



## IIS Data Quality Issues Resulting from Collection of 2009 H1N1 Influenza Vaccine Administration Data<sup>1</sup>

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 states using the STC IIS COTS product, 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*) along with key lessons learned. State H1N1 vaccinations captured in the registry were roughly proportional to population.

**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
<b>Number of total H1N1 vaccinations captured in registry (as of 3/5/2010)</b>	135,889	616,185	307,099	464,454	704,759	343,389
<b>Number and % of those patients with an address*</b>	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%)
<b>Number and % entered with a lot number</b>	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%)
<b>Number and % entered with campaign and tier associated</b>	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%)
<b>Number of patients older than 9 years with 2+ H1N1 vaccinations</b>	737	2,777	2,156	2,253	2,627	1,882
<b>Number of kids under 9 years with 3+ H1N1 vaccinations</b>	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.

### 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 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  $\leq 9$  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 bar-coding 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.

<sup>1</sup> Submitted to AIRA, [www.immregistries.org](http://www.immregistries.org), March 2010 by Danielle Reader-Jolley and Erich Daub, Scientific Technologies Corporation