Using NDIIS Doses Administered Data to Predict Future Vaccine Funding Needs

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NDIIS Background

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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.
- Established in 1988 as a modem, dial-up system
- The ND Department of Health (NDDoH) contracted with Noridian Mututal Insurance Company (NMIC), formally known as Blue Cross/Blue Shield of North Dakota in 1996 to develop the current web-based system.
- ND Century Code requires North Dakota providers enter all childhood (under 18 years of age) immunizations into the NDIIS within 4 weeks of administration.

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ND Immunization Program

- Three different funding sources are used to purchase public vaccine in North Dakota.
  - Section 317
  - Vaccines For Children (VFC)
  - State funds
- Providers who have enrolled in the VFC program with the NDDoH Immunization Program receive public vaccine to immunize qualified children.
- North Dakota uses 317 funds to provide:
  - all ACIP recommended vaccines to underinsured children at private clinics
  - the birth dose of Hepatitis B vaccine to insured newborns
  - certain vaccines to uninsured or underinsured adults
- North Dakota uses state funds to purchase vaccines for insured children seen at participating local public health units (LPHUs).
- **When budgeting for future vaccine needs, the NDDoH must anticipate how much publicly funded vaccine will need to be purchased using each of the three funding sources.**

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NDIIS Inventory Management and Dose Entry

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NDIIS Inventory Functionality

- The NDIIS has inventory management functionality that:
  - Allows providers to manually add private inventory
  - Tracks doses of private and public vaccine administered
  - Decrements inventory when doses are entered directly in the user interface or via interoperability with electronic health record (EHR) systems
  - Allows providers to make manual adjustments to their state and private inventory on hand
  - Order public vaccine in the NDIIS
    - 100% of VFC enrolled providers were placing their vaccine orders in the NDIIS as of February 2013
  - Enter public vaccine returns and wastages in the NDIIS

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Inventory Functionality continued…

- Funding source is not a discreet field in the NDIIS, it is assigned when the lot number is added to the provider's NDIIS inventory.
  - A funding source of "Public" or "Private" is assigned to every lot that is entered in a provider's NDIIS vaccine inventory.
    - Publicly purchased lot numbers are automatically entered into the NDIIS provider inventory through the VTrckS shipping file.
    - Privately purchased lot numbers are manually entered into the NDIIS by the provider.
- The lot number field in the NDIIS dose entry screen is not a free text field.
  - The list of available lot numbers will populate based on the provider's NDIIS inventory and will include all public and private lots.
  - Doses coming in electronically from provider EHR interoperability need to find an exact matching lot number in the provider's inventory (match based on lot number and funding source selected in EHR).
  - If an exact match is not found when the dose information comes from the EHR or if the lot is not in the provider's NDIIS inventory, a "dummy lot" will be added in it's place.

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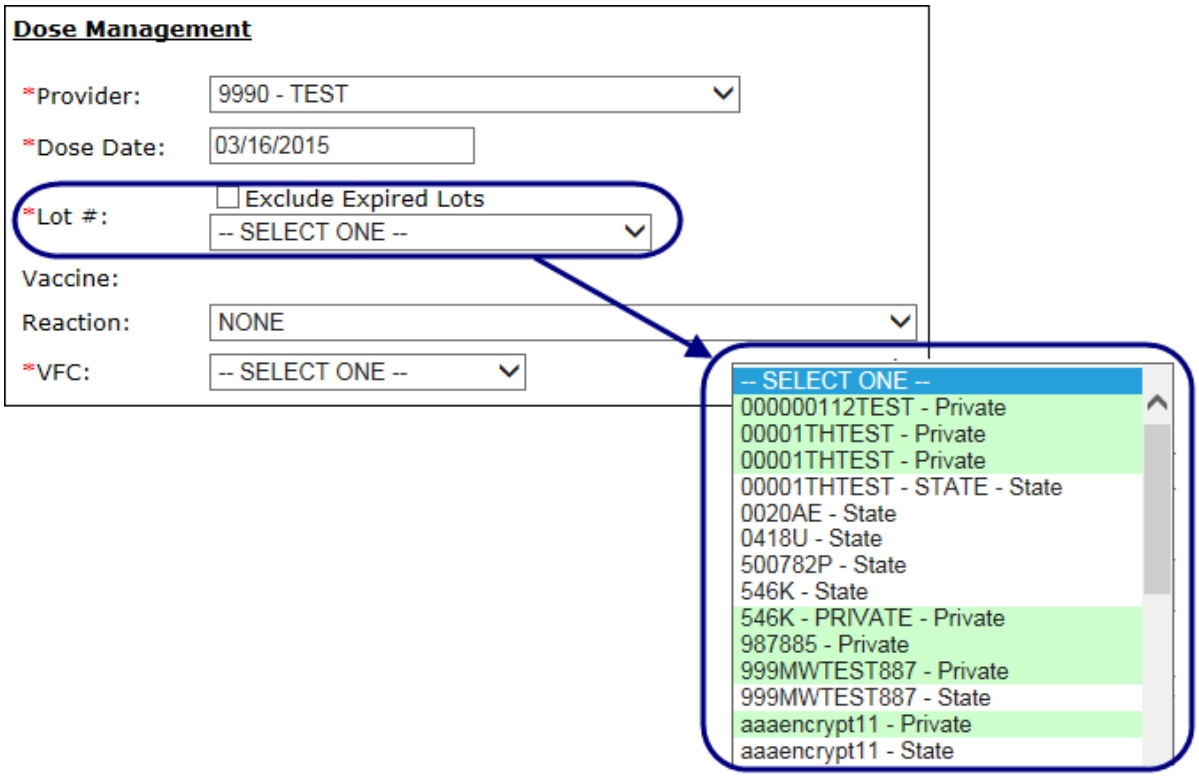
Inventory Functionality continued…

