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Tales From A Journey of Discovery

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In 1990, I started a personal journey which was unsuggested, unpaid, and unbeholden. It was to find out all I could about old age mortality, particularly at 90 and over. The project was a bit like climbing Everest: just because it was there.

Well, its 25 years later, and the results are at hand. They contain a couple of surprises:(1) at upper ages, mortality is higher for females, than for males, not lower; and (2) mortality after 97 doesn't increase; it decreases. What's going on here, anyway?

There are recent theoretical papers about longevity. But I looked in vain for any explanations of these surprises, which are the facts on the ground. So, let me explore the issue.

A. THE RESULTS

For the field of study, here are the ratios of female-to-male mortality:

Central Age	Ratio
67	.834
72	.569
77	1.073
82	1.292
87	1.030
92	1.345
97	1.159
100+	.703

The field of study is the important nonsmoker, middle- to upper-class market. (Currently, this can be thought of as policies for $100,000 or higher.)

The published SOA-Industry Life Experience, 2005–2007, has been extensively analyzed, and it confirms the main findings above: female mortality is higher than male mortality at ages 77 to 87, but lower at younger ages. (At ages 90 and up there are no SOA-Industry useable data, so the Bragg data stand alone.)

B. THE SPIKE AT 77

For the first time, the ratio spikes up dramatically at age 77. My explanation for this is "stress." The average female is still looking after the grown kids and is worried about finances, health and health insurance issues.

Also, I consulted "The New Health Contingencies." They showed that, for the 77 bracket, the prevalence of mental illness (for the first time) was higher for females than for males (14.62 percent and 13.31 percent respectively of the total population). This discovery seemed to corroborate the "stress" explanation.

The situation is not all bad, because the recovery rate is 14.63 percent for females. Also, I point out that the mental illness explanation works both ways; it also explains why male mostly is worse at the younger ages!

C. THE SPIKE AT 92

Nowadays, I am 94, and barely hanging on to my good denominator position in that 90–94 bracket. I again consulted "The New Health Contingencies" (which are very fascinating). I looked at prevalence in the sick category (other than mental illness). 63.9 percent of females were sick compared with 60.9 percent for males. Again, this seemed to corroborate the "spike" at 92.

D. THE DECREASE AFTER AGE 97

From age 97 to age 102, mortality decreased: (17 percent for males, and an astonishing 50 percent for females.) Thereafter, mortality seemed to "plateau." Females regained the role of being far better than males!

I consider this decrease after 97 to be the results of survivorship of the very fittest of the very fittest.

E. STATE OF OUR JOURNEY

Captain Cook went to the South Seas just to observe the transit of Venus. But serendipity set in and he ended up making three major discoveries (New Zealand, Australia, and Hawaii). He knew he couldn't have done any of this without a brand new tool: Celestial Navigation using the new chronometer. Finally he made a major proposal (colonization).

Our modest journey is parallel. We do have a brand new tool ("The New Health Contingencies"). Serendipity did set in and we made three new discoveries: (1) the mortality differences based on age and gender; (2) the mental illness explanation for those differences; (3) the discovery of recovery rates. Finally, we do make a major proposal (see Section G below).

We need to discuss mental illness much more thoroughly, and do so in Section F. That section also deals with recoveries.

F. MENTAL ILLNESS RESEARCH

Mental illness is suggested as a reason for the mortality differences observed. So this section deals with the present state of actuarial research in this most important topic.

Mental illness is a major scourge. A recent story estimated 43 million adult sufferers in the U.S. Its effects include suicide and even jail overcrowding. A front page headline in the April 22, 2016 edition of *The New York Times* reads, "Sweeping Pain As Suicides Hit A 30-Year High."

Mental illness permeates Federal disability programs and has led to coverage requirements for insurance programs, including the Affordable Care Act, and long-term disability coverage.

There are numerous types of mental illness, ranging through severe depression, post-traumatic stress disorder, concussion disorder, dementia, bi-polar, cognitive disorder, Alzheimer's disease, and many others. Classification is very difficult. To date, actuarial classification is by age, gender, smoking status, mortality ratio, and activities of daily living. In descending order, these activities are (1) needs skilled care, (2) needs assisted living, (3) needs home care, and (4) needs walk-in care. Cases are fitted into these classifications, regardless of the "clinical description." This system is fairly parallel to classical underwriting "table" systems.

Some general comments: (1) mortality ratios for mental illness are not particularly high, but it is still very important, because of its high prevalence; (2) gathering all of the conditions under a single label, mental illness seems gratifying for purposes of analysis; and (3) we hope that our use of the term mental illness does not conger up thoughts of extreme sickness. By far, the majority of cases are quite mild, requiring only home care or walk-in care.

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A prevailing "myth" about mental illness is that it only gets worse. However, this myth is wrong. Current actuarial research shows that recovery rates are quite good. This news could work wonders if properly pursued. It is also of interest that mental illness is not a major problem at very high ages (90 and over) because the prevalence of mental illness has declined.

Actuarial study of mental illness has made major use of "The New Health Contingencies," which are very fascinating and require extensive separate description. They are based on Quantum Mechanics and produce detailed results for incidence, prevalence, and especially recovery. They apply to all forms of disability, not just mental illness. A well-known application of "The New Health Contingencies" is health expectancy, which provides a break-down of life expectancy into the periods: Healthy, Needs Assisted Living, and Needs Skilled Care. Results were published in 2008 for the two candidates; they showed that both McCain and Obama would remain healthy for at least 8 years. It's nice to have predictions that come true.

The following brief table gives some information as examples for mental illness.

Age	Prevalence		Recovery Rate	
	M	F	M	F
67	7.74	4.35	19.79	17.93
72	10.15	8.36	18.45	15.88
77	13.31	14.62	14.65	14.63
82	17.85	18.47	9.72	11.01

Notes: (1) All numbers are percentages; (2) recovery rates are annual and consist of (a) movement to a more favorable activity level, and (b) total recovery; (3) "The New Health Contingencies" are capable of splitting (a) and (b).

Male mortality is higher through age 72; but female mortality is higher above that age. The prevalence pattern is exactly that way also. In fact, it was the prevalence pattern that caused us to

come up with the mental illness explanation, which applies in both cases!

We can report two famous recoverees from mental illness:

(1) Winston Churchill—Throughout his life, Churchill suffered from severe depression which he called "the black dog." However, he always managed to recover (through his own efforts).

(2) John Forbes Nash, Jr.—of "Beautiful Mind" Oscar winning fame. In his 30s, Nash was institutionalized for severe mental illness. Over a 10-year period, he managed to recover. Tragically, Nash was killed in a taxi accident in May 2015.

G. A PROPOSAL

Finally, I should say that the discovery of recovery rates (for all illnesses) has caused me to advocate the use of recovery rates as a second decrement (after mortality) for health insurance reserving and pricing; The financial benefits would be very welcome. Untold benefits could also arise in the treatment field, especially if the reasons for recovery are further researched and put to use.

H. NOTE TO REINSURANCE SECTION

I have been honored in the past by meeting with and providing data to the Reinsurance Section on many occasions. The above is a continuation along those lines. As usual, I would appreciate comments. A more widespread exposure could ensue. I can be reached at nbk@mindspring.com.

On a slightly different topic: the subject of Longevity Risk is quite hot right now. I believe that it is eminently insurable, as long as we know what is actually going on in the mortality world.

Longevity risk insurance is a needed and very good service for the public. ■

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