

# Teaching Immunization

*for Medical Education (TIME)*



MULTISTATION CLINICAL TEACHING SCENARIOS

## Adult Vaccination: Small Group Booklet

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## **Adult Vaccination: Small Group Booklet**

### Contents

Background on the Multistation Clinical Teaching Scenarios (MCTS) Method	page 2
Suggested Schedule for MCTS Session	page 3
Objectives	page 4
Module Pages	
Scenario One	page 5
Scenario Two	page 7
Scenario Three	page 10
Scenario Four	page 12
Scenario Five	page 15
Scenario Six	page 17

## **BACKGROUND ON THE MULTISTATION CLINICAL TEACHING SCENARIOS (MCTS) METHOD**

The multistation clinical teaching scenarios were developed to encourage active small-group learning in a clinically relevant context with a modest amount of faculty time. The time commitment of both the facilitator and the student is typically 50 to 90 minutes, depending on the setting and goals. The MCTS teaching method may be readily used in medical pre-clinical and clinical years when students' or residents' time is limited. MCTS is well-suited to objective-driven curricula. In the MCTS session, one facilitator can interact with groups ranging from 10 to 30 residents or students. The facilitator needs basic knowledge about the disease and immunization covered but does not need to be a content expert.

Students and residents are assigned to small groups of 2 to 5 for an MCTS session. All of the small groups simultaneously address the first scenario. Each small group spends approximately 5 to 10 minutes attempting to solve the problem addressed in the scenario. The scenario is then discussed in a large group. The facilitator calls on one of the small groups to present their answers, then the facilitator and the large group discuss each small group's response to the scenario and summarize the teaching points. The facilitator should correct wrong answers and discuss the teaching points. Generally, the large-group discussion should not last more than 7 minutes per scenario. After the first scenario is discussed, each small group works on the second scenario.

A large-group discussion follows. The process is repeated until all scenarios are completed or the allotted time expires.

**Suggested Schedule for MCTS Session**

1. Arrange chairs in groups of 3 to 5, and separate students or residents into small groups.
2. Distribute one copy of the Adult Vaccination MCTS *Small-Group Booklet* to each group along with a copy of the learning aids listed for the scenarios to be discussed. A major learning aid is needed: Recommended Adult Immunization Schedule -- United States, from [www.cdc.gov/vaccines/recs/schedules/default.htm#adult](http://www.cdc.gov/vaccines/recs/schedules/default.htm#adult), SHOTS software/App from [www.immunizationed.org](http://www.immunizationed.org) (includes Android and iPhone links), internet access to CDC's website [www.cdc.gov/vaccines](http://www.cdc.gov/vaccines), and/or the Pink Book in hard copy or internet access from <http://www.cdc.gov/vaccines/pubs/pinkbook/default.htm>. Review the objectives briefly, focusing on the primary objectives.
3. The students or residents are to start the first scenario by having one member of each small group read the scenario aloud. Subsequently, each small group should work on answering the questions for that scenario. To answer the questions, the learners should use their previous knowledge and experience, the resource materials/internet, and the abstracts included in selected scenarios. They should divide the resource materials since each individual may not have time to read all of the materials.
4. Convene as a large group after 5 to 10 minutes, depending upon the complexity of the scenario. Select one group to present their answers to the questions. Critique answers and discuss the teaching points for 5 to 7 minutes.
5. Repeat steps 3 and 4 for the remaining scenarios that have been selected.

## Objectives

**At the end of this session, every learner should be able to accomplish the following core set of objectives:**

### Primary Objectives:

1. Given an adult patient scenario, recommend vaccination appropriately, considering the factors of (a) age, (b) health, and (c) occupation.
2. Discuss the morbidity and mortality from vaccine-preventable diseases as they occur in adults, including the effects of age and underlying medical conditions.
3. State sources of current information on adult vaccinations, including information about the schedule, contraindications, administration routes, and injection sites.
4. Explain general vaccine safety and adverse event information, including the Vaccine Adverse Event Reporting System (VAERS).
5. Discuss three reasons for low vaccination rates among adults.
6. Suggest three procedures that a physician can implement in a practice or clinic to improve vaccination rates for adult patients given that many adults do not routinely make appointments for vaccination.