- Example - Direct Data Entry Provider:
  - Provider has private Hepatitis A lot H010145 in their NDIIS inventory
  - They can select this lot number from the drop-down in the dose entry screen



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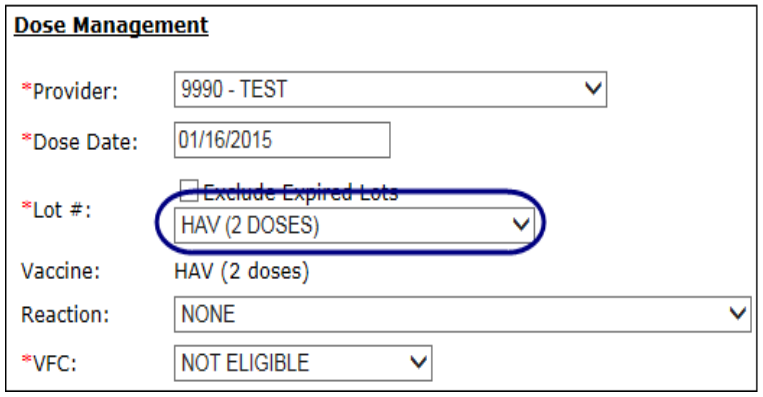
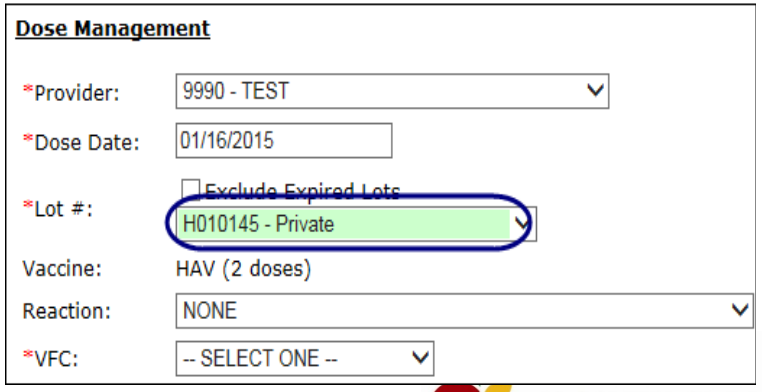
Inventory Functionality continued…

- Example - Interoperable Provider:
  - Provider has private Hepatitis A lot H010145 in their NDIIS inventory
  - Scenario 1:
    - User enters a funding source of private in their EHR but instead of zeros, they enter the letter "O" in the lot number
    - A match to the lot number will not be found in the NDIIS and the "dummy lot" will be added in its place
  - Scenario 2:
    - User enters the lot number correctly in their EHR, however they select a funding source of public
    - A match to the lot number will not be found in the NDIIS and the "dummy lot" will be added in its place
  - Scenario 3:
    - User enters the lot number and funding source correctly in their EHR
    - A match to the lot number is found in the NDIIS and the correct lot is added to the NDIIS record

