The Association for Research in Nervous and Mental Disease (ARNMD) meets annually in New York to present a symposium on one specific topic. The first session in 1920 dealt with von Economo’s encephalitis. The second was on multiple sclerosis (MS) [1].

The ARNMD Commission then concluded that MS affected chiefly young adults and men more than women. Duration averaged eight years, and it seemed to affect skilled manual workers more often. Geographically, in the United States it was most common near the Great Lakes, and in Europe more in the north than the south. Laboratory and field work, including “methods suggested by ecology,” were needed to define the cause.

These ecological methods constitute the field of epidemiology, which may be defined as the study of the natural history of disease (Fig. 1). The epidemiologic unit is a person with a diagnosed disorder. The basic question, after diagnosis, is how common is the disease, and this in turn is described by measures of the number of cases as numerator within defined populations as denominator. These ratios, with the addition of the time period to which they pertain, are referred to as rates.

The population-based rates in common use are the incidence rate, the mortality rate, and the prevalence “rate.” The incidence or attack rate is defined as the number of new cases of the disease beginning clinically in a unit of time within the specified population. This is usually given as an annual incidence rate in cases per 100 000 population per year. The mortality or death rate refers to the number of deaths with the disease as the underlying cause of death occurring within a unit of time and population, and thus an annual death rate per 100 000 population. The point prevalence “rate” is more properly called a ratio, and it refers to the number of the affected within the community at one point in time, again expressed per unit of population.

Age-adjusted national death rates for MS in the 1950s indicated that the rates in most of Western Europe were in the order of 2 or more per 100 000 population per year (Fig. 2). The northernmost lands of Europe were closer to 1 per 100 000, as too were Canada and US whites, and New Zealand. In keeping with the ARNMD Commission report, there was in Europe a sharp drop from rates in the north to those for the Mediterranean basin. South American rates were rather low, as were those for US non-whites (of whom more than 90% were African American). The Asian and African rates were clearly the lowest recorded.

The male preponderance described by the Commission was seen in MS death rates near 1960 in the US, but only among those of higher age (Fig. 3). White women were clearly in excess at younger ages. Incidence and prevalence rates in Denmark near 1950 had a similar pattern with higher rates for women among the younger patients and equal rates by sex in the older ones (Fig. 4). Prevalence rates in Ireland in 1971 had an equal sex ratio only at the oldest ages.
Fig. 1 Epidemiology: content and uses. (Modified from [2])

Fig. 2 Average annual death rates per 100,000 population for multiple sclerosis by country, 1951-1958, with rates adjusted for age to the 1950 US population. W, white; NW, nonwhite. (Modified from data of Goldberg and Kurland [3]; from Kurtzke [4])