Indiana State Department of Health

Indiana State Department of Health

Immunization Division

County Immunization Rate Assessment

2017

Immunization Division

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Contents

Data Dictionary

CHIRP	Children and Hoosiers Immunization Registry Program, also referred to as the "Indiana Immunization Registry"; the software application used by the Indiana State Department of Health Immunization Division for providers to report immunization data for patients. (Version 5.16.1.2)
Registered in CHIRP	A record exists for the patient, regardless of data contained within that record. Many records are imported through Vital Records data, established in 2005, and contain only the patient's name and address, with no immunization data.
Active Immunization Record	A patient record that is marked as "active" in CHIRP, and contains two or more vaccinations, excluding influenza.
CDC	Centers for Disease Control and Prevention
CoCASA	Comprehensive Clinic Assessment Software Application, developed by the CDC for use in assessments. (Version 11.0)
VTrckS	Vaccine Tracking System, maintained by the CDC for use in managing vaccine ordering.
19-35 months of age	Patients born between 04/30/2014 and 08/31/2015.
4:3:1:3:3:1:4	Vaccine series assessed for 19-35 months of age: 4 DTaP, 3 Polio, 1 MMR, 3 Hib, 3 HepB, 1 Var, and 4 PCV.
DTaP	Vaccine to prevent diphtheria, tetanus, and acellular pertussis.
Polio	Vaccine to prevent poliomyelitis.
MMR	Vaccine to prevent measles, mumps, and rubella.
Hib	Vaccine to prevent Haemophilus influenzae type B.
HepB	Vaccine to prevent hepatitis B.
Var	Vaccine to prevent varicella (chicken pox).
PCV	Vaccine to prevent pneumococcal disease.
Fully Insured	A patient that has health insurance coverage that covers vaccine.
VFC	Vaccines for Children program, funded through the CDC that provides free vaccine for eligible children in the state of Indiana.
VFC Provider	An immunization provider who is enrolled in the VFC program, and therefore granted permission to order and administer vaccines covered under the VFC program to eligible persons.
VFC Eligible	A child age 0-18 is eligible to receive free vaccine under the VFC program if they are Medicaid eligible, uninsured, or have health insurance that does not cover vaccines. Also, any child who identifies as an American Indian or Alaskan Native, regardless of insurance status. (NOTE: Some of the children who are classified as "underinsured" can be funded with VFC vaccine at approved facilities*)
Not VFC Eligible	A child age 0-18 who has health insurance that covers vaccines or adults over the age of 18.

Underinsured* (Insurance Does Not Cover Vaccines)	Children who were recorded as "underinsured" by a provider in CHIRP. This should include children who have commercial (private) health insurance but the coverage does not include vaccines, children whose insurance covers only selected vaccines (these children are categorized as underinsured for non-covered vaccines only), or children whose insurance caps vaccine coverage at a certain amount (once that coverage amount is reached, these children are categorized as underinsured).
Eligible for Publicly Funded Vaccines	A child age 0-18 who is eligible for VFC vaccines, or any state-funded vaccines through 317 funds; those who are underinsured and receive non-VFC funded vaccine.
Not Eligible for Publicly Funded Vaccines	A child age 0-18 who is fully insured and therefore not eligible for any publicly funded vaccines or adults over the age of 18.
Valid Dose	A dose of vaccine that was given at the appropriate age and interval from any previous doses of vaccine according to manufacturer and ACIP guidelines.
Invalid Dose	A dose of vaccine that was not given at the appropriate age and interval from any previous doses of vaccine or at a minimum age. A patient is not considered to have immunity to the disease that the vaccine was for unless it was administered as a "valid dose".

*Please refer to the ISDH Immunization Division Eligibility Policy for a detailed definition of underinsured.

Background

Each year, the Advisory Committee for Immunization Practices (ACIP) releases a recommended immunization schedule for childhood vaccination. These recommendations are supported by the Centers for Disease Control and Prevention (CDC). For each vaccine-preventable disease, there are particular rules and guidelines in the administration of the vaccine that, if followed, result in the optimal immune response in the patient. If these guidelines are not adhered to, in some cases, a child may be left unprotected. This can include scenarios where the child was administered a dose of vaccine incorrectly (invalid dose), or those who never receive the vaccine at all.

ACIP recommends children age 19 to 35 months to complete the 4:3:1:3:3:1:4 immunization series comprised of, at least four doses of diphtheria-tetanus-acellular pertussis (DTaP), at least three doses of polio, at least one dose of measles-mumps-rubella (MMR), at least three of Haemophilus influenzae B (Hib) depending on the brand used, at least three doses of hepatitis B, at least one dose of varicella antigens, and at least 4 doses of pneumococcal conjugate vaccine (PCV).

County level vaccination coverage estimates are important, both because public health issues often originate in small geographic areas and because certain public health actions are most effective at the local level. Previously in Indiana, it has not been possible to assess childhood vaccination series completion by county with the data available to the program. However with the use of the state immunization registry, Children and Hoosier Immunization Registry Program (CHIRP), more information is now available and a methodology has been developed for assessing children by county for completion of the complete ACIP recommended childhood immunization series (4:3:1:3:3:1:4).

It is increasingly important to measure children for completion of the entire series of childhood vaccines, rather than focusing on one antigen. In assessing the complete series, we can assist in improving immunization rates for at least 10 different vaccine-preventable diseases in

one measure. Improving the rate of completion for the entire series of childhood vaccines in those age 19-35 months can protect children from disease such as; diphtheria, pertussis, tetanus, polio, measles, mumps, rubella, varicella, pneumococcal disease, and *Haemophilus influenzae*.

Providing a measure of how well protected children are in specific communities assists immunization programs throughout the state to identify areas of greatest need, and allow targeting of resources. This may result in improving immunization rates in Indiana, which ultimately will help reduce the incidence of morbidity and mortality due to vaccine-preventable diseases.

Methods

Immunization data by county was obtained by extracting raw data for the birth cohort from CHIRP. This data was filtered to include only those children who had an active immunization record, as defined by this assessment (see Data Dictionary). Additionally, access queries were used to correct any children's records that were missing a county, populating the county based on other fields, such as the city or zip code. When a child's city or zip code could not be used, the facility that administered the most recent vaccine was used to populate the county of residence for the child.

After completing this data "clean-up", the remaining children were assessed in CHIRP using a report that has been embedded in the application to measure the number of records complete for the 4:3:1:3:3:1:4 immunization series for each county. Data exported from CHIRP included the number of patients assessed defined as only those that had an active immunization record and were born within the birth cohort for the corresponding age range (19-35 months as of 3/31/2017). Exported data from CHIRP was then imported into a database and analyzed using a software program provided by the CDC, Comprehensive Clinic Assessment Software Application (CoCASA).

Immunizations were assessed for completion of series based on age range using an algorithm embedded in CoCASA for determining which patients had completed the series with

valid doses of each vaccine. The 19-35 month age range was assessed for completion of the 4:3:1:3:3:1:4 series as of 03/31/2017.

