New Pediatric Vaccines

Injecting Them Into Your Practice

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Based on a workshop presented at the University of Toronto's Primary Care Today conference (October 2003)

Until recently, the standard series of vaccines given to children in this country covered diphtheria, pertussis, tetanus, polio, measles, mumps, and rubella. In 1988, a vaccine for *Haemophilus influenzae* type b was introduced to address what was then the most common cause of bacterial meningitis in children.

More recently, several new vaccines have entered the market, covering other serious pediatric diseases, such as:

1. pneumococcal disease;
2. meningococcal disease; and
3. varicella.

Adding these preventive treatments to an already crowded well-child visit, counselling parents about the benefits and risks of these new vaccines, and discussing payment issues are challenges for the family physician.

However, the Canadian Medical Protective Association has recommended that offering pneumococcal, meningococcal, and varicella vaccines become part of the standard of care for primary care physicians.

Jane's case

Jane, two months, is brought to your office for a regular checkup. You saw the child at two weeks of age. Growth and development were normal at that time and continue to be so.

Jane's father has a job with no drug benefits and the family is struggling to make ends meet.

Jane's mother is aware that this is a routine visit for vaccines and asks you to explain to her the vaccines available. She has some concerns about side-effects and the need for vaccines in the first place.

For a followup on Jane, go to page 68.

What types of agents should children be vaccinated against?

1. Pneumococcus

Streptococcus pneumoniae (pneumococcus) is the leading cause of invasive bacterial infections, bacterial pneumonia, and acute otitis media in young children in Canada. After the successful implementation of a vaccination program against *Haemophilus influenzae* type b, *S. pneumoniae* is now the most common cause of bacterial meningitis in children in this country.[1] It is

estimated that, in Canada, there are 65 cases of meningitis, 700 cases of bacteremia, 2,200 cases of hospitalized pneumonia, 9,000 cases of non-hospitalized pneumonia, and 15 deaths every year due to *S. pneumoniae* in children under five years of age. Meningitis has a case-fatality rate of 6.5% and children who do survive are often left with chronic neurologic disability.[1]

The risk of invasive pneumococcal disease is higher in certain patient groups, however, most children who develop such disease do not have any identifiable risk factors.

In the largest vaccine trial ever conducted, the pneumococcal conjugate vaccine (PCV)-7 was shown to have a 93.9% efficacy rate against invasive pneumococcal disease.

The National Advisory Committee on Immunization (NACI) guidelines recommend routine immunization of infants two to 23 months and of non-immunized children under five years at high or presumed high risk of infection (Table 1).[2]

The ideal vaccine schedule for PCV-7 is two months, four months, six months, and 18 months, with an approximate wholesale cost of $300.[1,3]

Table 1

Risk groups for invasive pneumococcal disease

High

- Sickle cell disease
- Congenital or acquired asplenia
- HIV infection

Presumed high

- Congenital immune deficiency
- Immunosuppressive or radiation therapy, or solid organ transplantation
- Chronic renal insufficiency (including nephrotic syndrome)
- Chronic cardiac disease (particularly cyanotic heart disease or cardiac failure)
- Chronic pulmonary disease
- Cerebrospinal fluid leaks
- Poorly controlled diabetes

Moderate

- All children 24 to 59 months of age, especially in those:
  - 24 to 36 months of age
  - attending group daycare
  - in aboriginal populations in Northern Canada

HIV: Human immunodeficiency virus

Adapted from: Greiver M: The Foundation for Medical Practice Education 2002; 10(6):1-11.

2. Meningococcus

Meningococcus causes sporadic cases, as well as outbreaks of meningitis or septicemia at a rate of two cases per 100,000 people per year in Canada.[2]

Children under five years make up nearly 40% of cases and the case-fatality rate ranges from 10% to 20%. Several host factors increase the risk of invasive disease, including:

- young age,
- certain immunodeficiencies,
- a recent respiratory tract infection (such as Influenza A),
- exposure to cigarette smoke, and
- overcrowded conditions (such as college dormitories).

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Menjugate® and NeisVac-C® are effective against serotype C infection only. The NACI guidelines recommend routine immunization of infants and children younger than five years and adolescents (ages 15 to 19) who have not yet been vaccinated.

A high-intensity vaccination schedule includes immunization at two, four, six and 12 months, although only two doses are needed if started between 12 and 23 months. The cost of the high intensity schedule is approximately $170 to $255.

