

USING IIS DATA TO MONITOR UPTAKE IN ADULT IMMUNIZATION RECOMMENDATIONS

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BACKGROUND



Pertussis Vaccine

- Current recommendations for pertussis-containing vaccines:
 - *start with combination diphtheria, tetanus and pertussis (DTaP) vaccine administered at 2, 4, 6, 15-18 months and 4-6 years of age,*
 - *followed by a single dose of tetanus, diphtheria and pertussis (Tdap) vaccine at 11-12 years of age,*
 - *and a single dose of Tdap for adults 19 years of age and older.*
- Despite the standard recommendations, the number of pertussis cases reported to CDC has been gradually increasing since 1980, with more than 32,000 cases reported in 2014 alone.^[1]
- The majority of pertussis-related deaths occur in infants younger than 3 months of age.^[2]

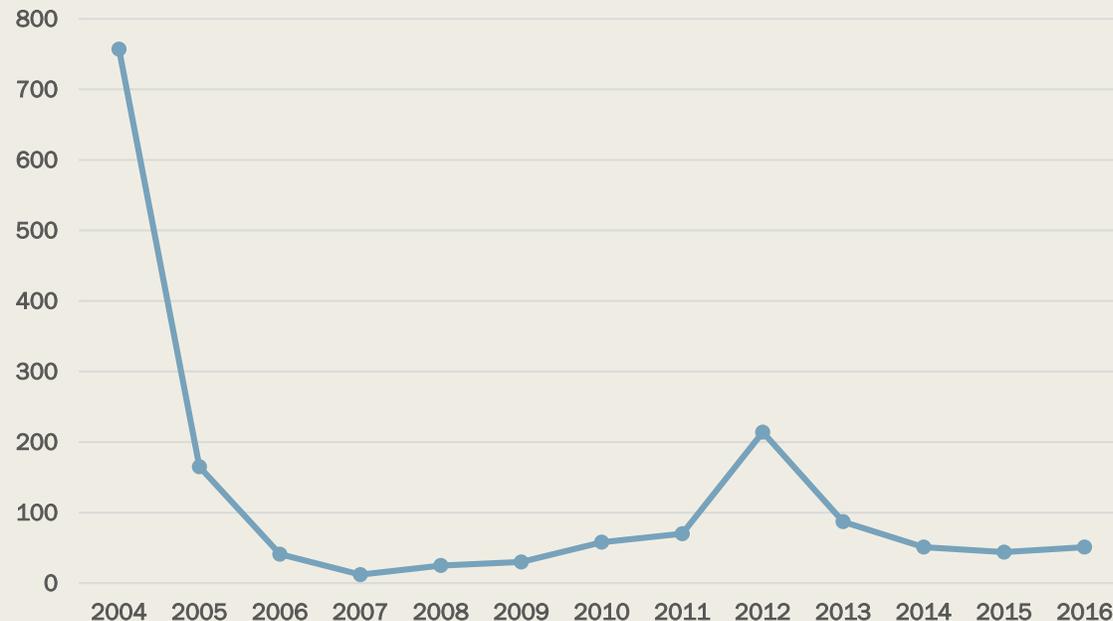
[1] Pertussis (Whooping Cough). (2016, June 6). *Surveillance and Reporting: Trends*. Retrieved from CDC website: <http://www.cdc.gov/pertussis/surv-reporting.html>

[2] Pertussis (Whooping Cough). (2016, June 6). *Surveillance and Reporting: 2012-2014 Final Pertussis Surveillance Report*. Retrieved from CDC website: <http://www.cdc.gov/pertussis/outbreaks/trends.html>

