Indiana State Department of Health

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Immunization Division

County Immunization Rate Assessment

2018

Immunization Division

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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 5.17.5.1)
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 13.0)
VTrckS	Vaccine Tracking System, maintained by the CDC for use in managing vaccine ordering.
19-35 months of age	Patients born between 04/30/2015 and 08/31/2016.
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 3/31/2018). 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 03/31/2018.

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 03/31/2018.

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 June 27, 2018) 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 2017 to 2018 there was an approximate decrease of 450 immunization records assessed. See Table 3 for a detailed comparison between 2017 and 2018.

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 2017, the overall immunization rate for the 4:3:1:3:3:1:4 series completion is 66.3% ± 7.6 among 19-35 month old children. The birth cohort for this data is January 2014 through May 2016. This estimate is lower than that provided in this report for Indiana, 67%. 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 2017 and 2018 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 2017 and 2018 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	**67%**	**756**
LAGRANGE	49%	5
DAVIESS	53%	7
MARTIN	54%	1
DEARBORN	54%	9
CRAWFORD	56%	2
ALLEN	58%	28
LAKE	58%	55
GRANT	59%	9
ST JOSEPH	59%	39
HENDRICKS	60%	9

Table 2: Ten Highest Rates by County

COUNTY	COMPLETION RATE FOR 4:3:1:3:3:1:4	NUMBER OF VFC PROVIDERS ENROLLED
INDIANA	**67%**	**756**
LAWRENCE	84%	9
SPENCER	84%	2
MONROE	83%	5
CASS	82%	4
WARRICK	81%	5
GIBSON	80%	4
OWEN	80%	3
GREENE	80%	3
WAYNE	79%	5
RUSH	79%	6

Table 3: Summary 2017 and 2018 Indiana Assessment

	2017	2018
Indiana completion rate for 4:3:1:3:3:1:4 series	63%	67%
Number assessed 19-35 months of age	111,137	110,687
Percentage of population represented	88.4%	87.2%
Number of VFC Providers	778	756
Number/ rate assessed by Not VFC-Eligible	43,763/ 68%	46,137/ 72%
Number/ rate assessed by Underinsured	646/ 64%	579/ 69%
Number/ rate assessed by VFC-Eligible	55,174/ 62%	55,737/ 65%

The average immunization rate in Indiana counties is 70%, and the median (or midpoint) is 67%. There were 50 out of 92 counties that fell above the average of 70%, 2 that were equal to the average, and 40 that were below the average of 63%.

Discussion

The result for Indiana's immunization rate for 2018 is 67% coverage among children age 19-35 months which increased 4% relative to the 2017 rate of 63%. 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 2017 US Census data by age, Indiana's population of 19-35 month old children should be approximately 126,979. After excluding any immunization records that were not considered to be "active", there were only 110,687 records assessed in this analysis. This represents 87% of the estimated population. The percentage of the population represented in Brown, Clay, Hendricks, Morgan Ohio and Pike 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 2017 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: 2018 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	2017 (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	**756**	**126,979**	**110,687**	**87%**	**67%**	**46,137**	**72%**	**579**	**69%**	**55,737**	**65%**
ADAMS	4	984	665	68%	60%	215	67%	4	50%	396	59%
ALLEN	28	7978	6,830	86%	58%	2,234	59%	87	57%	3,458	54%
BARTHOLOMEW	7	1578	1,524	97%	76%	562	75%	1	100%	441	76%
BENTON	1	172	129	75%	78%	41	83%	3	100%	64	72%
BLACKFORD	1	219	177	81%	65%	49	65%	0	N/A	111	66%
BOONE	8	1309	1,213	93%	74%	889	73%	6	100%	240	80%
BROWN	2	167	184	110%	75%	70	81%	1	100%	97	68%
CARROLL	3	315	268	85%	68%	83	80%	2	50%	145	62%
CASS	4	764	618	81%	82%	201	85%	12	100%	372	83%
CLARK	10	2261	1,966	87%	67%	785	76%	2	0%	951	69%
CLAY	5	504	506	100%	72%	208	75%	1	100%	290	71%
CLINTON	4	696	564	81%	73%	213	73%	4	100%	251	70%
CRAWFORD	2	183	104	57%	56%	35	63%	2	0%	59	58%
DAVIESS	7	832	613	74%	53%	140	74%	7	57%	449	47%
DEARBORN	9	806	588	73%	54%	300	57%	1	100%	249	55%
DECATUR	7	505	459	91%	73%	205	84%	5	60%	219	65%
DEKALB	10	874	709	81%	69%	299	74%	6	67%	333	62%
DELAWARE	12	1723	1,545	90%	72%	426	66%	5	100%	940	74%
DUBOIS	4	897	779	87%	71%	386	78%	9	89%	259	69%
ELKHART	32	4705	3,862	82%	63%	1,510	67%	11	55%	2,301	61%
FAYETTE	4	365	287	79%	70%	58	78%	1	100%	215	68%
FLOYD	8	1315	1,230	94%	71%	587	77%	4	50%	560	70%
FOUNTAIN	2	308	232	75%	66%	92	78%	3	67%	112	55%
FRANKLIN	2	374	216	58%	73%	110	80%	0	N/A	100	67%
FULTON	2	369	315	85%	67%	123	79%	12	75%	176	60%
GIBSON	4	631	541	86%	80%	320	88%	2	50%	213	69%

