

– Part 2 –

Recommended Immunization for Infants, Children and Adults

A. Immunization Schedules for Infants and Children

Few measures in preventive medicine are of such proven value and as easy to implement as routine immunization against infectious diseases. Immunization carried out as recommended in the following schedules will provide good basic protection for most children against the diseases shown.

Following a standard schedule ensures maximal achievable protection. However, modifications of the recommended schedule may be necessary because of missed appointments or intercurrent illness. Interruption of a recommended series does not require starting the series over again, regardless of the interval elapsed.

Similar vaccines are now available from different manufacturers, but they may not be identical. It is therefore essential for the user to read the appropriate chapter in this *Guide* as well as the manufacturer's package insert.

– Table 1 –

Routine Immunization Schedule for Infants and Children

Age at Vaccination	DTaP ¹	IPV	Hib ²	MMR	Td ³ or dTap ¹⁰	Hep B ⁴ (3 doses)	V	PC	MC
Birth									
2 months	X	X	X					X ⁸	X ⁹
4 months	X	X	X			Infancy		X	X
6 months	X	(X) ⁵	X			or		X	X
12 months				X		preadolescence	X ⁷	X	
18 months	X	X	X	(X) ⁶ or		(9-13 years)			or
4-6 years	X	X		(X) ⁶					
14-16 years					X ¹⁰				X ⁹
DTaP Diphtheria, tetanus, pertussis (acellular) vaccine IPV Inactivated poliovirus vaccine Hib <i>Haemophilus influenzae</i> type b conjugate vaccine MMR Measles, mumps and rubella vaccine Td Tetanus and diphtheria toxoid, adult type with reduced diphtheria toxoid dTap Tetanus and diphtheria toxoid, acellular pertussis, adolescent/adult type with reduced diphtheria and pertussis components Hep B Hepatitis B vaccine V Varicella PC Pneumococcal conjugate vaccine MC Meningococcal C conjugate vaccine									

– Table 2 –

Routine Immunization Schedule for Children < 7 Years of Age Not Immunized in Early Infancy

Timing	DTaP ¹	IPV	Hib	MMR	Td ³ or dTap ¹⁰	Hep B ⁴ (3 doses)	V	P	M
First visit	X	X	X ¹¹	X ¹²		X	X ⁷	X ⁸	X ⁹
2 months later	X	X	X	(X) ⁶		X		(X)	(X)
2 months later	X	(X) ⁵						(X)	
6-12 months later	X	X	(X) ¹¹			X			
4-6 years of age ¹³	X	X							
14-16 years of age					X				
P Pneumococcal vaccine M Meningococcal vaccine									

Part 2 – Recommended Immunization for Infants, Children and Adults

– Table 3 –

**Routine Immunization Schedule for Children
≥ 7 Years of Age Not Immunized in Early Infancy**

Timing	dTap ¹⁰	IPV	MMR	Hep B ⁴ (3 doses)	V	M
First visit	X	X	X	X	X	X ⁹
2 months later	X	X	X ⁶	X	(X) ⁷	
6-12 months later	X	X		X		
10 years later	X					
M Meningococcal vaccine						

Notes:

1. DTaP (diphtheria, tetanus, acellular or component pertussis) vaccine is the preferred vaccine for all doses in the vaccination series, including completion of the series in children who have received ≥ 1 dose of DPT (whole cell) vaccine.
2. Hib schedule shown is for PRP-T or HbOC vaccine. If PRP-OMP is used, give at 2, 4 and 12 months of age.
3. Td (tetanus and diphtheria toxoid), a combined adsorbed “adult type” preparation for use in people ≥ 7 years of age, contains less diphtheria toxoid than preparations given to younger children and is less likely to cause reactions in older people.
4. Hepatitis B vaccine can be routinely given to infants or preadolescents, depending on the provincial/territorial policy; three doses at 0, 1 and 6 month intervals are preferred. The second dose should be administered at least 1 month after the first dose, and the third at least 2 months after the second dose. A two-dose schedule for adolescents is also possible (see chapter on Hepatitis B Vaccine).
5. This dose is not needed routinely, but can be included for convenience.
6. A second dose of MMR is recommended, at least 1 month after the first dose for the purpose of better measles protection. For convenience, options include giving it with the next scheduled vaccination at 18 months of age or with school entry (4-6 years) vaccinations (depending on the provincial/territorial policy), or at any intervening age that is practicable. The need for a second dose of mumps and rubella vaccine is not established but may benefit (given for convenience as MMR). The second dose of MMR should be given at the same visit as DTaP IPV (± Hib) to ensure high uptake rates.
7. Children aged 12 months to 12 years should receive one dose of varicella vaccine. Individuals ≥ 13 years of age should receive two doses at least 28 days apart.
8. Recommended schedule, number of doses and subsequent use of 23 valent polysaccharide pneumococcal vaccine depend on the age of the child when vaccination is begun (see page 177 for specific recommendations).

