Vermont Immunization Registry (IMR)

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Denise Kall, PhD

Wednesday, May 21, 2025

VERMONT
DEPARTMENT OF HEALTH

Vermont Immunization & Infectious Disease Conference
Hotel Champlain, Burlington, VT
May 21, 2025
Session III – Immunization Registry/Immunization Data
Speakers: Craig Morrill, MPH and Denise Kall, PhD

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In support of improving patient care, this activity has been planned and implemented by The Robert Larner College of Medicine at the University of Vermont is jointly accredited by the Accreditation Council for Continuing Medical Education (ACCME) and the American Nurses Credentialing Center (ANCC), to provide continuing education for the healthcare team.

The University of Vermont designates this live activity for a maximum of 5.0 *AMA PRA Category 1 Credit(s)*™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

This program has been reviewed and is acceptable for up to 5.0 Nursing Contact Hours.

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This activity was planned by and for the healthcare team, and learners will receive 5.0 Interprofessional Continuing Education (IPCE) credit for learning and change.

Acknowledgements

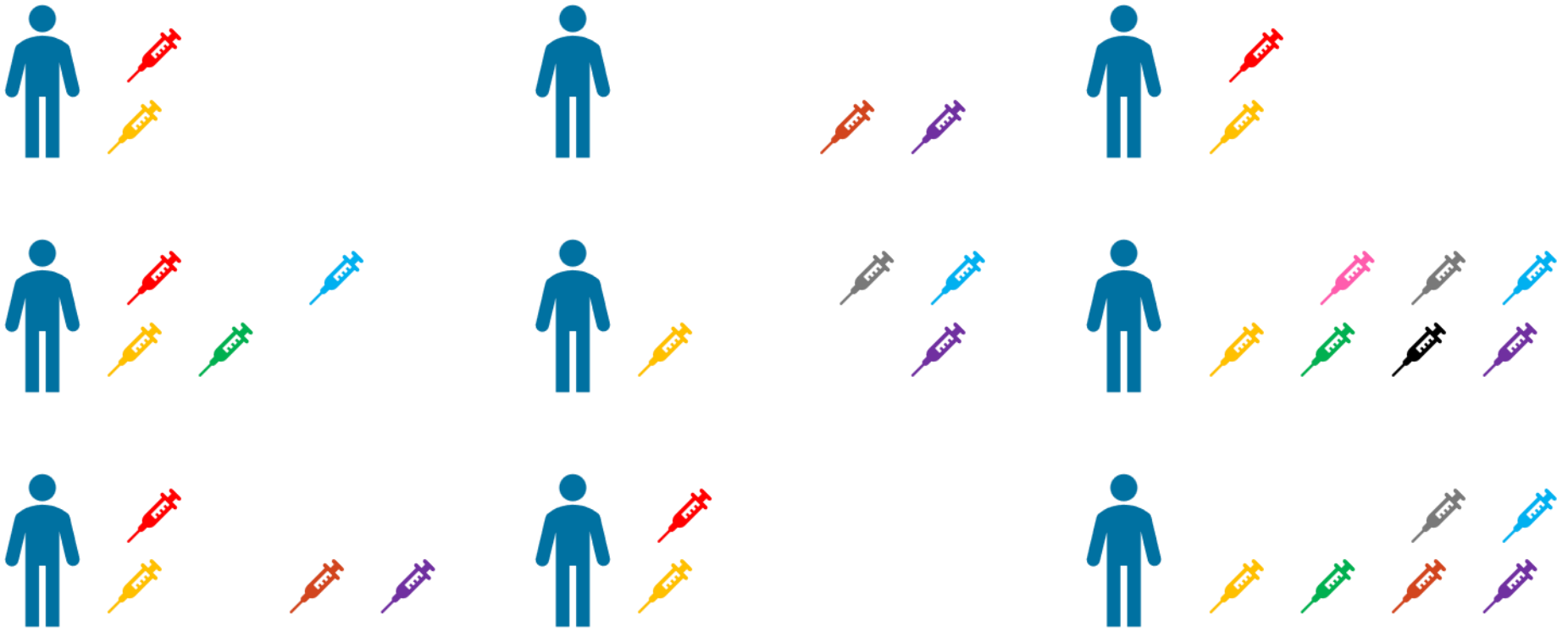
Special thanks to Immunization Registry users for working to improve outcomes for Vermonters of all ages by:

- Improving vaccine coverage rates
- Ensuring quality data
- Identifying and addressing areas of improvement

Practice-level reporting in the IMR

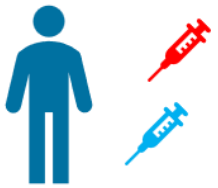
Immunization Quality Improvement Report (IQIP): Vaccine Coverage. Practice, county and state.

Immunization Quality Improvement Report (IQIP): Missed Immunizations *and* Vaccines due by Practice



Immunization Quality Improvement Report (IQIP): Invalid Immunizations

Too early



Minimum interval not met

Too early

Too close to live vaccine dose

Given too early

Too early

Vaccine not available yet

Too close to live vaccine dose

Incorrect vaccine for age

Running the IQIP Demonstration

HL7 (VXU) and Bidirectional (QBP)

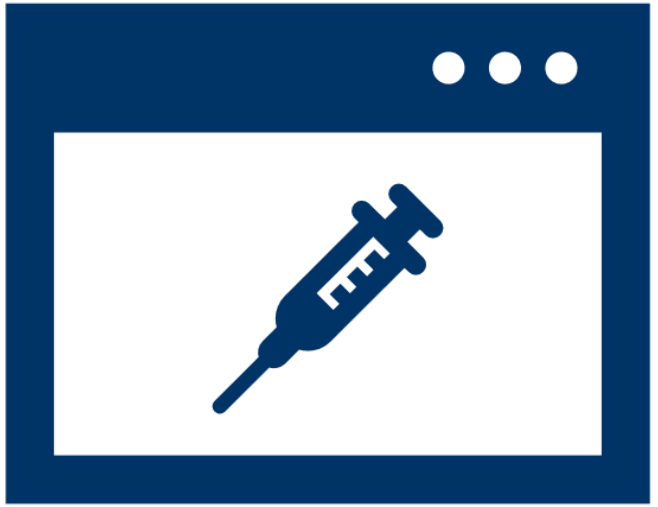
How Vaccines are reported to the IMR

Vaccine records are reported to the registry from a variety of sources such as:


Hospitals


Pharmacies


Nursing homes


Other sites including health insurance, etc.


Clinics


Providers


Emergency Rooms and Urgent Care

Bidirectional Query and Response

Bidirectional Query and Response

How an EHR accepts and displays a response depends on the settings configured by the EHR Vendor.

MSH|^~\&|VDH|VDH|||CurrentDate/Time||RSP^K11^RSP_K11|MessageControlID|P|2.5.1|
||NE|NE|||||Z32^CDCPH INVS|VDH MSA|AA|MessageControlID
QAK|QueryTag|OK|Z34^Request Immunization History^CDCPHINVS QPD|Z34^Request
Immunization
History^CDCPHINVS|QueryTag01|30F3CBAAF7BC771F5269B2AAEABFA488F6958D31D70ABE
E9D14F70F20E9FDCFB^^^VDH ^SR|**Killington^Amarylis^^^^^L||19810101|F|10 Patient
Street^^Burlington^VT^^^M**
PID|1||30F3CBAAF7BC771F5269B2AAEABFA488F6958D31D70ABEE9D14F70F20E9FDCFB^
^^VDH^SR||Amarylis^Killingt on^^^^^L||19810101|F|||10 Patient
Street^^Burlington^VT^05401^^M||||||||||||| ORC|RE||416485^VDH
ORC|RE||416486^VDH
RXA|0|1|**20220225**||**21^varicella^CVX**|999|||01^^NIP001|||||U020240|20230628|MS
D^^MVX|||CP RXA|0|1|20220315||208^COVID-19, mRNA LNP-S, PF, Pfizer^CVX|999|
||01^^NIP001|||||98765F|20220729|PFR^^MVX|||CP
RXR|C28161^^NCIT|LA^^HL70163 RXR|C28161^^NCIT|RA^^HL70163

Evaluated history and forecast

This response will allow the EHR to display the vaccine forecaster: a list of the immunizations due for a patient today or in the future.

