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Predicting health trajectories

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With data going back to pre-World War II, the HRS paints a picture of how we will age

As people age, men are less likely to have physical disabilities than women, but die earlier. Those with higher socio-economic status and education levels have less physical disabilities as they grow old. Less educated single women are often the least financially prepared for retirement.

Those are the main findings of the U.S. Health and Retirement Study (HRS), described as “the mother ship” of statistics on aging by **Michael Hurd**, Principal Senior Researcher and Director at the RAND Center for the Study of Aging in California, USA.

The facts make that claim difficult to dispute: Over 20,000 respondents aged 51 or older are interviewed every two years to measure their health in terms of limitations in performing basic Activities of Daily Living (ADLs – bathing; walking; feeding; transferring; dressing; toileting). On top of that, the data incorporates those born before 1924 and up to the early Baby Boomers born between 1948 and 1953.

Forecasting disability rates

Using the HRS data, Hurd and the Mannheim Research Institute for the Economics of Aging (MEA) produced the report *Pathways to Disability: Predicting Health Trajectories*. Among other things, the report predicts that disability is highly predictive of mortality. For example, a 65-year old with no ADL disabilities has a 78 percent chance of living to 75 years of age. However, if that same person had two or more ADL disabilities, that figure drops to 53 percent.

In other words, future health and disability are strongly correlated to health at 51, and conversely, survival to older ages provides information about health and disability at younger ages. Therefore, can we now confidently predict how future cohorts' health trajectory will be?

"Well, we can make predictions, but I'm not sure how confident I will be," cautions Hurd. "We certainly do not understand what will happen when the, if you will, obese generations get into their late sixties and seventies. These will be people who will have had diabetes for 15-20 years, and it's a fairly large fraction of population. We have no historical experience in what that will mean."

Speaking to *Perspectives@SMU* at the sidelines of a recent SMU SKBI conference, *Retirement Readiness: Income adequacy, long-term care and social well-being*, Hurd pointed out one disease that has remained constant, and is likely to remain so: dementia.

"From what we know now, age-specific rates of Alzheimer's and dementia are pretty much constant over time. There's maybe a little bit of improvement in vascular dementia – that is, dementia associated with strokes – but not with respect to Alzheimer's. And that means that as the population ages into its eighties and early nineties, we will have a greater fraction of people in those ages, and we'll have a greater fraction of people with dementia. So we can predict that."

Microsimulation

Much of the prediction is done using a technique called microsimulation.

"For microsimulation, you generally replicate the real world," explains **Peter Davis**, Professor of Sociology at the University of Auckland. "You tend to derive the characteristics of your agents from real entities and you don't want them to behave in too outlandish a fashion."

By "agents" Davis means the individual data points that make up the data, which in the case of the HRS are the individual respondents along with their education level, income, marital status, and ADL disabilities. Based on this real-life data, it is possible to run microsimulation software on a different sample group to predict future health, wealth, or any data category.

"We do a huge amount of microsimulation to look at economic preparation for retirement in the United States," says Hurd of the RAND Center. "We take about 1000 people aged 65-69 in the HRS, we assess their wealth, their pensions, all of these kinds of things. We ask, 'What is the probability that they will use up their resources before they die?' And for some groups the probability is very high, such as single women with less education."

Policy matters

Besides retirement preparedness, Hurd's research also shows that education level correlates strongly with health: at age 50, the poor health level of persons with eight years of education is about four times as high as the poor health level of those with 16 or more years of education.

With all the data at hand, policymakers can make provisions for various scenarios, and hopefully minimise the misery. But good policy is borne of quality data, and on this front, researchers are doing their bit.

"In England, they have the English Longitudinal Study of Ageing, or ELSA. Europe has the Survey of Health, Aging and Retirement in Europe, also called SHARE," Hurd elaborates. "Americans are using European data while Europeans are using American and English data. Many people are starting to use CHARLS, which is the survey in China, and JSTAR which is the survey in Japan. People worldwide are using datasets, open datasets available to anybody in the world."

However, even with all the data in the world, researchers such as Hurd and Davis can only look at historical data to predict future health trajectories. In the same way that current health trajectories will be significantly affected when today's obese youngsters age, future medical costs could also change dramatically, and not just for the worse.

"What we cannot predict is whether there will be breakthrough in healthcare treatment for dementia," Hurd muses. "The costs we attribute to dementia are to the order of \$50,000 per year per case. And this is over and

above what you would count as normal costs, such as nursing home expenses. So if we delay the onset of dementia it's going to relieve strain on the healthcare system very substantially."