9. Recommended schedule and number of doses of meningococcal vaccine depends on the age of the child (see page 151 for specific recommendations).
10. dTap adult formulation with reduced diphtheria toxoid and pertussis component.
11. Recommended schedule and number of doses depend on the product used and age of the child when vaccination is begun (see page 87 for specific recommendations). Not required past age 5.
12. Delay until subsequent visit if child is < 12 months of age.
13. Omit these doses if the previous doses of DTaP and polio were given after the fourth birthday.

National Guidelines for Childhood Immunization Practices

Preamble

The current edition of the Guide contains many examples of the effectiveness of provincial/territorial childhood immunization programs in Canada as carried out by both private and public providers. These include elimination of wild-type poliovirus and a decrease of over 95% in the incidence of *Haemophilus influenzae* type b and measles infections. To ensure continued success it is essential that policy makers, program administrators and providers work together, proactively, to plan, conduct and regularly review childhood immunization programs. Furthermore, several challenges remain, such as continued documented occurrences of “missed opportunities for immunization”; subgroups of Canadian children with lower than optimal vaccine coverage; evidence of incorrect handling and storage of vaccine by providers; wide variations in the reporting of vaccine-associated adverse events; and evidence that there is insufficient communication regarding the risks and benefits of vaccines.

Accordingly, in 1995 the National Advisory Committee on Immunization initiated a process to develop guidelines for childhood immunization practices applicable to both public and private systems of vaccine delivery. The guidelines that follow resulted from extensive consultation, over a 2-year period, with provincial/territorial health authorities; medical, nursing, public health and hospital organizations; and individual providers and child advocacy groups. The guidelines have been officially endorsed by the Canadian Paediatric Society, Advisory Committee on Epidemiology, College of Family Physicians of Canada, Canadian Medical Association, Canadian Nurses Association, Aboriginal Nurses Association of Canada, Society of Obstetricians and Gynaecologists of Canada and the Canadian Public Health Association.

The guidelines are deliberately broad, far-reaching and rigorous. They define the most desirable immunization practices that health care providers can use to assess

their own current practices, and identify areas of excellence as well as deficiency. It is recognized that some of the guidelines require involvement of the provinces and territories (e.g., regarding the need to track immunizations and audit coverage levels). Furthermore, some providers/programs may not have the funds necessary to fully implement the guidelines immediately. In such cases the guidelines can act as a tool to clarify immunization needs and to facilitate obtaining additional resources in order to achieve national goals and targets.

The following terms have been used throughout:

- *Provider*: any individual, nurse or physician qualified to give a vaccine
- *Regular provider*: individual usually responsible for a given child's vaccinations
- *Child/children*: the individuals (infancy to adolescence) being considered for immunization
- *Parent*: the individual(s) legally responsible for the child

These guidelines are recommended for use by all health professionals in the public and private sector who administer vaccines to or manage immunization services for infants and children. Although some guidelines will be more directly applicable to one or other setting, all providers and local health officials should collaborate in their efforts to ensure high coverage rates throughout the community and thus achieve and maintain the highest possible degree of community protection against vaccine-preventable diseases.

Guideline 1

Immunization services should be readily available.

Immunization services should be responsive to the needs of parents and children. When feasible, providers should schedule immunization appointments in conjunction with appointments for other health services for children. Immunization services, whether public-health clinics or physicians' offices, should be available during the week and at hours that are convenient for working parents. Services should be available on working days, as well as during some other hours (e.g., weekends, evenings, early mornings, or lunch hours).

Guideline 2

There should be no barriers or unnecessary prerequisites to the receipt of vaccines.

While appointment systems facilitate clinic planning and avoid unnecessarily long waits for children, appointment only systems may act as barriers to the receipt of vaccines. Children who appear on an unscheduled basis for vaccination should be accommodated when possible. Such children should be rapidly and efficiently screened without requiring other comprehensive health services.