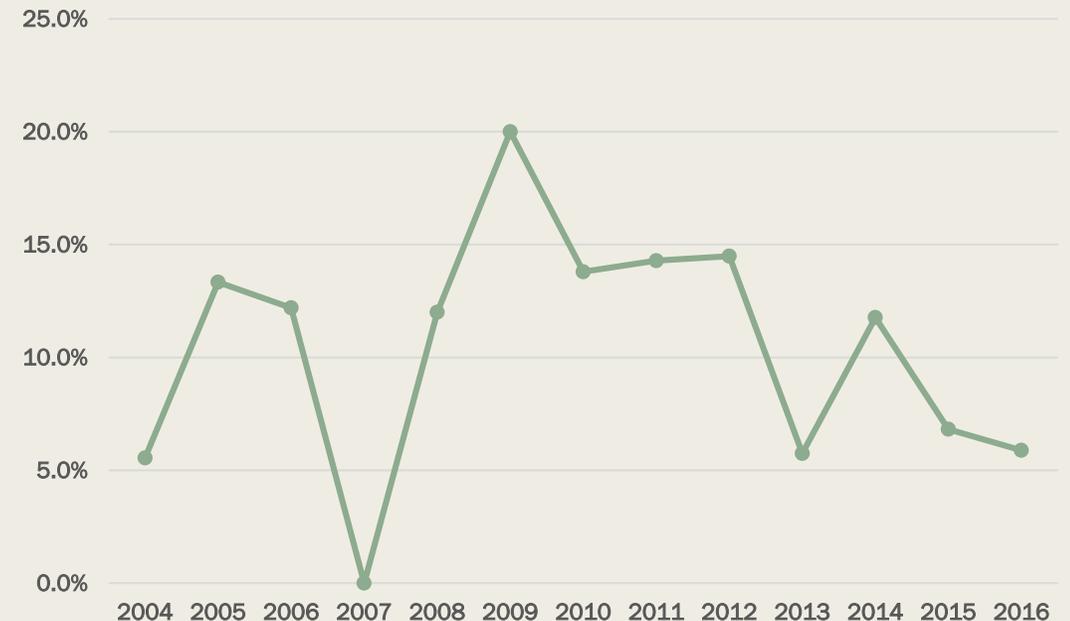
Pertussis Cases in North Dakota

- In North Dakota, the number of pertussis cases more than doubled from 2011 to 2012.
 - *ND had 70 cases in 2011 and 214 cases in 2012.*
 - *This was the highest number of pertussis cases in the state since 2004, where ND had 757 cases.*
- Since 2012, the number of reported cases has been declining.

Total Number of Pertussis Cases by Year



Percent of Pertussis Cases in Infants Under 1 year



Tdap Recommendation

- In October 2012, the Advisory Committee on Immunization Practices (ACIP) voted to recommend that providers administer a dose of Tdap vaccine during each pregnancy, regardless of the woman's prior history of Tdap vaccination.
 - *Goal of this recommendation was to maximize the transfer of pertussis antibodies from mom to baby.*
 - *Studies have shown that “transplacentally transferred maternal antibodies provide protection against pertussis” for infants who are too young to be vaccinated.^[3]*
- Recommendation was published by CDC in their Morbidity and Mortality Weekly Report (MMWR) in the February 2013.
- The North Dakota Immunization Program sent guidance to North Dakota healthcare providers about the new recommendation after it was published in the MMWR.
 - *Guidance encouraged providers to implement the new recommendation and to report doses of Tdap vaccine administered to the North Dakota Immunization Information System (NDIIS).*

[3] Department of Health and Human Services Centers for Disease Control and Prevention Advisory Committee on Immunization Practices (ACIP) Summary Report October 24-25, 2012. <http://www.cdc.gov/vaccines/acip/meetings/minutes-archive.html>