### Secondary Objectives:

1. Given a patient scenario, recommend vaccination, if indicated, at hospital discharge and during both acute and chronic-care visits to providers, thereby reducing missed opportunities.
2. State the indications for post-exposure prophylaxis for tetanus and hepatitis B.
3. Reduce missed opportunities for vaccination by recommending simultaneous vaccination and appropriate interpretation of contraindications

**SCENARIO ONE**

Janys, a 49-year-old postmenopausal woman, goes to her physician on a quarterly basis for diabetes management and is in the office today (October 15). Her medical history includes long-standing diabetes mellitus with complications of nephropathy and retinopathy, and chronic allergies. She just started hemodialysis for renal failure. Due in part to her own history of allergic rhinitis, and to a friend's "bad" reaction to influenza vaccine, Janys has not had any vaccinations since she completed the diphtheria and tetanus toxoids and pertussis vaccine (DTP), measles, mumps and rubella vaccine, and poliovirus vaccine series as a child. She had varicella disease as a child.

**Learning Aids**

1. Table 1 and Figure 1 — on the following page
2. Recommended Adult Immunization Schedule -- United States (use latest version).  
[www.cdc.gov/vaccines/recs/schedules/adult-schedule.htm](http://www.cdc.gov/vaccines/recs/schedules/adult-schedule.htm)

AND/OR

3. Shots from [www.immunizationed.org](http://www.immunizationed.org)

**Questions**

1. What vaccinations are indicated?
2. What can Janys' physician do to encourage vaccination? Is physician advice effective?
3. For hepatitis B, what vaccine dosages should be used? Does Janys need any postvaccination testing?
4. If Janys experiences an adverse event that is temporally associated with vaccination, does it need to be reported?
5. What vaccinations are indicated for staff at the hemodialysis center Janys attends?

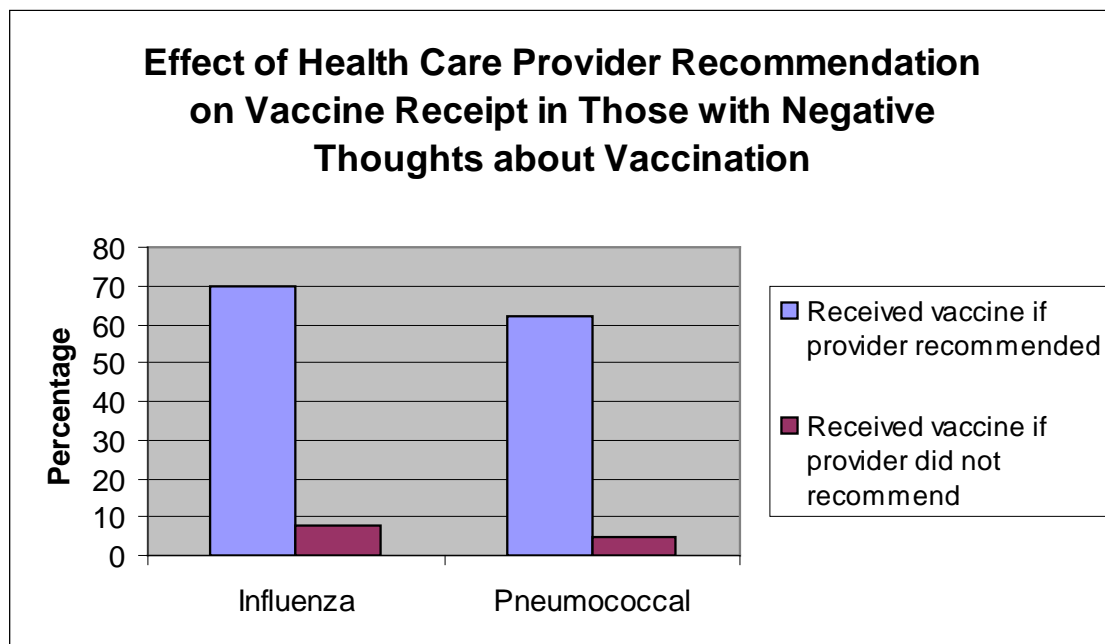
**Table 1. Influenza Associated Hospitalization Rates for Pneumonia and Influenza**