Vaccines Recommended by Tracking Schedule

Vaccine	Earliest Date	Recommended date	Overdue Date	Status
COVID-19		6/20/2023		Recommended
MMR	3/5/2005	3/5/2005	3/5/2005	Recommended
Tdap	7/28/1986	7/28/1986	7/28/1986	Recommended
Hep B	5/10/2023	7/1/2023		Future Recommendation
Pneumococcal		7/28/2044		Future Recommendation
Zoster	7/28/2029	7/28/2029		Future Recommendation
Rotavirus	Vaccine not recommended at this age; too old to initiate			

Before Implementation

The process begins with a site level agreement and any other related legal agreements and documentation specific to bidirectional queries.

Before Implementation

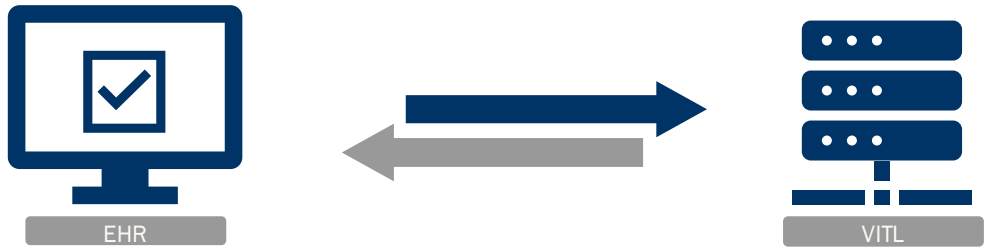
The provider organization and EHR vendor will then work with VITL to develop an Onboarding Implementation Plan.

Onboarding Implementation

In the **development phase** the EHR vendor configures the organization's EHR to send queries and map the responses to fields in the EHR so they display correctly.

Onboarding Implementation

In the **connectivity testing** phase, the organization EHR exchanges sample queries and responses with the VITL test environment.



Onboarding Implementation

In the **validation testing** phase, the organization EHR will send queries through VITL to the IMR.

Go Live

Following **Go Live**, the IMR and VITL will provide monitoring and support as the provider EHR continues to receive records from the IMR.

Who Should practices outreach If interested in Bidirectional Messaging (QBP)

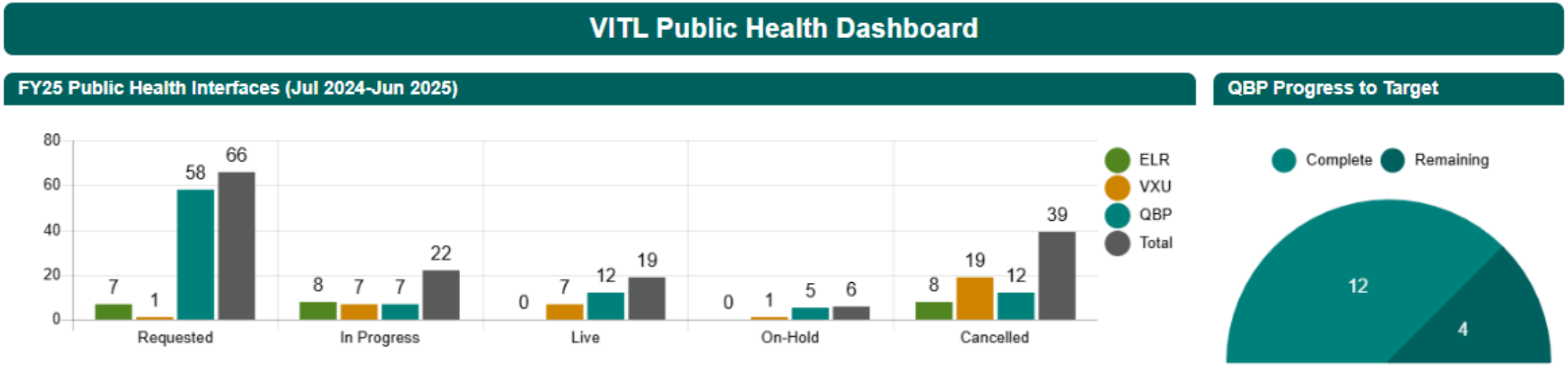
Practices (office managers or IT department) that are interested in QBP functionality should outreach:

Regi Wahl

Senior Applications Systems Analyst at VITL.

Rwahl@VITL.net

Practices/Sites In all Stages of Onboarding



IMR Forecaster updates

The IMR uses the Immunization Calculation Engine (ICE) for vaccination recommendation and forecasting updates

ICE Website News - ICE - Confluence (atlassian.net)

IMR Forecaster Updates Process updates

1. ICE sends an email out to all subscribers stating that a new update (release) is available on the ICE website.
2. VDH IT downloads this new release.
3. VDH IMR team creates test cases to ensure the new logic works as expected.
4. VDH IT runs test cases through the IMR TEST environment.
5. VDH IMR team validates test case scenarios and once all test cases pass as expected, VDH IT is given the ok to move the new release into the LIVE IMR.
6. Total process can take up to 3 months or longer.
7. Possible for IMR reports to run slower than normal due to this update, for about one to two weeks.

IMR Forecaster Updates Troubleshooting

- Very possible for vaccine updates to be delayed in the forecaster due to the time needed for ICE to implement new releases.
- Also, there might be many ICE releases within a year. This year (2025) there have been 3. Last year (2024) there were 2. The previous year (2023) there were 6.
- If you notice the forecaster isn't up to date with CDC recommendations, to verify, please use the ACIP recommendations here for evaluating a patient's history or vaccine recommendations.

cdsframework.atlassian.net/wiki/spaces/ICE/pages/14352468/Default+Immunization+Schedule

All data have strengths and limitations

Understanding those strengths and limitations can better help us use those data

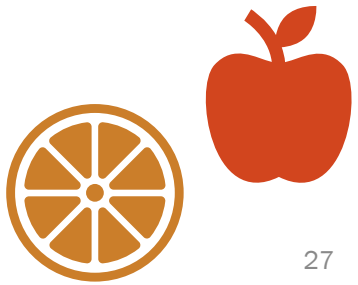
Why are these numbers different?

Seventy percent of Vermont adults 65 and older received a flu vaccine in the most recent season (BRFSS 2023).

- Self-reported data via a telephone survey
- Representative sample of Vermonters
- Different timeframe: During 2023, they were asked if they received a flu shot or nasal spray in the preceding 12 months

Sixty percent of Vermont adults 65 and older received a flu vaccine in the 2024-2025 flu season (IMR 3/20/2025).

- Uses immunization records submitted to the IMR by providers
- May not include records for those vaccinated out of state
- Real-time, current data – season is not complete

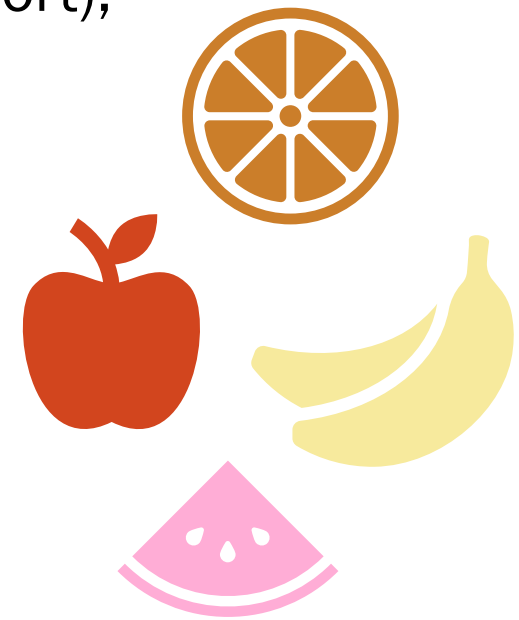


Why do numbers appear to be different?

