

# *The health impacts of work organization*

## *Part I*

**Paul Landsbergis, PhD, MPH**

**Mt. Sinai School of Medicine, New York, NY**



**THE WAY WE WORK AND ITS IMPACT ON OUR HEALTH**

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# MEASURING WORK ORGANIZATION

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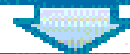
- **Work schedules**
  - Long work hours
  - Rotating, night shifts
- **Job characteristics**
  - High job demands/intensity + low job autonomy/control (job strain)
  - High job efforts + low job rewards
  - Low social support
  - Threat-avoidant vigilant work
  - Piece-rate work
- **Workplace climate**
  - Workplace violence
  - Discrimination, harassment, bullying
  - Job insecurity

# Organization of Work

## External Context

*Economic, legal, political, technological, and demographic forces at the national/international level*

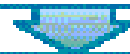
- Economic developments (e.g., globalization of economy)
- Regulatory, trade, and economic policies (e.g., deregulation)
- Technological innovations (e.g., information/computer technology)
- Changing worker demographics and labor supply (e.g., aging populations)



## Organizational Context

*Management structures, supervisory practices, production methods, and human resource policies*

- Organizational restructuring (e.g., downsizing)
- New quality and process management initiatives (e.g., high performance work systems)
- Alternative employment arrangements (e.g., contingent labor)
- Work/life/family programs and flexible work arrangements (e.g., telecommuting)
- Changes in benefits and compensation systems (e.g., gainsharing)



## Work Context

### *Job Characteristics*

- Climate and culture
- Task attributes: temporal aspects, complexity, autonomy, physical, and psychological demands, etc.
- Social-relational aspects of work
- Worker roles
- Career development

Figure 1. Organization of work.

# ORGANIZATIONAL CONTEXT

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- **Restructuring, downsizing, outsourcing, privatization**
- **Contingent work**
  - **Contract labor**
  - **Temporary and part-time employment**
  - **Job instability, insecurity**
- **New systems of work organization**
  - **Lean production (“Japanese production management”)**
  - **Total Quality Management (TQM)**
  - **Team concept**
  - **High Performance Work Systems**
  - **Scandinavian “socio-technical systems”**

# HEALTH IMPACTS OF STRESSFUL WORK ORGANIZATION:

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- **Most widely studied**
  - Cardiovascular disease (including hypertension)
- **Existing evidence**
  - Musculoskeletal disorders
  - Psychological disorders
  - Health behaviors
  - Sleeping problems
  - Injuries
- **More research needed on other outcomes**
  - Immune system
  - Reproductive health

# WORK ORGANIZATION AND UPPER EXTREMITY MUSCULOSKELETAL DISORDERS

#Studies with:	Null <u>assoc</u> <u>N</u>	Positive <u>assoc</u> <u>N</u> <u>Effect est.</u>	Attributable <u>fraction (%)*</u>
High job demands	6	10 1.5-2.4	33-58
Low job control	10	6 1.6-2.8	37-64
Low social support	7	7 1.4-2.1	28-52
Few rest break opportunities	3	3 1.5-3.3	33-70

\*Only some studies included in estimate

# Many studies controlled for physical job demands (but did not assess interaction)

# WORK ORGANIZATION AND LOWER BACK PAIN

## by Disability Phase (studies controlling for biomechanical RF)

Psychosocial Job Factor	LBP Com- plaints	Formal Report of LBP	Disability Phase of LBP		
			acute (1-30)	subacute (31-90)	chronic (>90 days)
high frequency of job problems	<b>X</b>	<b>X</b>			<b>X</b>
high psychological demands	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
high job strain	<b>?</b>	<b>o</b>	<b>o</b>	<b>X</b>	<b>X</b>
low job control	<b>o</b>	<b>?</b>	<b>o</b>	<b>X</b>	<b>X</b>
low work schedule flexibility			<b>o</b>	<b>X</b>	<b>X</b>
low supervisor support	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
low coworker support	<b>o</b>	<b>X</b>	<b>o</b>	<b>o</b>	<b>o</b>
low job satisfaction	<b>X</b>	<b>X</b>	<b>o</b>	<b>o</b>	<b>o</b>
low social environment score		<b>X</b>			

