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Rabies—At Home and Abroad

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Introduction

Although rabies has been enzootic or epizootic in domestic or wild animals in the United States during most of the twentieth century, the disease has never been a serious problem among people in this country. During the first half of the century, only about 50 cases of human rabies—most caused by dogs—were reported each year (1). Following the control of canine rabies in the 1940s and 1950s, the number of indigenously acquired human rabies cases fell to an average of fewer than two per year during the 1960s and 1970s (2). Between 1980, when potent and safe tissue culture-derived rabies vaccines were introduced in the United States, and 1992, only seven persons are known to have acquired rabies in this country. All but two of these cases were attributed to insectivorous bats (3–7). None of the these cases were definitely attributable to leisure activities, although the exact circumstances of the exposure were sometimes unknown (5,7).

Wild animals are now indirectly responsible for most of both the economic and public health burden of the disease in the United States; since 1960, more wild than domestic animals have been reported rabid in this country. Annual expenditures for rabies prevention and control may exceed $1,000,000 per 100,000 population in some parts of the United States (8). The principal component of these expenditures is the routine vaccination of pets against rabies (8).

In contrast to the situation in the United States, canine rabies remains a serious threat for persons traveling to and living in developing countries. Largely because of the ubiquitous presence of dogs in human society in these countries, rates of human rabies sometimes exceed 1 per 100,000 population per year, and more than 1,000 per 100,000 people receive postexposure treatment each year (9). U.S. residents are at much higher risk of exposure to rabies in these countries than in the United States and have occasionally developed the disease when they failed to receive proper postexposure treatment (10). Four Americans...
living outside the United States acquired the disease since 1980; one other U.S. resident acquired the disease during a 2-month visit to India (11). In addition, five persons from countries with endemic rabies developed the disease while in the United States; each is believed to have acquired the disease before coming to this country.

Since the animal reservoirs and human risk groups differ so markedly inside and outside the United States, the epidemiology and prevention of rabies in these two areas will be considered separately.

Epidemiology of Rabies in the United States

The marked increase in outdoor activities, suburbanization, and close contact with pets provides countless situations in which humans can come into contact with animals in the United States. For this reason, rabies prevention is usually based on an understanding of the epidemiology of the disease in animals rather than analysis of individual activities that may put persons at risk.

Wild Animals

The number of rabies cases in wild animals has increased markedly since the 1950s. Numbers of rabid wild animals exceeded rabid domestic ones in 1960. By 1991 wild animals accounted for 91% of the 6,974 cases, and cases were reported in one or more wild species in 48 of the 50 states (Table 11.1, Fig. 11.1) (1).* Raccoons (Procyon lotor), skunks (Mephitis mephitis), and bats (various species) were responsible for 83.7% of the cases.

Monoclonal antibody analysis has allowed the rabies virus strains or variants affecting terrestrial wildlife in the United States to be classified into six distinct variants (12). Geographic separation of the outbreaks allows further division into 10 distinct outbreak areas. In each of these areas, other rabid terrestrial animals (including domestic) appear to acquire the disease as a result of spillover from wild animals. Recently, nucleotide sequencing has revealed more diversity of rabies virus strains (13,14).

Raccoons now account for the largest proportion of rabies cases. Although raccoon rabies has been enzootic in the Deep South since the 1950s, the disease was not present in the Mid-Atlantic states until 1978, when raccoons that were presumably incubating the disease were transported from the Deep South to stock hunting clubs (15). In 1990, for the first time, raccoons exceeded skunks as the predominant rabid wild animal. In 1991, the number of rabid raccoons increased 69.1% to 3,079

* Rhode Island did not report any cases of the disease; Hawaii reported one imported case of bat rabies but is still considered rabies free.