While the data are topically the same, they all come from different sources.

When considering which data to use, always consider the following:

- how the data are collected (e.g. immunization records, self-report),
- who is included in the data (e.g. those enrolled in school),
- when the data were collected (e.g. real-time, point-in-time).



Available Data

Vaccination Coverage | Vermont Department of Health

Example page of Data Encyclopedia

HS_Data_Encyclopedia.pdf

- Not limited to immunizations, but some of these data sources include immunization data

Behavioral Risk Factor Surveillance System (BRFSS)	S
Purpose	The BRFSS tracks health-related risk behaviors, chronic health conditions and use of preventive services among Vermont adults, to assess progress on public health goals and to plan, support and evaluate health promotion programs.
Public Use Dataset	Available upon request
Design	Random digit dialed cellphone and landline telephone survey with an annual sample size of about 6,400 Vermont adults. Surveys are completed for a representative sample of the population. Data is weighted with a raking procedure (2011 forward and post-stratification 2010 and prior).
Frequency	Conducted annually, with data collection happening year-round. Prior year data is available in approximately July of the following year.
Population (Units)	Vermont non-institutionalized residents ages 18 and older (excludes group homes and correctional facilities)
Geographies	State, County, Health District, Hospital Service Area, US available through the CDC
Data Years	2000–2020
Strengths	Ideal for looking at risk factors and prevalence of chronic conditions at a population level in Vermont. Allows cross tabulation on many demographics, conditions, and behaviors. Well-established survey that allows us to look at trends over time. Data can be compared across states and to the US overall.
Limitations	Not a census; a representative sample of surveys weighted to represent the adult VT population. Information is self-reported.
Indicators for Analysis	Demographics (Age, Disability, Education, Employment, Gender, Income, LGBT, Race/Ethnicity); Chronic Conditions (Arthritis, Asthma, Cancer, Cardiovascular Disease, Cognitive Decline, COPD, Depression, Diabetes, High Cholesterol, Hypertension, Obesity, Oral Health); Preventive Measures (Doctor Visits, Family Planning, Fruit & Vegetable Consumption, Health Insurance, Immunizations, Physical Activity, Screenings, Quality of Life/Healthy Days); Risk Factors and Behaviors (Alcohol Consumption, Cannabis Use, Drinking Water, Firearm Storage, Prescription Drug Misuse, Seatbelt Use, Sexual Violence, Substance Use, Tobacco Use, Traumatic Brain Injury)
Health Equity Indicators	Age, Sex or Biological Sex, Gender or Gender Identity, Sexual Orientation, Race, Ethnicity, Socioeconomic Status (Educational attainment, Employment, Household income), Disability Status (Physical, Mental/Emotional), Federal Poverty Level, Veteran/Military Status, Housing Status, Food Security, Job Security, Transportation, Healthcare, Physical Environment/Neighborhood, Perceptions around Discrimination and/or Racism, Exposure to Violence or Trauma, Social Integration
Reports / Online Resources	BRFSS Webpage Annual reports, District Office profiles and summaries, data briefs
Who Manages Data	Vermont Department of Health, Division of Health Statistics and Informatics
Funding Sponsor	Co-sponsored by the Centers for Disease Control and Prevention BRFSS, Vermont Department of Health and various program partners
Contacts	Kate Emmons – BRFSS Coordinator AHS.VDHBRFSS@vermont.gov

Vermont Immunization Registry (IMR)

- **Confidential, digital system of immunization records** established in 2004 that connects to electronic health records
- When you **receive a vaccine in Vermont, that vaccine information gets logged** into the IMR
- The IMR includes vaccine records of Vermont residents who get vaccines at **Dartmouth Hitchcock Medical Center or some places in New York**
- Includes county, age, race, ethnicity and gender
- The IMR is used in our Respiratory Virus Vaccination Data Dashboard and Annual Immunization Coverage Report

Vermont Immunization Registry (IMR)

Strengths

- Provider-reported data. State law requires vaccine providers in Vermont to report to the IMR
- Includes all vaccines
- Data can be analyzed by demographics
- Multiple years of data
- Includes “real time” data and is updated daily

Very helpful for reporting during COVID-19 and real-time seasonal flu data.

