

HANDBOOK ON ADULT IMMUNIZATION FOR FILIPINOS *2009*

**PHILIPPINE SOCIETY FOR MICROBIOLOGY
AND INFECTIOUS DISEASES**

WITH THE
PHILIPPINE FOUNDATION FOR VACCINATION

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PREFACE

As with all fields of medicine, the field of vaccinology has enjoyed much growth in the four years since the first edition of this handbook of Adult Immunization was published. New understanding in the pathogenesis of disease, as well as discoveries of new bacterial and viral target sites, coupled with the development of new and novel vaccines, has expanded the horizons of vaccine science.

These have made necessary the publication of a revised, second edition of this handbook. Changes have been made in the outline and format of each chapter. A new, quick-reference appendix has been added, which summarizes all locally available vaccines, as well as dosages and other pertinent information.

Newly introduced vaccines have been added, such as the Tetanus/Diphtheria/acellular Pertussis vaccine. This in turn necessitated the inclusion of a new chapter on Pertussis which will help address the increasing incidence of this disease among both unimmunized, and partially-immunized adults. A new chapter on the Human Papilloma Virus has been added. In addition, the minimum age for routine vaccination with the Pneumococcal Polysaccharide vaccine has been reduced to 50 years.

It remains the hope of this Committee that this handbook will continue to be a useful reference for practicing physicians as they join in the fight against infectious diseases, not just by treating them, but through prevention as well.

REMEDIOS F. CORONEL, MD, FPSMID, FPCP
Chair, Committee on Adult Immunization

FOREWORD

The Adult Immunization Guidelines for Filipinos 2009 updates the previous version with the intent to provide every health care provider as well as every Filipino adult with the latest recommendations on routine immunization for Filipino adults.

Care has been observed by the PSMID Committee on Adult Immunization to review the latest evidence on the safety and efficacy of currently available vaccines. While the committee encourages the users of this handbook to adhere to the recommendations contained therein, the committee also recognizes the manufacturers' special instructions for their products. In which case, health providers are referred to these special instructions when necessary.

The current recommendations will be available as handbooks or other printable forms upon permission by this committee. Please observe existing Philippine copyright laws when using any information contained in this publication.

The Committee is responsible for the contents of the new guidelines. Please refer all your queries and comments to the committee. We hope that besides understanding the immunization guidelines, all of us shall be equitably protected against the priority diseases when we use these vaccines.

ENRIQUE A. TAYAG, MD, FPSMID

MESSAGE FROM THE PRESIDENT

Vaccine preventable infectious diseases continue to be a major public health problem in the country, both in children and in adults. These infections could have been prevented if only vaccination against the viral and bacterial etiologic agents were administered. Unfortunately, adult vaccination is not given as much importance and priority as are infants and children. It is lamentable because adults suffer from the morbidity and complications of these infections, too.

I congratulate the PSMID Committee on Adult Immunization, and the Philippine Foundation for Vaccination (PFV) for spearheading this educational activity on vaccination. They have published the first edition of the Handbook on Adult Immunization for Filipinos in 2004, and is now publishing the revised edition, with updates, and new recommendation for 2009.

I hope that physicians, after reading this important document, will educate, and encourage their patients to follow the recommendation on adult immunization.

Let us all do this – and we will produce a giant step towards eradication of vaccine – preventable diseases.

MA. CECILIA S. MONTALBAN, MD, MSc CTM, FPSMID, FPCP
President
PSMID

GENERAL PRINCIPLES OF VACCINATION

A. IMMUNITY

Ability of the body to tolerate the presence of material indigenous to the body (self) and to eliminate foreign material (non-self). This ability provides protection from infectious diseases. Usually indicated by the presence of antibody. Very specific to a single antigen.

Two basic mechanisms for acquiring immunity.

1. Active Immunity

- Protection produced by the person's own immune system
- usually permanent
- also produced by vaccination

2. Passive Immunity

- protection transferred from another person or animal as antibody
- transplacental most important source in infancy
- usually temporary

Antigen

- A live or inactivated substance (e.g. protein, polysaccharide) capable of producing an immune response

Antibody

- Protein molecules (immunoglobulins) produced by B lymphocytes to help eliminate an antigen

B. CLASSIFICATION OF VACCINES

1. Live Attenuated Vaccines

- attenuated (weakened) form of the " wild " virus or bacteria
- must replicate to be effective
- immune response similar to natural infection
- usually effective with one dose
- severe reactions possible

- interference from circulating antibody
- unstable

Examples:

Viral	Measles, Mumps, Rubella, Varicella, Yellow fever, oral Polio, Influenza nasal spray
Bacterial	BCG, oral typhoid

2. Inactivated Vaccines

- NOT live and cannot replicate
- minimal interference from circulating antibody
- generally NOT as effective as live vaccines
- generally requires 3-5 doses
- immune response mostly humoral
- antibody titer falls over time

Examples:

Whole cell vaccines

Viral ..	Influenza, Polio, Rabies, Hepatitis A
Bacterial ..	Pertussis, Typhoid, Cholera

Fractional vaccines

Subunit ..	Hepatitis B, Influenza, Acellular Pertussis, Typhoid Vi
Toxoid ..	Diphtheria, Tetanus

Polysaccharide Vaccines

Conjugate polysaccharide ..	H. influenzae type b, pneumococcal
Pure polysaccharide ..	Pneumococcal, Meningococcal, H. influenzae type b

Pure polysaccharide vaccines

- Not immunogenic in children < 2 yrs. of age
- no booster response
- antibody with less functional activity
- immunogenicity improved by conjugation

Recombinant Vaccines

Genetically engineered . . Hepatitis B, Typhoid (TY 21 a)

C. TIMING AND SPACING OF VACCINES

1. Interval between receipt of antibody containing blood products and measles vaccine.
 - Inactivated antigens are NOT substantially affected by circulating antibody, so that they can be administered before, after, or at the same time as the antibody.
 - All live vaccines must replicate in order to cause an immune response, so that antibody against live injected vaccine antigen may interfere with replication.
 - If the live vaccine is given first, it is necessary to wait for AT LEAST 2 WEEKS before giving the antibody.
 - If the interval between the vaccine and antibody is less than 2 weeks, the recipient should be tested for immunity or the vaccine dose should be repeated.

ANTIBODY AND LIVE VACCINES

Product given first	Action
Vaccine Antibody (blood / bld products, immune globulin)	Wait 2 weeks before giving the antibody Wait > 3 months before giving the vaccine

- There is NO contraindication to the simultaneous administration of any vaccines.
 - Individual vaccines should NOT be mixed in the same syringe unless they are licensed for mixing by the FDA.
2. Spacing of vaccine combinations not given simultaneously

Combination	Minimum Interval
Two live injected All other	4 weeks None

3. Spacing of live vaccines not given simultaneously:
 - If two live parenteral vaccines are given < 28 days apart, the vaccine given second should be repeated.
 - Exception is yellow fever vaccine given < 28 days after measles vaccine.

4. Interval between doses of the same vaccine
 - Increasing the interval between doses of a multi-dose vaccine does NOT diminish the effectiveness of the vaccine.
 - Decreasing the interval between doses of the multi-dose vaccine may interfere with antibody response and protection.
5. Minimum Intervals and Ages
 - Vaccine doses should NOT be given at intervals less than the minimum intervals or earlier than the minimum age.
6. Extended Intervals
 - It is NOT necessary to restart the series of any vaccine due to extended intervals between doses.
7. Number of Doses
 - Live attenuated vaccines generally produce lasting immunity with a single dose.
 - Inactivated vaccines require multiple doses and may require periodic boosting to maintain immunity.

A. ADVERSE EVENT FOLLOWING VACCINATION (AEFI)

- Adverse event following immunization is any event that follows immunization that is “believed to be caused by the immunization”.
- Can either be true vaccine reaction or coincidental event or due to human or program error.
- Local
 - pain, swelling, redness at the site of injection
 - common with inactivated vaccines
 - usually mild or self limited
- Systemic
 - fever, malaise, headache
 - nonspecific
 - may be unrelated to vaccine

- Allergic
 - due to vaccine or vaccine component
 - rare
 - risk minimized by screening

B. CONTRAINDICATIONS AND PRECAUTIONS TO VACCINATION

- A contraindication is a condition in a recipient which greatly increases the chance of a serious adverse reaction.
 - Example: administering influenza vaccine to a person with a true anaphylactic allergy to egg could cause serious illness or death in the recipient.
- A precaution is a condition in a recipient which may increase the chance or severity of an adverse event, or may compromise the ability of the vaccine to produce immunity.
 - Example: administering measles vaccine to a person with passive immunity to measles from a blood transfusion.
- Permanent Contraindications to Vaccination
 - severe allergy to a prior dose of vaccine or to a vaccine component
 - encephalopathy following pertussis vaccine

Contraindications and Precautions

Condition	Live	Inactivated
• Allergy to vaccine component	C	C
• Encephalopathy	—	C
• Pregnancy	C	V
• Immunosuppression	C	V
• Severe illness	P	P
• Recent blood product	P	V

C-contraindication P- precaution V- vaccinate if indicated

- Immunosuppression
 - Live vaccines can be given after chemotherapy has been discontinued for at least 3 months.
 - Persons receiving large doses of corticosteroids should NOT receive live vaccines.

- ≥ 20 mg of prednisone per day
- ≥ 2 mg/kg per day of prednisone
- NOT contraindicated with steroids given via aerosols, topical, alternate day, short courses
- Recent Blood Products
 - Varicella and MMR vaccines should be given 14 days prior to the blood product, or delayed until the antibody has degraded.
 - If MMR is given sooner than the minimum interval (3-7 months depending blood product) the recipient should be tested for immunity or the dose repeated after the appropriate interval.

C. INVALID CONTRAINDICATIONS TO VACCINATION

- mild illness
- disease exposure or convalescence
- antibiotic therapy
- pregnancy in the household
- breastfeeding
- allergies to products in the vaccine
- premature birth
- family history unrelated to immunosuppression
- need for TB skin testing
- need for multiple vaccines
- minor illness- low grade fever, upper respiratory tract infection, otitis media
- mild diarrhea

D. SCREENING FOR CONTRAINDICATIONS AND PRECAUTIONS TO VACCINATION

- Screening questions
 - allergies to food or medications?
 - any problem after the last shot?
 - any problem with the immune system?
 - any blood products received in the last year?
 - are you pregnant or trying to be pregnant?

E. HANDLING AND STORAGE

See sections on individual vaccines



VACCINES

CHOLERA

A. THE DISEASE

Cholera is an acutely dehydrating, watery diarrheal disease, that can produce electrolyte imbalance, severe dehydration and shock. A case fatality rate of > 5% may occur with delayed or inappropriate treatment.