Age and High-Risk (HR) Condition Status*	Hospitalization Rates per 100,000
15-49 Without high-risk (HR)	5
15-49 With HR	40
50-64 Without HR	18
50-64 With HR	123
≥ 65 Without HR	187
≥ 65 With HR	556

Modified from Mullooly JP, Bridges CB, Thompson WW, et al. Influenza- and RSV-associated hospitalizations among adults. *Vaccine* 2007; 25:846-855.

\*Examples of high-risk conditions are rheumatic heart disease, ischemic heart disease, asthma, emphysema, nephritis, diabetes mellitus, and malignancies.

**Figure 1**



Modified from CDC. Adult immunization: knowledge, attitudes, and practices—DeKalb and Fulton Counties, Georgia, 1988. *MMWR* 1988; 37: 657-661.

## SCENARIO TWO

Dr. Powell is concerned about the vaccination rates for adults at Troy Medical Center, where he practices. Troy Medical Center has three physicians: Dr. Powell, a family physician, Dr. Rivers, a general internist, and Dr. Murray, who does a mixture of subspecialty medicine and primary care. Using the office computer, Dr. Powell charted adult vaccination rates by physician for patients in the practice (Fig. 2). He would like to see an increase in the vaccination rates for influenza and pneumococcal polysaccharide vaccines for (a) all patients with an age-based indication, and (b) patients less than 65 years of age who have high-risk conditions.