Scenario 1 and 2



Scenario 3



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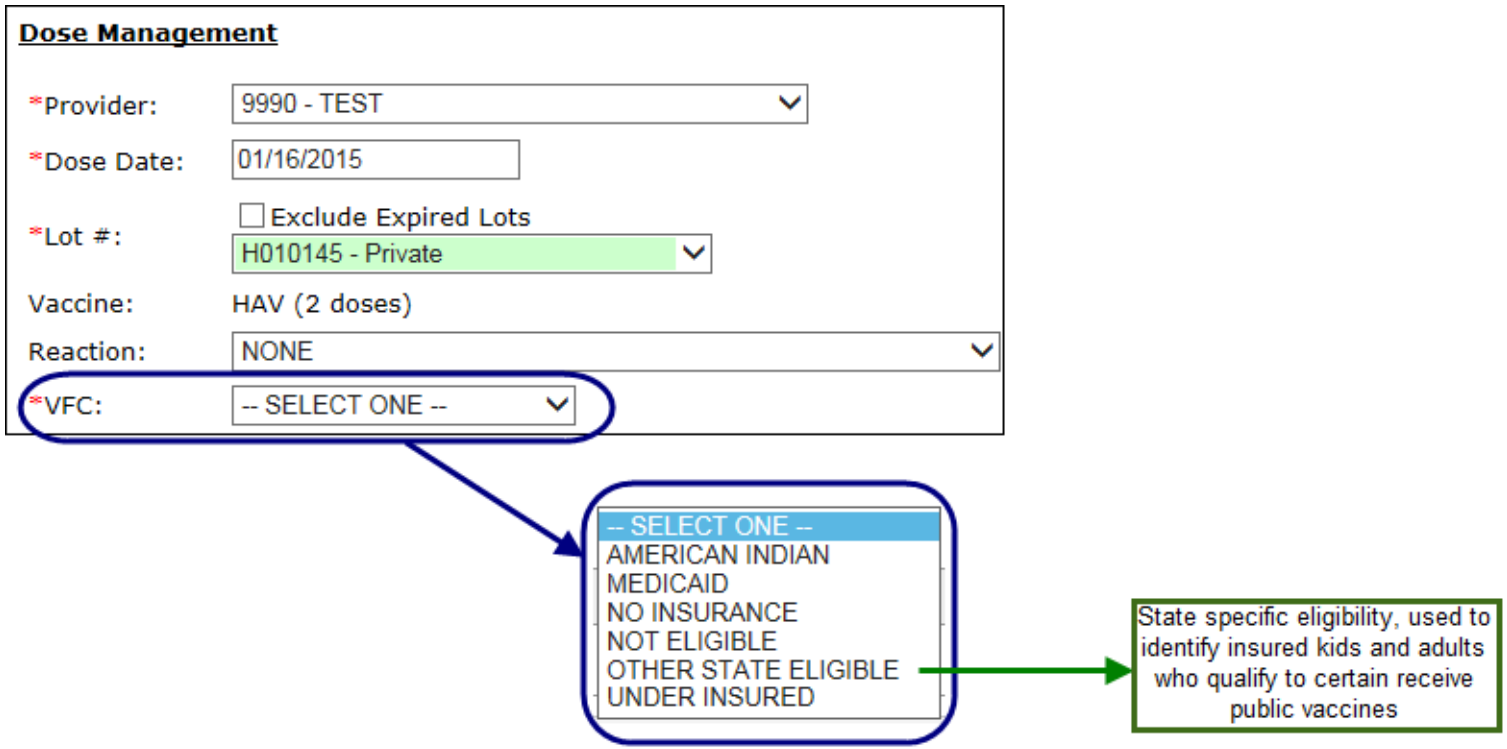
Inventory Functionality continued…

- Dose-level VFC eligibility status must be recorded for every administered dose, regardless of the lot number entered



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VTrckS Vaccine Ordering

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Fund Split Template

- The NDDoH must assign a specific, public vaccine funding source (i.e. state, 317, VFC) to all vaccines ordered.
  - Immunization Program staff manually assigns the fund source for frozen vaccines (MMRV and varicella).
  - The VTrckS fund split template is used to auto-assign a specific fund source to all other vaccines.
- NDIIS doses administered data is used to populate the fund split template before it is uploaded into CDC's VTrckS system biannually.
  - Appropriates funding source to provider orders submitted during the fiscal year.
  - Based on funding source assigned by fund split template, the North Dakota spend plan is decremented when public vaccine orders are placed.

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Fund Split Template continued…

- NDIIS inventory only tracks vaccine as public or private, so the NDDoH uses a combination of public funding source and VFC status to determine specific funding source for the fund split template.
  - 317 funding source is assigned to:
    - public vaccine doses administered to uninsured and underinsured adults
    - public vaccine doses administered to underinsured children at private healthcare clinics
    - public vaccine doses of hepatitis B vaccine administered to privately insured newborns at private and public hospitals
  - State funding source is assigned to:
    - public vaccine doses administered to privately insured children at universal LPHUs
  - VFC funding source is assigned to:
    - Public vaccine doses administered to VFC eligible children by healthcare providers enrolled in the North Dakota VFC program, including LPHUs, rural health centers (RHC), federally qualified health centers (FQHC), private healthcare providers and private and public hospitals

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Fund Split Template continued…

- Fund split template includes every enrolled provider
- Template assigns a percent of each vaccine type ordered that should be charged to each of the three funding sources.

