How Work Contributes to Health Disparities

NIMHD Symposium on Work

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The Observable Burden in The US

- 5000 deaths due to **injury** in the workplace annually
- 5,000,000 injuries in the workplace, recorded annually, resulting in \$50-100B loss in direct costs and productivity
- With resultant early exit from the labor force, injuries likely, result in 2% or more loss of GDP
 - Contribution to disease burden remains subject to debate





Fig. 5 CHD mortality among total population by year of follow-up.

Age-Adjusted, Annual Incidence Rate for Males by Job Grade (1996-2003)



But is work the cause? Our Dilemma:

- The way we live, and the work we do (or don't!) are not randomly assigned.
- We can't do experiments, so must rely on observing "life"
- The ability to tease out the effects of psycho-social factors-- in life and work-- are "confounded" by the presence of physical/chemical exposures in life and work

The ability to study physical environment is confounded by highly inter-correlated social stresses, behaviors and differences in health care



Theoretical Explanations for the Observed Gradients in Health Across the Life-Cycle:

- Genetic differences
- Early life environment
- Differential school experience
- Health care differentials
- Behavior differences (e.g. tobacco, diet, BMI)
- Physical environment (e.g. noise, pollution, climate)
 - Social environment (e.g. stress, social relations) *Work environment*

Potential Pathways by which Work may Contribute to the **Health Gradient**

- More dangerous jobs
- More hazardous exposures on the job
- Less control over work shift
- Higher stress
- Lower pay
- Lower status
- Less job security, especially during recession
 - Work-Job tension (especially for women)
 - Less ability to work from home (COVID-19)



(Cont.) Theoretical Explanations for the Observed Gradients in Health Across the Life-Cycle:

- Is status important per se?
- What's the role of job stress?
- How about those physical and chemical factors?
- What's happening to women as they enter the traditional male world of work?
- What role do changes in the culture of work play?
 - Has COVID-19 changed the conversation?



OR of Hypertension by Continuous Job Grade (v. hourly lowest)



Answer Questions using the following scale and according to what the job requires:

Often			Sometimes			Seldom				Never		
1	2	3	4	5	6	7	8	9	10	11	12	

- Q13 How often does the job require working fast?
- Q14 How often is it extremely important to do the work without mistakes?
- Q15 How often does the job demand simultaneous or consecutive completion of tasks that are difficult to combine (I.e. conflicting demands)?
- Q16 How often does the job permit complete discretion and independence in determining <u>how</u> the work is to be done?
- Q17 How often does the job permit complete discretion and independence in determining <u>when</u> the work is done?

Karasek Strain Model

	Control						
		Low	High				
Domond	Low	Monotonous (+/- Harm)	Sinecure (No Harm)				
Demand	Low	High Risk (+Harm)	Professional/Executive (+Benefit)				

Do Chemical and Physical Exposures at Work Contribute to the Gradient?

- 25-50% still exposed to major hazards
- Strong inverse relationship between education and hazard, though less with income
- The unanswered question is: what hazards remain that might explain excess risk for lower SES individuals





Results for PM2.5 (mg/day)* and All-IHD incidence (log scale)



PM2.5 concentration transformation: $mg/m^3x10 = mg/day$ 26

Risk Factors for Injury: Gender

	Injury Rate (95% CI)
All Jobs (n=58)	
All Employees	14.2 (13.8-14.6)
Males	14.3 (14.0-14.7)
Females	22.4 (20.8-24.0)
RR	1.6 (1.4-1.7)
Selected Jobs (n=14)	
All Employees	14.2 (13.8-14.6)
Males	13.6 (13.2-14.0)
Females	21.6 (19.9-23.5)
RR	1.6 (1.5-1.7)

➢Injury rates for women are significantly higher

➢ Relative risk (RR) shows women are 1.6 x more likely to be injured than men in comparable jobs

Risk Factors for Injury: Gender

Injury Rates for Males and Females by Standardized Job Title



Potential Contribution of Work Organization

Unemployment/underemployment

- Recessions/ work insecurity
- Shift work/overtime
 - The "new" work contract



What we have learned from COVID-19

- Not enough empirical work yet, but:
 - Essential work appears to be a critical risk factor for disease incidence.
 - While certain occupations have presented major clusters, the degree to which the ethnic, racial and geographic disparities can be explained by work remains uncertain.



Occupation*



Specific Occupations



Approaches for further study

• Modeling, using features from O*NET

• Linkages of occupational data with health data

Questions?