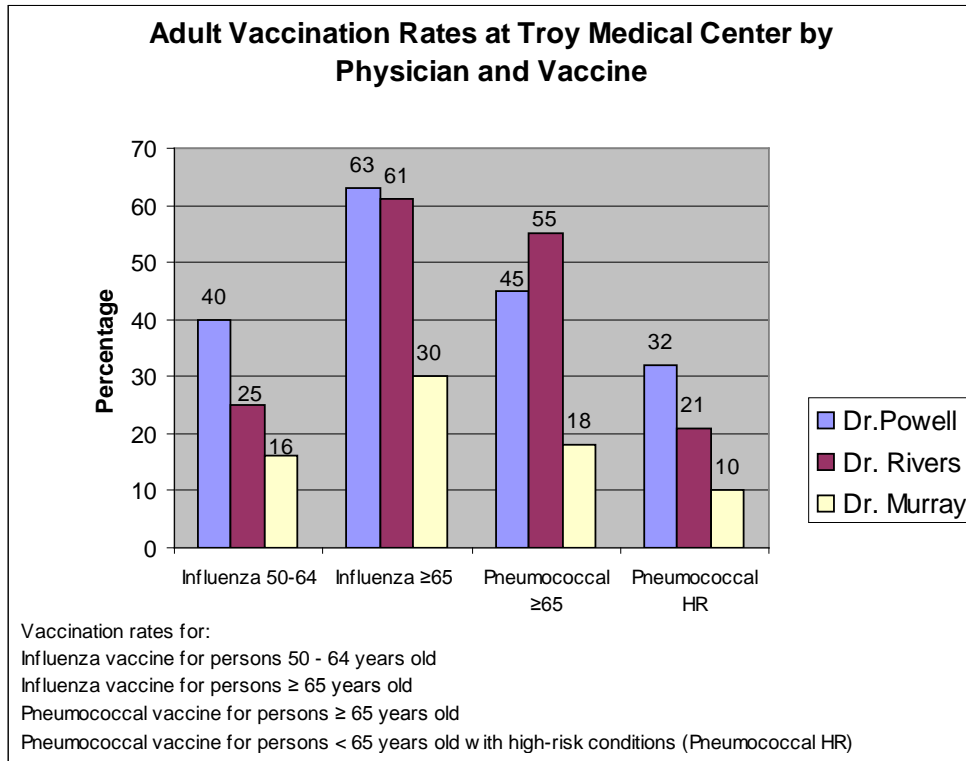
### Learning Aids

1. Figures 2 and 3
2. Abstract

### Questions

1. What are some of the reasons for low vaccination rates?
2. Why do the vaccination rates vary by physician?
3. What can Dr. Powell and the other physicians do to increase vaccination rates, given that many adults do not make appointments for vaccinations? How might ICD codes be used?

Figure 2



**Abstract**

**Generalist and Subspecialist Physicians’ Knowledge, Attitudes, and Practices Regarding Influenza and Pneumococcal Vaccinations for Elderly and Other High-Risk Patients**

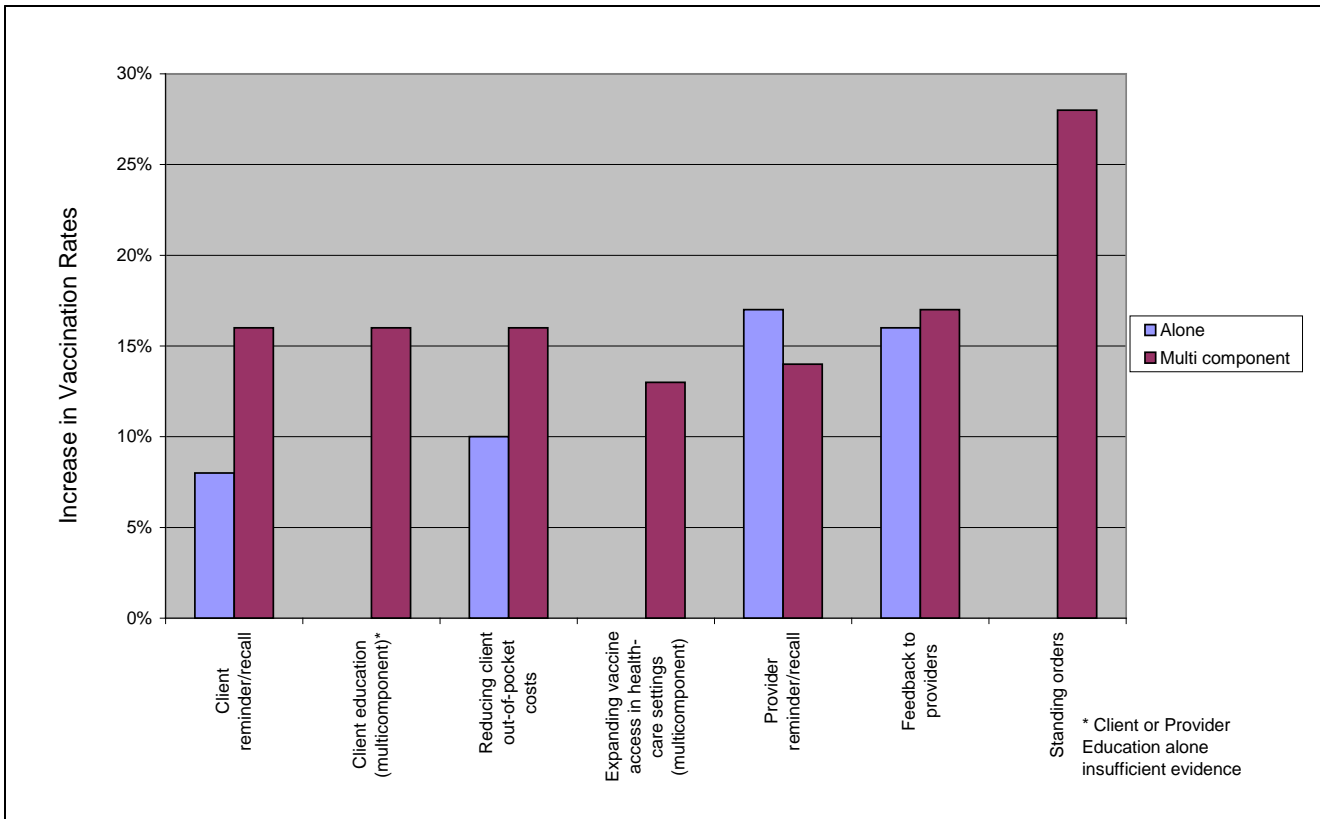
Kristin L. Nichol, MD, MPH, MBA; Richard Zimmerman, MD, MPH