# WORK ORGANIZATION



## Job design

- Output quotas
- Machine-paced work
- Repetition
- Increased force
- Awkward postures
- Longer duration
  - Few rest breaks
  - Overtime

## Stress reactions

- Reduced blood flow to extremities
- Blood pressure rise
- Cortisol
- Muscle tension
- Weakened immune system
- Increased pain sensitivity

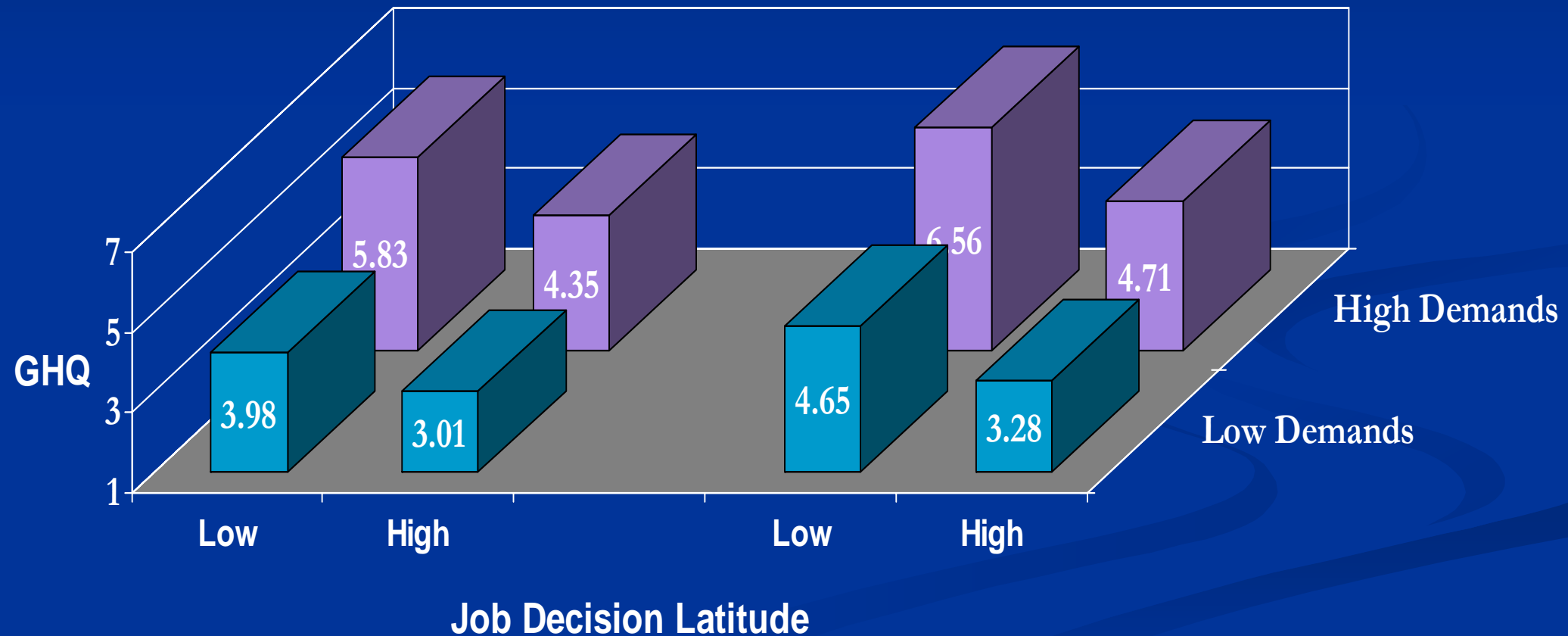


# MUSCULOSKELETAL DISORDERS

# Psychiatric disorder (30-item GHQ) among 10,314 British civil servants (Adjusted for age and employment grade)

Men

Women



# 3-Year Change in Smoking Prevalence and Job Decision Latitude

	<u>Time 1 (baseline)</u>	<u>Time 2 (3 years)</u>	<u>Change in Job Decision Latitude</u>
<b>Smoking</b>	<b>Yes</b>	Yes (n=27)	+1.5
		No (n=13)	+4.0
	<b>No</b>	Yes (n=7)	-1.6
		No (n=142)	-0.3