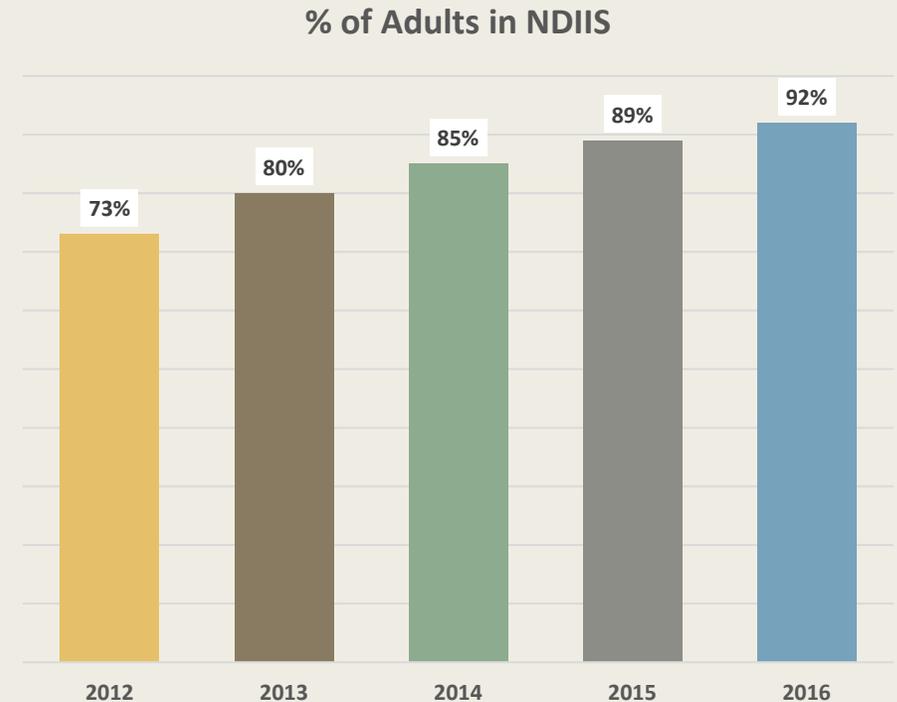
[4] Morbidity and Mortality Weekly Report (MMWR). (2013, February 22) *Updated Recommendations for Use of Tetanus Toxoid, Reduced Diphtheria Toxoid, and Acellular Pertussis Vaccine (Tdap) in Pregnant Women – Advisory Committee on Immunization Practices (ACIP), 2012*. Retrieved from CDC website: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6207a4.htm?s_cid=mm6207a4_e

NDIIS Background

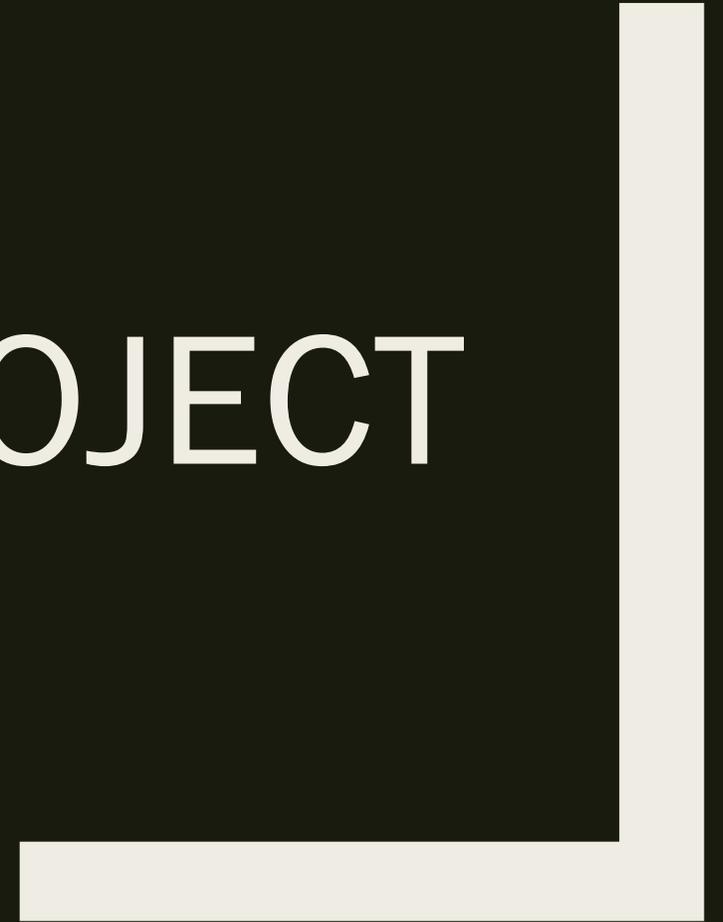
- The North Dakota Immunization Information System (NDIIS) is a confidential, population-based, computerized information system that attempts to collect vaccination data for all North Dakotans.
 - *There are more than 1.1 million active client records in the NDIIS.*
 - *There are more than 12.1 million dose records in the NDIIS.*
- Established in 1988 as a modem, dial-up system.
- The North Dakota Department of Health (NDDoH) contracted with Noridian Mutual Insurance Company (NMIC), formally Blue Cross/Blue Shield of North Dakota (BCBSND), in 1996 to develop the current web-based system.
- ND Century Code requires North Dakota providers enter all childhood (18 years of age and younger) immunizations into the NDIIS within 4 weeks of administration.
- Since 2006, the NDIIS has received electronic birth certificate data from North Dakota Vital Records.
 - *In 2016, approximately 92% of North Dakota newborns had an NDIIS record within four weeks of birth.*