Although most physicians thought that it was very important for their high-risk patients to be current on influenza and pneumococcal vaccinations, only 86% and 75% of generalists and subspecialists, respectively, very strongly recommended influenza vaccinations to their elderly patients. After multivariate logistic regression, factors significantly associated with strongly recommending vaccinations to elderly patients included female sex of provider, the provider having received an influenza vaccination, the provider’s beliefs about vaccine effectiveness and cost-effectiveness, a patient’s risk for illness, and ease of targeting patients. In addition, generalists were more likely than subspecialists to strongly recommend pneumococcal vaccinations to their patients.

Abstracted from *Arch Intern Med.* 2001;161:2702.

Figure 3

Evaluation of Effectiveness of Methods to Increase Vaccination Rates,  
Task Force on Community Preventive Services



### SCENARIO THREE

Margaret, a 19-year-old, is entering college this year and will be staying in a dormitory. Her college requires that her physician certify that her vaccinations are up-to-date. Prior to grade school, she had five doses of diphtheria and tetanus toxoids and pertussis vaccine (DTP), five doses of oral poliovirus vaccine (OPV), and one dose of measles-mumps-rubella vaccine (MMR). Margaret's medical history includes moderate asthma, for which she uses albuterol and steroid inhalers, and chlamydia cervicitis which she contracted from her boyfriend this year. She had varicella (chickenpox) as a child.

#### Learning Aids

1. Abstract
2. Vaccine Information Statements <http://www.cdc.gov/vaccines/pubs/vis/default.htm>
3. Shots from [www.immunizationed.org](http://www.immunizationed.org)

AND/OR

4. Recommended Adult Immunization Schedule -- United States (use latest version).  
<http://www.cdc.gov/vaccines/recs/schedules/adult-schedule.htm>
5. Contraindications to Vaccines Chart  
<http://www.cdc.gov/vaccines/recs/vac-admin/contraindications-vacc.htm>

#### Questions for Learners

1. What vaccination(s) should Margaret receive? What is the indication for each?
2. Vaccine Information Statements should be given to her for which vaccines?
3. Does she have any contraindications to these vaccines? Does she need a pregnancy test prior to vaccination?
4. If Margaret were pregnant, how would that change your vaccination recommendations?

## Abstract

### Vaccine Information Statements

As required under the Public Health Service Act, all healthcare providers who administer any vaccine containing diphtheria, tetanus, pertussis, measles, mumps, rubella, hepatitis A, hepatitis B, *Haemophilus influenzae* type b (Hib), varicella, influenza, meningococcal, pneumococcal conjugate, HPV or polio antigen shall, prior to administration of the vaccine, provide a copy of the relevant vaccine information materials contained in this notice: (a) to any adult to whom such provider intends to administer such vaccine, and (b) to the legal representative of any child to whom such provider intends to administer such vaccine.

Adapted from *Federal Register*, "New vaccine information materials"; notice, [59 FR 31888]; July 20, 1994:31889

**SCENARIO FOUR**

A 62-year-old dentist developed flank pain which he initially attributed to a fall while exercising. The pain is 8 on a 10 scale and is burning in quality. It is worse when touched and radiates on the right side of his thorax. He massaged the area and applied over-the-counter analgesia cream into it, but without effect. Then, the rash appeared (see photograph). He tried acetaminophen and ibuprofen at maximum dosages, but they only provide modest relief. Due to the pain and the accompanying rash, he consulted his physician.