3. Varicella

Varicella zoster virus causes chickenpox, an illness 50% of children become infected with by age five, and 90% by age 12.[2]

Most (90%) childhood cases of chickenpox run an uncomplicated course in healthy children, however, invasive disease and serious or fatal complications occur in a small percentage. These complications include:

- pneumonia,
- bacteremia,
- secondary skin and soft tissue infections,
- necrotizing fasciitis,
- toxic shock syndrome, and
- encephalitis.[2]

Adolescents and adults are much more likely to suffer complications. Adults, who account for only 10% of cases, account for 70% of fatalities.

Several varicella vaccines are available. A single dose is need for patients one to 12 years, while patients over 13 require two doses at least four weeks apart. The Canadian Task Force on Preventive Health recommends routine primary immunization of susceptible children older than 12

A followup on Jane

Jane should get vaccinated against diphtheria, pertussis, tetanus, polio and *Hemophilus influenzae* type b at this visit. Her mother should also be educated about the newer vaccines available. A handout discussing the benefits and side-effects of each vaccine would be beneficial, and is available from The Foundation for Medical Practice Education Web site (***www.fmpe.org***).

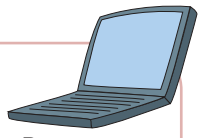
The pneumococcal vaccine should also be considered for Jane at this visit or in the near future. If Jane's parents can afford all three new vaccines (*i.e.*, against *S. pneumoniae*, meningococcus, and varicella) it would be appropriate to recommend them.

However, if her parents cannot afford all the vaccines, local risk factors for these illnesses should be considered. For example, protection against pneumococcus is usually preferred in most cases because it is more prevalent (except during a local meninogococcal outbreak). The physician could also make the parents aware that the cost of the vaccine is comparable to oher childhood safety expenditures (*i.e.*, bike helmets and car seats).

If the family could only afford one of the new vaccines, vaccination against varicella would be most appropriate, as it is more affordable and offers protection against a much more prevalent illness.

It is important for the physician to document all vaccine-related discussions in the patient's chart.

Surf your way to...



1. Canadian Immunization Awareness Program: *www.immunize.cpha.ca*
2. Canadian Pediatric Society "Caring for Kids" program: *www.caringforkids.cps.ca*

Frequently Asked Questions

1. Isn't it common for parents to have objections to the routine pediatric vaccine schedule, let alone "new" vaccines?

Yes. I try to listen carefully to the concerns of parents and give them concrete information to counteract some of the vaccine myths. For example, serious adverse effects from vaccination, such as anaphylaxis, can occur with any vaccine. However, such events are extremely rare. Most vaccine-related side-effects are mild and transient.

2. What is the ideal sequence for measles/mumps/rubella (MMR) and varicella vaccine after the age of one?

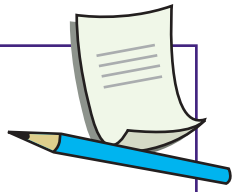
The administration of MMR and varicella vaccine concomitantly at separate injection sites or six weeks apart is generally well-tolerated and immunogenic in healthy children between 12 months and six years.

3. How often are parents willing to pay for vaccines?

A survey of 1,500 Canadian parents of children younger than seven years, revealed that most parents (> 95%) were willing to pay out-of-pocket, if necessary, for a vaccine to protect their child, despite concerns they might have about side-effects.

months. The vaccine can be given at the same time as the measles/mumps/rubella vaccine. The single dose costs approximately $60. Dx

Take-home message



- Recently, new vaccines have entered the market in order to prevent pneumococcal disease, meningococcal disease, and varicella.
- Parents should be educated about the benefits and side-effects of vaccines, as well as the potential risks of the illnesses the vaccines are meant to protect against, before making any decisions about their children.
- Unfortunately, doctors and parents must also take cost into consideration when deciding what vaccines should be used, as these vaccines are not universally funded.

References
1. National Advisory Committee on Immunization (NACI). Statement on recommended use of pneumococcal conjugate vaccine. Can Commun Dis Rep 2002; 28(Pt 2):1-32.
2. National Advisory Committee on Immunization. Canadian Immunization Guide, Sixth edition. Health Canada, 2002.
3. Canadian Pediatric Society Routine Immunization Schedule: Update 2004. Pediatr Child Health 2004; 9(1):17-9.

Dr. Little would like to thank The Foundation for Medical Practice Education, McMaster University, for developing the module that was the basis for this workshop.

Further references available—contact *The Canadian Journal of Diagnosis* at **diagnosis@sta.ca**.