APPENDIX A: 2018 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	2017 (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	9	1112	958	**86%**	59%	248	57%	12	33%	647	61%
GREENE	3	529	363	**69%**	80%	152	89%	2	100%	206	73%
HAMILTON	22	6470	5,641	**87%**	66%	4,455	65%	27	78%	931	71%
HANCOCK	6	1316	1,283	**97%**	71%	736	73%	5	80%	313	74%
HARRISON	4	746	625	**84%**	66%	327	70%	5	80%	263	64%
HENDRICKS	9	2860	2,876	**101%**	60%	1,023	67%	7	71%	794	73%
HENRY	6	696	651	**94%**	79%	200	87%	2	50%	403	76%
HOWARD	10	1503	1,360	**90%**	72%	608	76%	10	50%	715	70%
HUNTINGTON	5	618	596	**96%**	62%	253	66%	18	67%	290	62%
JACKSON	3	848	835	**98%**	63%	360	62%	7	86%	397	64%
JASPER	2	594	480	**81%**	71%	225	75%	9	89%	220	68%
JAY	4	473	352	**74%**	72%	113	77%	8	88%	213	68%
JEFFERSON	2	557	533	**96%**	75%	200	79%	1	100%	318	74%
JENNINGS	2	528	433	**82%**	76%	195	77%	0	N/A	198	74%
JOHNSON	21	3038	2,687	**88%**	74%	1,509	78%	11	64%	1,049	72%
KNOX	2	643	510	**79%**	65%	237	75%	7	71%	266	56%
KOSCIUSKO	6	1621	1,217	**75%**	65%	594	70%	3	67%	576	63%
LAGRANGE	5	1105	632	**57%**	49%	150	67%	2	50%	462	43%
LAKE	55	8822	7,683	**87%**	58%	2,908	68%	39	62%	4,424	52%
LAPORTE	11	1994	1,820	**91%**	60%	674	70%	5	80%	1,122	55%
LAWRENCE	9	781	652	**83%**	84%	299	88%	0	N/A	350	80%
MADISON	26	2218	2,032	**92%**	76%	719	80%	6	67%	1,261	75%
MARION	102	21030	18,592	**88%**	67%	5,724	69%	48	65%	11,835	68%
MARSHALL	12	914	801	**88%**	68%	332	76%	7	86%	459	63%
MARTIN	1	202	193	**96%**	54%	44	84%	3	100%	135	44%
MIAMI	3	555	429	**77%**	74%	176	74%	4	100%	232	75%
MONROE	5	2028	1,734	**86%**	83%	989	88%	5	100%	736	76%