**Learning Aids**

1. Photograph
2. Abstract

**Questions**

1. What is the cause of the pain? How long can it last? Who is most at risk?
2. How could this have been prevented? How well does prevention work?
3. Who should not receive the vaccine against this disease?



Source: CDC, Public Health Information Library (PHIL)

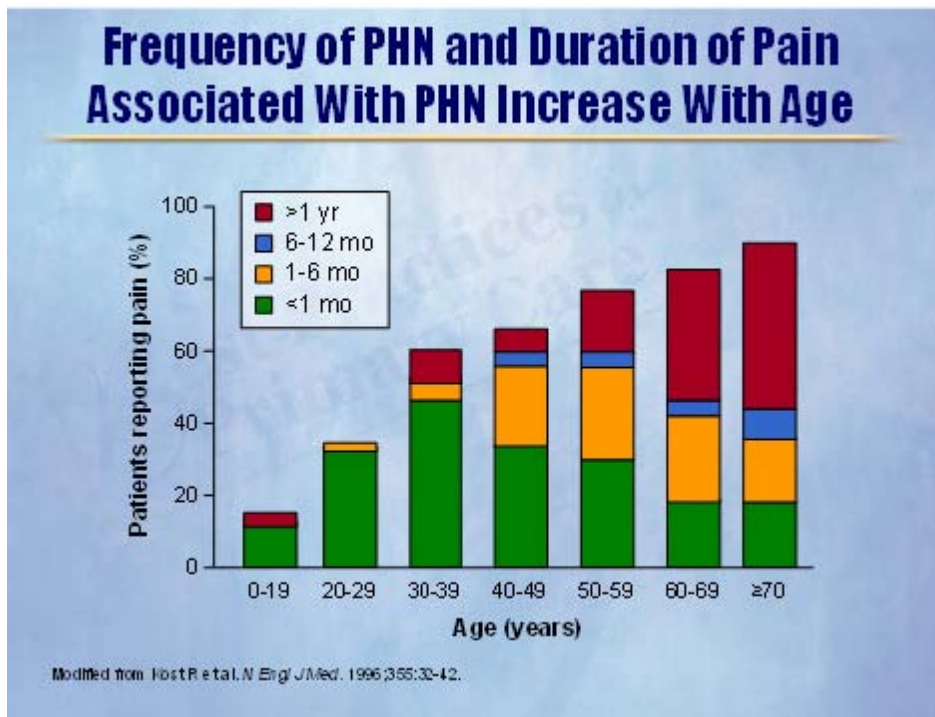
## **Zoster**

### **Herpes Zoster, Post-herpetic Neuralgia, and Zoster Vaccine**

Herpes zoster is unilateral reactivation of the varicella –zoster virus in the dorsal root ganglia in one to three dermatomes, typically in the thoracic or ophthalmic nerve distributions. About 750,000 to 1 million cases of herpes zoster occur annually in the United States, with an overall cumulative lifetime risk of 20% to 30%. The risk of herpes zoster increases with cellular immunosuppression and with age, reaching 50% for those living until age 85. About 15% to 40% of persons with zoster develop complications, including post-herpetic neuralgia, ocular complications or bacterial superinfection. Treatment includes pain relief and oral antiviral agents that are active against the virus (e.g., famciclovir, acyclovir, valacyclovir); steroids are used by some experts.

Post-herpetic neuralgia (PHN) is persistence of the pain after the zoster lesions have healed. It occurs in 10% to 33% of zoster cases for an annual burden of about 100,000 to 330,000 cases in the United States. The risk is higher with advancing age (see Figure 4). Pain exacerbations may be triggered by light touch or occur without any known stimulus. Post-herpetic neuralgia can last a year or longer, as a chronic pain syndrome, and can lead to depression and interference with work and social activities.