F=4.37 (8,180)  
p=.005

(controlling for age, race, education, marital status, and number of children at home)

# Work organization and sedentary behavior

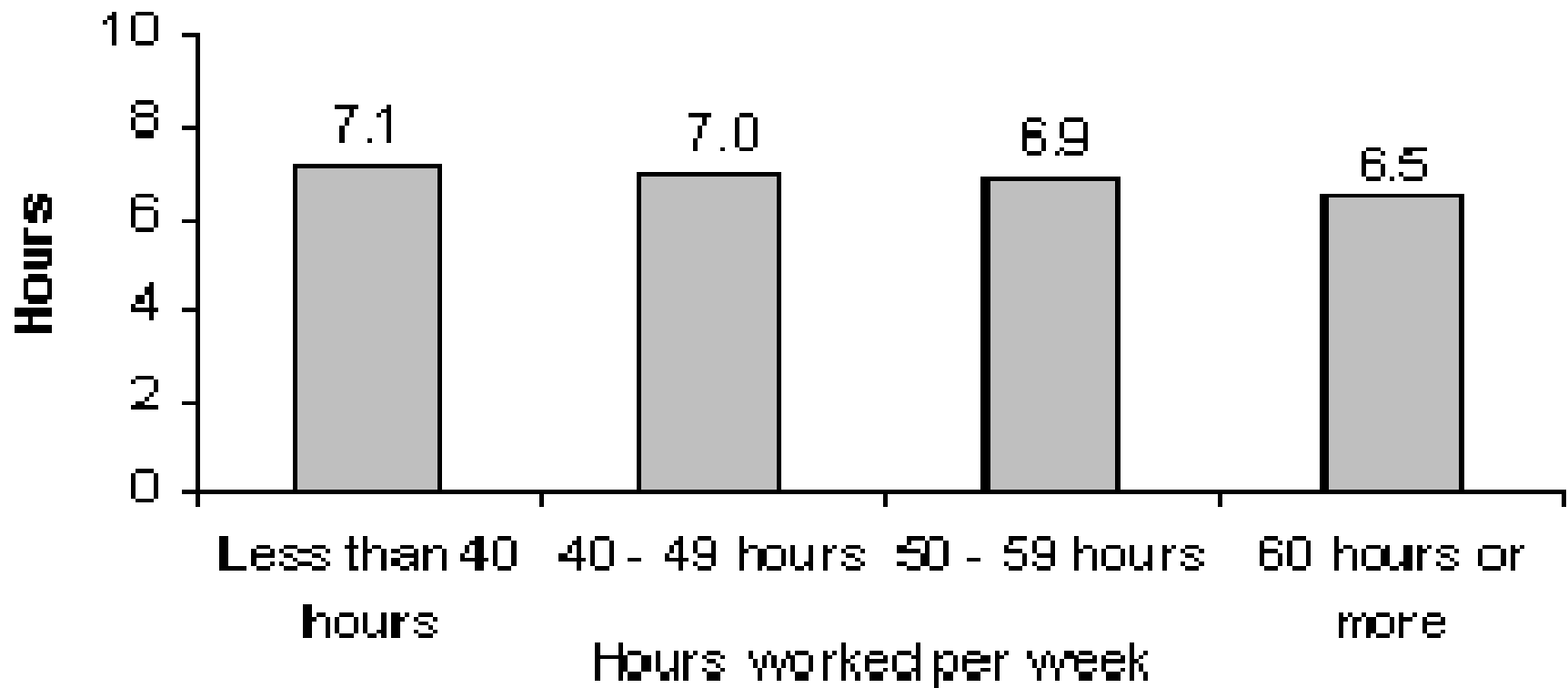
(Swedish national population survey)