Etiologic Agent

- *Vibrio cholerae*
- In the Philippines – Serotype OGAWA and INABA
– Biotype Classic and El Tor

Epidemiology

- Endemic in developing countries where sanitation is poor
- Outbreaks occur occasionally in the Philippines
- Sporadic cases very rare

Transmission

- Fecal-oral route: consumption of contaminated food or drink

Clinical Features

- Incubation period: several hours to 5 days; usually 2 – 3 days
- Acute intestinal infection
- Severe explosive diarrhea, (rice water stools)
- Profound dehydration
- Copious, projectile vomiting
- Significant electrolyte loss/imbalance
- Hypotension may occur in 4-12 hours
- Death may occur in 18 hours to several days

B. THE VACCINE

General Description

- Heat/formalin inactivated *Vibrio cholerae* of Inaba and Ogawa, classic and E1 Tor strains – in 3 ml oral suspension

- Sodium hydrogen carbonate 5-6 grams – 1 sachet – effervescent buffer

Indications

Routine

- Not given routinely
- For travelers visiting areas with on going epidemics/ outbreaks

Special Situations

- Persons living in highly endemic areas in unsanitary conditions without access to medical care
- Persons with compromised gastric defense mechanisms (achlorydia, prior ulcer surgery, on antacid treatment) visiting cholera risk areas
- For Refugees where cholera is known to be at risk

Vaccine Storage and Handling

- Store at +2°C to 8°C (refrigerator)
- Do not freeze
- After reconstitution, should be drunk in 2 hours

C. SIDE EFFECTS

- Gastrointestinal symptoms – upset stomach

D. PRECAUTIONS AND CONTRAINDICATIONS

Precautions

- Postpone vaccination in case of acute illness
- Avoid food and drink 2 hours before and 1 hour after vaccination

Contraindications

- Cannot be given to children below 2 years of age
- Pregnancy and to lactating mothers

REFERENCES:

1. Sack, D.A; Lang, D.R – Cholera Vaccines in Vaccines 4th edition p.905-917

VIRAL HEPATITIS, TYPE A

A. THE DISEASE

- Infection with Hepatitis A virus (HAV) is common (high endemicity) in developing countries, where it is frequently acquired during early childhood and usually with mild symptoms. In developed countries, HAV infection is less common.
- Hepatitis A is one of the common vaccine-preventable infections acquired during travel. The risk for infection increases with duration of travel and is highest for those who live in or visit rural areas, or frequently eat or drink in areas with poor sanitation. Nevertheless, many cases of travel-related hepatitis A occur in travelers to developing countries with presumably hygienic practices that comply with standard procedure.

Etiologic Agent

- Hepatitis A virus (HAV), a hepatotropic picornavirus
- Stable at low pH (it can survive gastric acidity)

Epidemiology

- World-wide distribution
- Prevalence of previous infection is directly related to age, socioeconomic status, and the general level of public sanitation.

Transmission

- Via the fecal-oral route, usually through direct person-to-person contact;
- Through exposure to contaminated water, ice, or shellfish harvested from sewage-contaminated water;
- From fruits, vegetables, or other foods that are eaten uncooked and that were contaminated during harvesting or subsequent handling.

Clinical Features

- Incubation period averages 28 days (range 2-6 weeks)
- Symptoms usually appear about 4 weeks after exposure
- Acute illness lasts from 1 to 3 weeks, followed by a period of prolonged convalescence
- Most common symptoms include fever, malaise, anorexia, nausea, and abdominal discomfort, followed within a few days by jaundice and dark urine
- Enzyme elevations may persist for weeks
- Chronic hepatitis does not follow the acute illness

B. THE VACCINE

General Description

- Inactivated Hepatitis A virus adsorbed to aluminum hydroxide as adjuvant, administered intramuscularly in the deltoid muscle

Indications

Routine

- In areas with high prevalence of Hepatitis A (e.g. Asia), susceptible individuals at risk of exposure:
 - Travelers
 - Armed forces
 - Persons for whom Hepatitis A is an occupational hazard
 - Homosexuals
 - IV drug users
 - Persons with multiple sexual partners
 - Contacts of infected persons
 - People who work with hepatitis A virus in research settings
 - People who work with infected non-human primates
 - Recipients of clotting factor concentrates
 - People with chronic liver disease (because of risk of fulminant hepatitis A).

Vaccine Storage and Handling

- Vaccine must be stored at +2°C to +8°C. Do not freeze; discard if vaccine has been frozen.

C. SIDE EFFECTS

- Local adverse events include injection site soreness, induration, redness & swelling
- Systemic adverse events reported include headache, malaise, fatigue, fever, nausea, & loss of appetite

D. PRECAUTIONS AND CONTRAINDICATIONS

- Hypersensitivity to any component of the vaccine (i.e. 2-phenoxyethanol, yeast)
- Should not be administered to subjects with severe febrile illness
- Should be used during pregnancy only when clearly needed. The effect of Havrix on fetal development has not been assessed.

However, as with all inactivated viral vaccines, the risks to the fetus are considered to be negligible).

- Vaccine should be used with caution in breastfeeding women. (The effect on breastfed infants of the administration of the vaccine to their nursing mothers has not been evaluated in clinical studies).
- As with all biologicals, a solution of 1 in 1,000 adrenaline should be readily available for immediate use in case of anaphylaxis.
- Vaccine should be administered with caution in subjects with bleeding disorders since bleeding may occur following an intramuscular injection.

E. THE ROLE OF PASSIVE IMMUNIZATION

Hepatitis A Immune globulin

- May be indicated for health care personnel who are not immune and exposed to feces of infected persons during outbreaks
- In the case of travel within 4 weeks of vaccine administration, a dose of immune globulin (0.02 mL/kg) may be given alone or in addition to hepatitis A vaccine, at a different site, for optimal protection.

Recommended doses of immune globulin (IG)* for protection against Hepatitis A

SETTING	DURATION OF COVERAGE	DOSE (mL/kg)
Pre-exposure	Short-term (1–2 mos)	0.02
	Long-term (3–5 mos)	0.06
Post-exposure	---	0.02

*IG should be administered by intramuscular injection into the deltoid or gluteal muscle.

REFERENCES

CDC. Prevention of hepatitis A through active or passive immunization: recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR Morbid Mortal Wkly Rep. 2006; RR 55:1-23.

Reese Richard E., Betts Robert F. A Practical Approach to Infectious Diseases. 1996:452- 455

Stanley M. Lemon & Stephen P. Day. Type A Viral Hepatitis (In Infectious Diseases. Eds.

Gorbach SL, Bartlett JG, Blacklow NR.) W.B Saunders Company 1992:705-709

Stephen P. Day & Stanley M. Lemon. Hepatitis A Virus. (In Infectious Diseases. Eds. Gorbach SL, Bartlett JG, Blacklow NR.) W.B Saunders Company 1992:1787- 1791

SmithKline Beecham Biologicals s.a. (Product insert)

VIRAL HEPATITIS, TYPE B

A. THE DISEASE

The prevalence of Hepatitis B Virus (HBV) infection is high (>8%) in all socioeconomic groups in the Philippines. The risk of HBV infection for travelers is generally low. Modes of HBV transmission that are important for travelers to consider are unprotected sex, sharing illegal drug injection equipment, contaminated equipment used for health care-related procedures or blood transfusions from unscreened donors.

Etiologic Agent

- Hepatitis B virus (HBV)

Epidemiology

- Occurs throughout the world with highly variable prevalence.
- Occurs very early in life in most areas of high prevalence, including the Philippines.

Transmission

- Contact transmission in unprotected sex with an HBV-infected partner
- Percutaneous transmission in drug abusers
- Accidental needlestick injury or work exposure to blood/body fluids
- Maternal-neonatal during labor or delivery
- Via blood transfusion

Clinical Features

- Incubation period 60-90 days (range 30-180 days)
- Symptomatic hepatitis: gastrointestinal symptoms with or without flu-like symptoms (mild fever, malaise, fatigue, weakness, nausea, anorexia; fulminant liver failure)
- 16-20% incidence of serum sickness-like illness with urticaria, skin rash, or arthralgias
- Some patients develop frank arthritis, arteritis, or glomerulonephritis that is caused by HBsAg-antibody complexes

- Chronic carrier state often asymptomatic but can lead to chronic liver disease, cirrhosis, and liver cancer.

B. THE VACCINE

General Description

Monovalent Hepatitis B vaccine uses recombinant DNA technology to express HBsAG in yeast, and purified from cells by biochemical and bio-physical separation techniques.

Indications

Routine

- Universal immunization of all infants, adolescents and adults

Special Situation

- Strongly recommended for individuals who are at increased risk of exposure:
 1. Health care personnel
 2. Patients receiving frequent blood transfusions or clotting factor concentrates
 3. Organ transplant recipients
 4. Thalassaemics, sickle-cell anemic, cirrhotic and hemophiliacs, etc.
 5. Personnel and residents of institutions
 6. Persons at increased risk due to their sexual practices (persons with multiple sexual partners, patients with STD, prostitutes, homosexually active males)
 7. Illicit users of addictive injectable drugs
 8. Travelers to high endemicity areas
 9. Infants born of mothers who are carriers
 10. Police, brigade, and armed forces personnel
 11. Household contacts of any of the above groups
 12. College entrants to healthcare associated courses

Vaccine Storage and Handling

- Vaccine must be stored at +2°C to +8°C. Do not freeze; discard if vaccine has been frozen.

C. SIDE EFFECTS

- Local reactions are characterized by transient soreness, erythema & induration.
- Systemic early onset events temporally related to vaccination include:
 1. fatigue, dizziness, syncope, hypotension, arthritis, arthralgia, lymphadenopathy, rash and urticaria
 2. influenza-like symptoms, such as low-grade fever, malaise, headache, myalgia
 3. gastrointestinal upsets, such as abdominal pain, diarrhea, vomiting, nausea and abnormal liver function tests
 4. neurological manifestations include rarely paresthesia and extremely rarely paralysis, neuropathy, and neuritis (including Guillain-Barre syndrome, multiple sclerosis and optic neuritis)
 5. severe skin disorders such as erythema multiforme

D. PRECAUTIONS AND CONTRAINDICATIONS

- Hypersensitivity to any component of the vaccine, including yeast
- Should not be administered to subjects with severe febrile infection
- General vaccination of pregnant women cannot be recommended because the effect of the antigen on fetal development is unknown. However, neither pregnancy nor lactation should be considered a contraindication for vaccination.
- The effect on breastfed infants of the administration of the vaccine to their mother has not been evaluated in clinical studies.
- As with all injectable vaccines, a solution of 1 in 1,000 adrenaline should always be readily available for immediate use in case of a rare anaphylactic reaction.

E. THE ROLE OF PASSIVE IMMUNIZATION

Hepatitis B Immune globulin

- Immunobiologics and schedules for which post-exposure prophylaxis may be indicated for HBV-susceptible health

care personnel with percutaneous or mucous-membrane exposure to blood known to be HbsAg seropositive or persons with IgA deficiency:

- One IM dose IG 0.02 ml/kg given within 2 weeks of exposure in large muscle mass (deltoid, gluteal)
- HBIG 0.06 ml/kg IM as soon as possible (and within 7 days) after exposure (with dose 1 of hepatitis B vaccine given at different body site); if hepatitis B series has not been started, 2nd dose of HBIG should be given 1 month after 1st dose
- Do not administer within 2 weeks after MMR or within 3 weeks after varicella vaccine

REFERENCES

CDC. A Comprehensive Immunization Strategy to Eliminate Transmission of Hepatitis B Virus Infection in the United States. Recommendations of the Advisory Committee on Immunization Practices (ACIP) Part 1: Immunization of Infants, Children, and Adolescents. MMWR Morbid Mortal Wkly Rep. 2005;54(RR16);1-23.