Figure 4



Kost, Strauss. N Eng J Med. 1996;355:32-42. Copyright © 1996 Massachusetts Medical Society, used with permission

Herpes Zoster (HZ) vaccine contains a high dose of the Oka/Merck varicella vaccine. In a randomized trial, HZ vaccine reduced the burden of illness by 61% and PHN by 66.5%, even though both the intervention and control groups received valacyclovir and analgesia. According to projections, vaccination of each million persons reduces lifetime outpatient office visits by 274,000 to 325,000 and hospitalizations by 8,800 to 10,100. The CDC recommends 1 dose of HZ vaccine one-time for all persons aged 60 years and older (note: the vaccine is licensed at age 50 and older). Contraindications include history of anaphylaxis to any vaccine component, primary or acquired immunodeficiency, active untreated tuberculosis, immunosuppressive therapy (e.g., high-dose corticosteroid therapy) and pregnancy (which is unlikely in those 60 years of age and older).

**SCENARIO FIVE**

Dr. Hall has just been hired as the Director of Employee Health for New Castle Medical Center. Dr. Hall's predecessor was assigned to other duties after the Medical Center experienced an influenza outbreak. Forty-nine patients and one hundred eighteen employees acquired influenza in the hospital setting and two patients died from complications. Prior to the outbreak, the influenza vaccination rate was 40% for employees.

**Learning Aids**

1. Abstract
2. Influenza Vaccine for Health Professionals  
[www.nfid.org/influenza/health\\_professionals.html](http://www.nfid.org/influenza/health_professionals.html)
3. Recommended Adult Immunization Schedule -- United States (use latest version).  
[www.cdc.gov/vaccines/recs/schedules/adult-schedule.htm](http://www.cdc.gov/vaccines/recs/schedules/adult-schedule.htm)

AND/OR

4. Shots from [www.immunizationed.org](http://www.immunizationed.org)

**Questions**

The president of the medical staff has identified priorities for Dr. Hall. Dr. Hall asks you to assist him in these tasks. Please describe how you would advise Dr. Hall regarding each of these priorities:

1. Decide which vaccines and number of doses are recommended for healthcare workers. Can these vaccines be administered simultaneously?
2. Formulate a plan to vaccinate staff, including physicians, nurses, trainees, and other workers, against influenza prior to the influenza season.
3. Develop a policy on post vaccination testing of healthcare workers who received hepatitis B vaccine.

**Abstract****A comprehensive immunization strategy to eliminate transmission hepatitis B virus infection of in the United States: recommendations of the Advisory Committee on Immunization Practices (ACIP), Part II: Immunization of Adults**  
Centers for Disease Control and Prevention

Postvaccination testing using anti-HBs is recommended for all persons at occupational risk for infection (exposure to blood or blood-contaminated body fluids); students whose professional activities will include blood exposure (e.g., medical, dental, nursing, clinical laboratory, and physician assistant students); immunocompromised persons at continued risk for HBV infection (i.e., hemodialysis patients); sexual partners of persons with chronic HBV infection; and infants born to HBsAg-positive mothers. Testing should be performed 1 to 2 months after completion of the vaccine series, with the exception of infants born to carrier mothers, who should be tested at 9 to 15 months of age. An adequate antibody response to vaccination is  $\geq 10$  mIU/mL. Testing is not indicated after routine vaccination of infants, children, adolescents, or persons at low risk of exposure, e.g., public safety workers and healthcare workers who do not have contact with patients or body fluids.

Revaccination is recommended for persons whose level of anti-HBs is less than 10 mIU/mL when postvaccination testing is done. Such persons should receive three doses on a 0-, 1-, and 6-month schedule or a 0, 1, and 4-month accelerated schedule. Antibody testing should be conducted 1 to 2 months after revaccination. Persons who do not respond after two series (six doses) of hepatitis B vaccine are either (1) primary nonresponders who should be counseled about universal precautions and the need for HBIG if they are exposed, or (2) persons infected with HBV, who should be tested for HBsAg.

