THE ROCKEFELLER UNIVERSITY

1230 YORK AVENUE NEW YORK, NY 10021-6399 U S A

Joel E. Cohen 212 570-8883 -8884

March 9, 1984

Professor Joshua Lederberg
Rockefeller University

Dear Josh:

The standard procedure for computing the effect on the life table, and hence on expectation of life, of removing a given cause of death, assuming independence between it and the remaining causes, is described by Spiegelman, reference 17 in the enclosed paper of mine from Health Services Research 1975. I refer to this technique on page 95.

Using this standard technique, Nathan Keyfitz (in Surgical Rounds 1978, enclosed) estimates that complete elimination of cancer at the 1964 rates would increase the male expectation of life by 2.3 years. More importantly, Keyfitz argues that this number is an upper bound on the actual improvement, if risk of cancer is positively correlated with other risks of mortality. The idea is that individuals saved from dying of cancer will be at elevated risks of dying from other causes, so the realized gain in years of life lived will be smaller than if causes of death were independent.

A useful idea in the other enclosed paper by Keyfitz (from the IUSSP meeting in Mexico 1977) is the idea of conditional life tables (p. 498), which, so far as I know, have never been constructed or even attempted.

The enclosed article by James Fries (New England Journal of Medicine 1980) defends a point of view that appears to differ from what I understood to be the presumption of some of your comments over the phone. Fries argues that, rather than facing increasing nursing costs during the tenth to fifteenth decade of life, people will increasingly lead healthy lives up to some age near 85 and then suffer an increasingly brief period of ultimately fatal sickness. (I would add that, of course, that terminal sickness may become increasingly costly. Victor Fuchs at Stanford has recently gathered data showing that the overwhelming proportion of medical costs for the aged are incurred during the last year of life.)

I have done an unpublished analysis of the U.S. white male 5-year survival probabilities from 1930-34 to 1975-79 for the 5-year age groups from 20-24 to 80-84. As would be expected, in all cases, the probabilities of survival have been increasing, at least until recently. The logistic model is a plausible first approximation to the change in survival probabilities for most age groups, but is not very good for the youngest two or three age groups, say up to age 34, where survival probabilities have leveled off during the last few decades. However, even for these age groups, a logistically increasing trend is a better approximation to the survival probabilities than is an assumption of constancy over time. Using the separate logistic curves fitted to the survival probabilities of each age group, I projected the 5-year survival

probabilities forward until 2005-2009 and then assumed they were constant at the values attained in 2005-2009. The hypothetical expectation of (remaining) life in 2005 at age 20 is 55 years, and at age 50 is 27 years. These are very modest increases over the expectations of (remaining) life of 52 and 24 years, respectively, computed from the survival probabilities of 1975-79. The point is that even if the aggregate (not cause-specific) forces of mortality continue to decline for the next quarter century as they have over the past half century, the gain in expected years of life for men who reach adulthood will be very small. Of course this computation does not consider morbidity.

Yours,

Joel

Joel E. Cohen

Enclosures: 4 papers