NDIIS Background continued...

- The NDIIS is a lifespan system that collects data for infants, children, adolescents and adults.
- Reporting of adult immunizations is not required, however providers are encouraged to report all immunizations to the NDIIS.
 - *Consent is not required before reporting adult data to the NDIIS.*
 - *Adults do have the option of opting out of the NDIIS.*
- The NDIIS has high adult participation with 92% of adults in the NDIIS having at least one adult (after age 19) vaccine.



EVALUATION PROJECT



Objectives

- Use data from the NDIIS to evaluate the response of North Dakota healthcare providers to implementing the recommendation of the ACIP to administer Tdap vaccine to pregnant women, during every pregnancy.
- Use data from the NDIIS to evaluate the response to the ACIP recommendation to administer Tdap vaccine to pregnant women during every pregnancy by different types of healthcare provider.
 - *Focused on uptake of recommendation by OB/GYN providers vs. family practice providers*

Methods

- Data was extracted from the NDIIIS for all clients with a birthdate from January 1, 2013 through December 31, 2015 and whose birth state is North Dakota.
 - *Data set included the baby's unique client identifier, birthdate, address, city, mother's first, last and maiden name.*
- The number of records with mother's first and last name complete were counted to get the population of pregnant women to use for our denominator.
- A second data file was extracted from the NDIIIS that included all female client record.
 - *Data set included the female client identifier, first and last name, birthdate, address and city.*
- Using Statistical Analysis Software (SAS), the female client first and last name was matched to mother's first and last name in the newborn data file to link mom's client ID with baby's client ID.

Methods continued...

- A third data file was extracted from the NDIIS that included all doses of Tdap vaccine administered between October 1, 2012 and January 7, 2016.
 - *This date range assumes babies are born at 40 weeks gestation and would account for doses administered 13 weeks prior to baby's birthdate through one week after baby's birthdate for our entire newborn cohort.*
- Tdap administration records were matched to the mothers' records using the NDIIS client ID.
- Once the mothers' records were linked to the Tdap dose records, the amount of time from vaccine administration to baby's birthdate was calculated.

Methods continued...

- Once the number of women who received Tdap vaccine during pregnancy was determined, the number of doses administered by healthcare provider was compared.
 - *The primary comparison was between family practice and OB/GYN providers.*
 - *An “Other” provider group included hospitals, local public health, rural health clinics and federal qualified health centers, Indian Health Services, and specialty service providers.*
- Provider type was based on the healthcare provider’s assigned NDIIS provider type.
- There is no “Family Practice” provider type in the NDIIS, so provider sites in the Tdap doses administered data file were manually reviewed to determine if they belonged to this category.

