



# Do working conditions at older ages shape the health gradient?

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## ARTICLE INFO

### Article history:

Received 28 March 2016  
 Received in revised form 12 October 2016  
 Accepted 14 October 2016  
 Available online 19 October 2016

### JEL classification:

I1  
 J1  
 J81

### Keywords:

Health  
 Health disparities  
 Working conditions  
 Aging workers  
 Socioeconomic status

## ABSTRACT

This study examines whether working conditions at the end of workers' careers impact health and contribute to health disparities across occupations. A dynamic panel correlated random effects model is used in conjunction with a rich data set that combines information from the Health and Retirement Study (HRS), expert ratings of job demands from the Occupational Information Network (O\*NET), and mid-career earnings records from the Social Security Administration's (SSA) Master Earnings File (MEF). Results reveal a strong relationship between positive aspects of the psychosocial work environment and improved self-reported health status, blood pressure, and cognitive function. However, there is little evidence to suggest that working conditions shape observed health disparities between occupations in the years leading up to retirement.

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## 1. Introduction

There is a growing body of evidence that morbidity and mortality are distributed unequally across occupations (e.g. Mackenbach et al., 2008; Marmot et al., 1991). Workers employed in manual occupations report worse health than workers in professional occupations, and their health declines faster with age (Case and Deaton, 2005). Yet little is understood about why occupational health gradients – or differences in health across occupations – exist and how these differences are generated over the life course (Morefield et al., 2011). In particular, as our workforce ages, a growing body of research is concerned with the effect of working conditions on well-being and best practices for integrating the work environment with successful aging (for a review see Zacher, 2015). However, conditional on socioeconomic factors and health behaviors, do working conditions later in life exacerbate the health disparities we observe across occupations at older ages? This study brings together data from ten waves (1992–2010) of the Health and Retirement Study (HRS) with expert ratings of job demands from the Occupational Information Network (O\*NET) to examine whether physical demands, environmental hazards, and conditions of the psychosocial work environment impact health and

shape health disparities across occupations in the years leading up to retirement.

Examining possible links between workplace factors and health has important implications for retirement age policies and the cost of retiree health care programs. Research on how conditions in the workplace are impacting health is needed to evaluate the efficacy of policies geared toward delaying retirement and increasing labor force participation at older ages. In addition, studying older workers helps us understand the connection between work and health over the life course. If working conditions have a long-term impact on health, investments in interventions earlier in life may mitigate future health expenditures and extend the working life, allowing more workers to claim full Social Security benefits and accumulate sufficient savings for retirement.

However, isolating changes in health due to working conditions in the years leading up to retirement is challenging; causal pathways are hard to define and measure and multiple aspects of a worker's job may be impacting health. Additionally, most studies do not adequately deal with the selection bias between job choice and health, making it difficult to draw conclusions regarding causality (Kelly et al., 2011). Workers may select into occupation based on initial wealth, education, and health, or adverse working conditions may trigger behavioral responses that can have compensating or reinforcing effects on health, resulting in nonrandom allocation across occupations (Cottini and Lucifora, 2013; Ravesteijn et al., 2013). Thus, particularly for older workers, estimation must account for

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factors over the life course that could influence health and selection into jobs.

This study builds on the existing literature on two fronts. First, expert ratings of working conditions that reflect the mix of psychosocial and physical demands found in today's information and service based economy are considered alongside those already identified in industrial settings. Expert ratings of job demands from the U.S. Department of Labor's Occupational Information Network (O\*NET) are merged with the HRS to avoid any bias from self-reports of working conditions and to incorporate a much broader range of occupational characteristics into the analysis. Because the O\*NET contains data on over 200 characteristics of the work environment, the "work ability" model – the leading model for research on aging and work in the occupational safety and health literature – is used to select working conditions that matter the most for health and labor force attachment at older ages (Ilmarinen and Rantanen, 1999). These include information on physical demands and the physical environment, the psychosocial work environment, workplace support for health and functional capacity, and utilization or maintenance of work-related skills.

Second, this study uses a dynamic panel correlated random effects model to estimate more robust correlations between workplace conditions and physical, mental, and cognitive health outcomes. The panel model accounts for a variety of factors that influence health and the decision to work over the life course. In particular, self-reports of childhood health, parental education, and administrative earnings data for jobs held before individuals enter the HRS are incorporated into the empirical model. Past research on occupational health differences at older ages either does not control for childhood health/SES, education, and lifetime earnings, or does not incorporate working conditions into the analysis (e.g. Ferrie et al., 2002; Gueorguieva et al., 2009; Marmot et al., 1997). Therefore, it is not clear whether working conditions have a separate effect on health beyond education, earnings, and occupational status. Incorporating measures of childhood health, lifetime socioeconomic status (SES), and current job demands into the same longitudinal framework makes it possible to assess the relative strength of each factor in shaping health after age 50 while also accounting for the potential feedback between them.