Assessment reports for each county were run using a template in CoCASA based on the imported data from CHIRP that contained the total number of patients assessed and the total number of patients complete for the corresponding vaccine series as of 03/31/2017.

Immunization rates by county were calculated by dividing the total number of patients that were complete for the series by the total number of patients assessed. The number of patients assessed includes only those that have an active immunization record and were born within the birth cohort for the corresponding age range.

Each county's cohort was assessed by VFC eligibility category, being either "VFC-Eligible", "Not VFC-Eligible", or "Underinsured" (see Data Dictionary for definitions of each category). Any child that was missing a VFC eligibility category code from CHIRP was included in the overall rate for the county, but was not included in a VFC eligibility category assessment.

The 4:3:1:3:3:1:4 immunization completion rate for the state of Indiana was calculated as a weighted average of the county rates, based on each county's cohort of children assessed (see Appendix C for a detailed standard operating procedure for conducting this assessment).

The total number of VFC providers by county (enrolled as April 27, 2017) was determined by exporting all provider data out of the Vaccine Tracking System (VTrckS), which is an application provided by CDC used to manage vaccine ordering and accountability.

Limitations

Provider's participation in the use of CHIRP for reporting immunizations was mandated in Indiana as of July 1, 2015, which means all medical providers in the State of Indiana who are authorized to administer immunizations must submit complete information to CHIRP within seven business days of administering an immunization to any patient 18 years of age and younger. However we have been notified that all providers are not compliant with entering data into CHIRP for various reasons. The data analyzed from CHIRP are considered to be

representative of the entire state; however, the true number of immunizations administered in Indiana remains unknown. Nonetheless, this assessment showed that from 2016 to 2017 there was an approximate increase of 4,000 immunization records assessed. Increasing this factor will allow for better assessment of the number of immunizations administered in Indiana. See Table 3 for a detailed comparison between 2016 and 2017.

Many immunization providers in the state of Indiana use CHIRP to record their patient's immunization records. However, when a child transfers from one provider who uses CHIRP to another who does not use CHIRP, this child may appear to have an active immunization record that remains incomplete, even if the child did receive the remaining immunizations from the new provider. While this scenario contributes to the limitations of this analysis, the impact is thought to be minimal overall.

Upon breaking out the VFC eligibility categories among the cohort assessed, many were missing a VFC eligibility code from CHIRP. When missing, these children were still included in the county rate, but were not included in any eligibility category. Therefore, the rate among each VFC eligibility category is only representative of those children who had appropriate documentation of their VFC eligibility status in CHIRP at the time of the most recent vaccination. In the secondary methodology used, any child with a missing VFC eligibility code was included in the analysis for "Not Eligible for Publicly Funded Vaccines" category.

In the most recent NIS (National Immunization Survey) data from 2015, the overall immunization rate for the 4:3:1:3:3:1:4 series completion is 74.7% ± 7.0 among 19-35 month old children. The birth cohort for this data is January 2012 through May 2014. This estimate is higher than that provided in this report for Indiana, 63%. The methodology used to generate the data contained in this report differs greatly from that used for the NIS determination of the immunization rate. NIS uses a random digit dialing survey, and contains a total sample size of approximately 400 surveys. Subjects are only selected to be included in the survey if they permit the surveyor to obtain medical records and information to verify the survey responses. This

presents a selection bias, as many individuals who are not up to date with vaccinations may refuse to give permission, as these records would then be excluded from the analysis. Additionally, any child whose immunization history cannot be verified is excluded from the analysis.

Results

The full results of this assessment can be found in the data table in Appendix A. A comparison between 2016 and 2017 immunization completion rates by county, number assessed and population represented can be found in Appendix B. Table 1 below summarizes the state average, weighted by county population assessed and lists the 10 counties with lowest rates. A summary of the number of VFC providers by county is also provided. Table 2 below displays the state average with the counties with the 10 highest rates. A summary of the number of VFC providers by county is also provided. Table 3 below summarizes 2016 and 2017 Indiana assessment overall.

Table 1: Ten Lowest Rates by County

COUNTY	COMPLETION RATE FOR 4:3:1:3:3:1:4	NUMBER OF VFC PROVIDERS ENROLLED
~INDIANA	**63%**	**778**
DAVIESS	45.7%	9
LAGRANGE	47.1%	7
GRANT	49.5%	8
ST JOSPEPH	50.5%	40
LAKE	53.4%	57
WELLS	53.6%	2
JACKSON	55.5%	3
ALLEN	55.8%	26
ELKHART	57.6%	33
CRAWFORD	58.1%	2

Table 2: Ten Highest Rates by County

COUNTY	COMPLETION RATE FOR 4:3:1:3:3:1:4	NUMBER OF VFC PROVIDERS ENROLLED
INDIANA	**63%**	**778**
SPENCER	83.3%	2
PIKE	79.5%	3
GREENE	79.0%	4
MONROE	79.0%	5
CASS	78.5%	4
PERRY	78.2%	2
HENRY	78.1%	6
DECATUR	77.8%	7
OWEN	77.8%	3
WARRICK	77.4%	7

Table 3: Summary 2016 and 2017 Indiana Assessment

	2016	2017
Indiana completion rate for 4:3:1:3:3:1:4 series	60%	63%
Number assessed 19-35 months of age	107,157	111,137
Percentage of population represented	85.3%	88.4%
Number of VFC Providers	780	778
Number/ rate assessed by Not VFC-Eligible	44,495/ 64%	43,763/ 68%
Number/ rate assessed by Underinsured	726/ 62%	646/ 64%
Number/ rate assessed by VFC-Eligible	51,901/ 60%	55,174/ 62%

The average immunization rate in Indiana counties is 63%, and the median (or midpoint) is 67%. There 60 were out of 92 counties that fell above the average of 63%, 4 that were equal to the average, and 28 that were below the average of 63%.

Discussion

The result for Indiana's immunization rate for 2017 is 63% coverage among children age 19-35 months which increased 3% relative to the 2016 rate of 60%. The increase in the number of children assessed and the percent of population represented could account for the increase in the overall rate.

According to 2015 US Census data by age, Indiana's population of 19-35 month old children should be approximately 125,686. After excluding any immunization records that were not considered to be "active", there were only 111,137 records assessed in this analysis. This represents 88.4% of the estimated population. The percentage of the population represented in Clay, Hancock, Jefferson, Martin, Morgan, Ohio, Pike, and Warren counties all exceed 100%. This is thought to be attributable to an increase in children age 19-35 months whom relocated to these counties after 2015 as well as the two year difference between the census data and the data extracted from CHIRP for analysis of the rates.

Recommendations

Achieving high vaccination rates is attainable and progress among the 19-35 months age group series completion, has been seen among many counties. Additional efforts are needed to ensure that health-care providers administer recommended vaccinations and use each visit as an opportunity to ensure each child is fully vaccinated on time with every recommended vaccine. Also, rather than targeting efforts towards children already past due, health departments need to implement targeted provider education to confirm kids are vaccinated before they fall within 19-35 months of age. Reducing the number of missed opportunities, and vaccinating at the 15 month appointment would greatly improve vaccination rates as well as number of children who are behind.