CDC. Provisional Recommendations for Hepatitis B Vaccination of Adults—October 2005. Available at: http://www.cdc.gov/nip/recs/provisional_rec/hepB_adult.pdf. Accessed 31 October 2006.

Stanley M. Lemon & Stephen P. Day. Type A Viral Hepatitis (In Infectious Diseases. Eds. Gorbach SL, Bartlett JG, Blacklow NR.) W.B Saunders Company 1992:709-714.

Reese Richard E., Betts Robert F. A Practical Approach to Infectious Diseases. 1996:455-460.

Engerix B (Product insert)

Hepacine (Product insert)

HUMAN PAPILLOMA VIRUS

A. THE DISEASE

Human Papilloma Virus infection is the most common sexually transmitted infection which infects the skin and mucous membranes of the genital areas of men and women. Forty types have been consistently associated with cancer of the cervix, vulva, vagina, penis, anus, head, neck and respiratory tract.

Etiologic Agent

- Small, non-enveloped, double-stranded DNA virus
- More than 100 types have been identified based on the genetic sequence of the outer capsid protein L1
- 40 types infect the mucosal epithelium
- HPV types are categorized according to their epidemiologic association with cervical cancer
- Low-risk or non-oncogenic types, types 6 and 11,(90%) cause benign or low-grade cervical cell abnormalities, anogenital warts, and laryngeal papillomas
- High-risk or oncogenic types, types 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 68, 69, 73, 82,(99.7%) cause low-grade cervical cell abnormalities, high-grade cervical cell abnormalities that are precursors to cancer, and anogenital cancers
- High-risk types are detected in 99.7% of cervical cancers
- Type 16 cause 50% of the cervical cancer worldwide
- Types 16 and 18 account for 70% of cervical cancers

Epidemiology

- Occurs worldwide
- Humans are the only reservoir.
- The risk of acquiring HPV infection is 50% during one's lifetime
- More than 80% of sexually active women will have been infected by age 50.
- Globally, there were 300 million asymptomatic infections, 30 million low-grade cervical lesions, 30 million genital

warts, 10 million high grade precancerous lesions, and 0.4932 million cervical cancer in 2002 (WHO).

- Cancer of the cervix is the second most common cancer among women worldwide
- 80% occur in developing countries

In the Philippines

- Cervical cancer incidence has remained unchanged from 1980 – 2005: 22/100,000 women and 56% die within 5 years.
 - 2/3 of cervical cancer are diagnosed in an advanced stage
 - Types 16, 18 and 45 are the most frequently isolated types in cervical cancer lesions
- Genital warts prevalence is at 0.2%
 - primary goal of treatment is removal, however treatment does not eliminate the infection
 - if untreated, 40% spontaneously resolve.
 - if treatment is performed, recurrence rate is 5%-65% within 3 months of successful treatment.

Transmission

- Sexual Contact
 - genital-genital
 - manual-genital
 - oral-genital
- Nonsexual routes
 - Mother-to-infant
 - Fomites

Risk Factors

- High parity
- Oral contraceptives
- Smoking
- HIV infection
- Co-infection with other sexually transmitted diseases
- Diet

- Endogenous hormones
- Genetic

Clinical Features

- Most infections are asymptomatic and result in no disease.
- Clinical manifestations of HPV infection include:
 - ano-genital warts
 - recurrent respiratory papillomatosis
 - cervical cancer precursors
 - cancers of the cervix, anus, vaginal, vulvar, penile, and some head and neck cancer

B. THE VACCINE

General Description

- There are 2 available HPV vaccines
 1. Quadrivalent HPV vaccine
 - contains types 6, 11, 16, 18 L1 capsid protein, virus-like particles
 - manufactured in yeast, *Saccharomyces cerevisiae*
 - adjuvanted with proprietary amorphous aluminum hydroxyphosphate sulfate
 - schedule of vaccination – 3 doses within 6 months at 0, 2, 6 months IM deltoid
 - for the prevention of cervical, vulvar and vaginal cancers and genital warts
 2. Bivalent HPV vaccine
 - contains types 16 and 18 L1 capsid protein, virus-like particles
 - manufacture in insect cells, Baculovirus
 - adjuvanted with ASO4 -aluminum hydroxide plus monophosphoryl lipid A derive from *Salmonella minnesota*
 - schedule of vaccination – 3 doses within 6 months at 0, 1, 6 months IM deltoid for the prevention of cervical cancer

- Minimum intervals for both vaccines are;
 - 4 weeks between doses 1 and 2
 - 12 weeks between doses 2 and 3
- Do not restart the series if the schedule is interrupted.
- Administer at the same visit other age-appropriate vaccines.

Indications

Routine

- Both Quadrivalent and Bivalent HPV vaccines are routinely given to adolescents males and females 10 years to less than 19 years

Catch-up Vaccination

- Quadrivalent HPV vaccine for women 19 to 45 years
- Bivalent HPV vaccine for women 19 to 55 years
- Both vaccines have no current recommendation for adult males.
- Both vaccines do not require prior screening before administration of the vaccine. However, routine screening should be continued even after vaccination as there are other types of HPV that can cause cervical cancer.

Special Situations

- Vaccines can be administered to :
 - Equivocal or abnormal Pap smear
 - Positive HPV DNA test
 - Genital warts
 - Immunosuppression
 - Breastfeeding

C. SIDE EFFECTS

- Local reactions-84% mostly pain and swelling
- Fever-10%
- No serious adverse reactions reported

D. PRECAUTIONS AND CONTRAINDICATIONS

Precaution

- Moderate or severe acute illnesses(defer until symptoms improve)
- If a woman is found pregnant after initiation of the vaccine series, remaining doses should be delayed until after the pregnancy.
- If a vaccine has been administered during pregnancy, there is no indication for intervention.

Contraindication

- Severe allergic reaction to a vaccine component or following a prior dose

Storage and Handling

- Store at +2°C to +8°C.
- Do not expose to freezing temperature
- Protect from light
- Administer immediately after removing from refrigeration

REFERENCES

Castellsaque X, Munoz N., J. Natl Cancer Inst. Monodr. 2003; 31:20-28

CDCQuadrivalent human papillomavirus vaccine Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 2007; 56(RR-2):1-24

Ferlay J, Bray F, Pisani P, Parkin DM. Lyon, France: IARC Press 2004

Kodner CM, Nasraty S Am Fam Physician 2004; 70(12) 2335-2342, 2345-2346

Laudico A, Esteban D, Redaniel T et al. Phil. Cancer Facts and Estimates 2005, Publication by the Phil. Cancer Society Inc.

Ngelangel et al, J Natl Cancer Inst 1998; 90: 43-9

MMWR March 23, 2007 No.53

Munoz N et al *Int J Cancer* 2004;111: 278-85

Parkin DM, Bray F, Ferlay J, Pisani P. *CA Cancer J Clin* 2005; 55:74-108
American Academy of Pediatrics Report of the Committee of
Infectious Diseases Red Book 2006 HPV infection pp. 473-477;
Meningococcal infection pp. 452-460

Trotter H, Franco E. The epidemiology of genital human
papillomavirus infection *Vaccines* 2006; 24(suppl):51-65

Villa LL, Costa RL, Petta CA, et al *Lancet Oncol* 2005;6:671-678

Wiley DJ, Douglas J, Beutner K, et al *Clin Infect Dis* 2002;35(suppl 2) :
S210-S224

WHO Office of Information WHO Features 1990;152:1-6

INFLUENZA

A. THE DISEASE

A disease characterized by upper respiratory tract symptoms and fever, which is caused by a constantly mutating virus, resulting in repeated episodes of the illness.

Etiologic Agent

- Influenza Virus
- 3 Virus Strains
 - Type A – moderate to severe illness
 - Type B – milder illness
 - Type C – rare

Epidemiology

- Occurs worldwide
- In the Philippines, it occurs year-round, with peaks in July to October

Transmission

- Droplet inhalation
- Occasionally, through indirect contact

Clinical Features

- Incubation Period: 1-3 days
- Causes fever, chills, myalgia, cough and sore throat
- Complications: pneumonia, which may lead to death in immune-compromised individuals

B. THE VACCINE

General Description

- An inactivated virus vaccine containing 3 strains (2 type A and 1 type B); updated yearly
- For the Philippines, current recommendations now state that the formulation for the Southern Hemisphere be used.

Indication

Routine

- Individuals > 50 years of age
- Anyone who wants to reduce the chance of falling ill with influenza
- International travelers
- Persons providing essential services
- Students or other persons in institutional settings

Special Situations

- Persons at High Risk for Severe Flu or Complications:
 1. Residents of chronic care facilities and nursing homes
 2. Those with chronic cardiovascular disorders (hemodynamically significant cardiac disease).
 3. Those with chronic pulmonary diseases (including asthma)
 4. Those with chronic disorders:
 - a. Diabetes
 - b. Other chronic metabolic diseases
 - c. Renal Dysfunction
 - d. Hemoglobinopathies
 5. Those who are immunosuppressed:
 - a. HIV/AIDS
 - b. Immunosuppressed due to medications
 6. Those pregnant in the 2nd or 3rd trimester
- Those who can transmit influenza to those at risk for complications:
 1. Household members of persons in high-risk groups
 2. Physicians, nurses and other health-care workers who come in contact with patients
 3. Health-care workers in nursing homes and chronic care facilities who come in contact with patients

Pre-exposure immunization

- A single dose given intramuscularly, once every year

Vaccine Storage & Handling

- Store at refrigerator temperature (+2°C to +8°C). Vaccine must not be frozen.
- Ship in insulated containers with coolant packs.

C. SIDE EFFECTS

- Most frequent: Soreness at the injection site
- Fever, malaise and muscle pain are very uncommon; allergic reactions may occur

D. PRECAUTIONS AND CONTRAINDICATIONS

- An immediate anaphylactic reaction to a previous dose of influenza vaccine
- Moderate to severe illness with or without a fever
- Age < 6 months
- Active neurologic disorder or a history of developing neurologic symptoms or illness following a previous dose
- History of Guillian-Barre Syndrome

REFERENCES

CDC. Prevention and Control of Influenza: Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 2008; 57 (No. RR-7).

World Health Organization. Recommendations for Influenza Vaccines. WHO 2007.

Williams et al. Epidemiology and Prevention of Vaccine-Preventable Diseases. CDC 2006.

MEASLES, MUMPS, RUBELLA

A. THE DISEASE

Measles is an acute viral infectious disease. It is a common and fatal disease in developing countries. Measles is a systemic infection with a prodrome of fever, cough, coryza and conjunctivitis lasting 2-4 days, followed by a characteristic maculopapular rash that proceeds downward and outward. Complications include diarrhea, otitis media, pneumonia, and encephalitis.