	<u>Men</u>		<u>Women</u>	
	<u>OR<sup>#</sup></u>	<u>p</u>	<u>OR<sup>#</sup></u>	<u>p</u>
Psychological demands	--	ns	<b>1.38</b>	<b>.01</b>
Monotonous work	1.31	.15	1.38	.11
Learning opportunities	<b>-1.51</b>	<b>.04</b>	<b>-1.95</b>	<b>.002</b>
Work process control	-1.25	.09	-1.24	.11
Social interaction	<b>-1.60</b>	<b>.001</b>	--	ns

<sup>#</sup>Top vs. bottom decile Odds Ratio, controlling for age and education

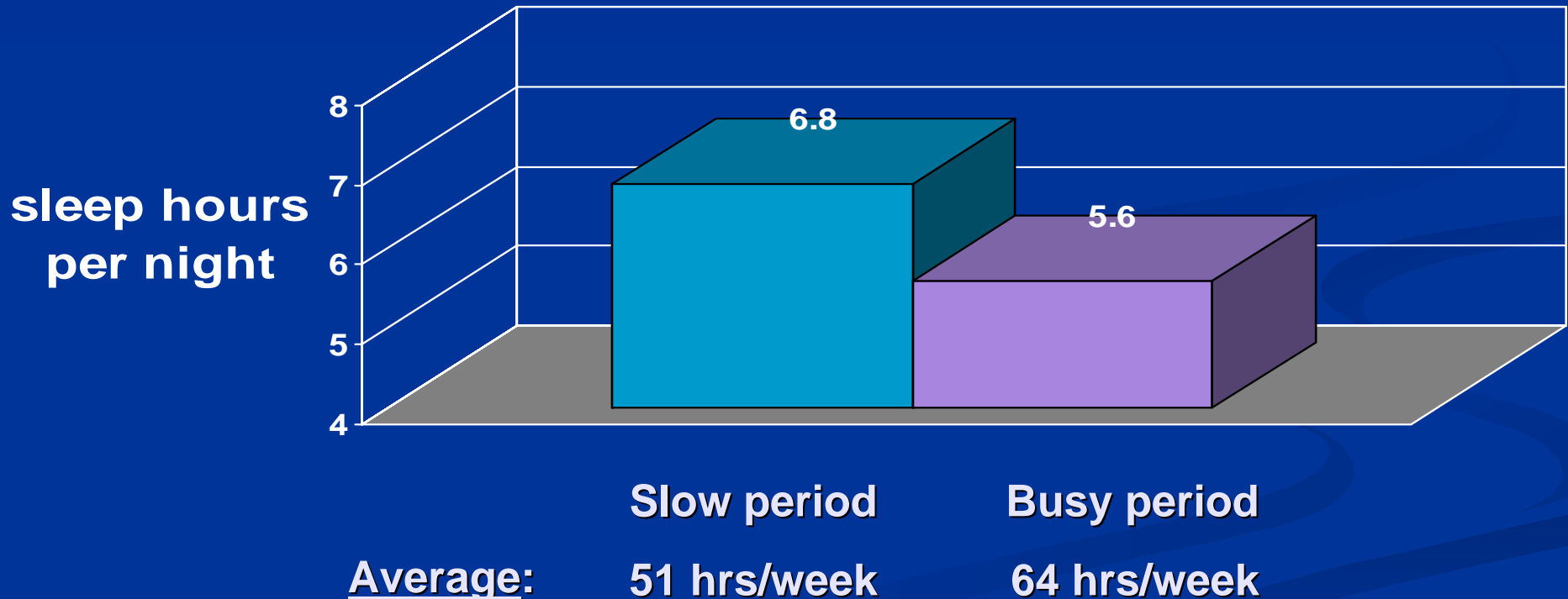
