 (88.61%)	144,420 of 278,800 (51.8%)	405,583 of 417,807 (97.07%)	617,016 of 632,671 (97.53%)	299,435 of 301,095 (99.45%)
Number and % entered with a lot number	135,070 of 135,889 (99.4%)	261,018 of 616,185 (42.36 %)	36,600 of 307,099 (11.92%)	454,231 of 464,454 (97.8%)	458,933 of 704,759 (65.12%)	342,792 of 343,389 (99.83%)
Number and % entered with campaign and tier associated	4,610 of 135,889 (3.39%)	1,289 of 616,185 (0.22%)	55,338 of 307,099 (18.02%)	223,688 of 464,454 (48.16%)	15,989 of 704,759 (2.27%)	339,047 of 343,389 (98.74%)
Number of patients older than 9 years with 2+ H1N1 vaccinations	737	2,777	2,156	2,253	2,627	1,882
Number of kids under 9 years with 3+ H1N1 vaccinations	104	633	301	191	471	146

* Denominators differ because states may have adjusted the number of registry records that include an address during database updates performed weeks to months after providers initially submitted records to the registry.

the point of service. One state reported that approximately 30% of H1N1 vaccinations reported to their registry initially lacked a patient address. In most cases, the lack of address capture resulted from state level administrative decisions that address would not be a required field for capturing H1N1 administration.

Lot Number

Capture of lot number is essential to accurate tracking of vaccine inventory, as well as the ability to perform manufacturer/lot recalls. Population of this field varied greatly among the 6 states reporting, ranging from 12% to 99%. Missing lot numbers resulted from two primary factors: 1) state level administrative decisions that lot number would not be a required field for capturing H1N1 administration, and 2) imported data from external data systems frequently arrived without lot numbers.

Campaign/Tier

Campaign and tier information is of particular interest in event monitoring and after action reporting. Early in the H1N1 response effort, it was determined by CDC that reporting of campaign/tier would not be required. As such, many states opted not to capture priority group information for H1N1 vaccine distribution – resulting in a range of 0.2% to 48%. A number of states mentioned that after the fact, campaign/tier would have been very helpful as reporting/evaluation metrics.

Number of Doses per Patient

Many data entry errors were tied to the date of vaccination. Data for a single patient could potentially be received through multiple data entry processes – manual entry at point of service, post-dated data entry, and data imports via HL7 or flat file. Occasionally this resulted in conflicting dates that were outside of administrative system configurations to auto-reconcile dates within +/- X number of days of each other. Reviewing metrics such as children ≤ 9 years of age with 3 or more vaccinations or patients older than 9 years with 2 or more vaccinations, provides an opportunity to identify these patients and correct the patient record.

Generally most data quality issues could be attributed to lack of requirements to capture desired

field(s), multiple reporting sources and human keying errors. As a result of the H1N1 response, states now have a better idea of the sources and potential solutions for future data quality issues. Looking forward, several strategies could be employed to improve data quality during rapid response scenarios:

- Give new providers access to a mass dispensing module rather than full-registry access to purposely limit data entry screens to only the fields required/desired for the specified event.
- Employ barcoding technology for more efficient and accurate data entry.
- Strengthen the content of Provider Agreements and training materials to specify required fields and special data exporting requirements.
- Establish automated data quality queries to help IIS staff to identify data issues early and often, along with tools for correction such as patient lists and provider level assessments.

Data quality is a critical element of both routine and emergent immunization efforts. The national response to Novel 2009 H1N1 Influenza has highlighted new vulnerabilities of registries to data errors during a period of sustained increased use.