Conclusions

The results of this analysis demonstrate the need for further investigation into identifying contributing factors which might explain why children are not completing the childhood vaccination series by 19 months of age. Further details of each county's data should be assessed on a case by case basis to find pockets of need.

It can be observed that the counties with the highest immunization rates also have some of the lowest numbers of VFC providers in the county. One reason for this may be that a fewer number of providers have more control over maintaining patient records and performing activities to increase the number of children who complete the immunization series. It should be noted, however, that there may be many disadvantages to limiting immunization services to few providers in an isolated area as this could create potential barriers to accessing healthcare.

Evidence-based approaches to increasing immunization should be utilized, such as targeting populations in need, and reminder-recall activities, which prompt the guardians of children missing immunizations to contact their medical providers.

APPENDIX A: 2017 Data Summary. Completion rate of 4:3:1:3:3:1:4 immunization series among children 19-35 month with an active immunization record in CHIRP

COUNTY	NUMBER OF VFC PROVIDERS ENROLLED	2015 (Census) POPULATION 19-35 MONTHS OF AGE	NUMBER ASSESSED 19-35 MONTHS OF AGE	PERCENTAGE OF POPULATION REPRESENTED	COMPLETION RATE FOR 4:3:1:3:3:1:4	NUMBER NOT VFC ELIGIBLE	RATE AMONG NOT VFC-ELIGIBLE	NUMBER UNDERINSURED	RATE AMONG UNDERINSURED	NUMBER VFC-ELIGIBLE	RATE AMONG VFC-ELIGIBLE
~INDIANA	**778**	**125,686**	**111,137**	**88%**	**63%**	**43,763**	**68%**	**646**	**64%**	**55,174**	**62%**
ADAMS	4	1,015	662	**65%**	58%	196	70%	6	67%	408	53%
ALLEN	26	7,857	6,889	**88%**	56%	2,175	63%	78	55%	3,322	55%
BARTHOLOMEW	8	1,599	1,442	**90%**	75%	590	75%	2	100%	413	76%
BENTON	1	175	133	**76%**	69%	32	63%	4	50%	62	65%
BLACKFORD	2	236	199	**84%**	64%	39	59%	0	0%	132	69%
BOONE	8	1,237	1,214	**98%**	71%	816	71%	13	77%	235	79%
BROWN	2	193	171	**89%**	71%	80	75%	0	0%	77	65%
CARROLL	3	307	274	**89%**	72%	95	78%	2	100%	117	69%
CASS	4	731	610	**83%**	79%	183	78%	5	100%	356	82%
CLARK	10	2,213	1,971	**89%**	59%	795	64%	2	0%	935	61%
CLAY	5	465	480	**103%**	70%	206	80%	3	33%	260	64%
CLINTON	4	675	647	**96%**	70%	237	78%	4	100%	288	63%
CRAWFORD	2	145	117	**81%**	58%	31	61%	1	100%	69	61%
DAVIESS	9	801	621	**78%**	46%	146	68%	13	38%	424	39%
DEARBORN	9	768	583	**76%**	63%	261	75%	2	100%	212	67%
DECATUR	7	517	442	**85%**	78%	187	86%	9	89%	214	73%
DEKALB	9	765	715	**93%**	68%	305	71%	7	86%	344	66%
DELAWARE	12	1,871	1,585	**85%**	66%	396	60%	3	67%	903	69%
DUBOIS	4	833	737	**88%**	72%	349	78%	30	67%	267	68%
ELKHART	33	4,530	3,947	**87%**	58%	1,559	60%	19	63%	2,250	58%
FAYETTE	4	391	311	**80%**	67%	61	82%	14	50%	218	66%
FLOYD	8	1,313	1,181	**90%**	59%	529	65%	4	0%	529	56%
FOUNTAIN	2	311	267	**86%**	66%	80	79%	5	60%	134	57%
FRANKLIN	2	392	215	**55%**	68%	95	78%	1	0%	110	64%
FULTON	2	377	322	**85%**	66%	111	78%	15	67%	175	61%
GIBSON	7	629	552	**88%**	75%	319	81%	1	0%	226	68%

COUNTY	NUMBER OF VFC PROVIDERS ENROLLED	2015 (Census) POPULATION 19-35 MONTHS OF AGE	NUMBER ASSESSED 19-35 MONTHS OF AGE	PERCENTAGE OF POPULATION REPRESENTED	COMPLETION RATE FOR 4:3:1:3:3:1:4	NUMBER NOT VFC-ELIGIBLE	RATE AMONG NOT VFC-ELIGIBLE	NUMBER UNDERINSURED	RATE AMONG UNDERINSURED	NUMBER VFC-ELIGIBLE	RATE AMONG VFC-ELIGIBLE
GRANT	8	1,163	1,000	**86%**	50%	248	61%	12	75%	650	47%
GREENE	4	493	429	**87%**	79%	185	86%	5	80%	232	74%
HAMILTON	21	6,107	5,566	**91%**	60%	4,240	59%	18	72%	804	68%
HANCOCK	8	1,161	1,276	**110%**	61%	653	62%	6	83%	297	68%
HARRISON	5	645	615	**95%**	60%	288	62%	0	0%	251	61%
HENDRICKS	10	2,719	2,700	**99%**	59%	952	67%	6	83%	602	69%
HENRY	6	760	645	**85%**	78%	219	86%	3	100%	366	77%
HOWARD	9	1,529	1,323	**87%**	70%	498	75%	11	64%	654	71%
HUNTINGTON	5	643	594	**92%**	59%	241	60%	8	88%	289	64%
JACKSON	3	991	840	**85%**	55%	277	56%	3	33%	398	62%
JASPER	2	572	510	**89%**	65%	232	72%	11	100%	225	58%
JAY	4	438	382	**87%**	73%	133	75%	5	60%	218	73%
JEFFERSON	3	500	529	**106%**	72%	184	74%	2	100%	288	72%
JENNINGS	2	530	435	**82%**	67%	151	66%	0	0%	211	69%
JOHNSON	21	2,821	2,658	**94%**	65%	1,398	66%	11	55%	1,007	66%
KNOX	3	722	603	**84%**	66%	246	77%	8	63%	345	59%
KOSCIUSKO	7	1,560	1,316	**84%**	61%	535	68%	8	38%	606	60%
LAGRANGE	7	1,151	613	**53%**	47%	149	70%	3	67%	443	40%
LAKE	57	9,113	7,807	**86%**	53%	2,710	62%	42	57%	4,614	50%
LAPORTE	11	1,983	1,878	**95%**	58%	689	68%	3	67%	1,165	53%
LAWRENCE	7	759	675	**89%**	75%	279	78%	2	100%	390	73%
MADISON	22	2,190	1,982	**91%**	71%	729	73%	8	63%	1,152	72%
MARION	112	21,149	18,808	**89%**	63%	5,513	62%	40	70%	11,862	65%
MARSHALL	12	850	736	**87%**	59%	286	64%	8	63%	415	58%
MARTIN	1	196	208	**106%**	58%	51	69%	9	78%	136	54%
MIAMI	3	526	455	**87%**	68%	121	75%	10	90%	286	68%
MONROE	5	1,909	1,775	**93%**	79%	998	85%	3	100%	767	72%
MONTGOMERY	7	736	618	**84%**	69%	206	77%	8	50%	315	65%

