

It is one thing to know which immunizations a person has received, and quite another to know what other immunizations are called for, and when the next dose is due. We are happy to announce the Vermont Immunization Registry (IMR) has implemented a new forecaster that will help us to quickly incorporate new vaccine schedule recommendations issued by the CDC’s Advisory Committee on Immunization Practices (ACIP).

Enhanced vaccine clinical decision support via the Immunization Calculation Engine webservice is now available in the Vermont Immunization Registry.

Vermont’s new forecaster uses the Immunization Calculation Engine (ICE) webservice – a state-of-the-art open-source software system that provides clinical decision support for immunization. The forecaster supports all routinely administered vaccine groups, including the child, teen, and now even adult immunization schedules. It provides clinicians with guidance for recommended immunizations as well as conditionally recommended doses for people with health conditions that might call for additional protection.

## Typical Immunization Records Look Like This

This is the Immunizations Grid in the IMR. It is clear what vaccines have been administered and when. But what vaccines might be due today? And, have the previously administered doses been given in line with the schedule guidance?

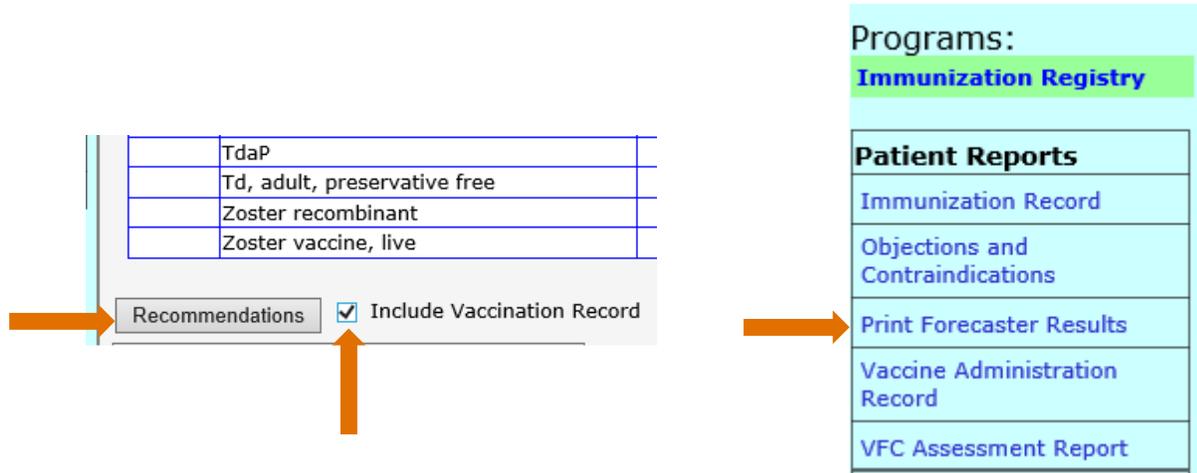
Patient: Icecream, Banana      Date of Birth: 1/24/2018      Patient Age: 2 years 5 months and 13 days  
 Practice Name: Brattleboro (Ped) Primary Care

The Vermont Immunization Registry is a tool to assist in tracking and forecasting immunizations currently due and overdue, based on date of birth. It is not intended to replace medical expertise.

Immunizations						
Status	Vaccine	Dose 1	Dose 2	Dose 3	Dose 4	Dose 5
	DTaP-Hep B-IPV	<a href="#">3/24/2018</a>	<a href="#">5/24/2018</a>	<a href="#">7/24/2018</a>		
	Hib (PRP-T)	<a href="#">3/24/2018</a>	<a href="#">5/24/2018</a>	<a href="#">7/24/2018</a>	<a href="#">1/24/2019</a>	
	DTaP-Hib-IPV					
	pneumococcal conjugate PCV 13	<a href="#">3/24/2018</a>	<a href="#">5/24/2018</a>	<a href="#">7/24/2018</a>	<a href="#">1/24/2019</a>	
	pneumococcal conjugate PCV 7					
	DTaP	<a href="#">4/24/2019</a>				
	DTaP-IPV					
	IPV					
	Hep A, ped/adol, 2-dose	<a href="#">1/24/2019</a>	<a href="#">7/24/2019</a>			
	Hep A, adult					
	Hep B, adolescent or pediatric	<a href="#">1/24/2018</a>				
	Hep A-Hep B					
	Hep B, adult					
	Hep B, adjuvanted					
	rotavirus pentavalent	<a href="#">3/24/2018</a>	<a href="#">5/24/2018</a>			

## To Use the Forecaster in the IMR

At the bottom of the **Immunizations Grid** in a patient record, click “Include Vaccination Record” and select “Recommendations,” or choose “Print Forecaster Results” in the Patient Report section of the blue navigation bar.