I. MEASLES

Etiologic Agent

- A paramyxovirus, genus Morbillivirus

Epidemiology

- Occurs worldwide
- Complications are more common among children <5 years and adults 20 years of age and older
- Highest morbidity and mortality in children 1-2 years of age.
- In the Philippines, there has been a decreasing incidence of measles (see appendix A)

Transmission

- Person to person through large respiratory droplets
- Airborne transmission has been documented in closed areas for up to 2 hours after a person with measles occupied the area
- Highly communicable

Clinical Features

- An acute viral infectious disease with an incubation period 10-12 days
- Fever, coryza, cough, conjunctivitis, Koplik spots, maculo-papular rash lasting 5-6 days appearing initially on the face proceeding downward and outward

- Complications: diarrhea, otitis media, pneumonia, encephalitis, seizure, death

II. MUMPS

Etiologic Agent

- Mumps virus, a paramyxovirus

Transmission

- airborne or direct contact with infected droplet or saliva

Epidemiology

- Occurs worldwide
- Most common among younger school-aged children 5-9 yrs

Clinical Features

- Incubation period is 14-18 days
- Prodromal symptoms are nonspecific and include: myalgia, anorexia, malaise, headache and low-grade fever
- Parotitis occurs in 30-40%, may be unilateral or bilateral, with single or multiple salivary glands affected
- Complications: aseptic meningitis, orchitis, oophoritis, deafness, encephalitis, pancreatitis

III. RUBELLA

Etiologic Agent

- A togavirus, genus Rubivirus

Transmission

- Person to person via airborne droplets from respiratory secretions of infected persons

Epidemiology

- Worldwide in distribution
- 10-20% of young adults are still susceptible

Clinical Features

- Incubation period varies from 12-23 days
- Symptoms are mild, upto 50% of infections may be subclinical or inapparent
- In children, rash lasting for 3 days, may be the only manifestation
- In older children and adults, presents with low-grade fever, malaise, lymphadenopathy and upper respiratory symptoms preceding the rash
- Other manifestations include lymphadenopathy (postauricular, posterior cervical and suboccipital), auralgia, arthritis, conjunctivitis, testalgia or orchitis
- Infection during the first trimester of pregnancy may lead to Congenital Rubella Syndrome

B. THE VACCINE

General Description

- Measles Vaccine is a live further attenuated strain. The Moraten strain was licensed in 1968 and causes fewer reactions
- Mumps vaccine is a live attenuated mumps virus vaccine
- Rubella vaccine (RA 27.3) is a live attenuated virus

Indications

Routine

- Measles – 9 months old
- MMR
 - 1st Dose – at 12-15 months of age
 - 2nd dose at 4-6 years
 - Adolescents and adults: 2 doses, 1 month apart
 - Anytime at least 4 weeks after the first dose

Special Situations

- Given to adolescents and adults without documented evidence of measles, mumps and rubella immunity
- Rubella vaccine for non-pregnant women of childbearing age

- For health care personnel and international travelers without evidence of immunity

Post-exposure prophylaxis

- Measles vaccine/ MMR may prevent measles if given within 72 hours of exposure

Vaccine Storage and Handling

- Must be shipped with refrigerant to maintain 10°C (50°F) or less at all times
- Refrigerated immediately and protected from light at all times
- Stored at refrigerator temperature +2°C to +8°C (35-45°F), but may be frozen
- After reconstitution, store in a refrigerator and should be used immediately or discarded after 8 hours

C. SIDE EFFECTS

- Adverse reactions following measles vaccine (except allergic reactions) represent replication of measles vaccine virus with subsequent mild illness. These events occur 5-12 days postvaccination and only occur in persons who are susceptible to infection. There is no evidence of increased risk of adverse reactions following MMR vaccination in persons who are already immune to diseases
- Fever is the most common adverse reaction, 5-15% of susceptible persons develop fever usually occurring 7-12 days after vaccination and generally lasting 1-2 days
- Transient rash, usually appearing 7-10 days has been reported in 5% of vaccines
- Rarely, thrombocytopenia, parotitis, lymphadenopathy, arthralgias
- Allergic reactions following vaccination are rare. Most of these reactions are minor and consist of a wheal and flare or urticaria at the injection site

D. PRECAUTIONS AND CONTRAINDICATIONS

- Persons with severe allergy (i.e., hives, swelling of the mouth or throat, difficulty breathing, hypotension, and shock) to gelatin or ncomycin or who have had a severe allergic reaction to a prior dose of MMR, should not be vaccinated with MMR
- Pregnant women should NOT receive measles vaccine. Pregnancy should be avoided for 1 month following receipt of measles vaccine/MMR vaccine
- Patients who are severely immunocompromised for any reason should not be given MMR vaccine
- Persons receiving large daily doses of corticosteroids (>2mg/kg per day or >20 mg per day of prednisone) for 14 days or more should NOT receive MMR
- Persons with moderate/severe acute illness should not be vaccinated until the illness has resolved
- Receipt of antibody-containing blood products (e.g., immune globulin, whole blood or packed red blood cells, intravenous immune globulin) may interfere with seroconversion to measles

E. THE ROLE OF PASSIVE IMMUNIZATION

- Immune globulin may prevent or modify the disease in measles but has no role in mumps and rubella
- May be given in household contacts younger than 1 year of age
- Should be given within 6 days of exposure
- Dose
 - 0.25ml/kg (max. 15ml)per IM
 - Immunocompromised person: 0.5ml/kg (max. 15 ml) per IM

REFERENCES

Centers for Disease Control and Prevention. Epidemiology and Prevention of Vaccine-Preventable Diseases. Atkinson W, Hamborsky J, McIntyre L, Wolfe S, eds. 10th ed.

World Health Organization Data and Statistics

MENINGOCOCCAL DISEASE

A. THE DISEASE

Meningococcal infection is a severe acute bacterial infection that can cause meningitis, bacteremia, and other localized infections, such as pneumonia and arthritis. Symptoms develop and progress rapidly which may lead to death in 24-48 hours despite appropriate therapy.

Etiologic Agent

- *Neisseria meningitidis*, or meningococcus, is an aerobic, gram-negative diplococcus.
- There are 13 serogroups based on the structure of the polysaccharide capsule.
- All invasive disease is caused by one of five serogroups: A, B, C, Y, and W-135

Epidemiology

- Humans are the only natural reservoir
- Occurs worldwide both in endemic and epidemic form
- The distribution of serogroups varies by age, location and time
- In the Philippines, serogroups A, B, C and W-135 have been implicated
- Invasive disease is highest in infancy with second peak in adolescence
- Case fatality rate is 9-12% in all age group.
- Sequelae of hearing loss, neurologic disability, digit or limb amputation, and skin scarring occur in 11 - 20%.

Transmission

- Asymptomatic colonization of the upper respiratory tract provides source for spread of the organism.
- Direct contact with respiratory droplet secretions through coughing, sneezing, kissing, mouth-to-mouth resuscitation
- Risk of secondary infection among close contacts, 500-800 times more than in the general population.

- Patients may transmit the organism up to 24 hours after initiation of antimicrobial therapy.

Clinical Features

- Incubation period is 1-10 days, usually less than 4 days.
- Invasive infection usually results in meningococcal bacteremia, meningitis or both.
- Meningococcal bacteremia is characterized by sudden onset of fever, and a petechial or purpuric rash often associated with hypotension, shock, acute adrenal hemorrhage, and multi-organ failure.
- Meningitis signs and symptoms are indistinguishable from other forms of acute purulent meningitis.
- Less common presentation include pneumonia, arthritis, otitis media, and epiglottitis.
- Meningococcal bacteremia case fatality rate is 40%.
- 20% of survivors have permanent disability

B. THE VACCINE

General Description

- There are 2 meningococcal polysaccharide vaccines (MPSV) available in the Philippines (Meningococcal Polysaccharide A and C, and Meningococcal Polysaccharide A, C, Y and W-135) for use in children 2 years and above, and adults.
- Meningococcal Polysaccharide B vaccine and Meningococcal Conjugate vaccines are not available locally.
- The meningococcal polysaccharide is not effective in children younger than 24 months of age.
- Protective antibody is achieved within 7-10 days of vaccination.
- Antibody levels among infants and children younger than 5 years decline with 3 years after vaccination.
- In healthy adults, antibody levels decrease but are detectable as long as 10 years after vaccination.
- MPSV is administered as a single dose 0.5ml dose and can be given concurrently with other vaccines but at different anatomic sites.

- Little boost occurs following repeated vaccination.
- Revaccination 5 years after receipt of the first dose if indications for vaccination still exist.

Indications

Routine

- Meningococcal Polysaccharide vaccines are not recommended for routine use in the general population.

Special Situations

- Recommended for children 2 years of age and older high-risk groups:
 1. with functional or anatomic asplenia
 2. with terminal complement component or properdin deficiencies
 3. with HIV infection
 4. microbiologist who is routinely exposed to *N. meningitidis*
 5. who travel to or reside in areas where *N. meningitidis* is hyperendemic or endemic
 6. for control of outbreaks caused by vaccine-preventable serogroups
 7. people who wish to decrease their risk of meningococcal infection may elect to receive the vaccine

Adverse Reactions

- Pain and redness at site of injection
- Fever, headache and malaise within 7 days of vaccination

C. PRECAUTIONS AND CONTRAINDICATIONS

- Severe allergic (anaphylactic) reaction to a vaccine component or following a prior dose is a contraindication.
- Defer if moderate or severe acute illness exists but a minor illness is not a contraindication.
- Breastfeeding, immunosuppression and pregnancy are not contraindications.

Storage and Handling

- Vaccine must be shipped in insulated containers.
- Should be stored at refrigerator temp (+2°C to +8°C).
- Vaccine must not be exposed to freezing temperature.
- Single dose vials must be used within 30 minutes of reconstitution.
- Multi-dose vials must be discarded after 10 days of reconstitution

REFERENCES

CDC Epidemiology and Prevention of Vaccine Preventable Diseases
10th Ed. Jan.2007 Meningococcal dse. Pp. 271-282

CDC Epidemiology and Prevention of Vaccine Preventable Diseases
10th Ed. Jan.2007 HPV pp. 283-293;

PNEUMOCOCCAL DISEASE, INVASIVE

A. THE DISEASE

A common bacterium causes illnesses ranging from a pneumonia, to invasive disease characterized by bacteremia, meningitis, and/or endocarditis.

Etiologic Agent

- *Streptococcus pneumoniae*

Epidemiology

- Occurs worldwide

Transmission

- Through droplet inhalation

Clinical Features

- Incubation Period: 1-3 days
- Pneumonia: cough, fever, pleuritic chest pain
- Invasive disease includes bacteremia, meningitis and endocarditis

B. THE VACCINE

General Description

- For adults, a 23-valent polysaccharide vaccine (PPV23) is available.
- A 7-valent pneumococcal conjugate vaccine (PCV-7) is locally available, but is indicated only for children.