APPENDIX A: 2018 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	2017 (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
MONTGOMERY	6	721	592	82%	74%	230	77%	5	100%	290	73%
MORGAN	8	1175	1,239	105%	74%	556	81%	0	N/A	614	71%
NEWTON	1	234	195	83%	66%	60	65%	1	100%	119	64%
NOBLE	3	991	794	80%	66%	331	72%	10	80%	405	61%
OHIO	2	82	112	137%	71%	55	78%	0	N/A	51	65%
ORANGE	3	332	317	95%	72%	114	75%	3	100%	188	71%
OWEN	3	331	260	79%	80%	98	83%	0	N/A	159	79%
PARKE	3	317	211	67%	70%	77	81%	0	N/A	120	62%
PERRY	2	345	240	70%	76%	116	78%	1	100%	117	74%
PIKE	3	216	227	105%	78%	117	82%	1	0%	99	77%
PORTER	13	2737	2,365	86%	67%	1,429	71%	10	80%	863	60%
POSEY	4	438	346	79%	75%	237	81%	3	33%	102	64%
PULASKI	2	206	167	81%	69%	60	75%	4	100%	94	63%
PUTNAM	5	554	489	88%	68%	122	75%	0	N/A	241	68%
RANDOLPH	3	452	352	78%	68%	135	71%	3	67%	195	67%
RIPLEY	3	495	448	91%	78%	237	84%	0	N/A	196	73%
RUSH	6	287	230	80%	79%	61	84%	2	100%	129	76%
STJOSEPH	39	5202	4,766	92%	59%	2,059	66%	18	50%	2,542	55%
SCOTT	4	419	358	85%	71%	115	83%	5	100%	219	66%
SHELBY	2	781	720	92%	78%	177	79%	2	0%	391	79%
SPENCER	2	340	213	63%	84%	120	85%	3	100%	78	86%
STARKE	6	428	322	75%	63%	132	70%	3	67%	186	59%
STEUBEN	3	576	505	88%	62%	212	66%	2	50%	265	58%
SULLIVAN	4	330	279	85%	68%	137	77%	2	50%	137	59%
SWITZERLAND	1	205	125	61%	69%	55	75%	0	N/A	62	66%
TIPPECANOE	17	3514	3,311	94%	74%	1,105	80%	13	69%	1,433	70%
TIPTON	1	234	195	83%	76%	118	83%	5	80%	64	69%

APPENDIX A: 2018 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	2017 (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
UNION	1	129	59	**46%**	75%	10	70%	0	N/A	46	78%
VANDERBURGH	23	3208	2,975	**93%**	77%	1,548	84%	7	86%	1,379	71%
VERMILLION	4	235	213	**91%**	71%	88	77%	0	N/A	124	67%
VIGO	19	1862	1,651	**89%**	67%	664	71%	2	50%	966	66%
WABASH	3	498	451	**91%**	65%	200	76%	4	75%	236	58%
WARREN	2	133	121	**91%**	76%	43	88%	3	67%	53	68%
WARRICK	5	1132	1,009	**89%**	81%	695	86%	2	100%	303	72%
WASHINGTON	5	483	372	**77%**	71%	162	77%	0	N/A	193	68%
WAYNE	5	1170	935	**80%**	79%	266	82%	3	33%	612	80%
WELLS	2	497	461	**93%**	65%	210	60%	5	80%	212	71%
WHITE	6	446	427	**96%**	77%	129	82%	4	100%	230	75%
WHITLEY	5	609	543	**89%**	72%	266	73%	9	67%	208	71%

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, 2017 & 2018

			Number Assessed 19-35 Months of Age			Percentage of Population Represented			Completion Rate for 4:3:1:3:3:1:4	
COUNTY	(2017 Census) POPULATION 19-35 MONTHS OF AGE		2017	2018		2017	2018		2017	2018
~INDIANA	**126,979**		**111,137**	**110,687**		**88%**	**87%**		**63%**	**67%**
ADAMS	984		662	665		67%	68%		58%	60%
ALLEN	7978		6,889	6,830		86%	86%		56%	58%
BARTHOLOMEW	1578		1,442	1,524		91%	97%		75%	76%
BENTON	172		133	129		77%	75%		69%	78%
BLACKFORD	219		199	177		91%	81%		64%	65%
BOONE	1309		1,214	1,213		93%	93%		71%	74%
BROWN	167		171	184		102%	110%		71%	75%
CARROLL	315		274	268		87%	85%		72%	68%
CASS	764		610	618		80%	81%		79%	82%
CLARK	2261		1,971	1,966		87%	87%		59%	67%
CLAY	504		480	506		95%	100%		70%	72%
CLINTON	696		647	564		93%	81%		70%	73%
CRAWFORD	183		117	104		64%	57%		58%	56%
DAVIESS	832		621	613		75%	74%		46%	53%
DEARBORN	806		583	588		72%	73%		63%	54%
DECATUR	505		442	459		88%	91%		78%	73%
DEKALB	874		715	709		82%	81%		68%	69%
DELAWARE	1723		1,585	1,545		92%	90%		66%	72%
DUBOIS	897		737	779		82%	87%		72%	71%
ELKHART	4705		3,947	3,862		84%	82%		58%	63%
FAYETTE	365		311	287		85%	79%		67%	70%
FLOYD	1315		1,181	1,230		90%	94%		59%	71%
FOUNTAIN	308		267	232		87%	75%		66%	66%