# Overtime work and sleeping hours

**Average Hours of Sleep on a Workday**



# Overtime work and sleeping hours

Japanese male middle-aged white-collar workers in manufacturing

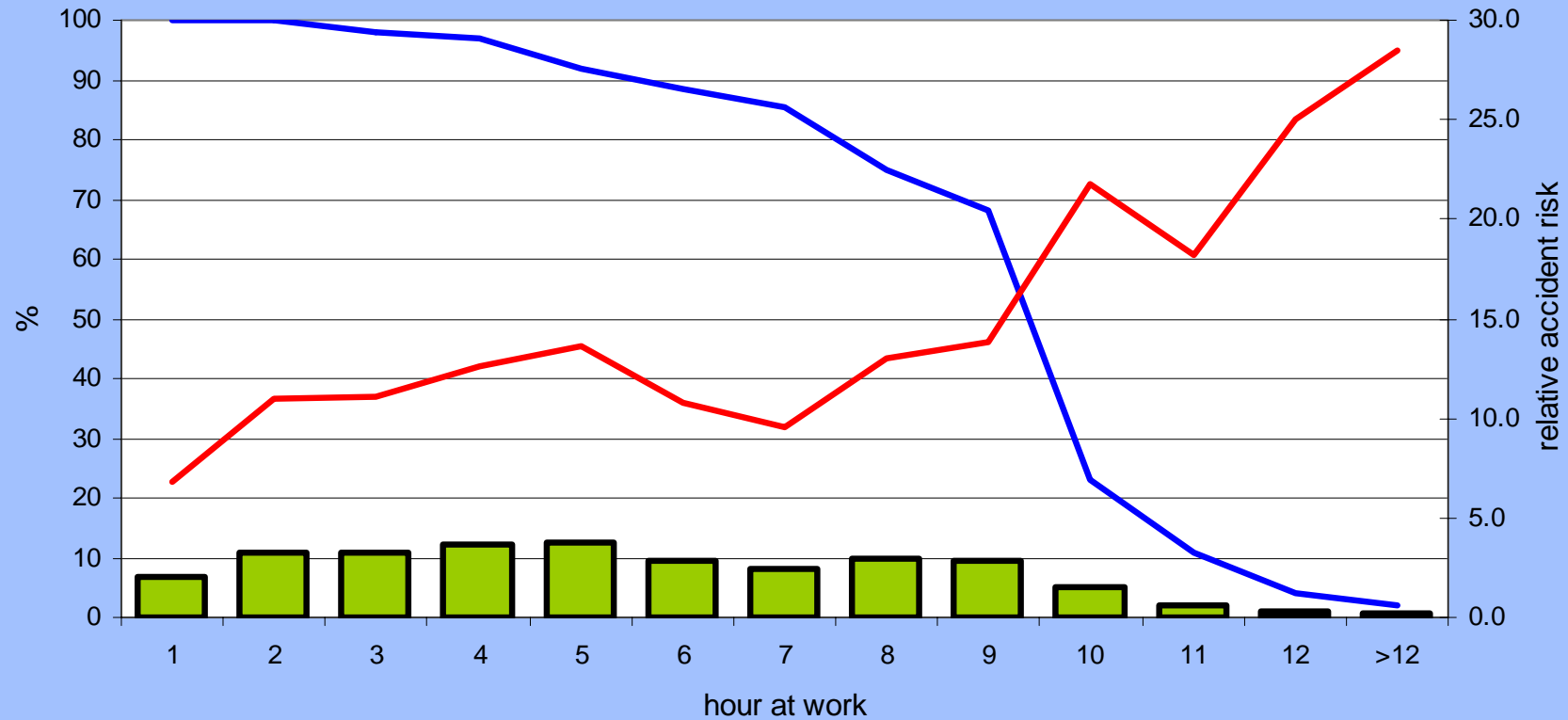


# Shorter sleeping hours

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- One important way path to illness:
  - Lack of sleep → higher blood pressure, heart rate
  - 4-6 (vs. 7-8) hrs/day of sleep → increased risk of heart disease