Indication

Routine

- Age > 50 years
- NOT recommended for routine use in children

Special Situations

- For Patients at High Risk of Invasive Disease:
 1. Functional or Anatomic Asplenia

2. Patients with chronic illnesses:
 - a. Chronic cardiovascular disease
 - b. Chronic pulmonary disease
 - c. Diabetes mellitus
 - d. Alcoholism
 - e. Chronic liver disease (including cirrhosis)
3. Cerebrospinal fluid leaks
4. Immunocompromised persons:
 - a. HIV/AIDS, lymphoma, leukemia, multiple myeloma, generalized malignancy
 - b. Chronic renal failure or nephrotic syndrome
 - c. Those receiving chemotherapy, including corticosteroids
 - d. Solid organ or bone marrow transplant
5. Those living in special environments which put them at risk:
 - a. Military recruits
 - b. Nursing home residents

Pre-exposure immunization

- A single 0.5 ml dose given IM or SC
- Booster Doses:

Not routinely recommended

May be given to the following:

1. Those > 65 years who received their first dose more than 5 years ago and before they reached age 65.
2. Persons less than 64 years old who received the vaccine more than 5 years ago and who have the following:
 - a. Asplenia
 - b. HIV, Leukemia, Lymphoma, Generalized Malignancy, Multiple Myeloma
 - c. Chronic renal failure or nephrotic syndrome
 - d. Receiving immunosuppressive therapy, including corticosteroids
 - e. Received solid organ or bone marrow transplant

Post-Exposure Prophylaxis – Not recommended

- Vaccine Storage & Handling Store at refrigerator temperature (+2°C to +8°C). **Vaccine must not be frozen.**
- Ship in insulated containers with coolant packs

C. SIDE EFFECTS

- Most frequent: Soreness, swelling and redness at injection site
- Fever, malaise and muscle pain are very uncommon
- Allergic reactions may occur

D. PRECAUTIONS AND CONTRAINDICATIONS

- An immediate anaphylactic reaction to a previous dose of pneumococcal vaccine
- Allergy to a vaccine component: anaphylaxis to phenol or thimerosal
- Moderate to severe illness with or without a fever

REFERENCES

CDC. Prevention of Pneumococcal Disease: Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 1997; 46 (RR-08).

Williams et al. Epidemiology and Prevention of Vaccine-Preventable Diseases. CDC 2006.

RABIES

A. THE DISEASE

Rabies is a preventable, zoonotic viral infection of the central venous system (acute encephalitis), with a fatal outcome, and no effective cure.

Etiologic Agent

- Rabies Virus, RNA Rhabdovirus

Epidemiology

- Worldwide zoonotic disease
- Endemic in the Philippines
- Incidence of 6-8/million population 300-500 cases/year
- Domestic dog transmits 83% of human rabies cases,
- Cats and other domestic animals transmit 17% of human rabies
- Rats and bats do not transmit rabies to humans in the Philippines.

Transmission

- Most common mode of transmission - bites of rabid animals
- Less common mode of transmission
 - scratches from animals with contaminated claws
 - licks of mucus membranes or abraded skin with infected saliva or with infected body materials
- Rare modes of transmission
 - airborne route such as exposure in caves populated by bats
 - corneal transplantation

Clinical Features

- Infected patients usually go through 4 stages namely:
 - Incubation period – usually 20-90 days; patients have no symptoms except those related to local wound healing

- Prodrome – 2-10 days; nonspecific symptoms of fever, headache, malaise, body aches, pain, itching, or paresthesia at bite site.
- Acute neurologic phase – 2-7 days encephalitis or furious rabies in 80 percent of cases, with hydrophobia and aerophobia; paralytic or dumb rabies in 20 percent of cases
- Coma – 4-10 days, complications start to appear followed by death due to respiratory paralysis.

B. THE VACCINE

General Description

- First known human rabies vaccines utilized nerve tissue (brain, spinal cord) of animals like goat, sheep, rabbits. NO LONGER AVAILABLE; and NOT RECOMMENDED. These vaccines produced SERIOUS neurologic adverse reactions
- Cell Culture Rabies Vaccines – These are modern day vaccines prepared from rabies virus grown on tissue culture, free of neuronal tissues, inactivated by β -Propiolactone and purified by ultracentrifugation
 - Human Diploid Cell Vaccine (HDCV) – the gold standard of human rabies vaccines. Very safe, but very expensive. Not available locally.
 - Purified Vero Cell Rabies Vaccine (PVRV) – as safe and as effective as HDCV. More affordable locally available.
 - Purified Chick Embryo Cell Vaccine (PCECV) – good immunogenicity, affordable and locally available.
 - Purified Duck Embryo Vaccine – not available locally

Indications

Routine

- Pre-exposure vaccination is recommended for:
 - Health care workers in hospitals that handle dog bites and rabies cases (doctors, nurses, paramedical staff)
 - Rabies research and diagnostic lab workers
 - Rabies biologic production workers

- Veterinarians and Vet students
- Animal control and wildlife handlers
- Spelunkers and other animal handlers
- Field workers (bill collectors, mailman, delivery man)
- Post-exposure prophylaxis
 - All persons exposed to rabid or suspect rabid animals
 Categorized as follows:

Category I* – touching or feeding of animals
Licks on broken skin

Category II** – nibbling of uncovered skin
Minor scratches or abrasion
without bleeding
Licks on broken skin

Category III** – Single or multiple transdermal
bites or scratches
Contamination of mucous
membranes with saliva
All Category II exposures in
the head, face or neck

* – Pre-exposure prophylaxis may be recommended

** – Post-exposure treatment MUST be administered

Vaccine Storage and Handling

- Ideal storage conditions are +2°C to +8°C
- Vaccine remains stable for at least 3-5 years

C. SIDE EFFECTS

- Soreness, swelling or itching induration at injection site
- Headache, dizziness, nausea, abdominal pain
- Rarely, neurologic reactions reported, resolved spontaneously

D. PRECAUTIONS AND CONTRAINDICATIONS

Precautions

- Always inject IM vaccines on the deltoid – NEVER IN THE BUTTOCKS
- In infants and neonates – anterolateral thigh may be chosen
- For persons with bleeding disorders, consider ID route
- For persons on corticosteroids, other immunosuppressive agents, or antimalarial prophylaxis agents, give vaccine only by IM route. (These drugs can interfere with antibody response and immune response may be inadequate.)

Contraindication

- Presence of moderate and severe acute illnesses
- Allergy to any vaccine component
- An immediate anaphylactic reaction to a previous dose of rabies vaccine
- Pregnancy is NOT a contraindication

E. THE ROLE OF PASSIVE IMMUNIZATION

Immunoglobulins are administered to

- All patients with Category III exposure
- All Category II exposure patients who are immunocompromised

REFERENCES

World Health Organization – Report on the Expert Committee on Rabies. WHO Technical Report Series, 1992.

Department of Health, Administrative Order No. _____, on Rabies, 2008

Plotkin SA, Rupprecht C.E, Koprowski M. Rabies Vaccine in Vaccines, 4th ed. 2004, p1011-1031.

TETANUS

A. THE DISEASE

Tetanus is a disease of the nervous system characterized by persistent tonic spasm, with violent brief exacerbations.

Etiologic Agent

- *Clostridium tetani*

Epidemiology

- Worldwide
- Incidence highest in densely populated regions with warm, damp climate and rich organic soil.

Transmission

- Spread by direct contamination of spores in a traumatized site
- Neonatal tetanus is due to contamination of umbilical stump

Clinical Feature

- Incubation period: typically 7 -10 days, can range from few days to several months.
- Shorter incubation period is associated with more severe disease.
- Progressive stiffness, rigidity and spasm of the jaw, neck, abdomen and back causing trismus, risus sardonicus and opisthotonus.
- Three clinical forms: Local(uncommon), cephalic (rare), generalized (most common)
- Complications: Laryngospasm, fractures, Hypertension, Nosocomial infections, Pulmonary embolism, Aspiration,

B. THE VACCINE

General Description

- Inactivated fractional adsorbed tetanus toxoid

DIPHTHERIA

A. THE DISEASE

A nasopharyngeal and skin infection with pseudomembrane due to a protein toxin that causes systemic toxicity, myocarditis and polyneuropathy.

Etiologic Agent

- *Corynebacterium diphtheriae*

Epidemiology

- Worldwide
- Humans are the principal reservoir for *C. diphtheriae*.

Transmission

- Via airborne respiratory droplet
- Contact with exudates from infected skin lesion
- Occasionally by fomites

Clinical features

- Incubation period 2 – 5 days
- Fever
- Pseudomembrane in the pharynx is the hallmark of the disease
- Complication: obstruction of the respiratory tract, myocarditis, polyneuritis, pneumonia.

B. THE VACCINE

General Description

- Purified inactivated adsorbed diphtheria toxoid

Indications

Routine

- All susceptible adults
- Persons recovering from the disease
- As part of wound care management

Special Situations

- All health care workers
- Pregnant women
- Unimmunized pregnant woman in the 2nd and 3rd trimesters of pregnancy.

Pre-exposure immunization

- Dose & Route of administration
 - 2 doses of Tetanus diphtheria toxoid 0.5ml at 4 to 8 weeks apart
 - 3rd dose to be given. 6 to 12 months later
 - In pregnancy 3rd dose given at least two weeks before delivery
 - Partially immunized pregnant women should complete the series of 3 doses

PERTUSSIS

A. THE DISEASE

An acute infection of the respiratory tract with a violent cough, “whoop” at the end of an episode of paroxysmal coughing.

Etiologic Agent

- *Bordetella pertussis*

Epidemiology

- Worldwide
- Significant cause of morbidity and mortality in the non-immunized and insufficiently immunized. More recently, most notably among adolescents and adults.
- Immunity from childhood pertussis vaccination wanes after several years and most adolescents and adults are again susceptible to pertussis.

Transmission

- Predominantly by aerosol droplet with highest attack rate for persons exposed to a coughing patient

Clinical Features

- Incubation period-< 1 week up to 3 weeks.
- Catarrhal phase-rhinorrhea, lacrimation, mild conjunctival injection, malaise, low grade fever followed by dry non-productive cough.
- Paroxysmal phase- series of short expiratory bursts, followed by an inspiratory gap, which results in a typical whoop.
- Complications are common- sleep, school or work disruption, ribs fracture and pneumonia. CNS abnormalities. Subconjunctival and scleral hemorrhages.

B. THE VACCINE

General Description

- A subunit fractional inactivated vaccine formulated to contain 5 Lf of tetanus toxoid, 2 Lf diphtheria toxoid, 2.5 Lf ug detoxified PT

Indications

Routine

- All adolescents and adults < 64 years of age

Special Situations

- New mothers, family and close contact of newborn
- Healthcare workers
- Childcare workers
- Grandparents in contact with infants
- Those who wish to receive the vaccine

Storage and Handling

- Store at +2° to +8° C. DO NOT FREEZE.
- It should not be stored in direct contact with refrigerant.

Post – Exposure Prophylaxis

Characteristic	Clean, minor wounds		All other wounds	
History of Tetanus Toxoid (doses)	Tdap or Td	TIG	Tdap or Td	TIG
Unknown or < 3	Yes	No	Yes	No
≥3	No ³	No	No ⁴	No

3 Yes, if > 10 years since the last Td

4 Yes, if > 5 years since the last Td

C. SIDE EFFECTS

Local

- Pain at the injection site

Systemic

- Headache, generalized body aches
- Tiredness, fever < 10%

D. PRECAUTIONS AND CONTRAINDICATIONS

General

- Moderate to severe illness with or without fever
- Moderate to severe anaphylactic reaction to any toxoid component like Thimerosal
- Per ACIP, history of neurologic or severe hypersensitivity reaction following a prior dose
- Bleeding disorders
- Thrombocytopenia, hemophilia and other coagulation disorders.