COUNTY	NUMBER OF VFC PROVIDERS ENROLLED	2015 (Census) POPULATION 19-35 MONTHS OF AGE	NUMBER ASSESSED 19-35 MONTHS OF AGE	PERCENTAGE OF POPULATION REPRESENTED	COMPLETION RATE FOR 4:3:1:3:3:1:4	NUMBER NOT VFC ELIGIBLE	RATE AMONG NOT VFC-ELIGIBLE	NUMBER UNDERINSURED	RATE AMONG UNDERINSURED	NUMBER VFC-ELIGIBLE	RATE AMONG VFC-ELIGIBLE
MORGAN	8	1,133	1,194	105%	71%	509	74%	1	100%	581	69%
NEWTON	1	192	175	91%	61%	58	71%	5	40%	97	55%
NOBLE	3	908	825	91%	70%	351	79%	13	77%	408	65%
OHIO	2	84	109	130%	63%	35	89%	0	0%	48	63%
ORANGE	5	360	304	84%	65%	94	76%	3	67%	172	64%
OWEN	3	301	261	87%	78%	94	86%	1	100%	162	74%
PARKE	3	317	205	65%	62%	74	68%	1	0%	119	59%
PERRY	2	303	234	77%	78%	120	79%	3	100%	108	77%
PIKE	3	211	215	102%	80%	110	88%	4	50%	93	72%
PORTER	12	2,718	2,377	87%	65%	1,384	70%	9	44%	919	60%
POSEY	5	429	388	90%	76%	260	81%	2	100%	121	66%
PULASKI	2	230	199	87%	69%	67	73%	3	100%	121	65%
PUTNAM	5	566	458	81%	63%	108	75%	1	0%	207	64%
RANDOLPH	3	445	412	93%	67%	170	68%	1	0%	205	68%
RIPLEY	4	520	396	76%	76%	199	85%	0	0%	170	70%
RUSH	6	272	262	96%	68%	72	71%	1	100%	129	70%
SCOTT	4	428	365	85%	65%	112	71%	5	100%	230	61%
SHELBY	3	756	726	96%	77%	143	70%	7	57%	429	81%
SPENCER	2	334	234	70%	83%	127	87%	7	71%	85	85%
STARKE	7	376	348	93%	61%	127	67%	0	0%	208	59%
STEUBEN	2	548	498	91%	58%	189	74%	2	50%	288	49%
STJOSEPH	40	5,269	4,597	87%	50%	1,828	54%	22	36%	2,375	53%
SULLIVAN	4	334	307	92%	70%	163	74%	3	67%	136	65%
SWITZERLAND	1	195	112	57%	67%	36	69%	0	0%	56	80%
TIPPECANOE	16	3,428	3,291	96%	73%	819	79%	16	75%	1,425	71%
TIPTON	1	192	171	89%	71%	89	74%	5	80%	43	77%
UNION	1	88	67	76%	64%	9	78%	0	0%	54	67%
VANDERBURGH	22	3,438	2,948	86%	74%	1,490	79%	6	50%	1,395	69%

COUNTY	NUMBER OF VFC PROVIDERS ENROLLED	2015 (Census) POPULATION 19-35 MONTHS OF AGE	NUMBER ASSESSED 19-35 MONTHS OF AGE	PERCENTAGE OF POPULATION REPRESENTED	COMPLETION RATE FOR 4:3:1:3:3:1:4	NUMBER NOT VFC ELIGIBLE	RATE AMONG NOT VFC-ELIGIBLE	NUMBER UNDERINSURED	RATE AMONG UNDERINSURED	NUMBER VFC-ELIGIBLE	RATE AMONG VFC-ELIGIBLE
VERMILLION	4	263	221	**84%**	69%	92	73%	0	0%	128	67%
VIGO	19	1,899	1,649	**87%**	65%	668	70%	4	25%	932	63%
WABASH	3	495	428	**86%**	59%	175	63%	3	33%	209	61%
WARREN	2	131	134	**102%**	72%	43	70%	1	100%	56	66%
WARRICK	7	1,020	1,004	**98%**	77%	691	80%	4	100%	297	72%
WASHINGTON	4	503	387	**77%**	62%	153	65%	2	100%	205	61%
WAYNE	5	1,194	985	**82%**	73%	264	76%	2	0%	662	75%
WELLS	2	536	440	**82%**	54%	188	53%	6	50%	199	59%
WHITE	5	449	399	**89%**	69%	97	87%	4	50%	230	65%
WHITLEY	5	559	549	**98%**	66%	271	69%	3	100%	204	67%

APPENDIX B. Immunization series completion rate for 4:3:1:3:3:1:4 among children aged 19-35 months, by county, number assessed, population represented, 2016 & 2017

			Number Assessed 19-35 Months of Age			Percentage of Population Represented			Completion Rate for 4:3:1:3:3:1:4	
COUNTY	(2015 Census) POPULATION 19-35 MONTHS OF AGE		2,017	2,016		2017	2016		2017	2016
~INDIANA	125,686		111,137	107,157		88%	85%		63%	60%
ADAMS	1,015		662	647		65%	64%		58%	56%
ALLEN	7,857		6,889	6,626		88%	84%		56%	56%
BARTHOLOMEW	1,599		1,442	1,437		90%	90%		75%	73%
BENTON	175		133	131		76%	75%		69%	68%
BLACKFORD	236		199	186		84%	79%		64%	62%
BOONE	1,237		1,214	1,126		98%	91%		71%	75%
BROWN	193		171	165		89%	85%		71%	69%
CARROLL	307		274	289		89%	94%		72%	71%
CASS	731		610	595		83%	81%		79%	79%
CLARK	2,213		1,971	1,902		89%	86%		59%	52%
CLAY	465		480	477		103%	103%		70%	68%
CLINTON	675		647	589		96%	87%		70%	66%
CRAWFORD	145		117	115		81%	79%		58%	57%
DAVIESS	801		621	649		78%	81%		46%	47%
DEARBORN	768		583	556		76%	72%		63%	55%
DECATUR	517		442	441		85%	85%		78%	73%
DEKALB	765		715	641		93%	84%		68%	62%
DELAWARE	1,871		1,585	1,608		85%	86%		66%	64%
DUBOIS	833		737	713		88%	86%		72%	68%
ELKHART	4,530		3,947	3,712		87%	82%		58%	49%
FAYETTE	391		311	301		80%	77%		67%	70%
FLOYD	1,313		1,181	1,173		90%	89%		59%	56%
FOUNTAIN	311		267	275		86%	88%		66%	60%