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, 2017 & 2018

			Number Assessed 19-35 Months of Age			Percentage of Population Represented			Completion Rate for 4:3:1:3:3:1:4	
COUNTY	(2017 Census) POPULATION 19-35 MONTHS OF AGE		2017	2018		2017	2018		2017	2018
FRANKLIN	374		215	216		57%	58%		68%	73%
FULTON	369		322	315		87%	85%		66%	67%
GIBSON	631		552	541		87%	86%		75%	80%
GRANT	1112		1,000	958		90%	86%		50%	59%
GREENE	529		429	363		81%	69%		79%	80%
HAMILTON	6470		5,566	5,641		86%	87%		60%	66%
HANCOCK	1316		1,276	1,283		97%	97%		61%	71%
HARRISON	746		615	625		82%	84%		60%	66%
HENDRICKS	2860		2,700	2,876		94%	101%		59%	60%
HENRY	696		645	651		93%	94%		78%	79%
HOWARD	1503		1,323	1,360		88%	90%		70%	72%
HUNTINGTON	618		594	596		96%	96%		59%	62%
JACKSON	848		840	835		99%	98%		55%	63%
JASPER	594		510	480		86%	81%		65%	71%
JAY	473		382	352		81%	74%		73%	72%
JEFFERSON	557		529	533		95%	96%		72%	75%
JENNINGS	528		435	433		82%	82%		67%	76%
JOHNSON	3038		2,658	2,687		87%	88%		65%	74%
KNOX	643		603	510		94%	79%		66%	65%
KOSCIUSKO	1621		1,316	1,217		81%	75%		61%	65%
LAGRANGE	1105		613	632		55%	57%		47%	49%
LAKE	8822		7,807	7,683		88%	87%		53%	58%
LAPORTE	1994		1,878	1,820		94%	91%		58%	60%
LAWRENCE	781		675	652		86%	83%		75%	84%

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, 2017 & 2018

			Number Assessed 19-35 Months of Age			Percentage of Population Represented			Completion Rate for 4:3:1:3:3:1:4	
COUNTY	(2017 Census) POPULATION 19-35 MONTHS OF AGE		2017	2018		2017	2018		2017	2018
MADISON	2218		1,982	2,032		89%	92%		71%	76%
MARION	21030		18,808	18,592		89%	88%		63%	67%
MARSHALL	914		736	801		81%	88%		59%	68%
MARTIN	202		208	193		103%	96%		58%	54%
MIAMI	555		455	429		82%	77%		68%	74%
MONROE	2028		1,775	1,734		88%	86%		79%	83%
MONTGOMERY	721		618	592		86%	82%		69%	74%
MORGAN	1175		1,194	1,239		102%	105%		71%	74%
NEWTON	234		175	195		75%	83%		61%	66%
NOBLE	991		825	794		83%	80%		70%	66%
OHIO	82		109	112		133%	137%		63%	71%
ORANGE	332		304	317		92%	95%		65%	72%
OWEN	331		261	260		79%	79%		78%	80%
PARKE	317		205	211		65%	67%		62%	70%
PERRY	345		234	240		68%	70%		78%	76%
PIKE	216		215	227		100%	105%		80%	78%
PORTER	2737		2,377	2,365		87%	86%		65%	67%
POSEY	438		388	346		89%	79%		76%	75%
PULASKI	206		199	167		97%	81%		69%	69%
PUTNAM	554		458	489		83%	88%		63%	68%
RANDOLPH	452		412	352		91%	78%		67%	68%
RIPLEY	495		396	448		80%	91%		76%	78%
RUSH	287		262	230		91%	80%		68%	79%
STJOSEPH	5202		4,597	4,766		88%	92%		50%	59%