Results

- For 2013 to 2015, there were 36,766 newborn records in the NDIIS.
- Of those 36,766 newborns, 89% had mother's first and last name complete for a denominator of 32,537 newborns.
- Of the records with mother's information complete, 20,316 (62.4%) had a matching NDIIS record for the mother.

	2013	2014	2015	Total
Newborn records including mother's information	91.3%	91.3%	82.8%	88.5%
Newborn records matched to mother's record	59.8%	62.8%	64.9%	62.4%

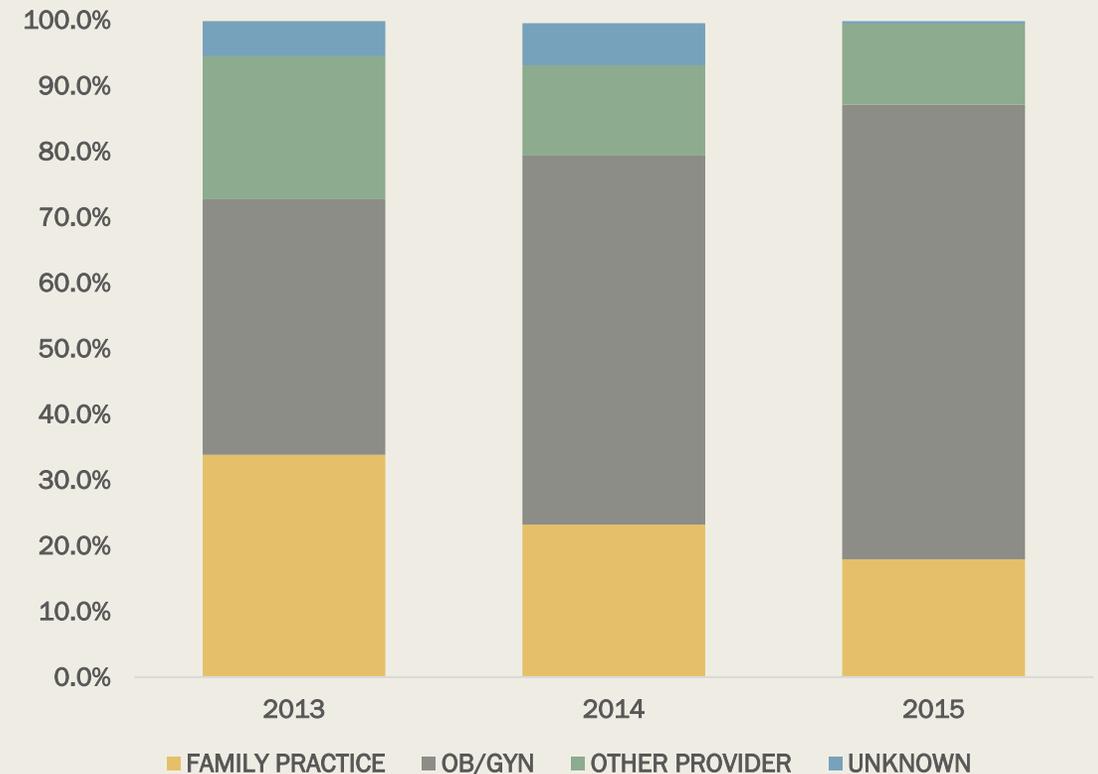
Results continued...

- Using the number of newborn records with mother's information complete as our denominator, a total of 42.7% of mothers had a dose of Tdap vaccine administered during pregnancy.
 - *Percent of mothers who received Tdap during pregnancy increased from 31.5% in 2013 to 45.3% in 2014 and 51.9% in 2015.*
- Of those women who received a dose of Tdap during pregnancy, 83% received the vaccine during the recommended interval of 27-36 weeks gestation.
 - *An additional 13.8% received the vaccine at 37-41 weeks for a total of 96.8% receiving their Tdap vaccine according to the recommendation from the ACIP.*

	2013	2014	2015	Total
% of mothers with dose of Tdap during pregnancy	31.5%	45.3%	51.9%	42.7%
of mothers who received a dose of Tdap during pregnancy				
% of mothers with a dose at 27-36 weeks	71.4%	84.0%	89.7%	83.0%
% of mothers with a dose at 37-41 weeks	22.3%	13.6%	8.4%	13.8%

Results continued...