Danielle Reader-Jolley and Erich Daub (STC)

Provider Recruitment and Retention Following Novel 2009 H1N1 Influenza: Results from a Registry User Consortium

The 2009 H1N1 response effort provided a unique opportunity for states to recruit, train and possibly retain new providers in the IIS. With new providers comes increased use of the registry resulting in increased data input and ultimately more complete centralized records. Further, it provides opportunity for a new mix of providers and a pool of already trained users for future response efforts. State Immunization Programs, having enrolled hundreds of H1N1 vaccine providers new to their state registry systems, are now seeking to sustain their participation beyond the H1N1 response, thereby

multiplying their vaccination efforts and the scope of their registries.

Provider Enrolment During H1N1

Six IWeb client states shared comparisons of their provider participation metrics from before and after their initial H1N1 Influenza response (*Table 1, Experience With Provider Enrolment During H1N1 – Selected States*). Some states reported doubling their participating provider sites – one state observed an eight-fold increase in participating providers within a three-month period. A significant proportion of newly-participating providers were “non-traditional” providers: pharmacies, OB/GYN and other specialty practices. In several states,

pharmacies represented one of the largest categories of new providers. Some states enrolled all providers meeting their criteria and determined separately which providers would receive vaccine shipments. Many of the new providers were practices serving adult populations – some states do not currently have legislative authority to collect adult immunizations in their registries.

Challenges of Working With New and “Non-Traditional” Providers

Dealing with new H1N1-specific providers while also managing the distribution and tracking of millions of vaccine doses posed unique challenges for state Immunization Programs. Among those

Table 1. Experience with Provider Enrollment During H1N1 -- Selected States (through 3/5/10)

	State A	State B	State C	State D	State E	State F
Number of Providers in the Registry before H1N1	42	1109	321	1,094 ^{***}	498	2,455
Number of Providers added to the Registry specifically for H1N1 doses administered reporting	298	30 [*]	436	Two statewide pharmacy chains; 0 to few additional Providers ^{***}	391	682
Type of Providers joining specifically for H1N1 efforts	OB/GYN: 18 FP/Internal Med: 78 Pediatrics: 11 Hospitals: 23 Pharmacy: 16 State PH: 21 Tribal health: 22 Schools: 6 Other: 103	Unknown distribution (Includes FP/Internal Med.; Specialty care Providers; clinics; Urgent Care)	OB/GYN: 27 (6%) Fam Pract: 114 (26%) Pharmacy: 100 (23%) Hospitals: 41 (9%) Other ^{**} : 154 (35%)	Pharmacy Chains (2)	Indeterminate mix of OB/GYN, Hospitals, and Pharmacies ^{****}	OB/GYN: 17 Fam. Pract.: 538 Hospitals: 2 Pharmacies: 125
Number of new Providers likely to continue utilizing the Registry	~150 (50%)	~20	None	Pharmacies	Estimates 5% to 10% will remain participants	Estimates 5%
Type of Providers likely to continue utilizing the Registry	Unknown – expect representation from all Provider types	Unknown	N/A	N/A	Unknown – expect representation from all provider types	Unknown – Family Practices

* Undercounts pharmacies due to confounding caused by coincident legislation adding pharmacies to list of eligible vaccine providers. Also, Registry participation was not a requirement of H1N1 Providers.

** Includes: pediatrics, public health, urgent care, nursing homes, etc.

*** Excludes two statewide pharmacy chains added specifically for H1N1.

**** Some Local Health Jurisdictions entered data on behalf of a few non-participating Providers.

most commonly observed were the following:

- *Problems with mandating or enforcing provider reporting to the registry.*
About half of states sharing information about their H1N1 experience were able to require that providers report H1N1 doses-administered to the state’s registry. However, the remaining states did not have an enforcement mechanism and subsequently felt that this negatively impacted reporting to their registry.
- *Managing the influx of new providers placed new staffing burdens for Immunization Programs.*
The volume of new providers typically required a large effort to validate their status before enrolling them. Most states registered providers before determining who and how many would receive vaccine shipments. In some instances this may have created unfulfilled expectations among some new providers, with little time and resources available for Immunization Programs to address such concerns.
- *“Non-Traditional” providers are unique.*
Many new providers served exclusively adult clientele which, in some states, were not required to be reported to the registry. Hospitals providing H1N1 vaccinations do not typically “own” a patient or serve as their medical “home.” Pharmacies represented one of the largest categories of “new” providers, and states reported that many have expressed interest in continuing as “routine” vaccine providers (although legislation would be required in some states).
- *Training of new providers was often incomplete.*
Enrolled providers did not always participate in registry training, leading several states to anticipate some future data quality issues.