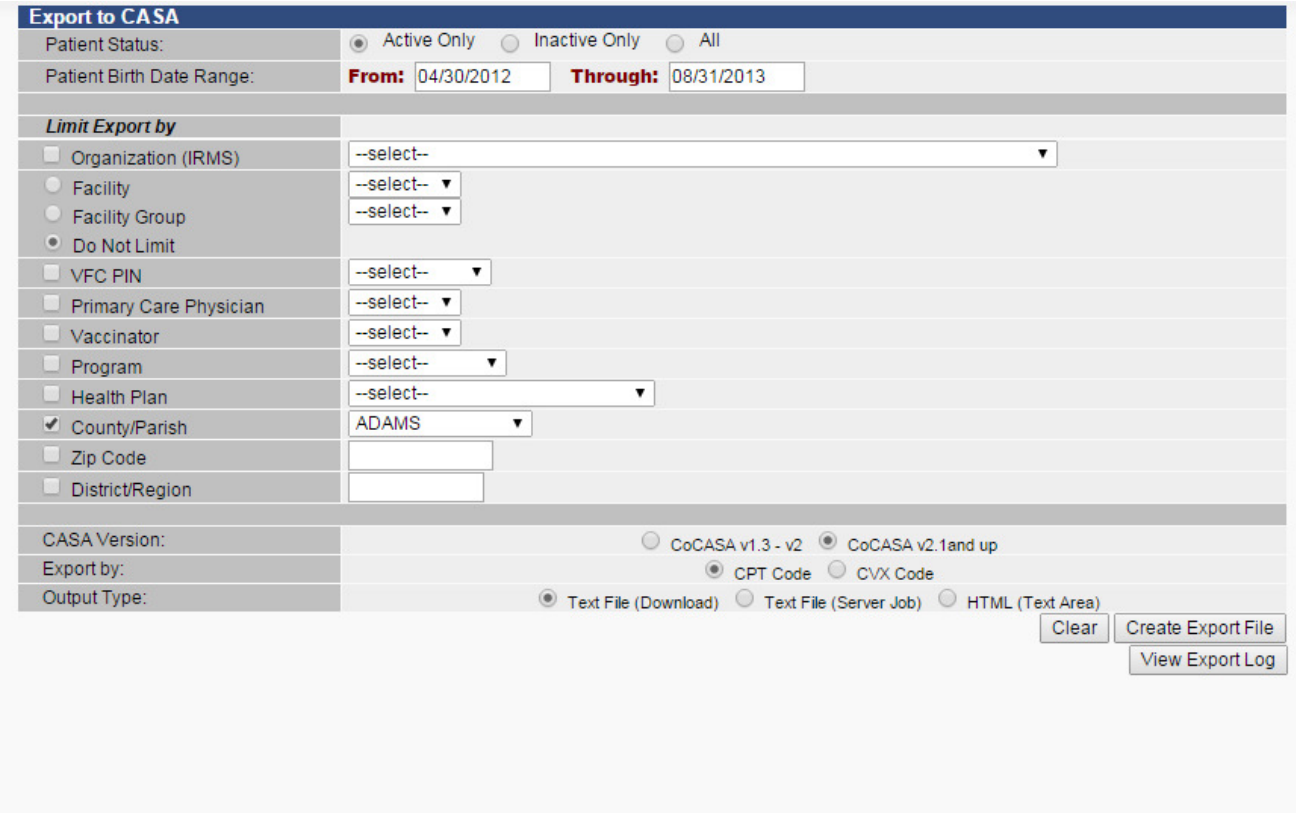
APPENDIX B. Immunization series completion rate for 4:3:1:3:3:1:4 among children aged 19-35 months, by county, number assessed, population represented, 2017 & 2018