## Forecast - Clinical Decision Guidance Times Three

The forecaster provides three pieces of information: An **assessment** of what has already been given, **recommendations** for what vaccines are due today, and **conditional recommendations** for which vaccine might be called for if the patient has special health conditions.

- Assessment provides an indication of whether each immunization administered in the past was in line with ACIP guidance.
- Recommendations includes an indication of whether a vaccine is due today as well as indicating the earliest date that the dose can be given and the date it is overdue.
- Conditional recommendations provide the clinician with a general flag for additional recommendations to consider based on what they know of their patient. The Immunization Registry does not capture information about specific health conditions.

## Forecaster Assessment

Below is a forecaster assessment for a patient born 1/2/2006. Note that the assessment indicates whether each dose is valid or invalid in the series and the reason why a dose is invalid.

Vaccination Record			
Vaccine Group (Vaccine)	Date Administered	Status	Evaluation Reason
MMR (MMR)	8/2/2006	INVALID	This patient was below the minimum age for this dose.
MMR (MMR)	3/15/2007	VALID	
Varicella (Varicella)	3/31/2007	INVALID	This immunization event occurred prior to the specified minimum interval for a live vaccine dose.

## Forecaster Recommendations

Here are forecaster recommendations for a different patient, born 1/24/1970. This patient has received two doses of Shingrix (zoster) and is up to date for Tdap and Td. Note that the **Recommended Date** for the pneumococcal group is far in the future as this would not be called for until age 65. The **Overdue Date** field is highlighted in blue to indicate an additional dose of MMR and Td are overdue.

You will also notice that the forecaster recommends influenza beginning on the first of July. This is because the forecaster includes a seasonal reset, based on June 30<sup>th</sup> of each year as the close of one flu season and July 1<sup>st</sup> as the opening of the next. This makes it possible to run a **Not Up to Date** report for influenza for your practice to find patients who have not received their flu shot this season. And it's a reminder that a "flu shot" is an important recommendation, even if your practice or site does not start administering flu shots until the fall.

### Vaccines Recommended by Tracking Schedule

Vaccine	Earliest Date	Recommended Date	Overdue Date	Status
Influenza	7/1/2020	7/1/2020		Recommended
MMR	2/21/2018	2/21/2018	2/21/2018	Recommended
Td, adult, absorbed	7/24/2018	7/24/2018	7/24/2018	Recommended
pneumococcal polysaccharide	1/24/2035	1/24/2035		Future Recommendation

Below is an example of a typical "newborn" record for a child born 7/1/2020 that was run a few days after birth. The child has received a birth dose of Hepatitis B. Note that most recommendations are in the future – nothing is due today. The Earliest Date column provides information on the earliest date a vaccine can be administered and still be valid. Note that the **Earliest Date** column provides guidance for the earliest a vaccine can be administered according to ACIP guidance. For instance, the first dose of DtaP is due on 9/21/2020, but would be considered a valid dose if administered no earlier than 8/12/2020.

### Vaccines Recommended by Tracking Schedule

Vaccine	Earliest Date	Recommended Date	Overdue Date	Status
DTaP NOS	8/12/2020	9/1/2020	10/28/2020	Future Recommendation
Hep A	7/1/2021	7/1/2021	7/28/2022	Future Recommendation
Hep B	7/29/2020	9/1/2020	10/28/2020	Future Recommendation
Hib	8/12/2020	9/1/2020	10/28/2020	Future Recommendation
HPV	7/1/2029	7/1/2031	7/28/2033	Future Recommendation
Influenza	1/1/2021	1/1/2021		Future Recommendation
Meningococcal	7/1/2031	7/1/2031	7/28/2033	Future Recommendation
MMR	7/1/2021	7/1/2021	11/28/2021	Future Recommendation
pneumococcal conjugate PCV 13	8/12/2020	9/1/2020	10/28/2020	Future Recommendation
Polio	8/12/2020	9/1/2020	10/28/2020	Future Recommendation
Rotavirus	8/12/2020	9/1/2020		Future Recommendation
Varicella	7/1/2021	7/1/2021	11/28/2021	Future Recommendation
Zoster recombinant	7/1/2070	7/1/2070		Future Recommendation

## Forecaster Conditional Recommendations

When a patient has particular health conditions, the ACIP guidance may call for additional doses or early administration of particular vaccines. Below is an example of the **Conditional Recommendations** for a patient born 5/5/1955. This patient is up to date for Tdap, Td, Influenza, and Zoster, but the **Conditional Recommendations** list some other vaccines that might be appropriate if the patient had certain health conditions, was a health care provider, or had other risk factors. Determination of whether conditionally recommended vaccines should be administered is at the discretion of the health care provider.