A reliable decision to vaccinate can be based exclusively on the information elicited from a parent, and on the provider's observations and judgment about the child's wellness at the time. At a minimum, this includes

- asking the parent if the child is well
- questioning the parent about potential contraindications
- questioning the parent about reactions to previous vaccinations
- observing the child's general state of health.

Policies and protocols should be developed and implemented so that the administration of vaccine does not depend on individual written orders or on a referral from a primary-care provider.

Guideline 3

Providers should use all clinical encounters to screen for needed vaccines and, when indicated, vaccinate children.

Each encounter with a health-care provider, including those that occur during hospitalization, is an opportunity to review the immunization status, and if indicated, administer needed vaccines. Physicians who offer care to infants and children should consider the immunization status at every visit and offer immunization service as a routine part of that care or encourage attendance at the appropriate public health or physician clinic. At each hospital admission the vaccination record should be reviewed, and before discharge from the hospital, children should receive the vaccines for which they are eligible by age or health status. The child's current immunization provider should be informed about the vaccines administered in hospital. However, successful implementation requires significant improvements in keeping records of immunization histories (see Guideline 8).

Guideline 4

Providers should educate parents in general terms about immunization.

Providers should educate parents in a culturally sensitive way, preferably in their own language, about the importance of vaccination, the diseases vaccines prevent, the recommended immunization schedules, the need to receive vaccines at recommended ages, and the importance of bringing their child's vaccination record to every health-care visit. Parents should be encouraged to take responsibility for ensuring that their child completes the full series. Providers should answer all questions parents may have and provide appropriate education materials at suitable reading levels, preferably in the parents' preferred language. Providers should familiarize themselves with information on immunization provided by the appropriate health departments as well as other sources.

Guideline 5

Providers should inform parents in specific terms about the risks and benefits of vaccines their child is to receive.

Information pamphlets about routine childhood vaccines are available from ministries of health in many provinces and the territories, and also from the Canadian Paediatric Society. Such pamphlets are helpful in answering many questions that parents may have about immunization. Providers should document in the medical record that they have asked the parents if they have any questions and should ensure that satisfactory answers to any questions were given.

Guideline 6

Providers should recommend deferral or withholding of vaccines for true contraindications only.

There are very few true contraindications to vaccination according to current Canadian guidelines and providers must be aware of them. Accepting conditions that are not true contraindications often results in the needless deferral of indicated vaccines. Minimal acceptable screening procedures for precautions and contraindications include asking questions to elicit a history of possible adverse events following prior vaccinations, and determining any existing precautions or contraindications.

Guideline 7

Providers should administer all vaccine doses for which a child is eligible at the time of each visit.

Available evidence indicates that most routine childhood vaccines can be administered at the same visit, safely and effectively. Some vaccines are provided in a combination format whereby more than one is given in a single injection and others require separate injection.

Guideline 8

Providers should ensure that all vaccinations are accurately and completely recorded.

8.1 Data to be recorded in the child's record at the time of vaccination

For each vaccine administered the minimum data to be recorded in the child's record should include the name of the vaccine, the date (day, month, and year) and route of administration, the name of the vaccine manufacturer, the lot number, and the name and title of the person administering the vaccine.

8.2 Updating and maintaining the personal vaccination record

All providers should encourage the parents to maintain a copy of their child's personal vaccination record card and present it at each health-care visit so that it can be updated. If a parent fails to bring a child's card, the provider should ensure that adequate information is given so the parent can update the card with the name(s) of the vaccine(s), the date, the provider and the facility.

8.3 Documentation for vaccines given by other providers

Providers should facilitate the transfer of information in the vaccination record to other providers and to appropriate agencies in accordance with legislation. When a provider who does not routinely vaccinate or care for a child administers a vaccine to that child, the regular provider should be informed.

Guideline 9

Providers should maintain easily retrievable summaries of the vaccination records to facilitate age-appropriate vaccination.

Providers should maintain separate or easily retrievable summaries of vaccination records to facilitate assessment of coverage as well as the identification and recall of children who miss appointments. In addition, immunization files should be sorted periodically, with inactive records placed into a separate file. Providers should indicate in their records, or in an appropriately identified place, all primary-care services that each child receives in order to facilitate scheduling with other services.

Guideline 10

Providers should report clinically significant adverse events following vaccination – promptly, accurately, and completely.

Prompt reporting of adverse events following vaccination is essential to ensure vaccine safety, allowing for timely corrective action when needed, and to continually update information regarding vaccine risk-benefit and contraindications.