			Number Assessed 19-35 Months of Age			Percentage of Population Represented			Completion Rate for 4:3:1:3:3:1:4	
COUNTY	(2017 Census) POPULATION 19-35 MONTHS OF AGE		2017	2018		2017	2018		2017	2018
SCOTT	419		365	358		87%	85%		65%	71%
SHELBY	781		726	720		93%	92%		77%	78%
SPENCER	340		234	213		69%	63%		83%	84%
STARKE	428		348	322		81%	75%		61%	63%
STEUBEN	576		498	505		86%	88%		58%	62%
SULLIVAN	330		307	279		93%	85%		70%	68%
SWITZERLAND	205		112	125		55%	61%		67%	69%
TIPPECANOE	3514		3,291	3,311		94%	94%		73%	74%
TIPTON	234		171	195		73%	83%		71%	76%
UNION	129		67	59		52%	46%		64%	75%
VANDERBURGH	3208		2,948	2,975		92%	93%		74%	77%
VERMILLION	235		221	213		94%	91%		69%	71%
VIGO	1862		1,649	1,651		89%	89%		65%	67%
WABASH	498		428	451		86%	91%		59%	65%
WARREN	133		134	121		101%	91%		72%	76%
WARRICK	1132		1,004	1,009		89%	89%		77%	81%
WASHINGTON	483		387	372		80%	77%		62%	71%
WAYNE	1170		985	935		84%	80%		73%	79%
WELLS	497		440	461		89%	93%		54%	65%
WHITE	446		399	427		89%	96%		69%	77%
WHITLEY	609		549	543		90%	89%		66%	72%

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

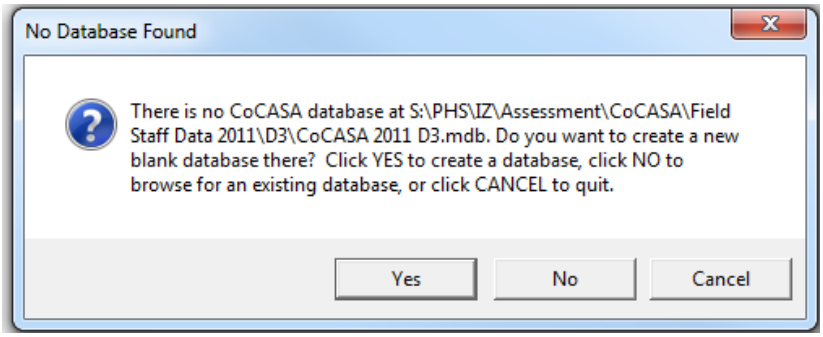
1. Create and save a 'CoCASA Export File' from CHIRP for each county.
    a. Login to CHIRP, click "CASA Export" from the left sidebar.
    b. Enter the patient date of birth range.
    c. Select the county.
    d. Leave all other settings at their default state, and click "Create Export File".
        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



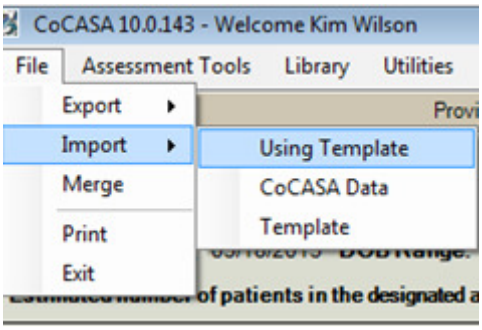
2. Import each export file into a new, blank CoCASA database.
    a. Rename an existing CoCASA database. Then, open CoCASA. A message will appear as shown below:

Figure 2



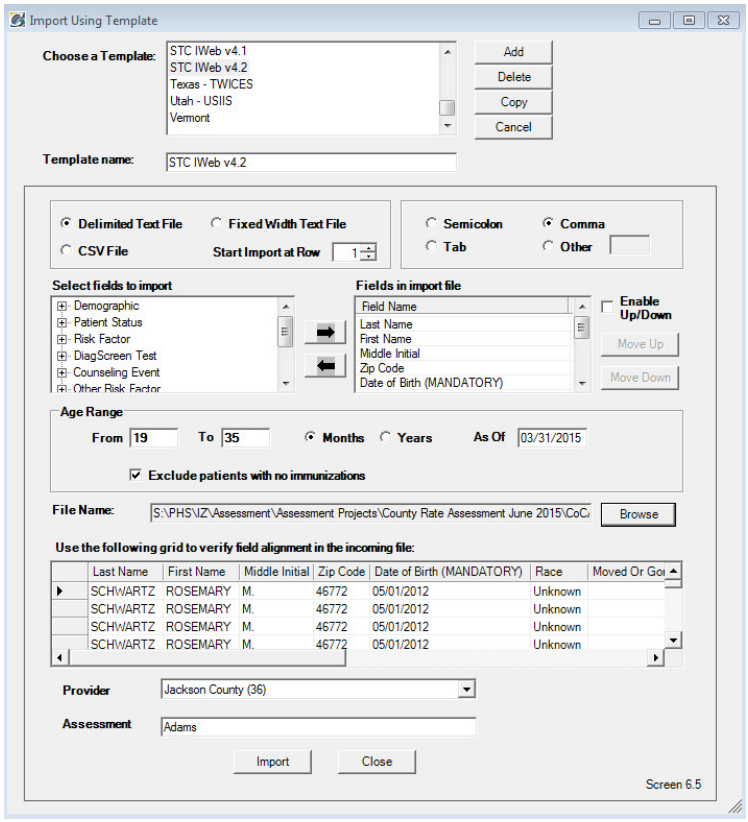
b. Click "Yes" on the dialog box to create a new blank database. Name the new database for the assessment it is being created for.
c. Open CoCASA, directing it toward the new database created for the assessment.
d. Set up a provider named "County Rate Assessment" with the address and phone number for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

