

# Protecting children: Online tool creates personalized catch-up immunization schedules for missed childhood vaccinations

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This image shows a 17-month-old child receiving an immunization from a nurse. The Catch-Up Immunization Scheduler helps parents and health care providers adjust vaccination schedules where needed. Credit: CDC Image

(Medical Xpress)—Children obtain protection against certain diseases by receiving vaccinations, but they commonly miss recommended times to receive these immunizations. Once a child falls behind, health care

professionals typically have to construct a unique, personalized catch-up schedule for each child – often while the child waits in the treatment room.

A new online tool takes the guesswork out of developing individualized catch-up [immunization schedules](#) by allowing parents and [health care providers](#) to easily create a schedule that ensures missed vaccines and future vaccines are administered according to approved guidelines.

"The immunization schedule is complex," said Larry Pickering, executive secretary of the Advisory Committee on Immunization Practices (ACIP) of the [Centers for Disease Control and Prevention](#) (CDC) and a collaborator on the project. "By using the online immunization scheduler, parents can ensure that their children stay current on all recommended vaccines, and they can also obtain useful information about vaccines and vaccine-preventable diseases."

The online catch-up immunization scheduling tool, which was developed by the Georgia Institute of Technology and the Centers for Disease Control and Prevention (CDC), is available at [www.vacscheduler.org/](http://www.vacscheduler.org/) . Since the new tool launched in January 2012, the site has recorded nearly 63,000 visits, 22 percent of them repeat visitors. Nearly half of the visitors identified themselves as [health care](#) providers.

The new online tool replaced a downloadable software program that was released by Georgia Tech and the CDC in 2008. The original software was designed by Professor Pinar Keskinocak and former graduate student Faramroze Engineer from the Georgia Tech Stewart School of Industrial and Systems Engineering. Researchers in the Georgia Tech Research Institute (GTRI) converted the software program into the new online tool and adapted it to show different views tailored for parents and [health care professionals](#).

"We've resolved several issues that existed with the downloadable catch-up immunization scheduling program by creating the online tool," explained Keskinocak. "For instance, some physicians told us that they were not able to download the original software program to their work computers because of information technology security restrictions and some users expressed concern because the program had to be downloaded again whenever updates to the vaccination rules were issued."

The [online tool](#) removes the challenging task of simultaneously considering complex rules, guidelines and discretionary considerations when creating a catch-up schedule. A physician or caregiver simply inputs a child's date of birth and previous immunization dates, and selects whether to administer the vaccines as soon as possible or to administer the vaccines when recommended. Then the program displays a personalized schedule of the recommended dates to administer all future vaccines, which can be saved to the user's computer.

To use this tool:

1. Enter the child's name and birthdate or load a previously saved vaccination history
2. Add, Modify or Delete dosages in the vaccination history table
3. Submit 'Get Vaccination Schedule' to generate the schedule based on the provided information
4. Save your entries for later use and print a copy of the schedule for your records

Need help? Go to [FAQ](#) or see the [QuickStart Guide](#)

**Enter child's vaccination history:**

Child's Name:

Birthdate:

Vaccine	Description	# Doses	Approximate dosage dates
HepB	<a href="#">Hepatitis B</a>	0/3	<input type="button" value="+ Add HepB Dose 1"/>
RV	<a href="#">Rotavirus</a>	0/3	<input type="button" value="+ Add RV Dose 1"/>
DTaP	<a href="#">Diphtheria, Tetanus, Pertussis</a>	0/5	<input type="button" value="+ Add DTaP Dose 1"/>
Hib	<a href="#">Haemophilus influenzae type b</a>	0/4	<input type="button" value="+ Add Hib Dose 1"/>
PCV	<a href="#">Pneumococcal</a>	0/4	<input type="button" value="+ Add PCV Dose 1"/>
IPV	<a href="#">Polio</a>	0/5	<input type="button" value="+ Add IPV Dose 1"/>
MMR	<a href="#">Measles, Mumps, Rubella</a>	0/2	<input type="button" value="+ Add MMR Dose 1"/>
Var	<a href="#">Varicella (Chickenpox)</a>	0/2	<input type="button" value="+ Add Var Dose 1"/>
HepA	<a href="#">Hepatitis A</a>	0/2	<input type="button" value="+ Add HepA Dose 1"/>

Schedule Type: ☒ Routine ☐ Accelerated

Select "routine" for a typical immunization schedule or "accelerated" if you need to schedule doses as soon as possible (e.g., traveling soon or due to disease outbreaks).

This form of the Catch-Up Immunization Scheduler accepts information about the vaccinations that a child has received.

"I have found the online scheduling tools to be very user friendly and helpful," said Thomas J. Steiner, the pediatric lead physician with Kaiser Permanente Gwinnett, in Duluth, Ga. "One of the most useful aspects is the fact that after the patient's immunizations are entered, you can print a 'catch up' schedule which can be given to the patient and scanned into the patient's chart."

Vaccines included in the scheduler are those required between birth and six years of age: Hepatitis A and B, Rotavirus,

Diphtheria/Tetanus/Pertussis, Haemophilus influenzae type b, Pneumococcal, Polio, Measles/Mumps/Rubella, Varicella (Chickenpox).

The scheduler follows the guidelines developed and revised each year by ACIP in collaboration with the American Academy of Pediatrics and the American Academy of Family Physicians. These guidelines include the feasible number, timing and spacing of doses of each vaccine based on the child's age, the number of doses and the age at which each dose was administered.

In addition, each dose of each vaccine has a minimum, maximum and recommended age for administration, and there are minimum and recommended gaps between doses. These gaps as well as future administrations of a particular vaccine may vary depending on the age of the child and the age at which previous doses were administered.

If a child requires more than one live vaccine to be administered, there are two options: administer all live vaccines on the same day or wait 28 days between live vaccine injections. There also may be discretionary considerations such as limiting the number of simultaneous administrations a child receives or the number of visits required to complete the series for all vaccines.

GTRI researchers converted the downloadable program into software that could run online. While doing so, they added the capability to show slightly different information depending on whether the visitor was a health care professional or a parent.

"We can have the same algorithm and recommendation rules, but the interface can vary slightly based on the audience," said Sheila Isbell, a GTRI research scientist who led the software conversion effort. "If the visitor is a parent, we can show parent-friendly footnotes instead of physician-specific ones and provide more basic information about the

vaccines and the importance of completing the immunization regimes."

As part of the redesign for online operation, the researchers also separated the information that are likely to be changed and housed it in a database that would be easier to update as recommendations change. Housing the rules in a database could also allow the system to be used in other countries where vaccination schedules differ from those of the United States.

For the future, the GTRI team is creating a version that combines child and adolescent schedules to allow it to serve persons up to 18 years of age. A version designed for mobile devices is also under development.

In addition to Isbell, GTRI researchers Scott Appling, Therese Boston, Josh Cothran, Moon Kim and Arya Irani also contributed to the software conversion project, which was supported by GTRI's Independent Research and Development program.

Beyond advising on vaccination schedules, the tool may also encourage interactions between parents and physicians.

"By using the scheduler, parents will enhance their knowledge of vaccines and the diseases they prevent, and receive assistance in formulating questions that can be discussed with their child's physicians and nurses, resulting in more productive interactions," said Pickering, who is also a professor of pediatrics at Emory University School of Medicine.

Provided by Georgia Institute of Technology

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