

# PROBLEMS IN THE MEASUREMENT OF THE PROGRESSION AND REGRESSION OF CHRONIC DISEASE

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**I**LLNESS is a dynamic process, as is health. The subject of this discussion, problems in the measurement of the progression and regression of chronic disease, quite correctly assumes the existence of difficulties in identifying, measuring, and analyzing the perceptible events in the natural history of a chronic disease. Without laboring the definition of "chronic disease," I should like briefly to mention a few of the more conspicuous hazards to be faced, if we are to understand the behavior of some of these conditions.

The problems might be considered in three categories, which are not mutually exclusive: first, those associated with the disease itself; second, those related to the population at risk; and third, those inherent in the long interval of time necessary for observation.

Little is known of the epidemiology of the chronic diseases of public health significance today, and there are also many gaps in the clinical knowledge of these same diseases. So imperceptible may be the time of onset, that it is difficult to determine. The time of discovery or first recognition of disease may be known, but the disease may have progressed to a generally recognized far-advanced stage. Consequently, much of the natural history is missed or available only in retrospect. The inability to fix the time of onset compromises our information concerning duration. Any data on morbidity, incidence, and prevalence are subject to this limitation.

Generally acceptable criteria for early diagnosis of some of the chronic diseases, such as diabetes, and the hypertensive states are not yet available. Likewise, uniform and acceptable criteria for the objective measurement of progression or regression of such diseases are also lacking, or are subject to variation

in personal analysis or interpretation. Objective clinical milestones are badly needed in the course of chronic disease. They need not only to be identified and accepted, but also to be interpreted. For example, the distinctions among reinfection, relapse, and recurrence must be drawn.

The second group of problems, those associated with the selection of a universe of study, will be developed more fully elsewhere in this panel, but I should like merely to indicate that they too comprise hazards in the measurement of change. Change to be meaningful in the epidemiologic sense must be measured with respect to a definable base line. This base line may be established from a representative group of cases, the selection of which itself is difficult, or in a sample of the population. The validity of the observations of change is determined in part by the denominator, i.e., sample of population.

Our knowledge of the epidemiology of many chronic diseases is so meagre that we have little understanding of the influence of such factors as race, sex, and age. Any study of progression or regression must be related to such fundamental factors as these. The original sample must be of considerable size because of the manifold classifications required, if statistical reliability is to be obtained.

The third group of problems in measuring progression and regression of chronic disease are those associated with the time interval involved. The interval must be relatively prolonged, because of the very character of chronic disease and the gradual course of many of the recognized changes. In some instances the course of change must be measured not only in years, but in decades. Frost and others have developed the statistical techniques for expressing change in the cohort during such intervals. But as previously noted, date of onset is difficult to ascertain, and frequently the significance of changes which have occurred almost imperceptibly must be based on retrospective observation.

A study of change can be effectively accomplished by longitudinal studies, which do not require assumptions necessary in

a cross-sectional study. However, they are notoriously subject to unforeseen influences; serial observations sufficiently frequent enough to be complete are expensive; and the initial study group must be of considerable size if differential observations are to be significant and generalizations are to be valid. Further, in such studies the personal bias of different observers may introduce pertinent changes in observations over the period of time required for the study.

In summary, three groups of problems have been enumerated which have to do with the recognition of chronic disease, and its progression and regression. They are associated with the disease, with the case and the population under observation, and with the time interval of observation. There has been no attempt to develop these problems, or to suggest possible solutions.