

XXX International Congress on Occupational Health  
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## Impact on workers health and work ability from work-related cardiovascular Disorders

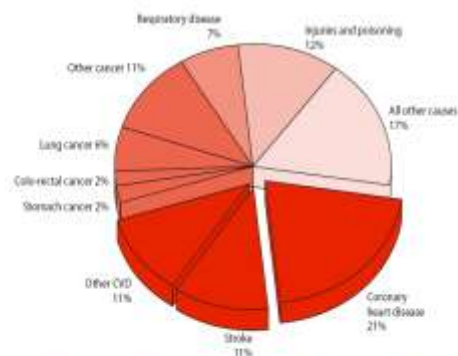
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Past President of the ICOH

## Background

### Mortality & morbidity data: Europe

- **4.35 million deaths** each year in the WHO European Region and more than 1.9 million deaths each year in the European Union
- Cardiovascular disease is also a **major cause of disability** and of reduced quality of life.
- **Falling in the North, South and West, rising in the East**
- **Mortality declining, living cases increase**
- Cardiovascular disease is **killing more people than all cancers combined** (55% of females and 43% of male deaths)
- Higher mortality among men and women with a **lower socio-economic position**.

Figure 1.1a Deaths by cause, men, latest available year, Europe



## Work-relatedness

### Etiological fractions of work environment for cardiovascular diseases in Denmark

Risk factor	Proportion of CVD	
	Men	Women
“Sedentary” work	42%	42%
Job strain	6%	14%
Shift & night work	7%	7%
Noise	1%	1%
Chemical exposures	0-1%	0%
Passive smoking	2%	2%
<b>All factors</b>	<b>51%</b>	<b>55%</b>
<b>All factors except sedentary work</b>	<b>16%</b>	<b>22%</b>

Olsen & Kristensen. J Epidemiol Community Health 1991;45:4-10.

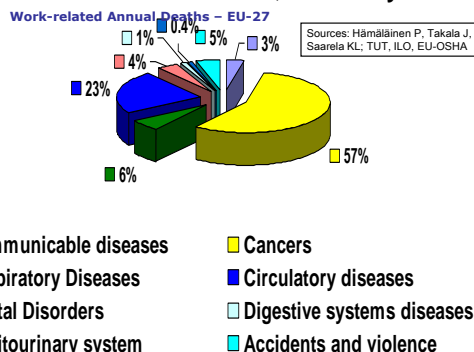
DK-2004-016

### The significance of work environment for hospitalisations

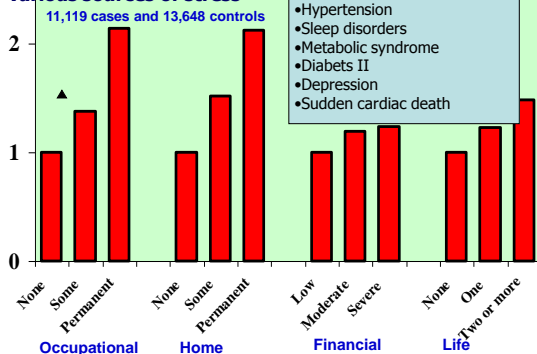
Estimates of etiologic fractions in Denmark		
	Men	Women
Circulatory	16%	18%
Cancer	8%	3%
Nervous system	17%	12%
Respiratory	16%	12%
Accidents	17%	6%
Musculoskeletal	21%	19%
Total	15%	11%

Tüchsen et al. Sci Total Environ 2004;328:287-294.

### Deaths attributed to work, 167 000/year

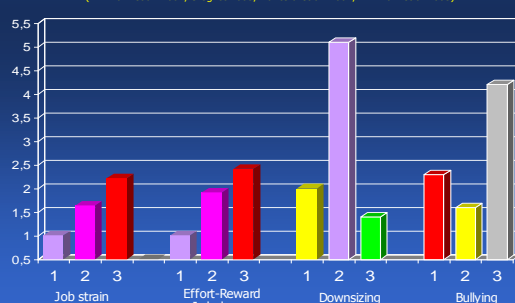


### Interheart Study 52 Countries: Risk of acute CHI from various sources of stress



Rosengren et al. Lancet. Vol 364 Sept. 11, 2004:953-62; Kristensen 2003

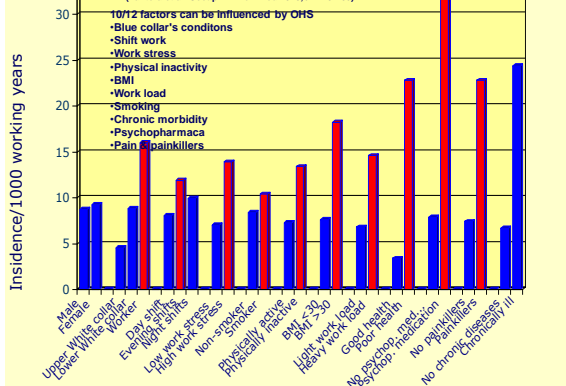
### Job Stress Psychosocial quality of work and cardiovascular mortality



