Occupational health: future challenges and solutions

Manolis Kogevinas, MD, PhD
Roel Vermeulen, PhD

Working group: Ingrid S Mehlum, Kurt Straif, Neil Pearce, Michelle Turner, Maria Albin
Why Research Priorities on Occupational Health?
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- Employment is an essential component of adult life, and occupation is a major determinant of health.
- There are profound changes in working life.
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• Employment is an essential component of adult life, and occupation is a major determinant of health

• There are profound changes in working life

• There has been little coordinated European occupational health research
Integration in the HERA Research Goals

**RG2.4 Changing work and employment conditions**

**Research Needs**

1. Climate change, key enabling technologies, the Green Deal
2. Changing and ageing workforce
3. Working time
4. Changing employment patterns
5. Neglected occupational diseases
6. Monitoring, electronic health records, and surveillance in occupational health
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Climate change

- Changing working environments
  - Heat stress

- Changing exposure patterns
  - Allergens
  - Agricultural practice - pesticides
Key enabling technologies, the Green Deal

Key enabling technologies and the European Green Deal, are rapidly transforming the European economy, production systems, and labour market.

New materials are introduced and mitigation measures, e.g. circular economy, result in new exposures.

Knowledge gaps. Research on new solutions should integrate risk assessment with implementation of sustainable technologies (e.g. green chemistry).
Aging workforce

European population pyramids (1990 – 2050)
Ageing workforce and prolonged working life

National policies with economic drivers to **prolong working life** may adversely affect those who would have retired if they could, e.g. for health reasons, but need to go on working for economic reasons.
Proportion (%) of population exposed to long working hours (≥55 hours/week), 2016, 194 countries (Pega et al. EnvInt 2021)
Working time – prolonged hours and shift work

Long term and more recent changes in employment patterns and work patterns are all related to multiple effects on health and wellbeing.

New research is needed on working-time both concerning effects of prolonged working hours and shift work, including exposome approaches and comprehensive evaluation of factors such as light, sleep, physical activity and diet in shift workers and emphasis on preventive measures and interventions.
Shift work as a complex exposure scenario; an exposome approach

- **Disturbed social pattern**
  - Stress symptoms
  - Changes in reproductive factors
- **Lifestyle aspects**
  - Increased use of tobacco, higher alcohol consumption
  - Changes in physical activity
  - Increased BMI
- **Disturbed sleep pattern**
  - Circadian disruption → Reduced melatonin
  - Changes in hunger and satiety hormones
- **Disturbed eating pattern**
  - Changes in diet
    - Circadian disruption → Uncoupling peripheral clocks
  - Changes in gut microbiome
- **Disturbed light exposure**
  - Light at night → Circadian disruption → Reduced melatonin
  - Sun exposure → Vitamin D level
- **Vigilance and cognition**
  - Decreased vigilance
  - Impaired cognition

Shiftwork

CHRONTYPE

C H R O N O T Y P E
Changing employment patterns - Precarious employment and work-life balance

- **Precarious employment**, increasingly common - mental health, neurodegenerative, cardiovascular diseases, quality of life.

- **Non-standard employment** - women, immigrants, the young and low educated; instability, multiple jobs, gig economy

- Societal changes following the **COVID-19** pandemic. Evaluate full complexity of work-life balance with emphasis in younger women, with the ultimate goal to provide **intervention strategies**
The COVID-19 pandemic and gender equality (Flor LS, Lancet 2022)

- Between March, 2020, and September, 2021, women more likely to report:
  - employment loss: women 26% (95% UI 24–29); men 20% [18–23]
  - forgoing work to care for others (ratio of women to men: 1·8 by March, 2020, and 2·4 by September, 2021).
  - women and girls 1·21 times (1·20–1·21) more likely than men and boys to report dropping out of school for reasons other than school closures
Neglected occupational disease

- Sensitive Time Windows
- Chemical Mixtures
- Susceptible populations

Burden of Disease for 17 ICD-10 chapters and specific health conditions. Size of the bubbles represents the burden of disease, expressed in DALYs.

Hilderink et al, 2020
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- Working time
- Changing employment patterns
- Neglected occupational diseases
- Monitoring, electronic health records, and surveillance in occupational health

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