- Comparing doses of Tdap vaccine administered during pregnancy by different types of providers:
 - *Family practice and OB/GYN providers administered 33.8% and 38.9% of doses in 2013.*
 - *The percent of doses administered by family practice providers decreased to 23.2% in 2014 and 17.9% in 2015.*
 - *The percent of doses administered by OB/GYN providers increased to 56.2% in 2014 and 69.2% in 2015.*



Discussion

- Since the NDIIS began receiving electronic data from provider electronic health record (EHR) systems in 2011, more than 70% of data comes into the NDIIS electronically.
- As a result of this increase in electronic data entry, we have seen an increase in the reporting of adult data in the NDIIS.
 - *Adult participation increased by 9% from 2013 to 2015.*
- The increase in Tdap vaccination during pregnancy was 20.5% from 2013 to 2015.
- The increase in Tdap vaccination during pregnancy is not simply due to an increase in reporting of adult data to the NDIIS. There has been an increase in administration of Tdap vaccine to pregnant women by North Dakota healthcare providers.

Discussion continued...

- The American Academy of Family Physicians (AAFP) and the American College of Obstetricians and Gynecologists (ACOG) support the ACIP recommendation.
- Although family physicians are able to provide prenatal care to pregnant women, the majority of women in the U.S. see an OB/GYN during pregnancy.
- If more women are seeing an OB/GYN during pregnancy, we would expect to see the percent of doses of Tdap vaccine administered during pregnancy by this type of provider to increase as the overall rate of Tdap vaccination during pregnancy increases.
- If more pregnant women are receiving Tdap vaccine at their OB/GYN offices, they would not be referred to another primary healthcare provider, like a family practice physician.
 - *As a result, we would expect to see the percent of doses of Tdap vaccine administered during pregnancy by non-OB/GYN providers to decrease.*

[5] Disease and Population-Specific Immunizations (©2016) *Pertussis Vaccine: Receiving Tdap During Pregnancy*. Retrieved from AAFP website: <http://www.aafp.org/patient-care/public-health/immunizations/disease-population/tdap.html>

[6] The American College of Obstetricians and Gynecologists (2013, June) *Committee Opinion: Update on Immunization and Pregnancy Tetanus Diphtheria and Pertussis Vaccination*. Retrieved from ACOG website: <http://www.acog.org/Resources-And-Publications/Committee-Opinions/Committee-on-Obstetric-Practice/Update-on-Immunization-and-Pregnancy-Tetanus-Diphtheria-and-Pertussis-Vaccination>

[7] National Center for Health Statistics Publications and Information Products. (2014, March 13) *Routine Prenatal Care Visits by Provider Specialty in the United States, 2009-2010*. Retrieved from website: <https://www.cdc.gov/nchs/data/databriefs/db145.htm#x2013;2010>

Conclusions

- With high adult participation and data completeness, the NDIIIS is an effective tool for looking at trends in immunization data.
- North Dakota healthcare providers have responded positively to the ACIP recommendation to administer Tdap vaccine during each pregnancy.
- Although we did see a significant increase in the administration of Tdap vaccine during pregnancy, this rate should be higher.

Limitations

- North Dakota does not require entry of adult immunizations into the NDIIS.
- Completeness of mother's first and last name, as well as differences in spelling of names between newborn records and mother's NDIIS record may have caused a lower match rate.
- NDIIS does not have a specific "Family Practice" provider type to uniquely identify all sites as this type of healthcare provider.
- Analysis had to make the assumption that all newborns assessed were born at 40 weeks gestation.

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