Figure 3



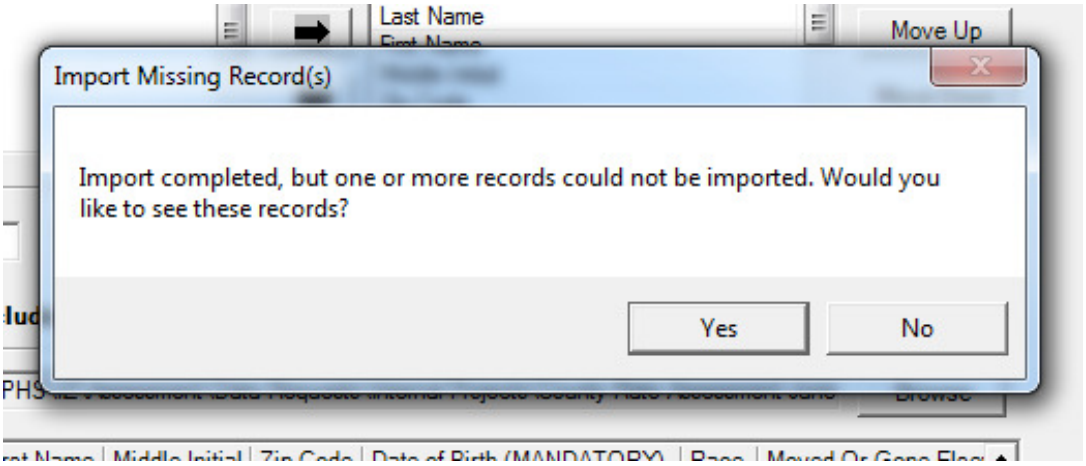
f. Choose the template to import from, STC IWeb v4.2.
g. Enter the date of birth range for the cohort, including the "as of" date, indicating what age the subjects should be at the time of assessment.
h. Click on "Exclude patients with no immunizations".
i. Click "Browse" and select the file saved for 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;
```

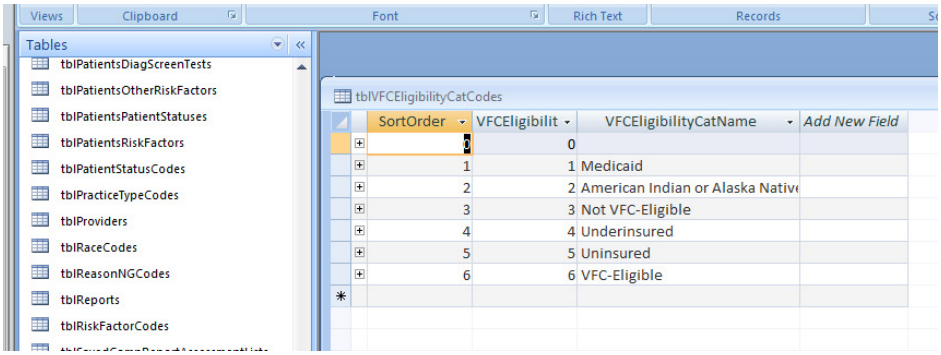
e. Finally, run a delete query to delete the patient records from the "tblPatients" table that are not contained in the unique patients table.
   i. Copy and paste the SQL script shown in Figure 9.
   ii. Run the query, this will update the "tblPatients" table by deleting those not contained in tblUniquePatients.