**SCENARIO SIX**

Stan, a 65-year-old, started a new career as a veterinarian's assistant in rural Pennsylvania. He is working with small animals as well as livestock. He recalls being vaccinated against polio but recalls no other vaccinations. He did not serve in the military due to a congenital malformation of his left hand. In October, while assisting the veterinarian on a call to a pig farm, Stan cut his finger on a piece of old barbed wire.

**Learning Aids**

1. Abstract
2. Table 2
3. Recommended Adult Immunization Schedule -- United States (use latest version).  
[www.cdc.gov/vaccines/recs/schedules/adult-schedule.htm](http://www.cdc.gov/vaccines/recs/schedules/adult-schedule.htm)

AND/OR

4. Shots from [www.immunization.org](http://www.immunization.org)

**Questions**

1. Given Stan's age and occupation, which vaccinations should he receive?
2. What is the significance of not serving in the military in terms of vaccination?
3. Does Stan need tetanus prophylaxis?

## **Abstract**

### **Vaccines for Veterinarians**

Veterinarians and animal handlers may be at increased risk for infection with rabies or hepatitis A virus.

### **Rabies**

The likelihood of human exposure to a rabid domestic animal in the United States has decreased greatly in the last 50 years because of effective domestic animal vaccination programs. Rabies among wildlife—especially raccoons, skunks, and bats—has become more prevalent, however, and is present throughout all states, with the exception of Hawaii.

In the United States, two types of inactivated rabies vaccine are licensed for pre-exposure and post-exposure use: human diploid cell vaccine and purified chick embryo cell. Both are considered equally safe and efficacious. Adverse reactions to these newer vaccines are less serious and less common than with previously available vaccines.

Pre-exposure vaccination is recommended for veterinarians and animal handlers. Administration of 3 doses (1.0 mL each) of any of the vaccines into the deltoid muscle can be scheduled at 0, 7, and 21 or 28 days. Depending on the risk for rabies in their area, persons with continuous or frequent exposure should have serologic testing done periodically and receive a booster dose if the titer is less than complete neutralization at a 1:5 serum dilution.

For obvious ethical reasons, no controlled trials of rabies vaccine have been conducted in humans, but field experience has demonstrated the effectiveness of post-exposure treatment. No documented human cases of rabies in the United States following appropriately administered prophylaxis have been reported.

Adapted from: Zimmerman RK, Middleton DB: Vaccines for persons at high risk, 2007. JFP 2007 56(2):S38-S46.

**Hepatitis A Virus**

Administration of 2 doses of hepatitis A vaccine in the deltoid muscle is recommended for animal handlers who work with primates potentially infected with hepatitis A virus. If the Havrix® vaccine is used, 2 doses (1.0 mL each) should be administered on a schedule of 0 and 6 to 12 months. If the Vaqta® vaccine is used, 2 doses (1.0 mL each) should be administered on a schedule of 0 and 6 months.

Table 2 Tetanus Wound Prophylaxis

Type of Wound	Previous Tetanus Immunization History		
	Uncertain or < 3 doses		3 or more doses*
	Give Tdap† or Td?	Give TIG?	Give Tdap† or Td? (No TIG needed)
Clean, minor wounds	Yes	No	No, unless > 10 years since previous dose
Wounds contaminated with dirt, feces, or saliva	Yes	Yes	No, unless > 5 years since previous dose
Puncture or missile wounds	Yes	Yes	No, unless > 5 years since previous dose
Burns, frostbite, or crush injury	Yes	Yes	No, unless > 5 years since previous dose

Modified from CDC

Abbreviations: Td = adult tetanus and diphtheria toxoids; Tdap = tetanus toxoid, reduced diphtheria toxoid and acellular pertussis; TIG = tetanus immune globulin

\* If the individual has only 3 doses of the nonadsorbed (fluid) tetanus toxoid, administer a fourth dose of Td or tetanus toxoid. Nonadsorbed (fluid) vaccine was only available as single antigen tetanus toxoid; diphtheria and tetanus toxoids and pertussis vaccine (DTP), Td, and pediatric diphtheria and tetanus toxoids (DT) all use adsorbed preparations.

† Tdap is licensed for persons 10 years of age or older.