



FIGURE 149-1 Monthly incidence rates of health problems during stays in developing countries. ETEC, enterotoxigenic *Escherichia coli*. (From R Steffen et al: *Int J Antimicrob Agents* 21:89, 2003.)

motor vehicle, drowning, or aircraft accidents) are several times higher among travelers. Motor vehicle accidents account for >40% of travelers' deaths that are not due to cardiovascular disease or preexisting illness.

GENERAL ADVICE

Health maintenance recommendations are based not only on the traveler's destination but also on assessment of risk, which is determined by such variables as health status, specific itinerary, purpose of travel, season, and lifestyle during travel. Detailed information regarding country-specific risks and recommendations may be obtained from the Centers for Disease Control and Prevention (CDC) publication *Health Information for International Travel* (available at www.cdc.gov/travel).

Fitness for travel is an issue of growing concern in view of the increased numbers of elderly and chronically ill individuals journeying to exotic destinations (see "Travel and Special Hosts," below). Since most commercial aircraft are pressurized to 2500 m (8000 ft) above sea level (corresponding to a $P_{a_{O_2}}$ of ~55 mmHg), individuals with serious cardiopulmonary problems or anemia should be evaluated before travel. In addition, those who have recently had surgery, a myocardial infarction, a cerebrovascular accident, or a deep-vein thrombosis may be at high risk for adverse events during flight. A summary of current recommendations regarding fitness to fly has been published by the Aerospace Medical Association Air Transport Medicine Committee (www.asma.org/publications/medical-publications-for-airline-travel). A pretravel health assessment may be advisable for individuals considering particularly adventurous recreational activities, such as mountain climbing and scuba diving.

IMMUNIZATIONS FOR TRAVEL

Immunizations for travel fall into three broad categories: *routine* (childhood/adult boosters that are necessary regardless of travel), *required* (immunizations that are mandated by international regulations for entry into certain areas or for border crossings), and

recommended (immunizations that are desirable because of travel-related risks). Required and recommended vaccines commonly given to travelers are listed in [Table 149-1](#).

Routine Immunizations • DIPHTHERIA, TETANUS, AND POLIO Diphtheria ([Chap. 175](#)) continues to be a problem worldwide. Large outbreaks have occurred in countries that do not have rigorous vaccination programs or that have reduced their public vaccination programs. Serologic surveys show that tetanus ([Chap. 177](#)) antibodies are lacking in many North Americans, especially in women over the age of 50. The risk of polio ([Chap. 228](#)) to the international traveler is extremely low, and wild-type poliovirus has been eradicated from the Western Hemisphere and Europe. However, studies in the United States suggest that 12% of adult travelers are unprotected against at least one poliovirus serogroup. In addition, challenges continue to be faced by polio eradication programs. Foreign travel offers an ideal opportunity to have these immunizations updated. With the recent increase in pertussis among adults, the diphtheria–tetanus–acellular pertussis (Tdap) combination is now recommended for adults as a once-only replacement for the 10-year tetanus–diphtheria (Td) booster.

MEASLES Measles (rubeola) continues to be a major cause of morbidity and death in the developing world ([Chap. 229](#)). Several outbreaks of measles in the United States and Canada have been linked to imported cases, especially from Europe, where large outbreaks have occurred recently. The group at highest risk consists of persons born after 1956 and vaccinated before 1980, in many of whom primary vaccination failed. The measles–mumps–rubella (MMR) vaccine is typically used; its coverage of rubella also addresses a growing concern in some areas of Eastern Europe and Asia.

INFLUENZA Influenza ([Chap. 224](#))—possibly the most common vaccine-preventable infection in travelers—occurs year-round in the tropics and during the summer months in the Southern Hemisphere (coinciding with the winter months in the Northern Hemisphere). One prospective study showed that influenza developed in 1% of travelers to Southeast Asia per month of stay. Annual vaccination should be considered for all travelers who do not have a contraindication. Travel-related influenza continues to occur during summer months in Alaska and the Northwest Territories of Canada among cruise-ship passengers and staff. The speed of global spread of the pandemic H1N1 virus once again illustrates why influenza immunization is so important for travelers.

PNEUMOCOCCAL INFECTION Regardless of travel, pneumococcal vaccine ([Chap. 171](#)) should be administered routinely to persons over the age of 65 and to persons at high risk of serious infection, including those with chronic heart, lung, or kidney disease; those who have been splenectomized; and those who have sickle cell disease.

Required Immunizations • YELLOW FEVER Documentation of vaccination against yellow fever ([Chap. 233](#)) may be required or recommended as a condition for entry into or passage through countries of sub-Saharan Africa and equatorial South America, where the disease is endemic or epidemic, or (by the International Health Regulations) for entry into countries at risk of having the infection introduced. This