PROV_ID	PROVIDER_NAME	PROVIDER_TYPE	VAC_NAME	TOTALDOSES	PERCENT	VFC_STATUS	FUND_SOURCE
01081	1081 - SANFORD MED CNTR - BIS	PUBLIC HOSPITAL	DTaP-HBV-IPV (Pediarix)	7	100	VFC ELIGIBLE	VFC
01081	1081 - SANFORD MED CNTR - BIS	PUBLIC HOSPITAL	HBV Pediatric	521	66.62	NOT_OTHER ELIGIBLE	317
01081	1081 - SANFORD MED CNTR - BIS	PUBLIC HOSPITAL	HBV Pediatric	1	0.13	UNDER INSURED	VFC
01081	1081 - SANFORD MED CNTR - BIS	PUBLIC HOSPITAL	HBV Pediatric	260	33.25	VFC ELIGIBLE	VFC
01081	1081 - SANFORD MED CNTR - BIS	PUBLIC HOSPITAL	HIB (PRP-T) ACTHib	6	100	VFC ELIGIBLE	VFC
01081	1081 - SANFORD MED CNTR - BIS	PUBLIC HOSPITAL	PCV13 (PNEUMOCOCCAL)	7	100	VFC ELIGIBLE	VFC
01081	1081 - SANFORD MED CNTR - BIS	PUBLIC HOSPITAL	ROTAVIRUS (2 DOSE)	5	100	VFC ELIGIBLE	VFC

Based on fund split template, 67% of doses of Hep B pediatric ordered by this provider will be charged to 317 and 33% will be charged to VFC.

100% of PCV13 doses ordered by this provider will be charged to VFC.

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Predicting Future Funding Needs

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Goal

- There are differing opinions in the IIS community as to whether dose-level eligibility is sufficient for vaccine inventory tracking and management or if vaccine funding source should also be used
  - Dose-level VFC eligibility is an IIS core data element
  - Vaccine funding source is not a core data element

- Wanted to see if using dose-level eligibility alone could be used to accurately track vaccine doses administered and predict future funding needs or if having funding source tracked in addition to dose-level eligibility is needed

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Methods

- NDIIS was queried for all doses administered for federal, fiscal year (FY) 2013 (October 1, 2012 – September 30, 2013).
- Data was extracted in two files:
  - File 1 looked for all doses administered with a public lot number and an administration date during FY 2013 and included all eligibility status (uninsured, underinsured, Medicaid eligible, American Indian, not eligible or other state eligible).
  - File 2 looked for all doses administered with an administration date during FY 2013 that had an eligible VFC status (i.e. excluded doses with a not eligible status).
- Data for children 18 and younger was extracted separately from data for adults 19 and older.
- Influenza doses were excluded because the purchasing and allocation of influenza vaccine is done separately from all other regularly administered vaccines.

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Methods continued…

- Vaccine doses actually ordered during FY 2013 were extracted directly from VTrckS by running the Spend Plan Actuals report and exporting the report data.
- A funding source of state, 317 or VFC was assigned to the doses administered in each data file using the same rules as the immunization program applies when populating the fund split template.
- The cost per dose for each vaccine was used to determine total cost.
  - Cost of each vaccine was taken from the CDC Federal Vaccine Price List.
- SAS 9.3 and Microsoft Excel 2010 were used in the data analysis.

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Results

- For FY 2013, NDIIS doses administered data analyzed based on both dose-level eligibility and funding source showed:
  - ND providers administered 124,330 doses of publicly purchased, non-influenza vaccine for a total cost of $6,758,105.06
    - 8.6% (10,736) were documented as 317 vaccine for a total of $274,625.81
    - 16.6% (20,631) were documented as state vaccine for a total of $1,323,231.41
    - 74.8% (92,963) were documented as VFC vaccine for a total of $5,160,274.84
- NDIIS doses administered data analyzed based on dose-level eligibility and excluding funding source showed:
  - ND providers administered 134,794 doses of non-influenza vaccine for a total cost of $7,338,447.82
    - 8.3% (11,183) were documented as 317 vaccine for a total of $278,750.90
    - 15.2% (20,437) were documented as state vaccine for a total of $1,312,450.76
    - 76.5% (103,174) were documented as VFC vaccine for a total of $5,747,246.16