Overall, results show a strong relationship between aspects of the psychosocial work environment and health outcomes at older ages. In particular, the degree of control and influence exercised on the job, or the extent to which jobs allow workers to use their strongest abilities and give them a sense of achievement, independence, variety, authority, creativity, and status, is associated with improved self-reported health status, blood pressure, and cognitive function. A one standard deviation increase in the amount of control and influence exercised on the job is associated with a 2.85 percentage point increase in reporting "excellent" or "very good" health – an effect comparable in magnitude to engaging in vigorous physical exercise three or more times per week. However, estimated health trajectories by age and occupational status reveal that even after controlling for working conditions and other life course measures of SES, a significant health gradient between occupations persists – i.e. white collar workers are in significantly better health than blue collar or service workers and these differences remain relatively stable at older ages. In other words, there is little evidence to suggest that working conditions shape observed health disparities between occupations in the years leading up to retirement.

The remainder of the paper is organized as follows. Section 2 provides a review of the literature and its significance. Section 3 describes the primary data sources used in this study. Section 4 explains the methodology, including the measurement and selection of working conditions from the O\*NET, the incorporation of administrative earnings data from the Social Security Administration's Master Earnings File (MEF) into the analysis, and the primary econo-

metric specification. Section 5 discusses the panel results. Section 6 uses model estimates to predict occupational health gradients by age and discusses implications for later retirement and population health. Section 7 concludes.

## 2. Review of the literature and significance

A great deal of economic research has focused on socioeconomic-related contributions to health inequality. Differences in health and health behaviors have been linked to income and wealth (Adams et al., 2003; Cutler et al., 2011; Smith, 2007; Smith and Kington, 1997), education (Conti et al., 2010; Cutler and Lleras-Muney, 2010; Lleras-Muney, 2005; Van Kippersluis et al., 2011), occupation (Case and Deaton, 2005; Cottini and Lucifora, 2013; Ravesteijn et al., 2013), and early childhood endowments and investments (Cunha and Heckman, 2007; Currie, 2009; Currie and Almond, 2011). Of course, these factors are highly interrelated, making it difficult to unravel their independent influence on health. Evidence from the Whitehall II study, for example, has shown that the work environment, social influences outside work, influences from early life, and health behaviors are all associated with differences in health (Ferrie et al., 2002; Marmot et al., 1997). Particularly with regard to occupation, the potential selection and behavioral effects, along with the scarcity of truly exogenous variation, make it extremely difficult to isolate the independent effect of occupation on health (Dias and O'Donnell, 2013).

To date, the majority of the research on working conditions and health has used cross-sectional data to show physically demanding jobs are correlated with lower levels of health (e.g. Bosma et al., 1997; Case and Deaton, 2005; Marmot and Smith, 1997). Longitudinal studies have begun to emerge that link work burdens with the health of workers at a point in time and over their careers (Fletcher et al., 2011; Gueorguieva et al., 2009; Gupta and Kristensen, 2008; Kelly et al., 2011; Robone et al., 2011). An important insight gained from this research is that the cumulative or durable impact of working conditions is potentially more relevant than any contemporaneous outcomes to health later in life. Among these studies, only one examines a large sample of older workers. Using data on the longest-held occupation reported in the HRS, Gueorguieva et al. (2009) find that health problems do accumulate over the life course and are systematically different by occupation for older workers. However, it is not clear from this analysis whether working conditions are the primary driver behind occupational differences and if they continue to shape differences in health between occupations at older ages.

Research also tends to focus on a single type or limited set of working conditions, making it impossible to explore clusters of working conditions that matter for health. Much research in the epidemiology, sociology, and occupational safety and health literature has shown that physical, environmental, and psychosocial aspects of work all have the potential to impact worker health (e.g. Bosma et al., 1997; Cheng et al., 2000; Ilmarinen and Rantanen, 1999; Tuomi et al., 2001). In particular, the decline in manufacturing jobs and the switch to service jobs have increased exposure to psychosocial job stressors (Johnson, 2007; Robone et al., 2011; Wilkinson and Pickett, 2009). More than one aspect of work at a time needs to be studied to see what their joint consequences are for health and how these pathways change over time in a longitudinal framework (Burgard and Lin, 2013). Considering a broad range of working conditions alongside those that have already been identified in more traditional industrial settings may also help pinpoint emerging hazards or specific work-related pathways that influence health in modern service sector and white-collar jobs (Robone et al., 2011).

Additionally, few studies deal with the selection bias that occurs between job choice and health, making it difficult to draw conclusions regarding causality. Particularly at older ages, convincing

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