J. Rantainen/MoDo04

### Risks to work ability

(Vahtera et al. Occup Environ Med 2010;67:479-485)



### Pathogenesis

Agents can be grouped by main or major effects:

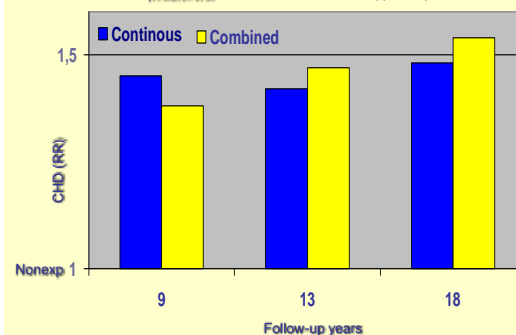
- Angina
- Atherogenesis
- Dysrhythmias
- Cardiomyopathy
- Hypertension
- Sudden death

## Pathogenesis 1

Pathology	Agent
Angina	Carbon monoxide, Methylene chlorine
Hypertension	Lead, Cadmium, Carbon disulfide, Work stress
Atherogenesis	Second hand tobacco smoke Carbon disulfide, Work stress
Dysrhythmias	Chlorofluorocarbons, chlorocarbons Aromatics, Pesticides, Shift work,
Cardiomyopathy	Cobalt
Adr. receptor & fibrinogene effect	Diesel exhaust, PM10, Pm 2.5

## CHD Risk from long-term exposure to occupational noise (n=6005)

(Verhulst et al. Scand J Work Environ Health 2005;31(4):291-299)



## White finger disease, WFD

- ~ 1000 h high frequency and several years lower frequency local hand-arm vibration
- Local oedema in nerve and perineural tissue
- Local damage in non-myelinated nerve fibers → changes in blood vessels → [vasoconstriction: white finger attacks](#)
  - mechanism: adrenergic reseptor damage in vessel walls → alfa-2-reseptor predominance
  - Aggravators: cold, tobacco

## Outcome- approach

Outcome	Chemical factors	Physical factors
IHD, CHD	CO, SHS, NG, PM 2.5, SHS	Cold, Heat, Noise
Atherogenesis	CS <sub>2</sub> , As, PM 2.5	
Arrhythmias	FCs, CCs, CO, solvents, (OPs and carbamates, acute)	EMFs
Hypertension	Pb, Cd, PM2.5	Noise, EMFs
Cardiomyopathia	Co, Sb?,	
Cardiac muscle depression or injury	As, CHCl <sub>3</sub>	
Cerebrovascular injury	DNT, PM2.5	
Microangiopathy	CS <sub>2</sub>	Vibration
Peripheral vessels	CS <sub>2</sub> , PM2.5	Local vibration
Malignant vascular outcomes	VCM	

## Prevention

## Problems in identification WR-CVDs

- Common in general population
- Increased risks superimposed on high baseline
- Multifactorial etiology:
  - Occupational and non-occupational factors
  - Work-relatedness difficult to proof at individual level
- Long latency
- Demanding diagnostics

## Primary Prevention

- 80% CHI preventable, 90% Diabetes 2 preventable
- Convincing examples of successful prevention at group and individual levels
- **Working conditions**
  - Stress control
  - Limiting shift work (<45yr)
  - Ergonomics
- **Work environment**
  - Elimination of cardiotoxic exposures
  - Limiting heavy physical work for aging workers
  - Controlling noise, vibration and thermal conditions
  - Controlling heat stress

## Prevention 2

- Management of individual factors, physical activity, nutrition, weight control, sleep, tobacco, alcohol
- Secondary and tertiary prevention for supporting participation in work
  - Early diagnosis
  - Good care
  - Early interventions
- RTW and rehabilitation programmes