

Washington State Data Validation Project

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Washington State Department of Health
Office of Immunization and Child Profile



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Executive Summary

In 2010, the Office of Immunization and Child Profile got a grant from the Centers for Disease Control and Prevention through the American Recovery and Reinvestment Act (ARRA). The grant supported the Data Validation Project to improve monitoring of school immunization requirements and exemptions in Washington State.

Project goals:

1. Develop a process to validate immunization data that parents report to schools.
2. Review immunization coverage rates and compare them with yearly immunization reports from schools.
3. Compare Certificates of Immunization Status (CIS) with data in the Washington State Immunization Information System (IIS).

We got parent consent and collected copies of the CIS from schools. We compared immunizations found on the CIS to immunization reports from schools for school year 2010-2011. We also compared CIS data to immunizations reported by healthcare providers in the IIS.

The project results are based on 14 schools (699 kindergarteners). We got 348 (49.8%) of the total possible consent forms from parents and 329 (94.5%) of the requested CISs from schools.

Based on immunizations reported on the CIS alone, the immunization coverage for kindergarteners in the project was high, ranging from 82.8% for varicella to 88.5% for DTaP/DT/Td. One possible reason is that parents may get help from healthcare providers to fill out the required CIS form to allow their children to enter school.

CIS coverage was lower, but not significantly, when compared to the required immunization reports that are submitted from schools. One possible reason for this is school personnel can access the IIS and may account for missing immunizations found in the IIS.

We found that immunization coverage from the IIS alone was significantly lower compared to the CIS data alone. This was surprising since we had expected IIS data to be higher. A possible reason for this is parents may supplement the CIS with immunizations received from out of state providers that have not been entered in the IIS.

Immunizations matched in both the CIS and IIS about 76.8% of the time. What parents reported on the CIS matched very well with what healthcare providers reported in the IIS. We found that less than 10% of students in this project didn't have any immunization records in the IIS. We were pleased that the IIS contained immunizations for 90% or more of students in our state.

We reached our goals for this project by coming up with a process to validate immunization data that parents report to schools. We reviewed immunization coverage rates and compared them with yearly school immunization status reports. We compared immunizations on the CIS with those in the IIS. We'll use results from the project to guide future immunization requirement policy decisions.

Background

The Washington State Department of Health Office of Immunization and Child Profile monitors immunization coverage and exemption rates for all schools in our state. The State Board of Health decides on the school entry immunization requirements. The Revised Code of Washington (RCW) 28A.210.110 (3)1 and the Washington Administrative Code (WAC) 246-105-060(3)(b)2 define and mandate school immunization and exemption requirements.

These laws require students to give proof of:

1. Full immunization as documented on the CIS.
2. Initiation and compliance with an immunization schedule based on the national Advisory Committee on Immunization Practices (ACIP).
3. A Certificate of Exemption (COE) if parents choose to opt out of immunizations.

Per state law, parents must report immunization history for school entry. All parents must complete and sign a CIS or COE at school entry. They don't need to validate or verify the record with a provider. Even with parents able to report immunization history, our state's exemption rate is one of the highest in the nation. This is in part because of the broad exemption laws that include philosophical exemptions and ease of access to exemptions based on convenience. We changed the exemption law in July 2011 to lower these rates. The new law requires parents to get immunization benefit and risk information from a licensed healthcare provider before they can get an exemption.

Statewide, 295 public school districts represent 3000 schools, over 600 private schools, and over 100 Head Start and Early Childhood Education and Assistance Programs (ECEAP). The state mandates yearly reports on immunization and exemption data for all schools. Also, licensed child care providers must report immunization status on their enrolled kids. State law requires schools and child cares to give aggregate reports to the state each year by November 1.

Since 1995, our state has operated a statewide Web-based IIS run by the Department of Health. About 1200 provider sites give immunization data to the IIS; more than 6000 users access the data. The system expanded in 2006 to include school nurses, school administrators, and designees. School users have view-only access. They have rights to view and print student immunization records and print pre-populated CISs. As of June 2011, 84 percent of public school districts use the IIS to find student immunizations. Head Start and ECEAP facilities have view-only access. About 86 percent of Head Start/ECEAP facilities across the state access the system.