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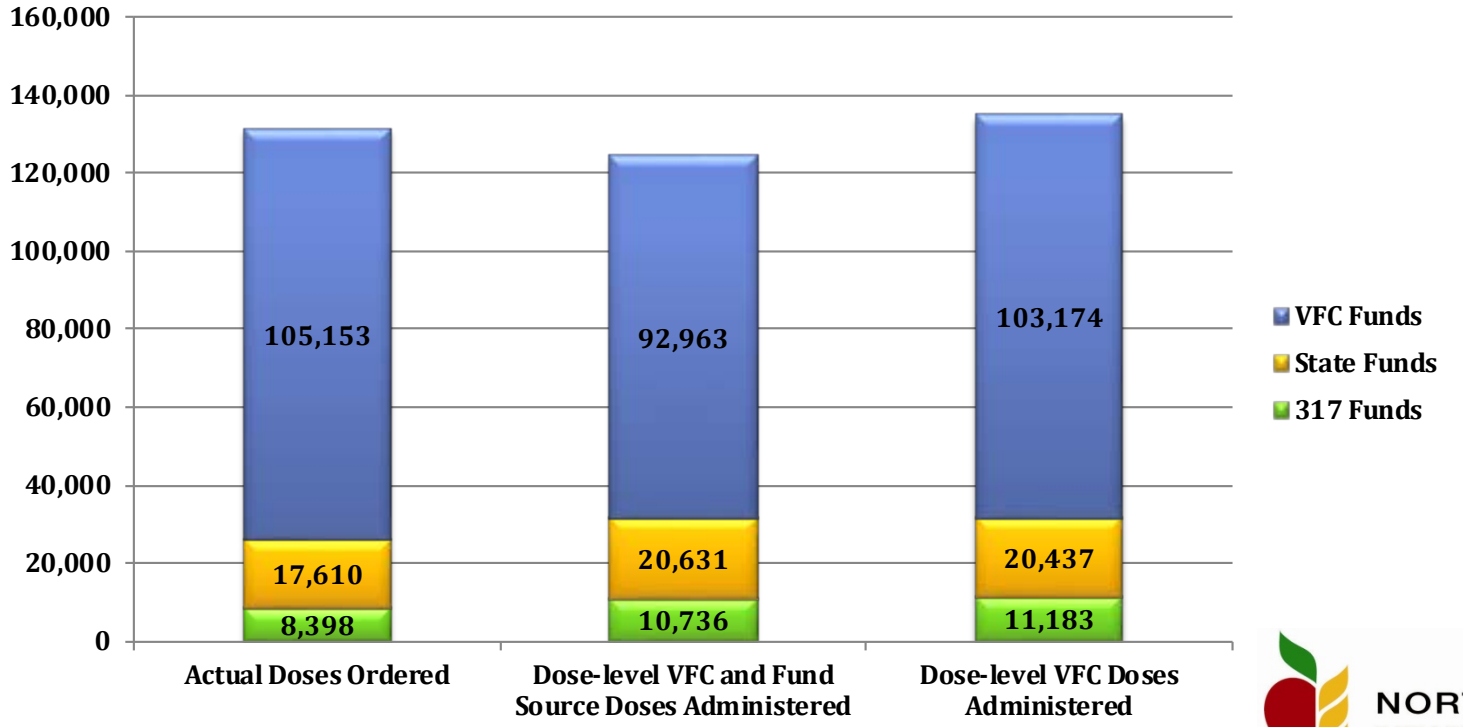
Results continued…

- According to VTrckS, North Dakota providers actually ordered:
  - 131,161 doses of publicly purchased, non-influenza vaccine for a total cost of $6,828,474.08
    - 6.4% (8,398) were purchased with 317 funds for a total of $323,656.56
    - 13.4% (17,610) were purchased with state funds for a total of $1,046,959.78
    - 80.2% (105,153) were purchased with VFC funds for a total of $5,457,857.74



