

The Role of Acute Health Shocks in the Evolution of Permanent Disability

Mark Cullen
Stanford University School of Medicine

Amal Harrati
Stanford University

James Hill
University of North Carolina at Chapel

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Although the evidence is overwhelming that retirement decision is multifactorial in origin, the contribution of adverse health as a predictor of early exit from the workplace has been established beyond debate. Overall health status, injury and hospitalization have all been shown to hasten the exit once economic incentives, baseline work status, demographic features and job characteristics are accounted for. Efforts to address the impact of adverse health on prolonged productive work-life have been hampered by limited information on how these factors conspire and interact to impact the work outcome, and even less is known about interventions that might alter their negative impact; in theory wellness programs to improve overall health, rehabilitation strategies to mitigate the negative impact of a shock, or altered incentives for return to work could offer benefit. New evidence that a sizeable fraction of even acute hospitalizations might be directly preventable by better primary care—so-called ambulatory sensitive conditions—offers yet another theoretical approach to prolonging productive work assuming such admissions are as responsible for bad outcomes as hospitalizations in general.

In a recent study availing exceptional linked administrative records of health and employment in Holland, Garcia-Gomez and others have demonstrated how the economic impact of an acute health shock persists, resulting in drops in future employability and income, as well as substantial household impact as long as 6 years subsequent to an event, and in a system with a strong personal safety net. However this work involves a very diverse sample of workers, and little is known about how much of this difference in outcome may be explained by differences in baseline health between those with health shocks and those without. Comparable data are not generally available in the US, so most work has relied either on self-reported health or income data or both from surveys, and follow-up has been limited. Although limited to one firm, the Alcoa Study of all workers since 1985 at multiple US locations, with a large diverse workforce and heavy representation of (likely more vulnerable) manual workers offers several potential strengths for exploring this question: First, the entire workforce faces almost identical incentives and carry identical health benefits; where there is choice in levels of coverage (eg deductibles; wage replacement rates for STD etc) these are observed prospectively. Second, all records regarding employment, health, work conditions, absenteeism, compensation, overtime and the like are derived from administrative data recorded contemporaneous with the events themselves. Third, these datasets have been updated continuously through the present, and because we have employee and spouse SSN's are directly linkable to SSA and IRS records of workers and their spouses (about which more shortly). Various observations and methodologic advances have been previously reported using these data in the environmental and social epidemiology, health services, and welfare economics literatures

Previous work by our group has yielded several important clues regarding the impact of health shocks. First, we have confirmed that hospitalization results in a substantial loss of work, with almost 12% out of work at 12 months after a hospitalization from any cause. This effect spans the range of medical reasons for the admission, though musculoskeletal conditions and cancer confer the worst prognoses, GI conditions the best and others intermediate. Worse pre-shock health status, female sex, older age, lower education and income and higher wage-replacement while on STD all augur delayed or diminished probability of return or both. Looking at determinants of early retirement, we also find that higher physical work demand and workplace injury contribute to early exit, while workers who have chosen to reduce the demands of their work at an earlier age appear likely to stay at work longer. Notably in this study of older

workers nearing retirement age the impact of acute hospitalization was not substantial compared to other determinants, but this may reflect the limited sample studied

In this series of studies we focus specifically on the role of acute health shocks because they would appear from an intervention perspective to be “low hanging fruit”. Unlike the very insidious evolution of chronic disease and declining health status more generally, acute events are readily characterized and timed, not subject to patient preference given the very high-bar for admission to hospital in the US, and some—given increased research in health services—potentially preventable altogether through effective ambulatory health care.

Overview of study approaches

With the objective of estimating the consequences of an acute health shock for future work function, income and health, conditional on pre-shock demographic, socioeconomic, health, family and job demands, we present four preliminary analyses—preliminary because several key indicators cannot presently be identified in the data pending future SSA collaboration.

In the first, we examine work status, income and health as outcomes in a cohort of men and women having at least one hospitalization between 2004 and 2012. Covariates include health status, income, demographics, job demands (pre-event) and location-related variables that are time invariate such as union status, business group, worker engagement at location level etc. Time varying covariates include regional unemployment and other aspects of the location whose variation may impact outcome such as layoffs, sale or closing.

In the second study we examine the same outcomes comparing two groups—the above cohort and a control group matched pre-event based on as many of the pre-event characteristics as possible, using a difference in difference approach. Controls will be selected each year for cases that occurred that year, and will include all available employees who have not had a hospitalization from 2004 up to that year; they must have been working the year the case was hospitalized.

In the third study we use multi-stage life tables to assess the role of transitions from regular work into short-term disability as determinants of future work status, conditional on all of the available covariates measured on the employee, spouse, location etc, using the entire workforce since 1996 when health records first became available.

In the fourth study we develop a predictive algorithm for long term disability—typically the immediate antecedent of disability retirement-- using an unsupervised, machine-learning approach that takes into account all of the available data on each employee, with the aim of identifying covariates of *potential* relevance which may not been chosen as part of the structured analyses described above based on a prior hypothesis. Recognizing such approaches do not differentiate causality from other relationships among covariates, we seek evidence of clues that might appear early in work-life as well as support for the hypothesized role of hospitalization and other health shocks.