In 2010, we got a grant from the Centers for Disease Control and Prevention through the American Recovery and Reinvestment Act (ARRA). The grant supported the Data Validation Project to improve monitoring of school immunization requirements and exemptions.

Project goals:

1. Develop a process to validate immunization data that parents report to schools.

2. Review immunization coverage rates and compare them with yearly immunization reports from schools.
3. Compare Certificates of Immunization Status (CIS) with data in the Washington State Immunization Information System (IIS).

Methods

In 2010, we got parent consent and collected copies of the CIS from schools. We compared CIS data to yearly school immunization reports for school year 2010-2011. We also compared CIS data to immunizations reported by healthcare providers in the IIS.

Determination of Pilot Schools

We developed criteria to choose which school districts to invite for the Data Validation Project. Some criteria included representation from each region of the state, availability of a kindergarten class, and districts with access to the IIS. We invited 27 schools with kindergarten classes to take part in the project. The schools included 2196 kindergarteners whose parents/guardians consented to participate. A total of 19 schools (1108 students) agreed to participate.

Collection of Consent Forms and CISs

In September 2010, we asked pilot schools to mail packets to the parents/guardians of current kindergarteners. We sent them enough packets for each enrolled kindergartener. Each packet had an envelope, cover letter, consent form, and self-addressed stamped envelope. The consent form, which asked for the student's birth date, allowed us to get a copy of the CIS from the schools. On the form we also asked parents/guardians to allow us to contact the provider if needed to get missing immunization records and to allow state staff to enter missing immunizations in the IIS.

The cover letter asked parents to fill out and sign the consent form and send it back to the Department of Health in the self-addressed stamped envelope. After we got the consent form, we sent it back to the school. School staff sent us a copy of the CIS in self-addressed stamped envelopes we gave to the schools.

For this project, we decided if kindergarteners complied with ACIP recommendations and our state's school immunization requirements. The CIS asks for all ACIP-recommended vaccines, not just the state-required ones. Because of this, we were able to study completeness for ACIP-recommended vaccines.

Our state's kindergarten immunization requirements are a subset of the ACIP-recommended vaccines. It includes:

- Three doses of hepatitis B.
- Five doses of DTaP/DT.
- Four doses of polio.
- Two doses of MMR.

- Two doses of varicella.

In our state, the State Board of Health decides on immunization requirements for school and child care attendance. State rules note the ACIP immunization schedule for the specific vaccination schedule. The Department of Health puts the requirements in place. We used the following assumptions in our analysis:

- We referenced the 2010 immunization schedule (the one currently referenced in state rule).
- If a combination of immunizations from the CIS, IIS, and/or provider records were complete and appropriate for ages and intervals, the child complied with ACIP and state immunization requirements.
- If a child got flu vaccine in fall 2009 or winter 2010, he or she complied with ACIP recommendations (flu vaccination is not required for school entry in our state).

After we started the project, five schools dropped out due to lack of staff resources. We based the project results on 14 schools, for a total of 699 kindergarteners (representing 0.9% of total students enrolled in our state). We got 348 (49.8%) of the total possible consent forms from parents and 329 (94.5%) requested CISs from schools.

To get a higher consent response rate from parents, we asked schools to resend packets to parents after the first mailing. Many schools sent packets home with kids instead of re-mailing. The response rate rose from about 30 percent to 50 percent after the second attempt.

We also contacted schools many times to get CIS forms after we mailed the consent forms to them. Our high rate of CIS response was the result of many contacts with school staff.

We contacted providers for 97 (29.5%) students not in the IIS. We got 83 of 97 immunization records (86%) from them.

Data Analysis

For this project, we analyzed two types of immunization records: CIS and IIS. We manually entered the birth date and vaccination dates of each vaccine from each child's CIS into Excel. We used the dates to see if the child complied with ACIP recommendations and Washington State school immunization requirements for individual vaccines.