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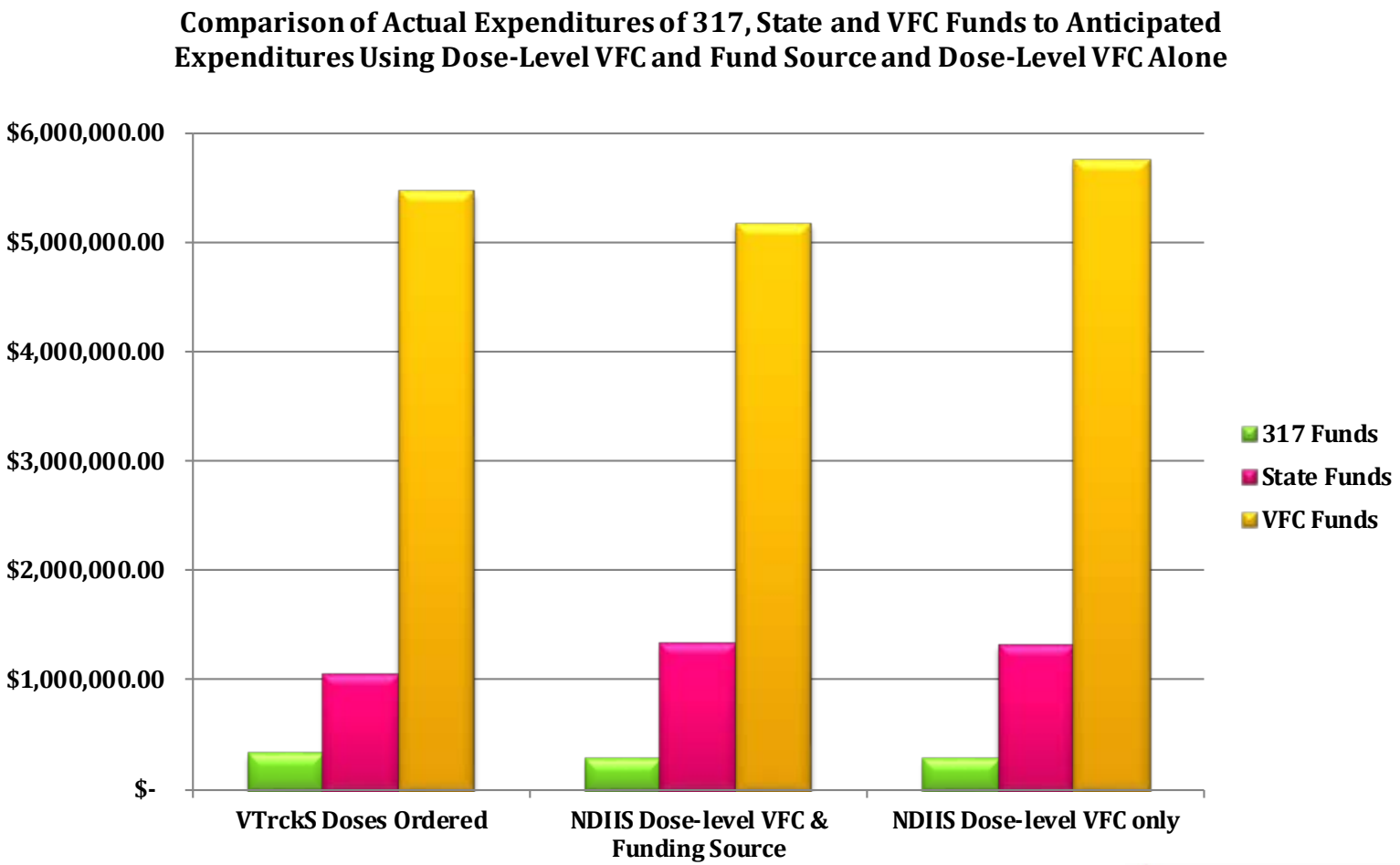
Results continued…



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Discussion

- When comparing NDIIS doses administered data using a combination of eligibility and funding source to doses administered using eligibility alone with actual vaccine ordered during FY 2013 it was found that:
  - both options for doses administered data showed less 317 doses administered than was ordered
    - $49,030.75 less for eligibility and funding source
    - $44,905.66 less for eligibility alone
  - both options for doses administered data showed more state vaccine doses administered
    - $276,271.63 more for eligibility and funding source
    - $265,490.98 more for eligibility alone
  - data for both eligibility and funding source showed fewer VFC doses administered, whereas data for eligibility alone showed more VFC doses administered
    - $297,609.90 less for eligibility and funding source
    - $289,388.72 more for eligibility alone