			Number Assessed 19-35 Months of Age			Percentage of Population Represented			Completion Rate for 4:3:1:3:3:1:4	
COUNTY	(2015 Census) POPULATION 19-35 MONTHS OF AGE		2,017	2,016		2017	2016		2017	2016
FRANKLIN	392		215	211		55%	54%		68%	70%
FULTON	377		322	338		85%	90%		66%	64%
GIBSON	629		552	548		88%	87%		75%	73%
GRANT	1,163		1,000	1,025		86%	88%		50%	48%
GREENE	493		429	374		87%	76%		79%	71%
HAMILTON	6,107		5,566	5,117		91%	84%		60%	57%
HANCOCK	1,161		1,276	1,143		110%	98%		61%	48%
HARRISON	645		615	554		95%	86%		60%	56%
HENDRICKS	2,719		2,700	2,722		99%	100%		59%	54%
HENRY	760		645	643		85%	85%		78%	73%
HOWARD	1,529		1,323	1,293		87%	85%		70%	70%
HUNTINGTON	643		594	558		92%	87%		59%	61%
JACKSON	991		840	752		85%	76%		55%	62%
JASPER	572		510	499		89%	87%		65%	67%
JAY	438		382	353		87%	81%		73%	68%
JEFFERSON	500		529	496		106%	99%		72%	68%
JENNINGS	530		435	449		82%	85%		67%	71%
JOHNSON	2,821		2,658	2,599		94%	92%		65%	61%
KNOX	722		603	633		84%	88%		66%	77%
KOSCIUSKO	1,560		1,316	1,217		84%	78%		61%	59%
LAGRANGE	1,151		613	621		53%	54%		47%	46%
LAKE	9,113		7,807	7,748		86%	85%		53%	52%
LAPORTE	1,983		1,878	1,808		95%	91%		58%	58%
LAWRENCE	759		675	613		89%	81%		75%	80%
MADISON	2,190		1,982	1,933		91%	88%		71%	66%
MARION	21,149		18,808	17,895		89%	85%		63%	60%
MARSHALL	850		736	682		87%	80%		59%	49%

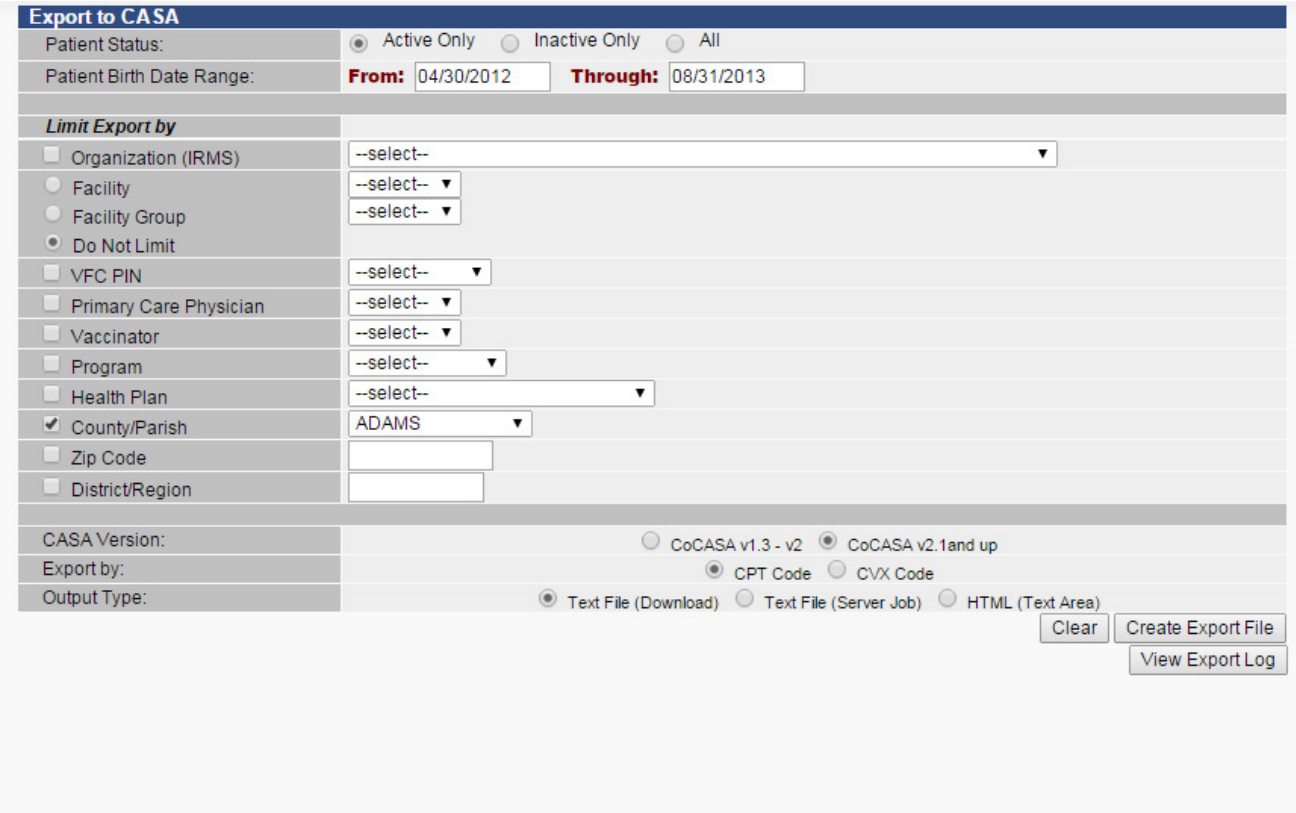
			Number Assessed 19-35 Months of Age			Percentage of Population Represented			Completion Rate for 4:3:1:3:3:1:4	
COUNTY	(2015 Census) POPULATION 19-35 MONTHS OF AGE		2,017	2,016		2017	2016		2017	2016
MARTIN	196		208	215		106%	110%		58%	60%
MIAMI	526		455	498		87%	95%		68%	71%
MONROE	1,909		1,775	1,651		93%	86%		79%	76%
MONTGOMERY	736		618	600		84%	82%		69%	69%
MORGAN	1,133		1,194	1,140		105%	101%		71%	70%
NEWTON	192		175	166		91%	86%		61%	65%
NOBLE	908		825	794		91%	87%		70%	66%
OHIO	84		109	109		130%	130%		63%	54%
ORANGE	360		304	342		84%	95%		65%	63%
OWEN	301		261	239		87%	79%		78%	73%
PARKE	317		205	189		65%	60%		62%	61%
PERRY	303		234	206		77%	68%		78%	72%
PIKE	211		215	232		102%	110%		80%	76%
PORTER	2,718		2,377	2,436		87%	90%		65%	63%
POSEY	429		388	355		90%	83%		76%	70%
PULASKI	230		199	206		87%	90%		69%	62%
PUTNAM	566		458	475		81%	84%		63%	60%
RANDOLPH	445		412	393		93%	88%		67%	62%
RIPLEY	520		396	400		76%	77%		76%	71%
RUSH	272		262	237		96%	87%		68%	65%
SCOTT	428		365	347		85%	81%		65%	56%
SHELBY	756		726	707		96%	94%		77%	74%
SPENCER	334		234	228		70%	68%		83%	75%
STARKE	376		348	310		93%	82%		61%	54%
STEUBEN	548		498	480		91%	88%		58%	56%
STJOSEPH	5,269		4,597	4,386		87%	83%		50%	42%
SULLIVAN	334		307	301		92%	90%		70%	57%