Limitations

- Does not include socioeconomic and other health-related data
- Information on vaccinations provided to Vermont residents out of state may be missing
- People move out of state, but their data might stay in the IMR
- May not include those who never received a vaccine
- May not include vaccines prior to 2004.

This can make doing analysis challenging.

Child Care and School Data

- Data is submitted to the Health Department **from child care programs and schools**
- Data are **based on official immunization records** collected by the program or school
- The data are submitted by January 1
- Aggregated program/school level data
- Data are used in the School Vaccination Dashboard

Child Care and School Data

Strengths

- Data for all students in school settings
- High reporting rates
- See trends and data overtime
- Can get some county-level data from this data
- Somewhat comparable data available nationwide for Kindergarteners

Limitations

- Excludes children not in school settings (e.g. homeschooled children)
- Point in time data for a school year, not real-time
- Does not include demographic or socioeconomic information
- When we report school data, we have a lot of suppression since most Vermont schools are small.

Small numbers make exact reporting hard, we have to suppress a lot of school level data.

Behavioral Risk Factor Surveillance Survey (BRFSS)

- Data come from an **annual telephone survey of Vermont adults**
- Typically between **6,000 and 7,000 Vermont adults** (18 or older) are interviewed as part of the Vermont BRFSS each year
- **Data are self reported**
- Conducted by the Vermont Department of Health in collaboration with the Centers for Disease Control and Prevention (CDC)
- Data are used to find **demographic-specific insights on vaccine rates**, like Adults with Chronic Disease and Immunization and Adults with Disability and Immunization

Helpful Links:

Behavioral Risk Factor Surveillance System (BRFSS) | Vermont Department of Health

Behavioral Risk Factor Surveillance System

Behavioral Risk Factor Surveillance Survey (BRFSS)

Strengths

- Comparable national and state-level data, and data over time
- Representative of Vermont adults
- Includes health-related risk behaviors, chronic health conditions, use of preventive services and various demographic and socioeconomic variables

Great way to see which populations in Vermont have high or low vaccine rates.

Limitations

- Not a census
  - Excludes those who live in an institution (e.g. skilled nursing facility)
- Self-reported data via a telephone survey
- Data are available the year after data were collected
- Only some data available in certain years

Self reported data are not based on official medical records.

Pregnancy Risk Assessment Monitoring System (PRAMS)

- Survey is mailed to a **stratified sample of birth certificates from Vermont residents 3 to 6 months after having a live birth**
- **Web or paper questionnaire** with phone follow-up
- Data is weighted to be representative of Vermonters who had live births within the surveyed cohort year
- Conducted by the Vermont Department of Health in collaboration with the Centers for Disease Control and Prevention (CDC)
- Data is used to determine Pregnancy Vaccination Rates

Helpful Links:

Pregnancy Risk Assessment Monitoring System (PRAMS) | Vermont Department of Health

PRAMS | PRAMS | CDC

Pregnancy Risk Assessment Monitoring System (PRAMS)

Strengths

- Comparable national and state-level data, and data over time
- Representative sample of new moms
- Includes health-related risk behaviors, use of preventive services, and various demographic and socioeconomic variables

Limitations

- Self-reported data
- Only includes pregnancies resulting in a live birth
- Only includes flu and Tdap vaccines
- Data are not real time and only focused on before, during pregnancy, and postpartum

Other data sets not managed by the Health Department

- **National Healthcare Safety Network (NHSN)**: COVID-19 immunization data for staff and residents in nursing homes
- **National Immunization Survey (NIS)**: National phone survey on vaccination coverage
- **Household Pulse Survey**: Data on emergent social and economic matters facing U.S. households

Which dataset should I use?