Providers should instruct parents to inform them of adverse events following vaccination. Providers should report all clinically significant events to the local public-health authority, regardless of whether they believe the events are caused by the vaccine or not. Providers should fully document the adverse event in the medical record at the time of the event or as soon as possible thereafter. At each immunization visit, information should be sought regarding serious adverse events that may have occurred following previous vaccinations.

Guideline 11

Providers should report all cases of vaccine-preventable diseases as required under provincial and territorial legislation.

Providers should know the local requirements for disease reporting. Reporting of vaccine-preventable diseases is essential for the ongoing evaluation of the effectiveness of immunization programs, to facilitate public-health investigation of vaccine failure, and to facilitate appropriate medical investigation of a child's failure to respond to a vaccine appropriately given.

Guideline 12

Providers should adhere to appropriate procedures for vaccine management.

Vaccines must be handled and stored as recommended in manufacturers' package inserts. The temperatures at which vaccines are transported and stored should be monitored daily. Vaccines must not be administered after their expiry date.

Providers should report usage, wastage, loss, and inventory as required by provincial, territorial or local public-health authorities.

Providers should be familiar with published national and local guidelines for vaccine storage and handling. Providers must ensure that any office staff designated to handle vaccines are also familiar with the guidelines.

Guideline 13

Providers should maintain up-to-date, easily retrievable protocols at all locations where vaccines are administered.

Providers administering vaccines should maintain a protocol that, at a minimum, discusses the appropriate vaccine dosage, vaccine contraindications, the recommended sites and techniques of vaccine administration, as well as possible adverse events and their emergency management. The Canadian Immunization Guide and updates, along with package inserts, can serve as references for the development of protocols. Such protocols should specify the necessary emergency equipment, drugs (including dosage), and personnel to manage safely and competently any medical emergency arising after administration of a vaccine. All providers should be familiar with the content of these protocols, their location, and how to follow them.

Guideline 14

Providers should be properly trained and maintain ongoing education regarding current immunization recommendations.

Vaccines must be administered only by properly trained persons who are recognized as qualified in their specific jurisdiction. Training and ongoing education should be based on current guidelines and recommendations of NACI and provincial and territorial ministries of health, the Guidelines for Childhood Immunization Practices, and other sources of information on immunization.

Guideline 15

Providers should operate a tracking system.

A tracking system should generate reminders of upcoming vaccinations as well as recalls for children who are overdue for their vaccinations. A system may be manual or automated, and may include mailed or telephone messages. All providers should identify, for additional intensive tracking efforts, children considered at high risk for failing to complete the immunization series on schedule (e.g., children who start their series late or children who fall behind schedule).

As an added measure, providers should encourage the development of, and cooperation with, a comprehensive provincial and territorial immunization tracking system.

Guideline 16

Audits should be conducted in all immunization clinics to assess the quality of immunization records and assess immunization coverage levels.

In both public and private sectors, an audit of immunization services should include assessment of all or a random sample of immunization records to assess the quality of documentation, and to determine the immunization coverage level (e.g., the percentage of 2-year-old children who are up-to-date). The results of the audit should be discussed by providers as part of their ongoing quality assurance reviews, and used to develop solutions to the problems identified.

B. Immunization for Adults

Childhood immunization programs have proven to be an effective and safe method of preventing many infectious diseases. The delivery and implementation of adult immunization programs have not matched the successes achieved in the pediatric population. However, given increased emphasis on disease prevention and health promotion, physicians and the general public must be made aware of the need to improve immunization programs for adults. Immunization status should be considered an integral part of the health assessment of any adult. Opportunities to provide vaccines to adults are being missed.

Prevention of infection by immunization is a lifelong process that should be tailored to meet individual variations in risk resulting from occupation, foreign travel, underlying illness, lifestyle and age. All adults should receive adequate doses of all routinely recommended vaccines, and other vaccinations should be given for selected circumstances when appropriate. Particular emphasis should be placed on improving appropriate utilization of influenza, pneumococcal and hepatitis B vaccines in Canadian adults. For elderly people, influenza and pneumococcal vaccines are reported as more cost-effective than all other preventive, screening and treatment interventions that have been studied.

Recommended Antigens

All Canadian adults require maintenance of immunity to tetanus and diphtheria, preferably with combined (Td) toxoid.

The first priority is to ensure that children receive the recommended series of doses, including the school leaving dose at 14 to 16 years of age, and that adults have completed primary immunization with Td.