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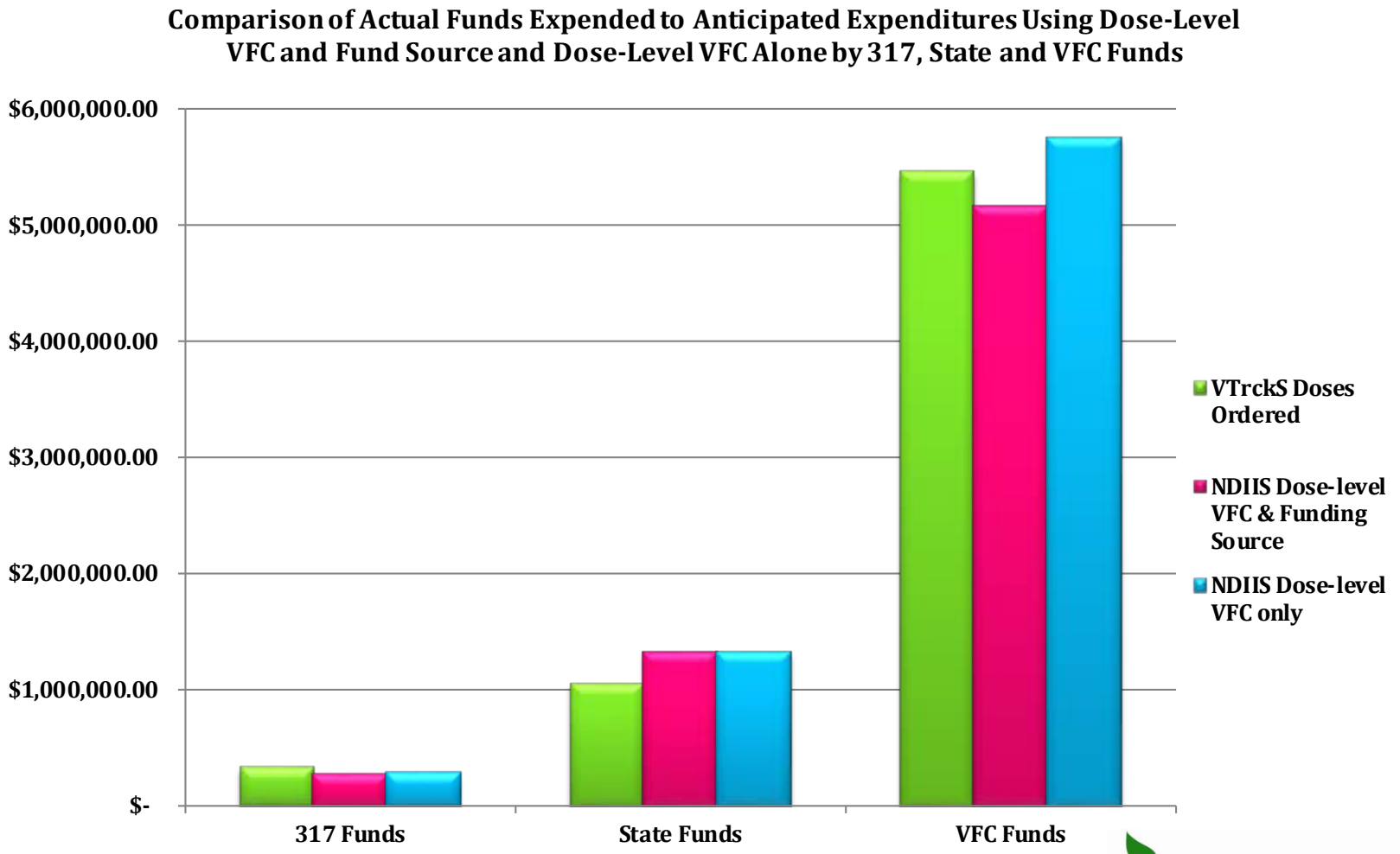
Discussion continued…



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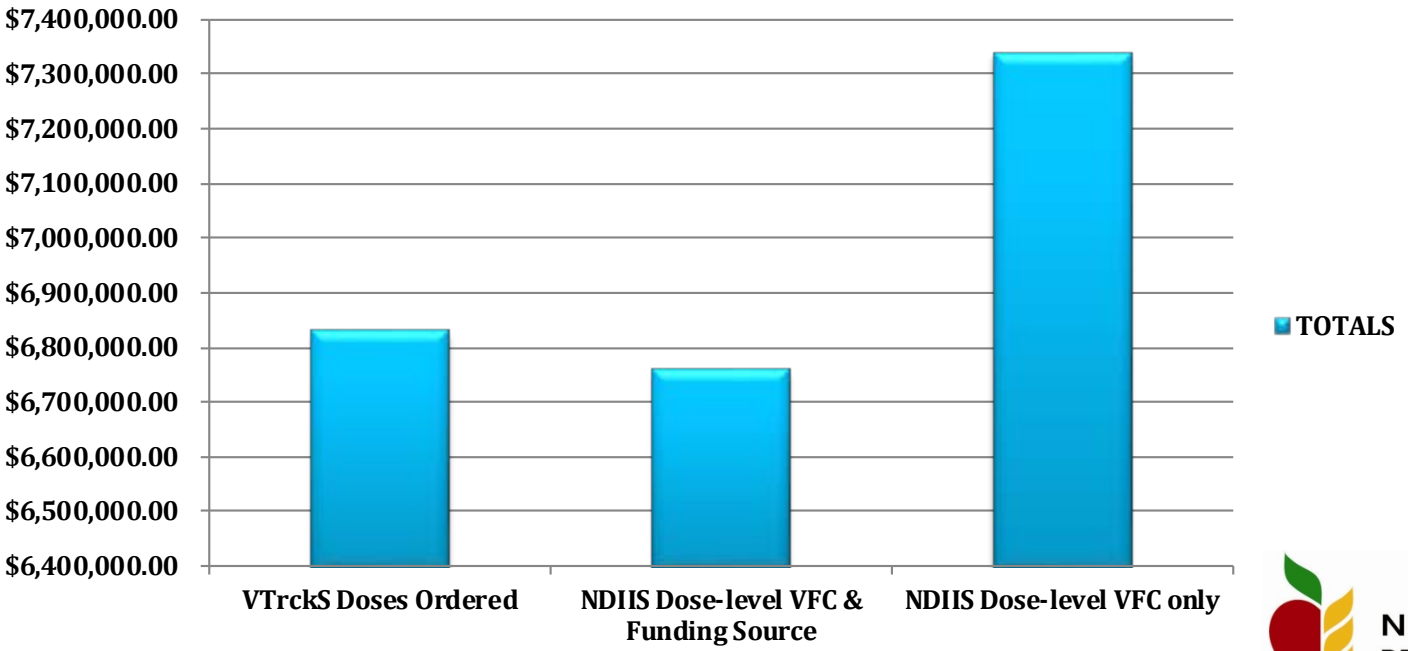
Discussion continued…