Strategies to Sustain H1N1 Provider Participation in the Registry

The dramatic increase in providers participating in the registry for H1N1 in many states presents a unique opportunity to Immunization Programs if they can find ways for them to continue as “routine” vaccine providers. Among the several strategies shared by several states were the following:

- *Identify high-volume new providers –* Immunization Programs should consider evaluating the observed or expected yield in terms of submissions to the registry) from these providers.
- *Identify high-error rate providers –* Based on an analysis of data submitted for H1N1 vaccinations it should be possible to identify new providers in need of counseling or other interventions to improve data quality.
- *Deliver supplementary training and continuing education –* H1N1 vaccination reporting differs from routine vaccination reporting in enough ways that Immunization Programs should consider supplementary training for new providers who will remain registry participants.
- *Create appropriate incentives –* Inducements such as identifying cost savings associated with registry participation (such as labor savings when generating school immunization records, reminder-recall, and patient reports) may be an effective strategy.
- *Strengthen the content of Provider Agreements –* These agreements, as well as associated training materials and user guides, should be reevaluated when transitioning new H1N1 vaccine providers to routine immunization reporters.
- *Establish more electronic interfaces –* With H1N1 response efforts beginning to wind down, creating registry interfaces with new providers may be a sound investment, particularly for ongoing routine immunization reporting. Current federal incentives for establishing such connections may serve as an added inducement.

Conclusion

States are just beginning to consider their goals and strategies for sustaining the participation of H1N1 vaccine providers in their registry. Options that may not have been feasible during the initial response to H1N1 Influenza – such as creating interfaces with provider’s Electronic Medical Records systems – may now be possible. A careful analysis of how these new providers can allow the Immunization Program to reach more vulnerable populations will likely yield significant long-term benefits.

Erich Daub and Danielle Reader-Jolley (STC)

The Latest from AIRA

The following are just a few of the highlights from AIRA activities the past few months.

- Webinar February 24 – MIROW chapter on data quality of incoming data. Washington State presented on their implementation of these guidelines.
- Webinar March 24 – IIS Research and Publishing. Dr. Alan Hinman moderated the presentations by staff from the CDC, Oregon ALERT, and the New York City CIR. The audio/web recording of this and all AIRA webinars can be found on the AIRA web site. www.immregistries.org/news/Open_info_calls.phtml
- Completion and submission of AIRA response to the ONC IFR (Office of the National Coordinator Interim Final Rule) and the CMS NPRM (Notice of Proposed Rulemaking). These documents can be found on the AIRA web site. www.immregistries.org/news/hit_index.phtml
- Call for nominations for the Center of Excellence Award. Ten nominations were received. Submissions were reviewed and awards will be presented at the opening plenary of the NIC.
- Kickoff of the AIRA IIS Performance Improvement Test Site initiative. Ad hoc meeting planned for the NIC.
- Planning and development of two AIRA pre-conference workshops at the NIC. Workshop #1 was on the new HL7 v2.5.1 Implementation Guide. Workshop #2 was on provider recruitment and online IIS training.
- Planning begun for the next AIRA Regional Forum to take place in Denver, CO, in June. Eleven states have been invited and are participating in the planning.
- Work on the MIROW Chapter #5, VFC status in IIS, is well underway. Facilitated meeting of the subject matter experts will take place in Atlanta in June.
- The HL7 v2.5.1 was posted on the AIRA web site. www.immregistries.org/news/hit_index.phtml



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