We analyzed the data by counting the number of kids with vaccination records that showed compliance. The percentage of compliant kids over the total number of records from all schools involved in the project equals the vaccine coverage rate. We calculated coverage rates for each vaccine.

We compared coverage rates from CIS and IIS records to yearly immunization reports from the same schools involved in the project (Pilot School Annual Status Report) and the reports from all schools statewide (Statewide Annual Status Report).

For each student and each vaccine, we compared the vaccination dates with the student's immunization record in the IIS. If a child was not in the IIS, we contacted the provider listed on the consent form to get immunization records. We updated the child's record in the IIS with information from the provider. We came up with coverage rates when we combined immunizations from the CIS, IIS, and healthcare provider records and called it the "Final Pilot School Coverage."

We looked at all ACIP-recommended vaccines except rotavirus vaccine. It's not required for child care entry in our state. We also excluded hepatitis A and flu vaccines in the analyses of completeness for school requirements since they're not required for school or child care entry.

We calculated the sample mean, standard deviation, and 95 percent confidence coefficient of each vaccine by the five categories (Pilot School CIS Coverage, IIS Coverage, Pilot School Annual Status Report, Statewide Annual Status Report, and Final Pilot School Coverage) using Excel. We got confidence intervals using the point estimate (sample mean), plus or minus the margin of error.

Results

Immunization Coverage Rates Compared to School Status Reports

The coverage rates for Washington-required immunizations, when estimated from the CIS alone for the schools involved in the project, ranged from 82.8 percent for varicella to 88.5 percent for DTaP/DT/Td (Table 1). CIS coverage was lower, but not statistically significant, when compared to immunization reports from the same schools involved in the project (Pilot School Annual Status Report); reports from all schools statewide (Statewide Annual Status Report); or when we combined data from the CIS, IIS, and provider records (Final Pilot School Coverage).

Coverage rates using the IIS alone, ranging from 79.8 percent for MMR to 84.7 percent for polio, were significantly lower for all vaccines compared to the CIS Coverage, Pilot School Annual Status Report, Statewide Annual Status Report, and Final Pilot School Coverage (Table 1).

Coverage rates for all vaccines were highest, but not statistically significant, after we included CIS, IIS, and/or provider records. Final Pilot School Coverage rates ranged from 91.4 percent for varicella to 95.1 percent for hepatitis B (Table 1).

Table 1: Coverage Rates for Washington-Required Immunizations Compared to Yearly Status Reports

Vaccine	Pilot School CIS Coverage	IIS Coverage	Pilot School Annual Status Report SY 2010-2011	Statewide Annual Status Report for all Schools SY 2010-2011	Final Pilot School Coverage*
Hep B	87.6%	83.5%	92.7%	92.4%	95.1%
DTaP/DT/Td	88.5%	82.9%	89.8%	90.8%	92.5%
Polio	85.6%	84.7%	91.1%	91.5%	94.0%
MMR	84.2%	79.8%	91.6%	91.2%	92.8%
Varicella	82.8%	81.8%	91.1%	89.9%	91.4%