REFERENCES

Bleck, TP: *Clostridium tetani* in Principles and Practice of Infectious Diseases, 5th ed. GI

Mandell et al, 2000 pp 2537 – 2543

Center for Disease Control and Prevention, ACIP and HICPAC, MMWR 55 (RR17), 2006

Vaccine preventable deaths and the Global Immunization Vision and Strategy, 2006-2015, MMWR 55: 511, 2006

Wirsing von Konig, C.H. Pertussis of Adults and Infants, Lancet Infect. Dis. 2002; 2: 744-50

TYPHOID FEVER

A. THE DISEASE

Typhoid fever is an acute, generalized infection of the reticuloendothelial system, the intestinal lymphoid tissue and gall bladder

Etiologic Agent

- *Salmonella typhi*

Epidemiology

- Disease of developing countries, where sanitation is primitive and water supplies are not treated
- Endemic in the Philippines
- Occurs in all places all year round, all ages
- Morbidity is 30.5/100,000 population
- Mortality of 1.7 / 100,000
- Outbreak of Chloramphenicol, Co-trimoxazole resistance occurred in 1993-1994
- Resistance contained at present
- Presently, resistance to first line drugs remains below 5%

Transmission

- Fecal-oral route usually by ingestion of contaminated food or drink

Clinical Features

- Incubation period 1-3 weeks
- Insidious onset
- Prolonged fever, usually step ladder
- Headache in more than 70% of cases
- Have diarrhea or constipation, abdominal discomfort, malaise, anorexia, vomiting
- Complications follow delay in treatment- such as intestinal perforation or hemorrhage, encephalitis, septicemia, myocarditis

B. THE VACCINE

General Description

- Oral vaccine is a live-attenuated vaccine from Ty21a “strain” of *S.typhi*
- Parenteral vaccine is a polysaccharide extracted from bacterial capsule of *S.typhi* strain Ty 2

Indications

Routine

- Hospital personnel involved in food handling
- Microbiology lab technicians
- Persons with intimate exposure to a documented *S.typhi* carrier/patient
- Any person who wants to get protected

Vaccine Storage and Handling

- Store vaccines in refrigerator between +2°C to +8°C
- Capsules should be kept refrigerated; Do not freeze
- Capsules must not be exposed to direct sunlight
- Capsules must not be taken with milk or alcohol
- Capsules must not be broken to mix with food or drink

Special Considerations

- Advantages of injectable - good compliance; single dose
- approved for use in children >2 years

C. SIDE EFFECTS

- Erythema, pain, induration at injection site (resolves within 48 hours)
- Occasional fever and flu-like symptoms
- Nausea, abdominal pain, cramps
- Vomiting, headache
- Occasional rash

D. PRECAUTIONS AND CONTRAINDICATIONS

Oral Vaccines

- Should not be given to children below 6 years of age

- Should not be given to patients with diarrhea or vomiting
- Should not be given to patients taking antibiotics within 7 days
- Should not be given to persons taking malaria prophylaxis (Mefloquin)
- Should not be given to immunocompromised persons
- Should not be given to pregnant women

Parenteral Vaccine

- Should not be given to children below 2 years of age
- Should not be given to persons with bleeding disorders
- Should not be given to immunocompromised persons
- Should not be given to pregnant women
- Should not be given intradermally

Contraindications

- Allergy to any vaccine component
- Presence of moderate or severe acute illness
- History of any adverse reaction to a previous dose of vaccine
- Persons with bleeding disorders

REFERENCES

Myron M. Lovine. Typhoid Fever Vaccines, in Vaccines, 4th ed. 2004 p1057-1062.

VARICELLA

A. THE DISEASE

Varicella, or chicken pox, is an acute, generalized viral illness commonly presenting as sudden onset of fever and the appearance of skin rashes varying from maculopapular rashes to vesicles to granular scabs, all occurring at the same time. While it is a common childhood illness with mild manifestations, adults can suffer from severe illness or serious complications.

Etiologic Agent

- Varicella-Zoster virus

Epidemiology

- Highly infectious with incubation period of 12-14 days
- Progressively affects more adolescents than children
- Generalized disease more common in neonates, in children with acute leukemia, and in pregnant women who get ill at or near delivery
- Very high secondary attack rates
- Results typically in lifetime immunity

Transmission

- Airborne

Clinical Features

- Commonly with fever, mild constitutional symptoms and successive appearance of maculopapular, vesicular rashes and crusted lesions or scabs
- Serious complications include pneumonia, secondary bacterial infections, hemorrhagic manifestations and encephalitis
- Some vaccinated persons may develop modified disease with atypical presentation
- Post-vaccination breakthrough varicella presents with mild disease accompanied by maculopapular rashes

B. THE VACCINE

General Description

- Live attenuated Varicella virus vaccine
- Propagated in human (or guinea-pig) cells
- Lyophilized and to be reconstituted when used
- Either as single antigen or combination (with MMR, at least in U.S.)
- Contains hydrolyzed gelatin, neomycin, fetal bovine serum, sucrose, human-diploid cells (MRC-5) and egg protein (in combination MMR vaccine)
- Does not contain known preservatives

Indications

Routine

- Recommended for all adolescents and adults without evidence of immunity

Catch-up

- Second dose recommended for all persons who received one dose previously

Special situations

- Maybe considered for HIV+ adolescents and adults with CD4 count >200U
- Recommended antenatal screening with prenatal assessment and post-partum vaccination; for outbreak control

Requirement

- All persons attending colleges or other post-secondary educational institutions

Post-exposure Immunization

- within 3-5 days of exposure, also 2 doses SC, 4-8 weeks apart

Vaccine Storage and Handling

- store only in stand-alone freezers or the freezer compartment of refrigerator-freezer combinations, provided that the freezer compartment has its own separate, sealed, and insulated exterior door
- Use immediately after reconstitution or within 72 hours upon removal from freezer; may not refreeze once out of the freezer
- May be transported using dry ice or frozen packs, particularly for field vaccination; combination MMR may not be transported at any time

C. SIDE EFFECTS

- Injection site complaints
- Fever
- Local rash

D. PRECAUTIONS AND CONTRAINDICATIONS

Precautions

- Acute severe illness
- Untreated tuberculosis
- Thrombocytopenia
- Recent administration of blood, plasma, or immune globulin
- Use of salicylates

Contraindications

- History of anaphylactic reaction to any vaccine component
- Pregnancy
- Malignant condition affecting bone marrow or lymphatic system
- Primary or acquired immunodeficiency including HIV+ (if combination MMR)
- Family history of congenital or hereditary immunodeficiency in first degree relatives
- High dose immunosuppressive therapy or any low-dose steroid therapy exceeding two weeks duration

E. THE ROLE OF PASSIVE IMMUNIZATION

Passive Immunization (Varicella Zoster Immune Globulin)

- High risk persons to which Varicella vaccine is contraindicated
- Post-exposure (Within 4 days) especially from hospital contacts including neonates born of infected mothers
- Do not use if person is on regular immune globulin treatment
- Do not use to treat Varicella or Herpes Zoster

REFERENCE

CDC. Prevention of Varicella: recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 2007; 56 (No. RR-4).

YELLOW FEVER

A. THE DISEASE

This is a disease caused by a mosquito borne virus, found only in South America and sub-Saharan Africa, characterized by fever, jaundice and bleeding.

Etiologic Agent

- Yellow Fever Virus, a flavivirus
- 1 Virus Strain, with 3 genotypes
 - East African
 - West African
 - New World

Epidemiology

- Occurs in sub-Saharan Africa and South America
- Has never been documented in Asia

Transmission

- Transmitted by the *Aedes aegypti* mosquito

Clinical Features

- *Period of infection*: fever, chills, myalgia, with conjunctival injection, relative bradycardia, then resolves
- *Period of intoxication*: may follow period of infection after a few days, with renewed fever, headache, abdominal pain, somnolence, later with icteric hepatitis, hemorrhagic diathesis with GI bleeding
- *With hemorrhage*: up to 50% mortality rate
- 5-50% of cases are asymptomatic

B. THE VACCINE

Yellow Fever is the only disease for which the WHO requires an International Certificate of Vaccination for travelers. Some countries require a certificate for all travelers, while other countries require it only from travelers coming from endemic areas. The Philippines requires a vaccination certificate from all travelers over 1 year of age coming from endemic countries.

Filipinos traveling to endemic areas can get the vaccine and the certificate from the Bureau of Quarantine, Port Area, Manila, at telephone number: (632) 527-4678.

General Description

- A live-attenuated virus vaccine

Indications

Routine

- Not indicated for routine use

Special Situations

- For persons 9 months or older traveling to or living in areas of South America or Africa where yellow fever is endemic.
- For persons 9 months or older traveling to or living in rural areas of countries that lie in the yellow fever endemic zone.
- For infants less than 9 months or for pregnant women: consider vaccination if traveling to areas with yellow fever where travel cannot be postponed or protection against mosquitoes cannot be guaranteed.

Pre-exposure immunization

- A single 0.5 ml dose is given SC
- Booster: Given every 10 years

Vaccine Storage & Handling

- Store at a temperature between +2°C to +8°C (refrigerator temperature)
- Do not freeze

C. SIDE EFFECTS

- Most frequent: Fever, headache and muscle ache may occur from 5-14 days after immunization
- Rare cases of encephalitis reported in young infants
- Allergic reactions rarely occur.

D. PRECAUTIONS AND CONTRAINDICATIONS

- An immediate anaphylactic reaction to a previous dose of yellow vaccine
- Anaphylactic reaction to a vaccine component
- Moderate to severe illness with or without a fever
- History of anaphylaxis or sensitivity to eggs or egg protein
- Infants <4 months should NEVER receive the vaccine
- Pregnancy (see “Indications for Immunization” above)
- Infants <9 months (see “Indications for Immunization” above)
- Concurrent administration of cholera and yellow fever vaccines leads to a suboptimal immune response to both vaccines. They should be given at least 3 weeks apart. If this cannot be done because of time restraints, then they should be given on the same day.