The acceptable options for adult booster doses are

- 1) to continue to offer boosters of Td at 10-yearly intervals at mid decade years, i.e., at age 15, 25, 35, etc. or
- 2) as a minimum, to review immunization status at least once during adult life, e.g., at 50 years of age, and offer a single dose of Td to everyone who has not had one within the previous 10 years.

In addition, people who are travelling to areas where they are likely to be exposed to diphtheria may be offered a booster dose of Td if more than 10 years have elapsed since their most recent booster.

People \geq 65 years of age should receive influenza vaccine every year and, on a one-time basis, a dose of pneumococcal vaccine. Special recall strategies may be necessary to ensure high coverage, particularly for those who are at greatest risk of influenza-related complications, e.g., people with chronic cardiopulmonary disease.

Adults < 65 with high-risk medical conditions for complications of influenza and pneumococcal infection should also receive influenza vaccine every year and a single dose of pneumococcal vaccine (see pages 177 for high-risk conditions).

Adults born before 1970 may be considered immune to measles. Adults born in 1970 or later who do not have documentation of adequate measles immunization or who are known to be seronegative should receive measles vaccine (given as MMR). For adults who have already received one dose of measles vaccine, a second dose of vaccine would provide optimal protection. Priority for a second dose should be given to health care workers, college students and travellers to areas where measles is epidemic.

Most individuals born before 1970 may also be considered immune to mumps. Mumps vaccine (given as MMR) is recommended for young adults with no history of mumps.

Rubella vaccine should be given to all female adolescents and women of childbearing age unless they have documented evidence of detectable antibody or documented evidence of vaccination. Combined measles, mumps and rubella (MMR) vaccine is preferred. In addition, MMR vaccine should be given to rubella-susceptible health care workers of either sex who may, through frequent face-to-face contact, expose pregnant women to rubella.

Universal immunization for hepatitis B is recommended in Canada. Opportunities should be provided for adults to receive hepatitis B vaccine. In addition, adults who are at increased risk of exposure to hepatitis B by virtue of their occupation, lifestyle or environment should receive hepatitis B vaccine at the earliest possible clinical encounter (see page 102).

In the future, booster doses of adult formulation of acellular pertussis vaccine may be recommended to prevent occurrence and spread of the disease. Further studies are needed in this area.

Table 4 lists antigens that are indicated for routine use in adults. Detailed information on immunization for health care workers and travellers can be found in Part 5 and 6 (pages 251 and 255) of the *Guide*.

– Table 4 –

Routine Immunization of Adults

Vaccine or toxoid (reference page)	Indication	Further doses
Diphtheria (adult preparation) (page 82)	All adults	Every 10 years, preferably given with tetanus toxoid (Td)
Tetanus (page 208)	All adults	Every 10 years, preferably given as Td
Influenza (page 120)	Adults ≥ 65 years; adults < 65 years at high risk of influenza-related complications and other select groups (see chapter)	Every year using current vaccine formulation
Pneumococcal (page 177)	Adults ≥ 65 years; conditions with increased risk of pneumococcal diseases	See page 181
Measles (page 143)	All adults born in 1970 or later who are susceptible to measles	May be given as MMR
Rubella (page 200)	Susceptible women of child-bearing age and health care workers	May be given as MMR
Mumps (page 166)	Adults born in 1970 or later with no history of mumps	May be given as MMR

Strategies to Improve Vaccine Delivery to Adults

Despite favourable attitudes among Canadian physicians towards the use of vaccines in adults, such vaccines are underused. It is estimated that only 45% of high-risk individuals receive influenza vaccine annually. An organized systematic approach to vaccine delivery is required. Physicians play a major role in the identification of adults in need of immunization. Methods of identification include reminder notices in patient records, pre-employment medical examinations, school and college entry questionnaires, employee health nurse visits and letter reminders. Emergency rooms, public health clinics, hospitals and other health care institutions may also play an important role in vaccine delivery. Health visits of recent immigrants can identify this particular population at risk. When people are offered vaccines, high rates of compliance are usually noted. Adult immunization can be successful if well-organized provincial/territorial/institutional programs are established and maintained.

See Table 5 for a summary of immunization in selected cases.

