As we approach the millennium, it is worth asking some fundamental questions involving the life insurance industry. Perhaps the most fundamental of questions remains our year by year mortality projections and how the dual observations of an upward trend in life expectation and an increasingly sophisticated diagnostic and treatment strategy will interplay in the balance of determining a fair premium for a life insurance policy at competitive rates.

The expectations of life at birth for the total population has increased in every quintile from 1970. In 1970 it was 70.8 years, in 1975, 72.6 years, in 1980, 73.7 years, in 1985, 74.7 years, in 1990, 75.4 years, In 1995, 75.8 years and predicted to be 76.3 years in 2000. This is an increase in life expectancy of nearly 8% in three decades or 0.26% increase per year. As an industry we are becoming more and more sophisticated in our ability to stratify the mortality risk and calculate a fair and competitive premium. So what do we expect in the first few decades of the twenty-first century in terms of life expectancy prolongation and what are the critical factors in our ability to stratify risk more exactly?

Life Expectancy Prolongation. Not only may one look at the expectation of life at birth for the total population, it is more relevant to our business to look at the average life expectancy for an average male of 50 years of age. This reveals an increase of 20% in average life expectancy in three decades or half a percent per year. These latter numbers more accurately reflect changes in life style, disease prevention, disease recognition and treatment rather than the expectation of life at birth as it is not influenced by perinatal mortality.

Life Style: In the previous issue of The Journal in the Commentary section there was an article on the “metabolic syndrome”. The clinical picture of which we know well. Obesity, impaired glucose tolerance, hyperlipidemia, hypertension, hyperuricemia, fatty liver and cholecystasis, to which we may add smoking a cigar, are all caricature signs of the successful, prosperous and over-indulgent businessman. Likewise, those of us whose behavior resembles this, will, after our dinner of sweetbreads, washed down with claret, finished with port and a cigar, promise ourselves after that first agonizing pain in the great toe, to give up our dietary habits and do some exercise when the level of indomethacin lets us. People are much more sophisticated in the US and Europe now than three decades ago. A large percentage know about cholesterol levels and good and bad lipoproteins. They know their blood pressure and often have had checks in the supermarket for diabetes mellitus and carotid stenosis. Most people know their ideal weight and understand that some exercise is good for them.

Disease Prevention: It is tempting to attribute much of the increase in life expectancy described above to disease prevention, but we are looking forward to a quantum leap in progress in the next few years. The development of many vaccines for disease are already on the horizon. We must however build caution into our optimism. Fewer than half the children under two years of age in the US are fully vaccinated and it is estimated that 70,000 people die each year from vaccine-preventable
diseases like measles and hepatitis B. Currently vaccines are contemplated for HIV/AIDS, hepatitis C, asthma, certain cancers, malaria, diabetes mellitus and multiple sclerosis. The widespread introduction of these preventive measures would conceivably cause a drop in mortality rate and a prolongation of life expectancy.

Disease Recognition: It is tempting to consider each disease process in binary terms, you have it or you don’t. Medical underwriting is the very process of defining the Gaussian distribution of severity that describes most diseases. The average course of the disease rates a certain mortality ratio and the form fruste may be standard whereas the flagrant disease may carry a mortality ratio that is too high to price. To take but one test. Troponin T levels following an acute myocardial infarction give a clear correlation as to the 30 day mortality following the acute event. Do they give us any longer term predictive ability? There are many such diagnostic tests that we are awaiting study results. Obviously, while the knowledge of early deaths are important, from a life insurance underwriting perspective we want to know the more distant future.

Treatment: More accurate diagnosis, earlier diagnosis can often modify the natural history of a disease. Easier surgical approaches and more direct such as “key-hole” surgery to the coronary arteries, stenting a narrowed coronary artery with a new low-profile catheter system not only make the procedures easier to perform but may be used at an earlier time where, to delay may in fact damage the organ.

Enhanced Risk Stratification. Enhancement of risk stratification can be due to either more sophisticated diagnostic tools, to better information concerning the proposed insured and finally to deeper knowledge of the medical literature.

Advances in Diagnostic Acumen: Essentially screening has been of immense benefit to the medical underwriter of insurance products for using such tools for small amounts of money we can rule out significant amounts of disease. Indeed it has been the life insurance medical directors, who have by and large from the turn of the last century, brought into clinical use; urinalysis, blood pressure measurements, electrocardiograms, cholesterol and lipid profiles, tests for diabetes mellitus and most recently tests for HIV/AIDS and hepatitis screening.

In the future it is likely that we will see broad screens developed for metabolic disease, and disease products as well as for tests to identify pharmaceuticals that indicate treatment of specific diseases. They can be used for both adversely affecting and benefiting the proposed premium. The physical examination that misses someone who has severe hypertension maybe supplemented by the finding of a diuretic or antihypertensive drug in the urine. Perhaps in someone who has had a myocardial infarction, and been found to have a high LDL-cholesterol, the presence of evidence from the urine that they are currently on a lipostatin might give them credits.

Dr. Francis Collins predicted that the human genome project is likely to be completed in 2003, two years earlier than planned. Although at the moment the performance of specific gene testing is limited practically to a handful of genes, the development of the “gene chip” by which thousands of tests can be performed almost instantaneously changes the dynamics dramatically.

Availability of Medical Information: The quicker the medical record moves towards electronic format, the quicker, and cheaper becomes the review of medical data by the medical underwriter. The more the record is stored digitally, the more chance that there is for the complete medical records to be transferred to the life insurance company and for that company to develop edits to select the important information from the massive amounts of data. It is not beyond the bounds of possibility that if the proposed insured has had medical care from the same physician or
group of physicians for more than a period of time such as five years that the moment that the proposed insured gives permission for the data to be sent to the insurer, that the scans can be performed electronically and simultaneous the policy can be issued.

Missing Patient Data: The closer that the medical record comes to being electronically stored, it matters little if the proposed insured has a myriad of attending physicians or simply one. A switch can integrate all the different records and the edits can remove duplicative data.

Telephone/Internet Underwriting: For those that have not had the continuity of care such that the proposed insured has been seen for routine examinations at intervals, the medical questions that appear on the application can be either answered over the telephone or directly at a terminal which communicates directly with the medical underwriting department.

Dissemination of Medical Knowledge: Apparently some twenty years ago there were over one million peer reviewed articles which appeared in the medical literature in the English language. There are clearly more now! Although there are books, articles, seminars and lecture demonstrations, it is still difficult to search the medical literature except to find if there are studies that either accept ones own hypothesis or reject it. The difficulty comes when there are articles in the literature which support both positions. Does something or other ever appear with this or that condition? With the available literature, it would be a decidedly unlikely event not to find one match, but from that one match, it is difficult to determine the denominator.

There is hope, however! Day by day the search engines are becoming more sophisticated and the experience of the user be they a medical director or underwriter are becoming better trained in how to use the data intelligently. There will, I have no doubt, be methods for us to insert clinical outcomes studies and convert them into mortality tables almost

In conclusion, we are in exciting times, Moore's rule describes the relationship of time to the size of the microchip. It is exponential. Likewise, I don't doubt that the ability for us to underwrite from a medical perspective will increase exponentially in terms of medical knowledge, interpretation of that information and comparison with the expected.

References
2. US Life Tables, Section 6, Table 6-4 Life Table Values by Race and Sex: Death - Registration States, 1900 - 1921 and United States, 1929 - 1931 to 1989.