			Number Assessed 19-35 Months of Age			Percentage of Population Represented			Completion Rate for 4:3:1:3:3:1:4	
COUNTY	(2015 Census) POPULATION 19-35 MONTHS OF AGE		2,017	2,016		2017	2016		2017	2016
SWITZERLAND	195		112	121		57%	62%		67%	57%
TIPPECANOE	3,428		3,291	3,045		96%	89%		73%	73%
TIPTON	192		171	192		89%	100%		71%	59%
UNION	88		67	48		76%	55%		64%	75%
VANDERBURGH	3,438		2,948	2,886		86%	84%		74%	71%
VERMILLION	263		221	206		84%	78%		69%	66%
VIGO	1,899		1,649	1,631		87%	86%		65%	58%
WABASH	495		428	441		86%	89%		59%	55%
WARREN	131		134	149		102%	114%		72%	72%
WARRICK	1,020		1,004	945		98%	93%		77%	71%
WASHINGTON	503		387	362		77%	72%		62%	62%
WAYNE	1,194		985	953		82%	80%		73%	71%
WELLS	536		440	440		82%	82%		54%	50%
WHITE	449		399	397		89%	88%		69%	77%
WHITLEY	559		549	521		98%	93%		66%	70%

APPENDIX C: Standard Operating Procedure (SOP) for Performing County Rate Assessment

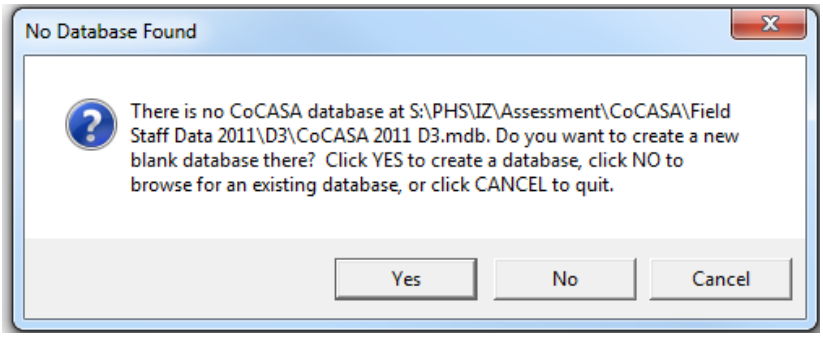
1. Create and save a 'CoCASA Export File' from CHIRP for each county.
    a. Login to CHIRP, click "CASA Export" from the left sidebar.
    b. Enter the patient date of birth range.
    c. Select the county.
    d. Leave all other settings at their default state, and click "Create Export File".
        i. The default settings should be:
            1. CoCASA Version: CoCASA v2.1 and up,
            2. Export by: CPT code,
            3. Output Type: Text File (Download)
    e. After export file has generated, save the file named for the county exported.

Figure 1



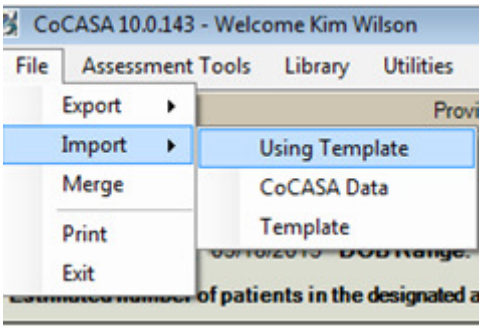
2. Import each export file into a new, blank CoCASA database.
    a. Rename an existing CoCASA database. Then, open CoCASA. A message will appear as shown below:

Figure 2



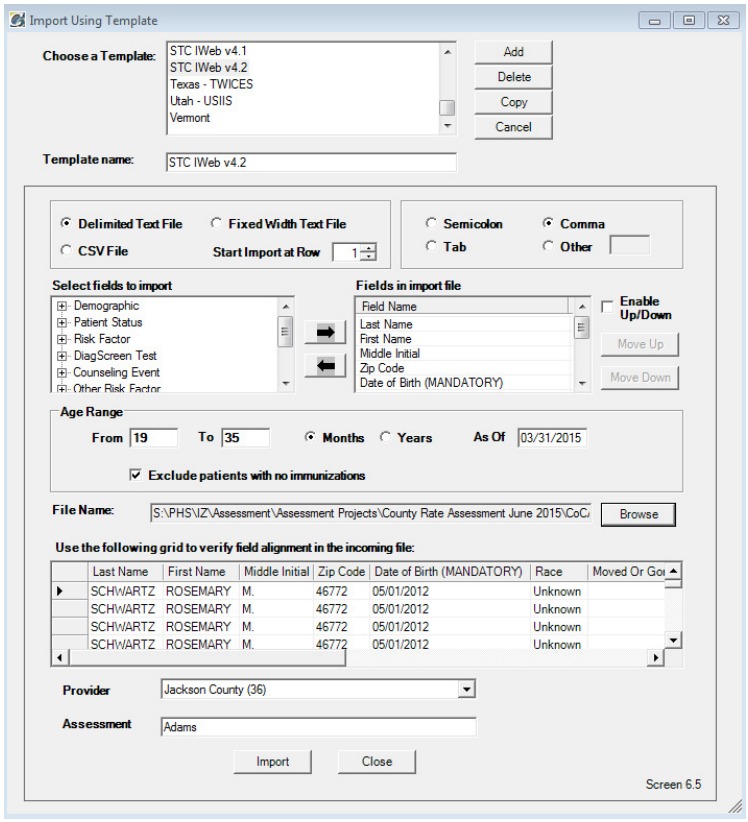
b. Click "Yes" on the dialog box to create a new blank database. Name the new database for the assessment it is being created for.
c. Open CoCASA, directing it toward the new database created for the assessment.
d. Set up a provider named "County Rate Assessment" with the address and phone number for ISDH.
e. Click on File, Import, Using Template.