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 03/31/2018
      ii. Antigens-Series: 4:3:1:3:3:1:4
      iii. Compliance: by date: 03/31/2018

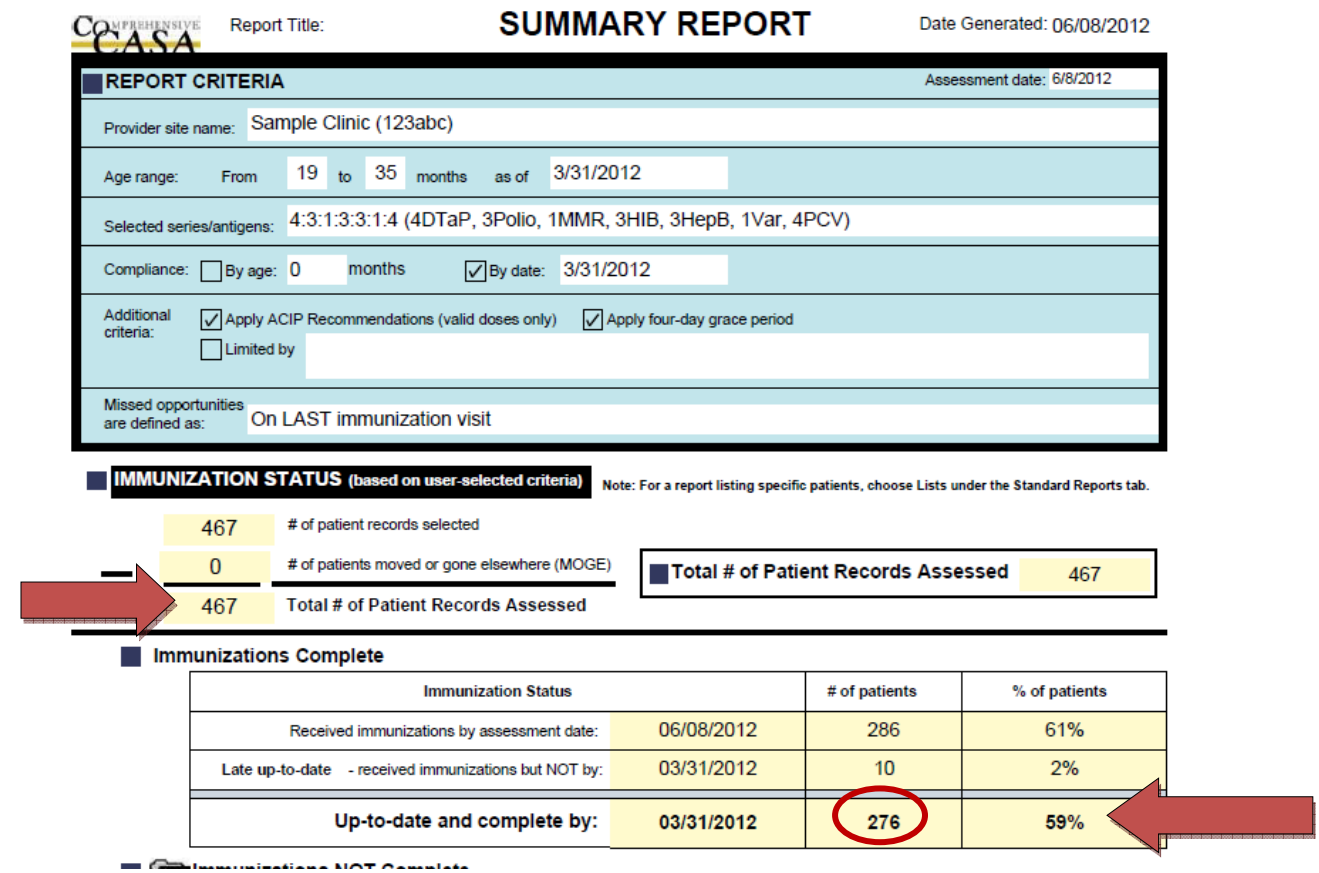
iv. Limit by a user-selected variable: after checking this box, click the button to open up the choices of variables. Choose the VFC Eligibility category you are running the report for.
v. Click "Run Report". When report is complete, click on "Export" and save the report.

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 January 29, 2019 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6181261/

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 13.0

Indiana Immunization Registry, CHIRP. Data obtained July 6, 2018.