There are several data sets for vaccination data. Let’s walk through a few quick scenarios on selecting a data source for your project or report.

Questions to ask when getting ready to use vaccination data sets.

What is your goal?

What vaccines are you interested in?

What other factors are you interested in?

Are you interested in real-time data? data over time?

Do you want to make comparisons to national data?

Which strengths and limitations are best suited for your needs?

Which dataset should I use?

Have MMR immunization rates declined in Vermont for children?

Which counties have the lowest vaccination rates for flu this year?

How many pregnant Vermonters received an RSV vaccine?

Vermont Immunization Registry (IMR)

Child care and school data

National Healthcare Safety Network (NHSN)

Behavioral Risk Factor Surveillance Survey (BRFSS)

Pregnancy Risk Assessment Monitoring System (PRAMS)

National Immunization Survey (NIS)

Household Pulse Survey

Which dataset should I use?

What questions are you trying to answer?

Vermont Immunization Registry (IMR)

Child care and school data

National Healthcare Safety Network (NHSN)

Behavioral Risk Factor Surveillance Survey (BRFSS)

Pregnancy Risk Assessment Monitoring System (PRAMS)

National Immunization Survey (NIS)

Household Pulse Survey

Acknowledgements

Special thanks to health care providers, child care and school staff for:

- Submitting quality data, and
- Using data to improve outcomes for Vermonters.

Thank you!

Let’s stay in touch.

Email: ahs.vdhvaccinationdata@vermont.gov

Web: Vaccination Coverage | Vermont Department of Health

Social: @HealthVermont.gov

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National Immunization Survey (NIS)

Phone surveys used to monitor vaccination coverage

Self-reported information, combined with vaccination records obtained from immunization providers, in some instances

National data collected by CDC

Includes VT data

Various surveys:

- Vaccinations recommended by the Advisory Committee on Immunization Practices (ACIP)
  - Children 19–35 months
  - Teens 13–17 years
- Adults
  - COVID-19

ChildVaxView | CDC; TeenVaxView | CDC; RespVaxView | CDC

National Immunization Survey (NIS)

Strengths

Comparable national and state-level data, over time

Includes people of all socioeconomic backgrounds, including uninsured children

Includes those who are unvaccinated

Includes various demographic, socioeconomic, and other household characteristics data

Some vaccination records are obtained from immunization providers

Limitations

Small sample size compared to other data sources

Very large confidence-intervals

Declining survey response rates

Limited ability to analyze data below the state-level, especially in VT

National Healthcare Safety Network (NHSN)

COVID-19 immunization data reported by nursing homes to the CDC's National Healthcare Safety Network (NHSN)

Weekly reporting

Facility level data for both staff and residents

COVID-19 Nursing Home Data | CMS Data

National Healthcare Safety Network (NHSN)

Strengths

Data for all staff and residents in nursing homes in those settings

High reporting rates (required)

Comparable data nationwide

Close to ‘real time’ data

Limitations

Not all long-term care facilities

Only COVID-19 currently

Vaccines included vary over times

Household Pulse Survey

To collect data on emergent social and economic matters facing U.S. households

Designed to be implemented quickly

Implemented by the US Census Bureau

Considered experimental data, meaning it may not meet data quality standards

Household Pulse Survey

Household Pulse Survey

Strengths

Helpful when no other relevant data

Somewhat comparable national and state-level data

Includes people of all socioeconomic backgrounds, including uninsured

Includes those who are unvaccinated

Includes vaccine hesitancy questions

Limitations

Very small sample size compared to other data sources

Very large confidence-intervals

Limited ability to analyze data below the state-level, especially in VT

Limited data

Questions change

Thank you!

Let’s stay in touch.

Email: IMR@vermont.gov
Web: HealthVermont.gov/stats/registries/immunization-registry
Social: @HealthVermont.gov

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