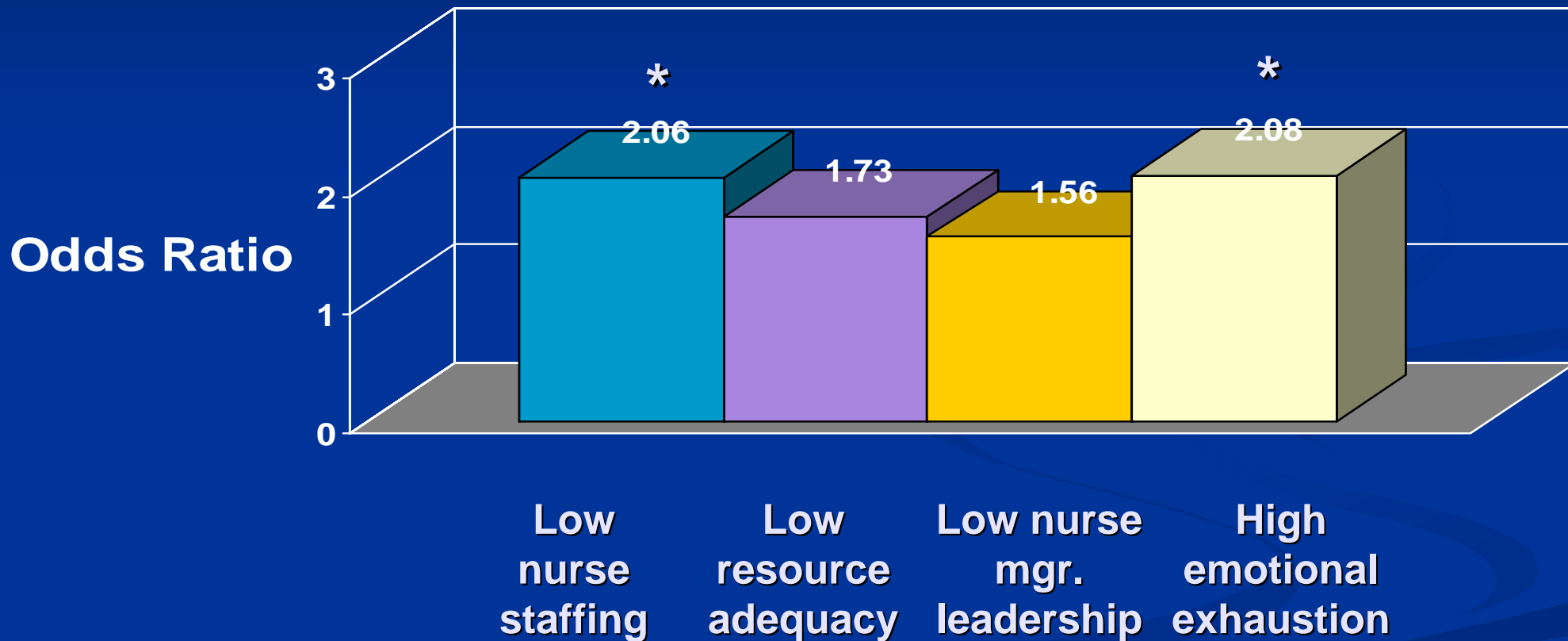
## Exposure model of the German working population, accident frequencies, and accident risk by hour at work, 1994



Hanecke K, Tiedemann S, Nachreiner F, Grzech Sukalo H. Accident risk as a function of hour at work and time of day as determined from accident data and exposure models for the German working population. *Scand J Work Environ Health* 1998;24 Suppl 3:43-8.