Figure 3



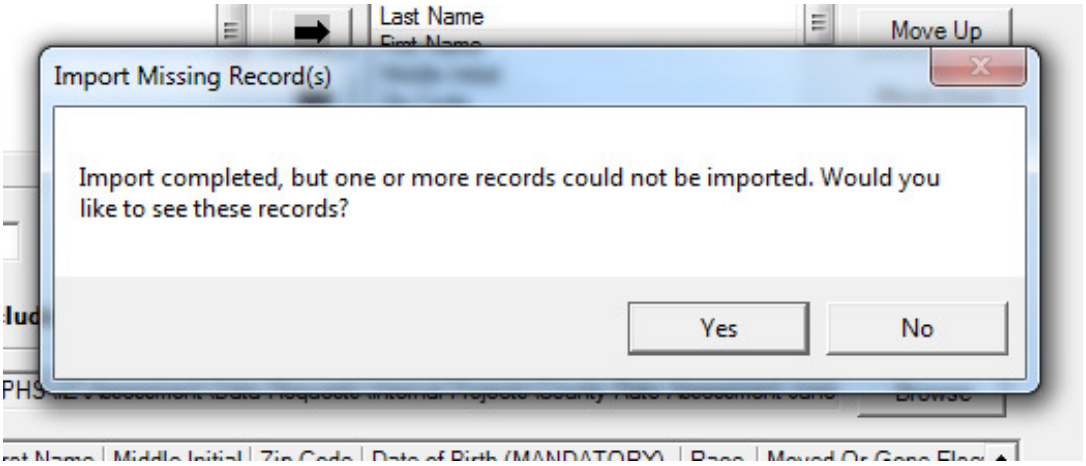
f. Choose the template to import from, STC IWeb v4.2.
g. Enter the date of birth range for the cohort, including the "as of" date, indicating what age the subjects should be at the time of assessment.
h. Click on "Exclude patients with no immunizations".
i. Click "Browse" and select the file saved for the county being imported.
j. Choose the provider "County Rate Assessment", and enter the county name for "Assessment".
k. Click "Import".

Figure 4



l. After the records have finished importing, if there was at least one record excluded, the following message will display:

Figure 4



m. Click Yes, then save the text file for later reference. This can be used in working with CHIRP staff to "clean up" the data.
n. Complete all steps for each county in the state.

3. Make a copy of the complete database after importing all county export files.
4. Open the Access database that contains the county assessment data.
   a. Double click the file in Windows Explorer.

b. Upon opening, you will be prompted to enter a password, enter “COCASAnip”. This is case-sensitive.

5. Exclude patients from the patient table that do not have 2 or more vaccines excluding influenza.
   a. First, run a query to create a new “tblDoses” table containing all doses excluding influenza. (copy and paste the SQL script shown in Figure 6)
      i. The vaccine code for the influenza family is “11”.
      ii. Run the query, naming the table “tblDosesNoFlu”.

Figure 6

```
SELECT tblDoses.AntigenID, tblDoses.DateGiven, tblDoses.DoseNumber, tblDoses.Location,
tblDoses.LotNumber, tblDoses.ManufacturerID, tblDoses.PatientID, tblDoses.TradeNameID INTO
tblDosesNoFlu
FROM tblDoses
GROUP BY tblDoses.AntigenID, tblDoses.DateGiven, tblDoses.DoseNumber, tblDoses.Location,
tblDoses.LotNumber, tblDoses.ManufacturerID, tblDoses.PatientID, tblDoses.TradeNameID
HAVING (((tblDoses.AntigenID) Not Like "11"));
```

   b. Next, run another query to create a new “tblDoses” table containing all doses excluding those for patients with fewer than 2 vaccines (excluding flu). (copy and paste the SQL script shown in Figure 7)
   c. Run the query, naming the table “tblDosesNoFlu2ormore”

NOTE: THIS QUERY WILL TAKE APPROXIMATELY 48 HOURS TO RUN

Figure 7

```
SELECT tblDosesNoFlu.AntigenID, tblDosesNoFlu.DateGiven, tblDosesNoFlu.DoseNumber,
tblDosesNoFlu.Location, tblDosesNoFlu.LotNumber, tblDosesNoFlu.ManufacturerID,
tblDosesNoFlu.PatientID, tblDosesNoFlu.TradeNameID INTO tblDosesNoFlu2ormore
FROM tblDosesNoFlu
GROUP BY tblDosesNoFlu.AntigenID, tblDosesNoFlu.DateGiven, tblDosesNoFlu.DoseNumber,
tblDosesNoFlu.Location, tblDosesNoFlu.LotNumber, tblDosesNoFlu.ManufacturerID,
tblDosesNoFlu.PatientID, tblDosesNoFlu.TradeNameID
HAVING (((tblDosesNoFlu.PatientID) In (SELECT [PatientID] FROM [tblDoses] As Tmp GROUP
BY [PatientID] HAVING Count(*)>1 )));
```

   d. Now create a new table for unique patient IDs contained in the “tblDosesNoFlu2ormore” table.
      i. Copy and paste the SQL script shown in Figure 8.
      ii. Run the query, naming the table “tblUniquePatients”

Figure 8

```
SELECT DISTINCTROW tblDosesNoFlu2ormore.PatientID INTO tblUniquePatients
FROM tblDosesNoFlu2ormore
GROUP BY tblDosesNoFlu2ormore.PatientID;
```

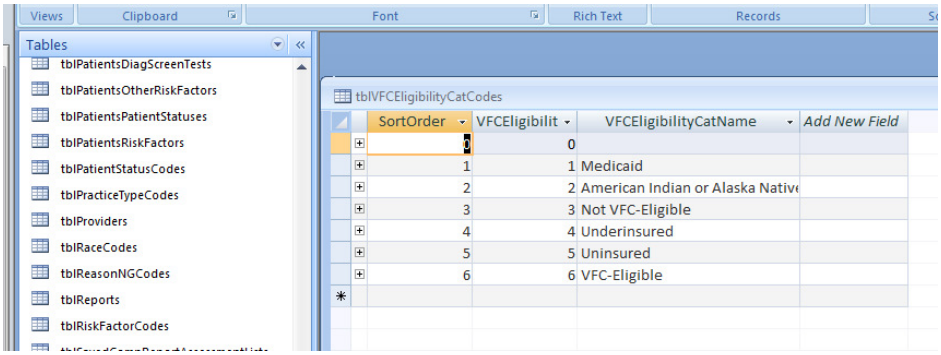
e. Finally, run a delete query to delete the patient records from the "tblPatients" table that are not contained in the unique patients table.
   i. Copy and paste the SQL script shown in Figure 9.
   ii. Run the query, this will update the "tblPatients" table by deleting those not contained in tblUniquePatients.

Figure 9

```
DELETE Delete AS Expr1, tblPatients.[PatientID]
FROM tblPatients
WHERE (((tblPatients.[PatientID]) Not In (Select PatientID from tblUniquePatients)));
```

6. Create a variable for "VFC-Eligible" in the "tblVFCEligibilityCatCodes" table
   a. Click underneath the record for 5-Uninsured to create a new record
   b. Enter 6 for Sort Order, 6 for VFCEligibilityCatID, and "VFC-Eligible" under VFCEligibilityCatName. (see Figure 10)

Figure 10



7. Update patient eligibility codes in the "tblPatientsPatientStatuses" to VFC-Eligible for all relevant categories.
   a. Find all values in the "VFCEligibilityCatID" field that are "1", "2", or "5" and replace with "6". This will put all VFC-Eligible categories into one category.
   b. Be sure to save the database after making these changes, then close it.