REFERENCES

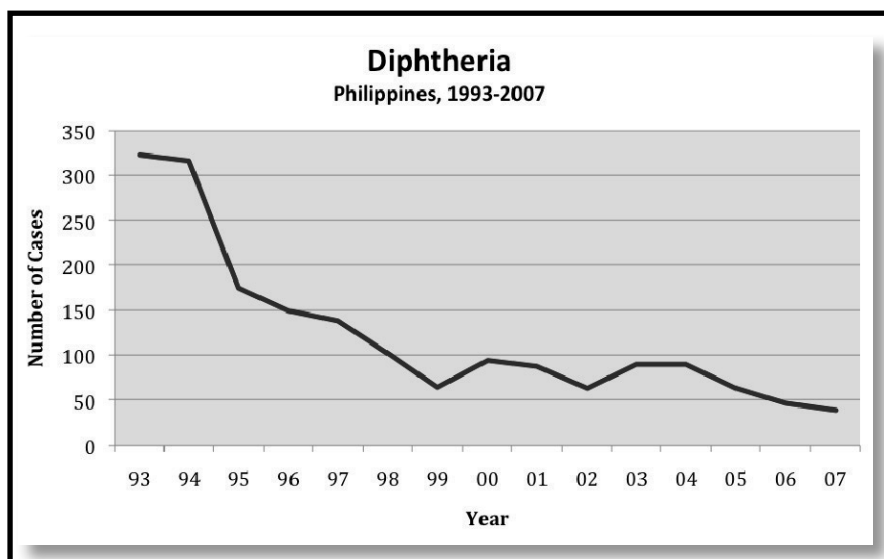
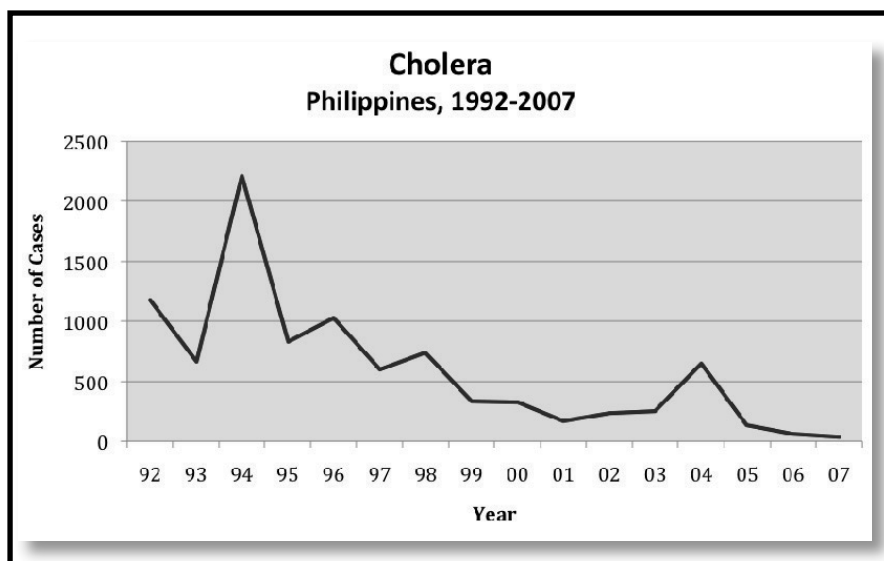
CDC. Yellow Fever Vaccine Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 2002; 51(RR-17).



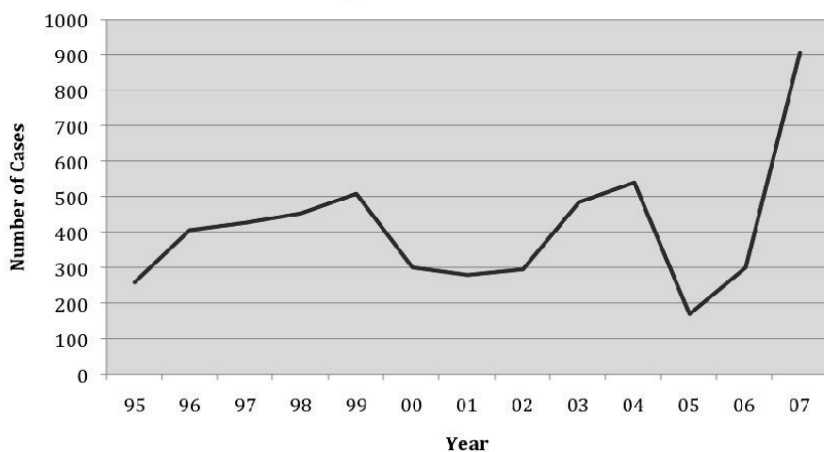
APPENDICES

APPENDIX A

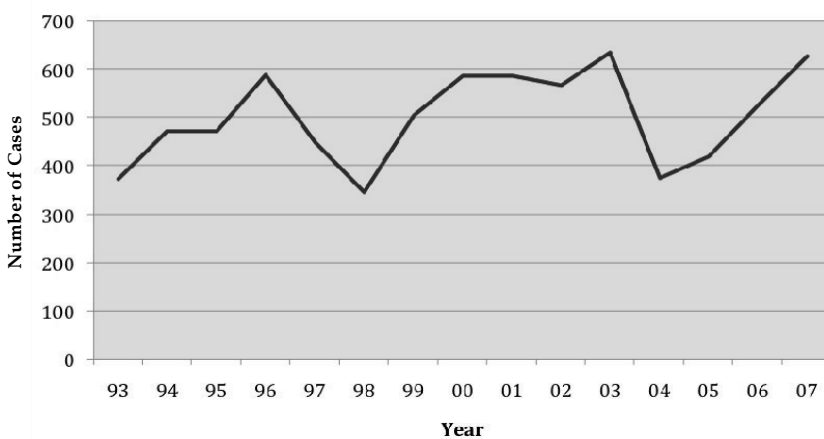
All information from National Epidemic Sentinel Surveillance System (except Influenza and Varicella, from Field Health Service Information System), National Epidemiology Center, Department of Health.