*Includes records from CIS, IIS, and/or provider

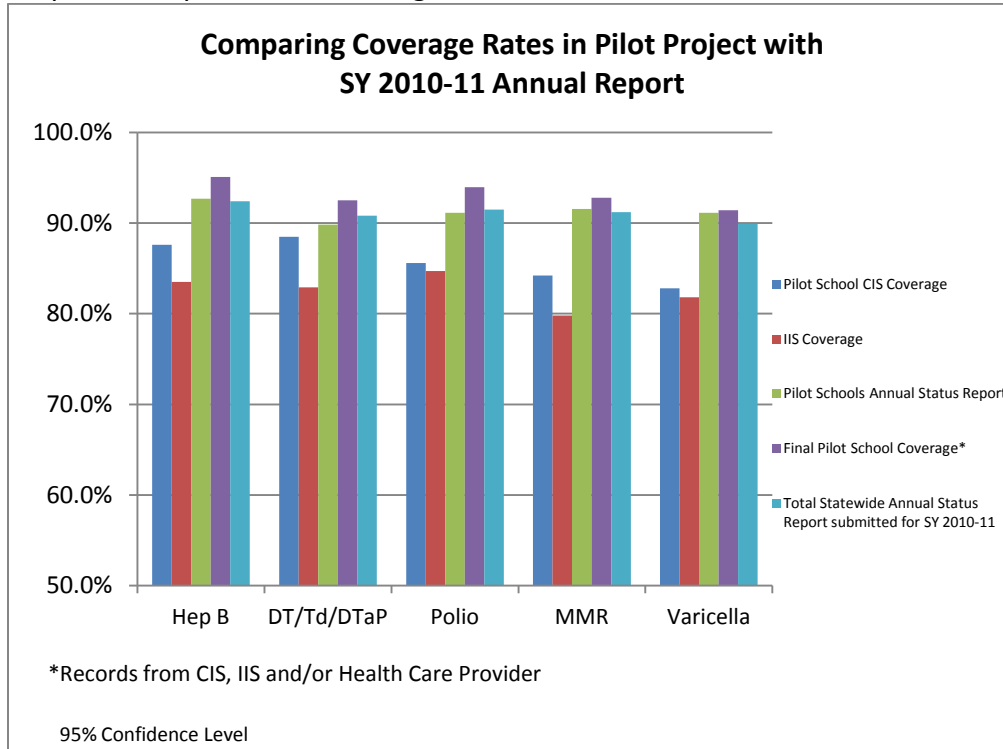
Final Pilot School Coverage rates for vaccines not required for school ranged from 33.6 percent for flu to 90.5 percent for Hib, when supplemented with CIS, IIS, and/or provider records (Table 2). See Appendix A for more on coverage rates.

Table 2: Coverage Rates for ACIP-Recommended Vaccines not Required for School Entry

Vaccine	Pilot School CIS Coverage	Final Pilot School Coverage*
Hib	81.3%	90.5%
PCV	56.0%	86.5%
Flu	17.0%	33.6%
Hep A	62.1%	78.4%

*Includes records from CIS, IIS, and/or provider

Graph 1: Comparison of Coverage Rates



Comparison of CIS and IIS Data

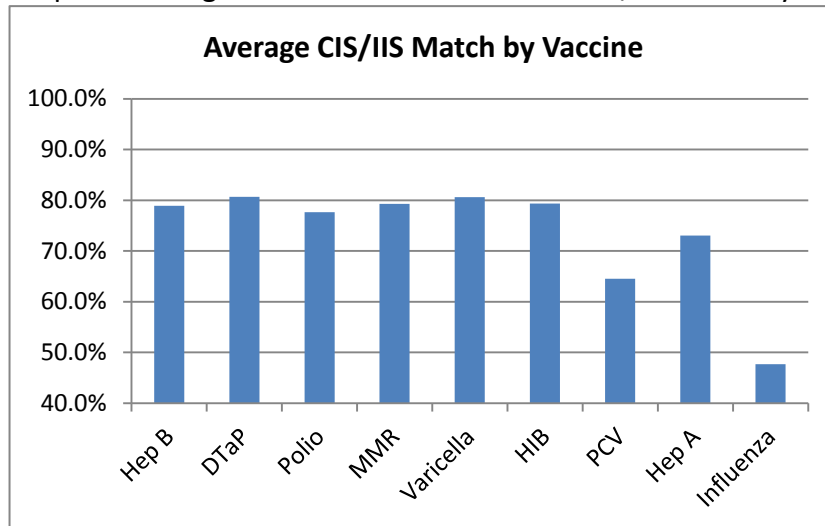
The average percentage of matching vaccines in the CIS and IIS compared to total number of vaccine doses (excluding flu) was 76.8 percent (Table 3). The average percentage of vaccines with no record in the IIS compared to total number of vaccine doses (excluding flu) was less than 10 percent. The average percentage of records with a different provider date from either the CIS and/or the IIS compared to total number of vaccine doses (excluding flu) was 2.4 percent (Table 3). None of these was statistically significant.

