

Table 4 presents cumulative relative survival information for 0-5 years and for 5-10 years for all causes of death by sex and level of blood glucose. It was seen previously that there were differences between the groups in the prevalence of ASHD and hypertension. To consider the possibility that selectivity in the choice of treatments (i.e. that persons with history of cardiovascular problems might be more likely given one specific treatment) might account for observed differences in survival between the groups, relative survival was also evaluated separately for individuals with and without previous history of ASHD or hypertension. Results for all causes of death are presented in Table 5 for those with negative history and in Table 6 for patients with a positive history.

For both sexes the overall relative survival in the first 5 years is lower for persons on insulin than for those in either of the other two groups, and the experience of both the tolbutamide and diet groups is similar. For individuals who survive at least 5 years, however, the relative survival experience for persons receiving tolbutamide is worse in all cases than that of those on diet and in the middle ranges of blood glucose it is worse than for persons on insulin alone. The results are most striking for persons with positive histories of ASHD or hypertension.

The above results have considered all causes of death. Tables 7, 8 and 9 present similar findings for deaths attributable to all cardiovascular causes (ASHD and all heart related deaths). These results are consistent with and are more striking than those presented above. In most cases, there appears to be a decline in relative survival with increasing level of blood glucose among persons who survive at least 5 years.

During the first 5 years, the relative survival between the groups is not very different and is generally higher in the subgroups with no history of ASHD or hypertension. In the period from 5 to 10 years, however, relative survival from cardiovascular causes is lower among those on tolbutamide than either those on insulin or those controlled by diet alone. The lower relative survival for those on tolbutamide is more pronounced among males.

Because all of the risk factors discussed previously are important and a method of quantitating an individual's overall risk without substantially reducing the numbers available for comparison is desirable.

Kanarek (17) has recently investigated a method of using risk factors to predict survival. Basically this method involves calculating a risk for each individual which is a function of his particular set of risk factors (e.g. age, sex, average blood sugar). These individual risks, λ_i , are known in statistical terms as the force of mortality or instantaneous risk of death and are defined by:

$$\lambda_i = a + \sum_{k=1}^c b_k x_{ki}$$

where we are concerned with evaluating the effect of c risk factors. For purposes of this analysis four factors were selected: age at first visit, history of previous myocardial infarction, interval between onset of diabetes and first visit and average blood sugar. Therefore an individual's risk is defined as follows:

$$\lambda_i = a + b_1 (\text{age at first visit}) \\ + b_2 (\text{history of previous myocardial infarction}) \\ + b_3 (\text{interval between onset and first visit}) \\ + b_4 (\text{average blood glucose}).$$

Estimates of a set of coefficients (a , b_1 , b_2 , b_3 , b_4) were obtained for each of 4 age-sex groups: males 40-59 at first visit, females 40-59, males 60 and over and females 60 and over. Each age-sex group was then stratified into three levels of risk—low, middle and high on the basis of the λ_i and survival by treatment was evaluated using life table methods. The λ_i as described above have been shown to be reasonable delineators of low and high risk individuals. (See ref. 16.) The estimated coefficients and risk level stratification are presented elsewhere (18). Table 10 presents the 0-5 and 5-10 year cumulative survival rates and their respective standard errors for all causes of death and from cardiovascular causes for males and females 40-60 and Table 11 presents the same information for individuals over 60 at entry to the study.

In all groups the probability of surviving either 5 or 10 years decreased with increasing risk level. For all causes of death, in the first five years, survival was lowest among persons on insulin and best among those on diet. However, for individuals who survive at least 5 years, the probability of surviving the next 5 years did not follow this pattern. In fact, in many cases most notably those over 60 at entry, survival for the second 5 years was poorer for the