### Vaccines Not Recommended or Conditionally Recommended by Tracking Schedule

Vaccine	Status	Message
Hep A	Conditionally Recommended	Recommended for high-risk groups.
Hep B	Conditionally Recommended	Recommended for high-risk groups.
Hib	Conditionally Recommended	Recommended for high-risk groups.
Meningococcal	Conditionally Recommended	Recommended for high-risk groups.
Meningococcal B	Conditionally Recommended	Recommended for high-risk groups.
MMR	Conditionally Recommended	Recommended for high-risk groups.
Polio	Conditionally Recommended	Recommended for high-risk groups.
Varicella	Conditionally Recommended	Recommended for high-risk groups.
HPV	Not Recommended	Vaccine not recommended at this age.
Rotavirus	Not Recommended	Vaccine not recommended at this age; too old to initiate.
Zoster	Not Recommended	Completed vaccine series.

## Forecaster Printed Report

Forecaster results from the IMR can be printed by opening **Print Forecaster Results** report under Patient Reports in the blue navigation bar to the left of the Immunization Grid. You can see an example of the report on the next page.

**Vaccines Recommended Based on ACIP Schedule and Immunization History  
as of 07/08/2020**

**Patient Name:** VINTAGE ICECREAM

**Date of Birth:** 08/05/1955

**History of Varicella:** Unknown

**Vaccination Record**

Vaccine Group (Vaccine Name)	Date Administered	Status	Evaluation Reason
DTP (Td, adult, absorbed)	02/28/2017	VALID	
DTP (Tdap)	05/05/2020	VALID	
Influenza (influenza, high dose, seasonal)	12/19/2019	VALID	
Influenza (influenza, high dose, seasonal)	07/02/2020	VALID	
Zoster (Zoster recombinant)	05/05/2020	VALID	
Zoster (Zoster recombinant)	06/30/2020	VALID	

**Vaccines Recommended by Tracking Schedule**

Vaccine	Status	Earliest Date	Recommended Date	Overdue Date	Message
Influenza	Future Recommendation		07/01/2021		Due in the future.
pneumococcal polysaccharide	Future Recommendation	08/05/2020	08/05/2020		Due in the future.
Td, adult, absorbed	Future Recommendation	11/05/2020	11/05/2020	11/05/2020	Due in the future.

Vaccine	Status	Earliest Date	Recommended Date	Overdue Date	Message
Hep A	Conditionally Recommended				Recommended for high-risk groups.
Hep B	Conditionally Recommended				Recommended for high-risk groups.
Hib	Conditionally Recommended				Recommended for high-risk groups.
Meningococcal	Conditionally Recommended				Recommended for high-risk groups.
Meningococcal B	Conditionally Recommended				Recommended for high-risk groups.
MMR	Conditionally Recommended				Recommended for high-risk groups.
Polio	Conditionally Recommended				Recommended for high-risk groups.
Varicella	Conditionally Recommended				Recommended for high-risk groups.
HPV	Not Recommended				Vaccine not recommended at this age.
Rotavirus	Not Recommended				Vaccine not recommended at this age; too old to initiate.
Zoster	Not Recommended				Completed vaccine series.

**Bonus: IMR Reports now use the Forecaster**

Practice level reports in the IMR that assess vaccine coverage or up to date status use the new forecaster. All routine series for all ages are included in assessments. This means:

- You can run a **Not Up to Date** report for Human Papilloma Virus (HPV) vaccine, Zoster, Influenza, or any other vaccine series and for any age cohort. You can also use this report to run a reminder/recall mailing labels for any vaccine group.

- **Vaccines Due** reports will continue to exclude influenza so you can focus more clearly on other vaccine groups.
- **Invalid Doses report will** now exclude persons who have received invalid doses in the past but have since completed the dose requirements for the specific vaccine group.

## Limitations

The ICE forecaster supports “routinely administered vaccine groups.” There is currently no forecaster support for travel vaccines, or vaccines not routinely given in the US. These include rabies, yellow fever, typhoid, and adenovirus. You will see record of these immunizations in the IMR if the patient has received them, but the forecaster does not yet assess these groups or recommend the next appropriate dose.

## Additional Guidance

For more guidance about using the forecaster in the IMR, contact our user support at 888-688-4667.

For more information about immunization schedules and guidance:

[www.healthvermont.gov/disease-control/immunization-providers](http://www.healthvermont.gov/disease-control/immunization-providers)

[www.cdc.gov/vaccines/schedules/index.html](http://www.cdc.gov/vaccines/schedules/index.html)

[www.cdc.gov/vaccines/schedules/hcp/imz/child-adolescent.html](http://www.cdc.gov/vaccines/schedules/hcp/imz/child-adolescent.html)

[www.cdc.gov/vaccines/schedules/hcp/imz/adult.html](http://www.cdc.gov/vaccines/schedules/hcp/imz/adult.html)