Table 3: Average Match between the CIS, IIS, and Provider Records

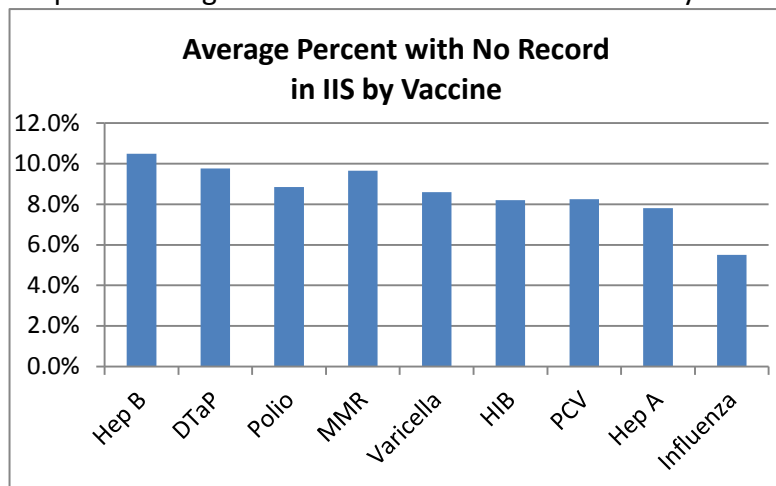
Vaccine	CIS/IIS Match	No IIS Record	Different Provider Date from CIS and/or IIS
Hep B	78.9%	10.5%	2.9%
DTaP	80.7%	9.8%	2.1%
Polio	77.7%	8.9%	3.0%
MMR	79.4%	9.7%	2.4%
Varicella	80.5%	8.6%	2.4%
Hib	79.3%	8.2%	1.7%
PCV	64.5%	8.3%	2.8%
Hep A	73.1%	7.8%	1.7%
Flu	47.7%	5.5%	3.5%
Average Total	76.8%*	9.0%*	2.4%*

*Does not include flu

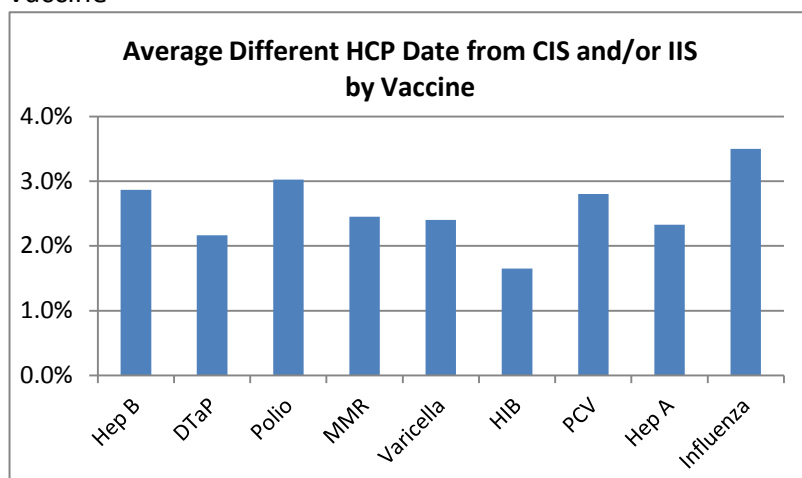
Graph 2: Average Percent of Records with a CIS/IIS Match by Vaccine



Graph 3: Average Percent of Records not in the IIS by Vaccine



Graph 4: Average Percent of Records with Different Provider Dates than the CIS and/or IIS by Vaccine



The number of exemptions found was low. There were five students with exemptions (representing 1.4% of total students included in the survey). Two students had a hepatitis B exemption; three students had a varicella exemption; and one student had a DTaP, Hib, polio, MMR, flu, PCV, and hepatitis B exemption. Parents who chose to participate in the project had kids with high immunization coverage rates and low exemption rates.

