



Occupation as Socioeconomic Status and Environmental Exposure: *Setting the Stage for Productive Collaborations between Occupational Health and Public Health Researchers*



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Background

Elucidation of determinants of the social gradient in health promises to enhance prevention for outcomes such as cardiovascular disease (CVD). As both a component of socioeconomic status (SES) and as a source of environmental risk, occupation has been shown to be associated with CVD. Much of the evidence linking work and CVD, however, is cross-sectional, and these studies are often small, limited to a single industry sector, and under-represent racial minorities. Community-based CVD research increasingly extends beyond traditional risk factors in an effort to understand socio-demographic differences in risk, but progress has been limited by reliance on overly-simplistic global measures of SES. Collaborative efforts between NIOSH and cardiovascular researchers could advance our understanding of contribution of work-related social and environmental risk factors for CVD and aid prevention by informing how and where to direct intervention activities.

We conducted a systematic review of large-scale prospective community-based CVD studies to:

- Identify practices in the collection of occupational data
- Review published findings to examine how occupational data are used in CVD epidemiology studies and what conclusions are drawn
- Identify research gaps and collaboration opportunities

Methods

Federally funded cardiovascular epidemiology studies were identified for review from the National Heart, Lung, and Blood Institute (NHLBI) website (<http://www.nhlbi.nih.gov/resources/deca/directry.htm>) and the Computer Retrieval of Information on Scientific Projects (CRISP) biomedical database (<http://crisp.cit.nih.gov>).

Study selection criteria:

- Funding dates through 1999 or later
- Health outcomes (cardiovascular)
- Study design (prospective community-based epidemiology study)

Results

- We were able to retrieve and review data for 30 of 33 studies (91%) selected
- Most (83%) studies collected descriptive occupational data (e.g., job title)
- More than half (60%) collected data on social and environmental working conditions (e.g., job strain, mercury exposure)
- Broad occupational classifications were often used in composite socioeconomic status (SES) measures in published analyses
- Authors rarely acknowledged the likely interdependence and interaction of SES and workplace conditions, despite considerable empirical evidence linking them

Conclusions:

- Although occupational data were collected in the majority of studies reviewed, these data were largely underutilized. Analysis and interpretation of occupational data within community-based epidemiology studies was hampered by reliance on composite measures of SES, which obscure hypothesized relationships between working conditions and chronic disease.
- Opportunities exist within numerous prospective community-based studies to improve our empirical understanding of the associations between workplace social and environmental factors and cardiovascular disease. Such efforts promise to enhance prevention by identifying underlying mechanisms that support or hinder cardiovascular health.
- Since completing our review, productive collaborations have been established with two of the reviewed study groups (see details in the far-right column).

Publications

Response to Invited Commentary
MacDonald et al. Respond to "Search for Preventable Causes of Cardiovascular Disease"
Sherry Baron, and Cecil M. Burchfiel
1 for publication March 11, 2009.

Special Article
Occupation as Socioeconomic Status or Environmental Exposure? A Survey of Practice among Population-based Cardiovascular Studies in the United States
Leslie A. MacDonald, Alex Cohen, Sherry Baron, and Cecil M. Burchfiel
Initially submitted September 24, 2008; accepted for publication January 9, 2009.

References:
1) MacDonald LA, Cohen A, Baron S, Burchfiel C (2009). Occupation as Socioeconomic Status or Environmental Exposure? A Survey of Practice among Population-based Cardiovascular Studies in the United States. American Journal of Epidemiology, 169 (12):1411-1421.
2) MacDonald LA, Cohen A, Baron S, Burchfiel C (2009). MacDonald et al. Respond to "Search for Preventable Causes of Cardiovascular Disease." American Journal of Epidemiology, 169 (12):1426-1427.

Collaborations

Multi-Ethnic Study of Atherosclerosis: Occupational Secondary Analysis

Background: NIOSH funds (NORA FY2008) were awarded in support of a collaborative effort to perform a secondary analysis of occupational data collected among participants enrolled in the NHLBI-funded Multi-Ethnic Study of Atherosclerosis (MESA). The multi-center MESA Study, initiated in 2000, involves a multi-ethnic sample (38% Caucasian, 23% African-American, 23% Hispanic, 11% Chinese) of men and women aged 45 and over (N=6,814) being followed prospectively for cardiovascular and respiratory disease. MESA investigators' had collected data on occupational hazards (psychosocial, physical, and chemical), however, these data had not been used in published analyses.

Objectives: Secondary analyses of occupational data from the MESA study data are being performed to examine associations between occupational exposures and sub-clinical cardiovascular disease and respiratory disease.

Status: Two manuscripts were published in 2011 and numerous manuscripts are in the final stages of development. Published analyses include a report on the reliability and validity of job control and demands scales for immigrant workers and a significant association between low job control and carotid artery intima-media thickness, controlling for conventional risk factors. Manuscripts in development are examining the occupational prevalence rates for smoking and obesity, and associations between occupational exposure to dust, mists and fumes and respiratory disease, long work hours and sub-clinical cardiovascular disease, job strain and hypertension.

Occupational Supplement to the REGARDS Cohort Study

Background: NIOSH funds (NORA FY2010) were awarded in support of a collaborative effort to collect occupational data for participants enrolled in the NINDS-funded REasons for Geographic And Racial Differences in Stroke (REGARDS) study. The REGARDS study, initiated in 2003 by investigators at the University of Alabama Birmingham, involves a national general population sample of Caucasian and African American men and women aged 45 and older (N=30,239) being followed prospectively for stroke and other vascular outcomes. REGARDS collected descriptive occupational data (employment status) among participants at enrollment, but no data on the social and environmental conditions of work.

Objectives: To obtain current and historical occupational information for all active participants (n=24,013) that will characterize exposure to adverse working conditions (e.g., schedule demands, job insecurity, job strain) previously linked to cardiovascular disease. These occupational data will augment the study's extensive clinical (e.g., blood pressure, blood assays), genetic, and lifestyle data collected during initial enrollment (2003-2007) and follow-up (bi-annual since enrollment).

Status: Administration of the survey to the full cohort began in March, 2011. To date the survey has been administered to 49% of the active cohort (89.5% participation). Planned analyses will examine pathways through which adverse working conditions are hypothesized to be associated with cardiovascular disease.