8. Open CoCASA and begin running a "Summary Report" (see Figure 11) for each county, for each VFC eligibility category to be assessed.
   a. Click on the "Reports" tab. Select the assessment to run the report for; these should be named for the county the data came from.
   b. Select "Summary Report" from the left sidebar, then enter the report criteria.
      i. Age Range: 19-35 Months as of 03/31/2017
      ii. Antigens-Series: 4:3:1:3:3:1:4
      iii. Compliance: by date: 03/31/2017

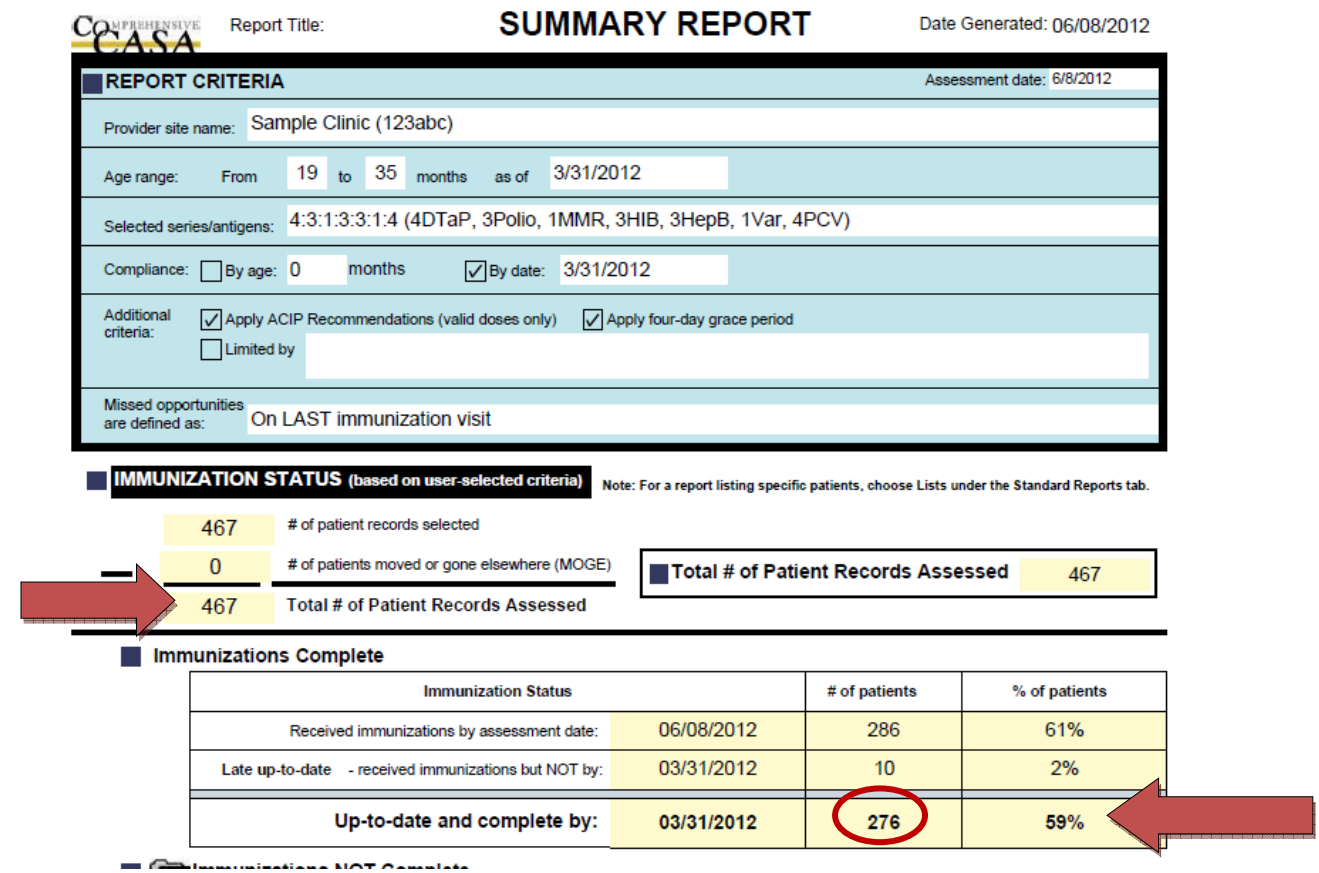
iv. Limit by a user-selected variable: after checking this box, click the button to open up the choices of variables. Choose the VFC Eligibility category you are running the report for.
v. Click "Run Report". When report is complete, click on "Export" and save the report.

c. In most cases, you will run 4 different reports for each county. One without choosing the user selected variable (to capture all children), one with "VFC-Eligible" as a choice, one with "Not VFC-Eligible", and one with "Underinsured".

9. Use the data provided on the county reports to manually populate a spreadsheet of values for each county (shown in Figure 11). Key fields to include are:
   a. Number of children included in the assessment
   b. Number of children who were up to date
   c. Percentage of children who are up to date

10. These fields should be populated for each eligibility category assessed.

Figure 11



COMPREHENSIVE CASA

Report Title: **SUMMARY REPORT** Date Generated: 06/08/2012

REPORT CRITERIA Assessment date: 6/8/2012

Provider site name: Sample Clinic (123abc)

Age range: From 19 to 35 months as of 3/31/2012

Selected series/antigens: 4:3:1:3:3:1:4 (4DTaP, 3Polio, 1MMR, 3HIB, 3HepB, 1Var, 4PCV)

Compliance: ☐ By age: 0 months ☑ By date: 3/31/2012

Additional criteria: ☑ Apply ACIP Recommendations (valid doses only) ☑ Apply four-day grace period ☐ Limited by

Missed opportunities are defined as: On LAST immunization visit

IMMUNIZATION STATUS (based on user-selected criteria) Note: For a report listing specific patients, choose Lists under the Standard Reports tab.

467 # of patient records selected

0 # of patients moved or gone elsewhere (MOGE)

467 Total # of Patient Records Assessed

Total # of Patient Records Assessed 467

Immunizations Complete

Immunization Status		# of patients	% of patients
Received immunizations by assessment date:	06/08/2012	286	61%
Late up-to-date - received immunizations but NOT by:	03/31/2012	10	2%
Up-to-date and complete by:	**03/31/2012**	**276**	**59%**

References

Centers for Disease Control and Prevention. National Immunization Survey, NIS. Estimated for Completion of 4:3:1:3:3:1:4, complete for Hib series. Retrieved May 23, 2017. https://www.cdc.gov/mmwr/volumes/65/wr/mm6539a4.htm?s_cid=mm6539a4_w

Centers for Disease Control and Prevention (CDC). (2015) Epidemiology and Prevention of Vaccine-Preventable Diseases. 13th ed. May 2015.

Centers for Disease Control and Prevention (CDC) Comprehensive Clinic Assessment Software Application (CoCASA), Version 12.0

Indiana Immunization Registry, CHIRP. Data obtained April 17, 2017.