– Table 5 –

Summary of Selected Immunization for Adults

Vaccine (reference page)	Indication
BCG (Seldom used, see page 71)	High-risk exposure
Hepatitis A (page 93)	Occupational, life-style or environmental exposure
Hepatitis B (page 102)	Universally recommended in Canada, especially for occupational, life-style or environmental exposure
Japanese encephalitis (page 128)	Travel to endemic area or other exposure risk
Lyme disease (page 135)	Travel to endemic areas Risk determination should determine high, moderate, low or no risk
Meningococcal (page 151)	High-risk exposure or travel
Pertussis (page 169)	See pertussis chapter, page 171
Poliomyelitis (page 185)	Travel to endemic area or other exposure risk
Rabies pre-exposure use (page 191)	Occupational or other risk
Typhoid (page 214)	High-risk exposure
Varicella (page 223)	Occupational, household contacts of susceptible individuals and those susceptible because of underlying disease
Yellow fever (page 233)	Travel to endemic area or if required for foreign travel

Teenagers, young adults and recent immigrants require special attention. Some may not have received recommended vaccines while others may have received vaccines of lower potency than those currently available. Given the infrequency with which these groups seek medical care, practitioners and health officials should use every opportunity to review and update their protection.

C. Opportunity for Immunization in Acute Care Institutions

Taking an immunization history from those admitted to hospital provides an important opportunity to maintain up-to-date immunization for all patients. For patients without regular sources of care or those followed in specialized clinics, the only opportunities for immunization may be during hospital outpatient visits or hospitalization. For children, particularly, emergency room visits should be exploited to check immunization status and immunize if necessary.

The admission of elderly patients and others at high risk of influenza complications should be regarded as an opportunity to ensure that these people are immunized against influenza. Programs to immunize such patients before discharge will ensure that these very high-risk patients will not miss immunization in the community because of hospitalization during influenza season. The routine presence of standing orders or delegated acts for immunization in these institutions, along with clear departmental protocols, can help to reduce administrative barriers to incorporating these preventive acts in an institution traditionally preoccupied with treatment.

Pneumococcal vaccine should be administered before discharge to unvaccinated patients ≥ 65 years of age and those with chronic health problems for which immunization is recommended.

All pregnant women should be screened for hepatitis B surface antigen (HBsAg), and the newborn of an HBsAg positive woman should be given hepatitis B immune globulin (HBIG) and started on a course of vaccine. In jurisdictions where routine hepatitis B immunization is not offered to all children at birth, newborns at high risk of exposure to hepatitis B should receive the first dose of a course of vaccine before discharge. These children might have an infected family member other than their mother, have family circumstances leading to high risk of acute infection, or belong to an immigrant community from an area where hepatitis B is endemic.

Women susceptible to rubella should receive vaccine post-partum, before discharge from hospital.

D. Immunization of Residents of Long-Term Care Institutions

Children living in residential or long-term care institutions should receive all routine immunizations appropriate for their age. Adults should be immunized against tetanus and diphtheria. If required, a primary series should be administered, although in most cases only a booster dose(s), repeated every 10 years, will be needed.

Annual immunization against influenza is strongly recommended for individuals in residential and long-term care institutions, and a program to ensure that this occurs should be in place. Patients or their surrogate decision makers should be informed of the immunization policy on admission, and every effort made to obtain and document informed consent before the influenza season.

Pneumococcal vaccine is recommended for the elderly and the chronically ill, particularly in closed populations. A single dose of the vaccine should be administered to all previously unvaccinated individuals admitted to such facilities and to current unvaccinated residents.

Residents of institutions for people with developmental disabilities should also receive hepatitis A and B vaccines.

Selected References

- ACP Task Force on Adult Immunization and Infectious Diseases Society of America. *Guide for adult immunization*. 2nd ed. Philadelphia, PA: American College of Physicians, 1990.
- American Academy of Pediatrics, Committee on Infectious Diseases. *Immunization of adolescents: recommendations of the Advisory Committee on Immigration Practices, the American Academy of Pediatrics, the American Academy of Family Physicians, and the American Medical Association*. Pediatrics 1997;99:479-88.
- CDC. National Immunization Program. *Adult immunization: a report by the National Vaccine Advisory Committee, National Vaccine Program*. Atlanta, GA: US. Department of Health & Human Services, 1994.
- CDC. *Update on adult immunization: recommendations of the Advisory Committee on Immunization Practices (ACIP)*. MMWR 1991;40(RR-12):1-94.
- Gardner P, Schaffner W. *Immunization of adults*. N Engl J Med 1993;328:1252-58.
- Williams WW, Hickson MA, Kane MA et al. *Immunization policies and vaccine coverage among adults: risk for missed opportunities*. Ann Intern Med 1988;108:616-25.