# Needlestick injuries to nurses

(960 nurses, 20 U.S. hospitals, 1990-91)



Adjusted for number of shifts worked during study period; \* $p < .05$

# Job redesign & work organization changes associated with lower injury rates

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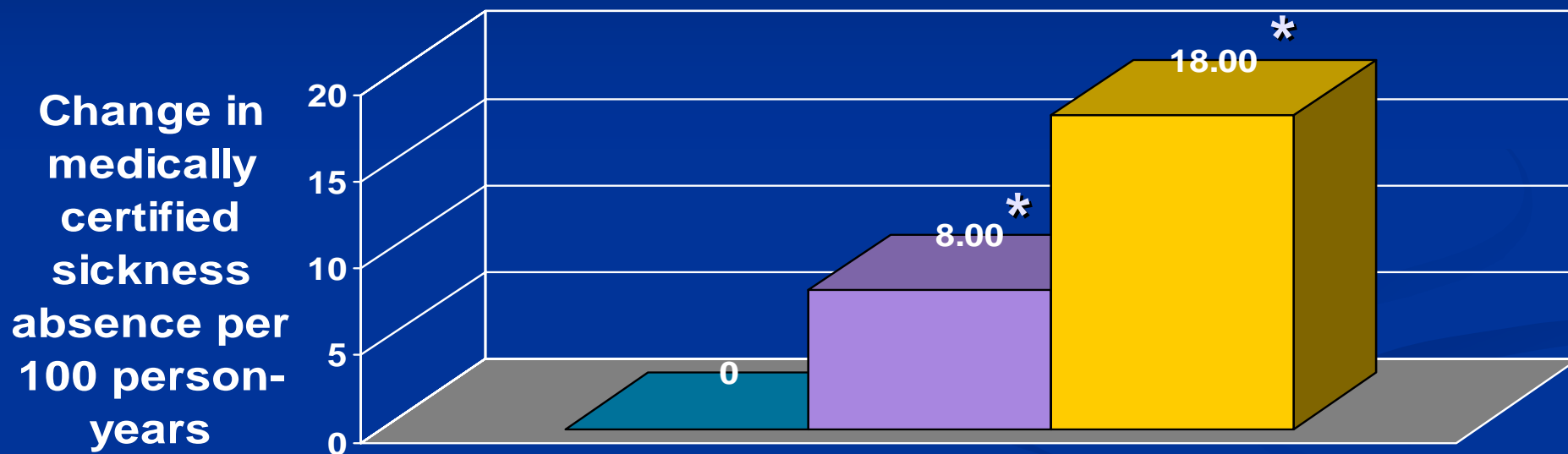
- Empowerment of the workforce, autonomy, delegation of control
- Good relations between mgmt & workers
- Low stress, low grievance rates
- Encouragement of long-term commitment of the workforce

Shannon H, Mayr J, Haines T. Overview of the relationship between organizational and workplace factors and injury rates. *Safety Science* 1997;26(3):291-217.

Hale A, Hovden J. Management and culture: the third age of safety. In: Feyer A-M, Williamson A, editors. Occupational injury: Risk, prevention and intervention. London: Taylor & Francis; 1998.

# Downsizing and sickness absence

(22,430 Finnish public employees, permanent contracts, age 19-62, 4 cities, followed for 7.5 yrs)



Personnel decrease in each occup. group in each city:

<8% (ref)

8-18%

>18%

Adjusted for age, sex, SES, absence rate before downsizing; \* $p < .05$ ;  $p(\text{trend}) < 0.001$

# Increasing rates of stress-related disease in U.S.?

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- \$70 billion/yr (SSDI), 20% of social security
- 90% of claimants are disabled workers
- 9.7 million disabled under age 65
- 6.2 million claimants (2001) vs. 3 million (1990)
- New applications rose >50%, 1999-2003
- Most common causes: mental health (27%), musculoskeletal (22%), cardiovascular (12%)