Hepatitis A
Philippines, 1995-2007

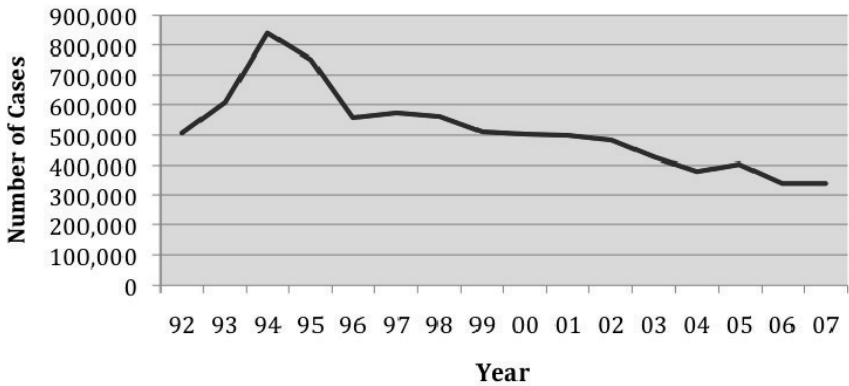


Hepatitis B
Philippines, 1993-2007



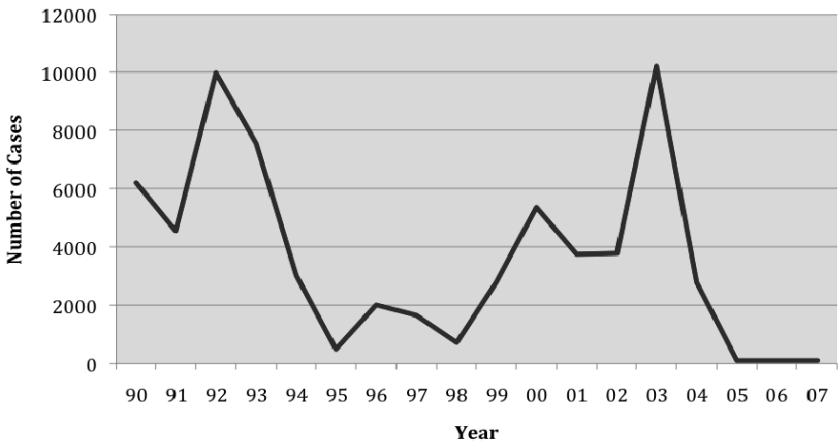
Influenza

Philippines, 1992-2007

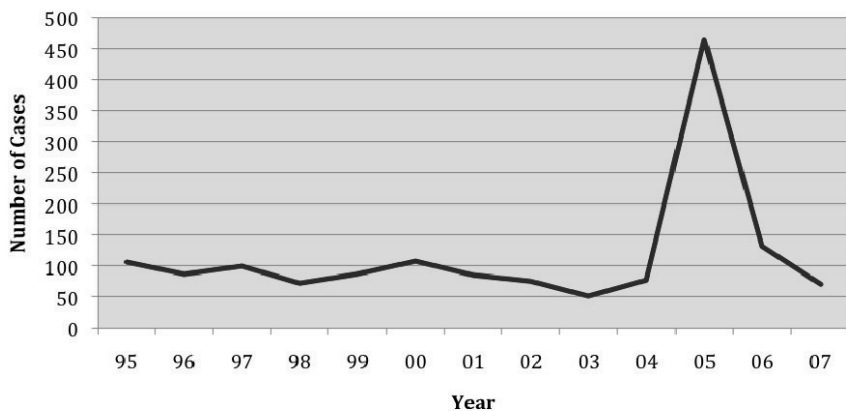


Measles

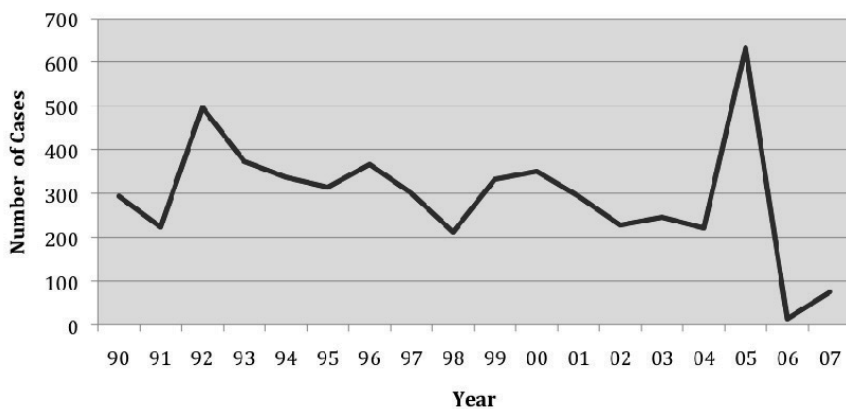
Philippines, 1990-2007



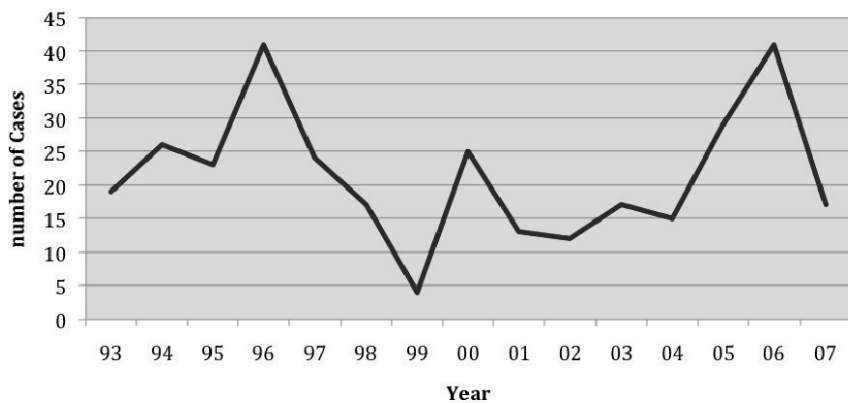
Meningococemia
Philippines, 1995-2007



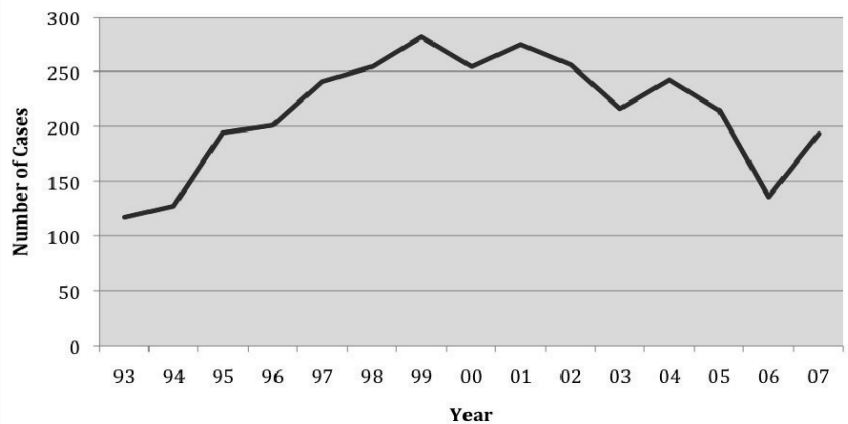
Neonatal Tetanus
Philippines, 1990-2007



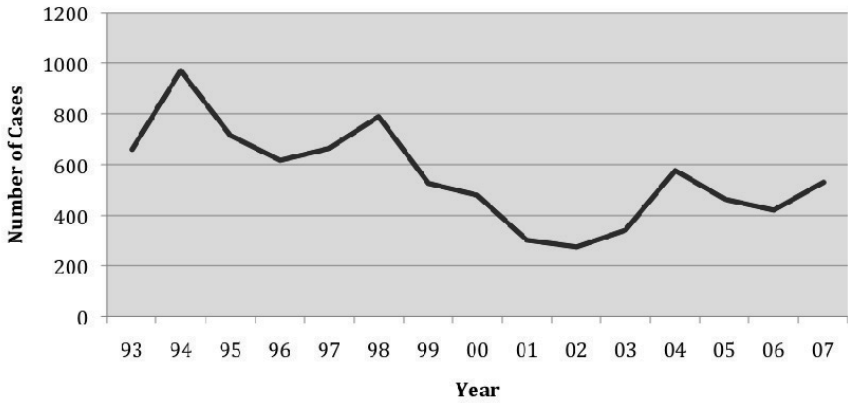
Pertussis
Philippines, 1993-2007



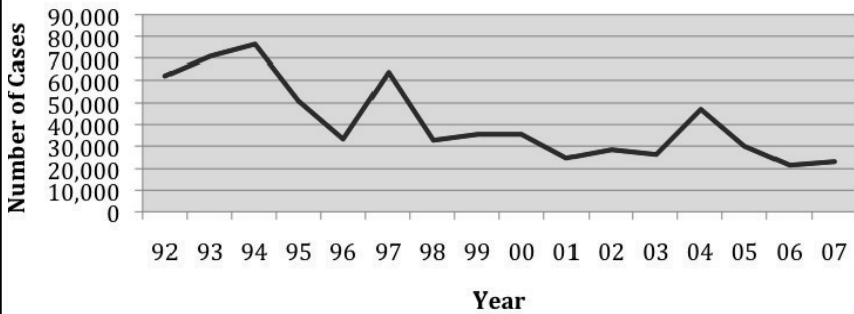
Rabies
Philippines, 1993-2007



Typhoid Fever
Philippines, 1993-2007



Varicella,
Philippines, 1992-2007



APPENDIX B

Locally Available Cholera Vaccine

Vaccine Type	Brand Name	Dosage	Remarks
Oral Vaccine (Against Cholera and ETEC – diarrhea)	Dukoral (Sanofi Pasteur)	Dissolve buffer in 1 glass water and add 1 vial vaccine. Mix well and drink	Adults and children above 6 years 2 doses at 1-6 weeks intervals. Children 2 – 6 years of age – 3 doses with an interval of 1 – 6 weeks between doses Booster after 2 years

Locally Available Hepatitis A Vaccine

Vaccine Type	Brand Name	Dosage	Remarks
Hepatitis A	Havrix 720 (GlaxoSmithKline)	1 ml IM (deltoid) - 2 doses 1 month apart	Booster dose between 6 & 12 months after initiation of primary course is recommended to ensure long term antibody titers.
Hepatitis A	Havrix 1440 (GlaxoSmithKline)	1 ml single dose	Booster dose between 6 & 12 months after initiation of primary course is recommended to ensure long term antibody titers.
Combined Hepatitis A & B	Twinrix**	3 doses at 0,1,6 months	**Combined Hepatitis A (720 ELISA Units) & Hepatitis B (20 ug/ml recombinant) Doses at days 0, 7, and 21) for travelers has been approved by the FDA. A booster dose should be given at 1 year. Postvaccination testing to assess serologic response or antibody levels is not indicated

Locally Available Hepatitis B Vaccines

Vaccine Type	Brand Name	Dosage	Remarks
Recombinant Hepatitis B Vaccine	Engerix B (GlaxoSmithKline)	3 doses of 1 ml IM at 0,1,6 months for adults & children > 10 years	20 ug/ml
Recombinant Hepatitis B Vaccine	Boryung Hepatitis B Vaccine (Boryung Biopharma Marketlink)	3 doses of 1 ml IM at 0,1,6 months for adults & children > 10 years	20 ug/ml
Recombinant Hepatitis B Vaccine	Euvax-B (Sanofi Pasteur)	3 doses of 1 ml IM at 0,1,6 months for adults & children > 10 years	20 ug/ml

Locally Available Human Papillomavirus

Vaccine Type	Brand Name	Dosage	Remarks
Quadrivalent HPV Types 6, 11, 16 & 18	Gardasil (MSD)	0.5ml IM 0, 2, 6 months	For Cervical ca & anogenital warts Routine use for 10 to 18 years old adolescents Catch up immunization for women 19 to 45 years old
Bivalent HPV Types 16 & 18	Cervarix (Glaxo Smith Klinol)	0.5ml IM 0, 1, 6 months	For cervical ca Routine use for 10 to 18 years old adolescents Catch up immunization for women 19 to 55 years old

Locally Available Influenza Vaccines

Vaccine Type	Brand Name	Dosage	Remarks
Split Virion	Vaxigrip (Sanofi Pasteur) Fluarix (Glaxo Smith Klinol)	Single IM 0.5 ml; given yearly	3 yrs and above given yearly

Locally Available Measles, Mumps, Rubella Vaccines

Vaccine Type	Brand Name	Dosage	Remarks
Measles Measles, Mumps Rubella (MMR)	Rouvax (Sanofi Pasteur) Trimovax (Sanofi Pasteur)	Single SQ 0.5 ml Single SQ 0.5 ml	9 mos First dose: 12-15 mos. of age Second dose: 4-6 yrs old/ Adolescents and adults: 2 doses, 1 month apart Anytime at least 4 weeks after the first dose
Measles, Mumps Rubella (MMR)	Priorix (GlaxoSmithKline)	Single SQ 0.5 ml	12-15 mos or older

Locally Available Meningococcal Vaccines

Vaccine Type	Brand Name	Dosage	Remarks
Purified polysaccharides of meningococcal types A + C	Meningococcal polysaccharide vaccine A + C (Sanofi-Pasteur)	Single dose 0.5ml SC or IM	Not for routine use. May be given in special situations. For outbreak control may be given to infants 3 months & above
Purified polysaccharides of meningococcal types A, C, Y, W-135	Mencevac (GSK)	Single dose 0.5ml SC or IM	

Locally Available Pneumococcal Vaccine

Vaccine Type	Brand Name	Dosage	Remarks
23-valent, polysaccharide vaccine	Pneumo 23 (Sanofi Pasteur)	Single IM or SC 0.5 ml dose	>2 yrs and above

Locally Available Rabies Vaccines and Passive Immunization Products

Vaccine Type	Brand Name	Dose	Pre-exposure	Post-exposure
Purified Vero Cell Rabies Vaccine PVRV	VERORAB (Sanofi Pasteur)	0.5 ml IM 0.1 ml ID	Primary series 1 I.D. or I.M. injection on D0, D7, D21 or D28 Booster – 1 dose after 2-3 years	1 injection I.M. on D0, D3, D7, D14, D28 (Essen) or 2 injections I.M. on D0 1 injection IM on D7 and D21 (Zagreb) or 2 injections I.D. on D0, D3, D7, D28 (TRC)
Purified Chick Embryo Vaccine PCECV	Rabipur (Novartis)	1.0 ml IM 0.1 ml ID		
Human Rabies Immunoglobulin (HRIG)	(Sanofi Pasteur)	20 I.U./kg body weight		½ to almost total dose to be infiltrated around then wound, and the remaining dose to be injected IM on the anterolateral aspect of the thigh
Equine Rabies Immune Globulin (ERIG)	FAVIRAB (Sanofi Pasteur)	40 I.U./kg body weight		

Locally Available Tetanus, diphtheria acellular pertussis Vaccines

Vaccine Type	Brand Name	Dosage	Remarks
Adsorbed tetanus toxoid	Anatetall(Novartis)	0.5 ml given IM at 0, 1,7-13 mos	Booster dose of 0.5 ml given every 5-10 years
Adsorbed tetanus toxoid	Te anatoxal Berna (berna/ Swiss Serum)	0.5 ml given IM at 0, 1, 4-13 mos	
Adsorbed tetanus toxoid	Tetavax (Sanofi Pasteur)	0.5 ml given IM at 0, 1, 4-13 mos	
Purified Diphtheria and Tetanus toxoid	Td pur (Novartis)	3 doses 0.5 ml given at 6-8 weeks interval	
Adsorbed tetanus diphtheria acellular pertussis vaccine (Tdap)	Adacel (Sanofi Pasteur) Boostrix (GSK)	0.5 ml IM	Given as booster; can replace one dose of the primary series

Locally Available Typhoid Vaccines

Vaccine Type	Brand Name	Dosage	Remarks
Polysaccharide Vi capsule	Typhim Vi (Sanofi Pasteur) Typherix (GSK)	Single IM dose 0.5 ml	Booster: Same dose after 2 years

Locally Available Varicella Vaccines

Available Vaccine	Brand Name	Dosage	Remarks
Single live-attenuated	Okavax (Sanofi Pasteur) V-Z Vax (Green Cross) Varilrix (GSK)	2 doses SC, 4 weeks apart but 3 months apart if HIV+	Storage at freezer required; Refrigerator temperature-stable up to 3 days from removal in freezer; Does not contain preservatives; Needs reconstitution as directed from package insert; Rare serious adverse events following immunization

Locally Available Yellow Fever Vaccine

Vaccine Type	Brand Name	Dosage	Remarks
Live Attenuated	Stamaril (Sanofi Pasteur)	Single 0.5 ml given SC	Primary: 1 dose Booster: every 10 years