- Despite variations in individual totals for 317, state and VFC vaccine, the total anticipated dollar amount for doses administered data using both eligibility and funding source was close to actual doses ordered in FY 2013 than doses administered data using eligibility alone
  - Difference of 1% ($70,369.02) between actual doses ordered and doses administered with eligibility and funding source
  - Difference of 7.5% ($509,973.74) between actual doses ordered and doses administered with eligibility alone



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Conclusion

- Using a combination of dose-level eligibility and funding source when evaluating doses administered allows for more granularity and accountability, reflecting what type of vaccine (public or private) is being administered and to whom.
- IIS can still accurately anticipate future public vaccine funding needs at a more granular level (i.e. VFC, state, 317) while allowing providers to separate and track their vaccine at a higher level (i.e. public vs. private) when using both eligibility and funding source than when using just eligibility alone.
  - Reduces burden on immunization providers by reducing amount of space needed to store vaccines separately, reducing the cost of storage equipment
  - Reduces staff time needed to determine which funding source to use, reducing administration errors
  - Reduces time immunization providers have to spend on inventory reconciliation

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Conclusion continued…

- Using both dose-level eligibility and vaccine funding source allows immunization programs to accurately track and account for public vaccine, predict future vaccine funding needs and reduces financial burden and staff time required of immunization providers to determine eligibility and manage their vaccine inventory.

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Limitations

- Vaccine wastage is not accounted for in doses administered data.
  - Doses of publicly funded vaccine that had been returned or wasted would be included in the VTrckS doses ordered data but would not have been administered and therefore wouldn't have been included in the NDIIS data files.
- North Dakota allows enrolled providers to have a maximum of 3 months inventory on hand so there may be doses ordered during FY 2013 that had not been administered during the same time frame.

➢ Both of these limitations will decrease the number of doses administered and affect the comparison to doses ordered

- ❖ For doses administered data with eligibility and funding source, this helps explain why the doses administered was lower than actual doses ordered.
- ❖ For doses administered data with eligibility only, the gap between doses administered and doses ordered would be even bigger if taking vaccine returns and wastages and unused inventory in to account.

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Limitations continued…

- Using doses administered from the previous year cannot account for changes in population, vaccine uptake or potential new vaccine recommendations.
  - Population increases or decrease would impact how much public vaccine would need to be purchased using each of the three funding sources and overall but cannot be accurately anticipated.
  - Increase in vaccine uptake (i.e. more individuals are being vaccinated) or licensure and routine recommendation of new vaccines cannot be accurately anticipated and is therefore difficult to account for when predicting vaccine needs for the upcoming year.

Limitations continued…

- NDIIS doses administered data is dependent on accurate and timely data entry through manual, direct data entry and through electronic data exchange with EHR systems.
- Doses entered into an EHR must find an *exact* match of lot number in the NDIIS based on funding source sent from the EHR.
  - If an exact match is not found, due to incorrect data entry in the EHR or errors in the messaging system, the correct lot number with the appropriate funding source will not be added to the NDIIS and the dose cannot be decremented from the provider's NDIIS inventory.
    - This means the dose cannot be accounted for as either a public or private dose administered but could be counted using dose-level eligibility, although it may not accurately reflect what was actually given.
- An EHR may not have a discreet field for vaccine funding source and may try to infer funding source based on VFC eligibility.
  - Decreases accuracy of NDIIS data because an eligible patient could have been incorrectly given private vaccine and vice versa and the inference will not reflect what was actually administered.

Questions?

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