INFORMATION PAPER

Military Vaccine Agency
1 March 2007

SUBJECT: Measles Infection and Measles Vaccine

1. Purpose. To describe measles and the vaccine to prevent it.

2. Facts.

a. Microbiology. Measles virus is a type of paramyxovirus. Measles infection is an acute, highly contagious respiratory infection. Measles is marked by several days of rash, high fever, cough, runny nose, and red, watery eyes (conjunctivitis). Koplik spots (lesions with blue or white centers) may be seen on the gums and the inside of the cheeks. The disease can be complicated by middle-ear infection, diarrhea, pneumonia, or encephalitis (brain inflammation). Pneumonia occurs in up to 6% of cases and accounts for 60% of deaths attributed to measles. Measles is also known as rubeola. Do not use this nickname, to avoid confusion with rubella infection.

b. Epidemiology. Measles is transmitted by direct contact with nasal or throat secretions from infected people or, less frequently, via airborne respiratory droplets. Before 1963, when measles vaccine was first licensed in the United States, there were about 500,000 measles cases in the United States. By 1983, about 1,500 cases were reported. The disease resurged in 1990, when more than 25,000 cases and 89 measles-associated deaths were reported to CDC. Due to increased emphasis on vaccination measles is now uncommon in the U.S. with most new cases being imported. However, measles remains a common disease in many regions, including Europe and Asia.

c. Vaccine. The measles vaccine currently available in the United States contains live attenuated measles virus. Measles virus of the Moraten strain is grown in chick-embryo-cell culture. It can be packaged alone (*Attenuvax*, Merck), in combination with rubella vaccine (*M-R-II*, Merck), or combined with both mumps and rubella vaccines in a trivalent form known as MMR (*M-M-R-II*, Merck). The vaccine is equally effective and safe in any of the combinations. In recent years, Merck has distributed only MMR in the United States. The Food & Drug Administration licensed Merck to produce the original form of monovalent measles vaccine in 1963. *Attenuvax* was licensed in 1968 and MMR in 1971 (with a formulation improvement in 1979). Most recently, MMR has been combined with varicella (chickenpox) vaccine (*ProQuad, Merck*). All of these vaccines contain small amounts of egg protein, neomycin and gelatin.

d. Immunization. MMR is given subcutaneously as a 0.5-mL dose. Give children the first dose at 12 to 15 months of age and the second dose at 4 to 6 years of age. Give MMR to children who have not received the second dose by their 11- to 12-year-old visit. *ProQuad* can replace one or both doses of *MMR-II* where varicella vaccination is also required. There should always be at least 4 weeks between the first and second dose. Adults born before 1957 are assumed to be immune to measles by natural infection. Adults born in 1957 or later who do not have medical restrictions should receive at least one dose of MMR vaccine during their lifetime. Give two lifetime doses of MMR vaccine to certain adults born in 1957 or later including healthcare workers, those who travel overseas, or those who attend post-secondary educational institutions. A second dose of MMR is also recommended for adults who have been recently

exposed to measles or who are in an outbreak setting, were previously vaccinated with killed measles vaccine, were vaccinated with an unspecified measles vaccine between 1963 and 1967, or plan to travel internationally.

e. Cautions. The following people should not receive MMR vaccine: people with severe hypersensitivity to the vaccine or its components, pregnant women or women who are considering pregnancy within the next month, people who are immune suppressed, people with moderate to severe acute illnesses, and people with severe allergies to gelatin. The American Academy of Pediatrics has stated that, "Most children with a history of anaphylactic reactions to eggs have no untoward reactions to measles or MMR vaccine. Persons are not at increased risk if they have egg allergies that are not anaphylactic, and they should be vaccinated in the usual manner."

f. Adverse Events. The most common adverse reactions after MMR vaccine are fever and rash, usually caused by the measles vaccine component. Inflammation of the parotid gland is rare after vaccination and is caused by the mumps vaccine component. Temporary swelling of lymph nodes sometimes occurs after MMR vaccination and is mostly caused by the rubella vaccine component. Joint aches or inflammation is reported in up to 25% of rubella-susceptible post-pubertal women who receive MMR or other rubella-containing vaccine.

g. DoD Policy. MMR is administered to all basic trainees and other accessions, unless they have positive blood tests to all three components or documented evidence of two prior vaccinations. For other adults and children, DoD follows guidelines of the Advisory Committee on Immunization Practices (ACIP). In general, ACIP prefers use of MMR to monovalent or bivalent vaccines, to optimize immunity to all three diseases.

3. References.

a. Advisory Committee on Immunization Practices (ACIP). Measles, mumps, and rubella: Vaccine use and strategies for elimination of measles, rubella, and congenital rubella syndrome and control of mumps. MMWR 1998; 47(RR-8):1-57.
http://ftp.cdc.gov/pub/Publications/mmwr/rr/rr4708.pdf

b. CDC disease information. www.cdc.gov/ncidod/diseases/submenus/sub_measles.htm

c. Multiple resources (e.g., product insert, Vaccine Information Statements) assembled by Military Vaccine Agency: www.vaccines.mil/measles

CPT Allison Christ/ 703-681-5101

Approved by LTC Stephen Ford