Strengths and Limitations

This is the first project in our state to compare coverage rates from parent-reported immunizations on the CIS with provider-verified data in the IIS. It also shows how much more information is available when parent-reported immunizations are supplemented with IIS and/or provider data.

We got a high response rate from schools (94.5%) when we asked for CIS forms and a high response rate from providers (86%) when we asked for immunization records.

Project limitations included a small sample size—about 1 percent of all students enrolled in Washington State schools. We also got only half of the total consent forms for a response rate of 49.8 percent. We did not randomly select the sample of schools or students; thus, the results may not be generalizable to the total state school population. However, we tried to select a representative sample of schools.

Discussion

Higher than expected coverage rates from the CIS alone matched immunizations in the IIS an average of 77 percent of the time. CIS coverage rates were also higher than IIS coverage rates. We expected higher IIS coverage than CIS coverage. We need to further study this finding. The information tells us that parent-reported data may be more valid than we thought. Parent immunization information from out-of-state may not be in the IIS. Parents can get electronic immunization records from providers to fill out the CIS. Or, many providers and schools can print a pre-populated CIS from the IIS and give it to parents to sign.

As expected, CIS coverage rates were lower than those reported in the yearly immunization reports from schools. One possible reason for higher coverage rates on the yearly report is because schools can access the IIS and add immunizations found in it into their school systems to give a more complete immunization status report.

As expected, coverage rates for all vaccines were higher after we included IIS and/or provider records compared to CIS data not supplemented with these records. Our findings show the importance of accessing the IIS and/or getting immunization records for missing doses not available on the CIS.

The match between the immunizations reported on the CIS and those available in the IIS was high at 76.8 percent. We didn't find records in the IIS for less than 10 percent of the students, which is what we expected. We continue to improve electronic data transfers to the IIS and expect the number of missing records to decrease over time.

Besides funding for the Data Validation Project, our state got funding to make the School Nurse Module in the IIS available to schools to track, monitor, and report required immunizations. At the same time as we continue policy talks about use of the IIS for immunization reporting or data validation, we'll also work with pilot schools next year to test the module to see if it's possible for schools to use it as the main system to track and report immunizations.

One school nurse got parent consent from 100 percent of the students during a parent session for new kindergarteners. This method proved a successful way to get consents compared to mailings or sending packets home with kids. However, it calls for more effort and resources on the part of schools, which may not be realistic.

The exemption rate was only 1.4 percent in this population compared to 6 percent reported in the yearly immunization report for school year 2010-2011. A response bias may exist in this

project. Parents who responded may have a more complete CIS and be more willing to immunize their kids. Non-responding parents may have less complete CISs. We could not verify this as we were unable to collect comparable data for kids of parents who didn't consent to participate. However, the coverage rates we got from CISs for the pilot schools were not statistically different from the overall yearly immunization reports for either the total sample of pilot schools or the total statewide population of schools.

We called providers to get immunization records only for students not in the IIS. If we do this project again in the future, we recommend contacting providers for all discrepant immunizations. Getting immunizations from providers would help populate the IIS and address discrepancies in the IIS.

This project allowed us to come up with a process to validate immunization data from parents and improve monitoring of school immunization requirements and exemptions without going into schools to do the work. It's possible to repeat this methodology in our state and other states.

If we do this again in the future, we would consider the following lessons learned:

- Devote office staff to do follow-up with schools and providers.
- Clarify objectives for the project and set up the data collecting tool to capture the appropriate data.
- Set up detailed processes to track receipt of consent forms, CISs, and immunization records from providers.
- Encourage schools to get parent consent during kindergarten round-up or other school-wide events.
- Ask schools to send consent forms and envelopes home with students rather than mailing them.
- Keep in close contact with school administrative staff and nurses throughout the project to ease follow-up and reduce dropout rates.
- Consider setting up a secure website to send e-mails, consent forms, and CISs.

We achieved the goals of the Data Validation Project by developing a process to validate immunization data that parents report to schools. We determined the immunization coverage rates and compared them with yearly school immunization reports. We also compared CIS data with the IIS. We'll use the project results for future data validation projects and to guide future immunization policy decisions.

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