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Improving mental and physical health for waste management and recycling workers

Submission date
18/12/2024

Recruitment status
Recruiting

Registration date
19/12/2024

Overall study status
Ongoing

Last Edited
02/02/2026

Condition category
Injury, Occupational Diseases, Poisoning

[X] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[_] Results
[_] Individual participant data
[X] Record updated in last year

Plain English summary of protocol

Background and study aims
Increased recycling is a key part of the circular economy and the transition towards green energy. However, increased recycling may lead to hazardous exposure to workers including exposure to biological and chemical hazards, repetitive work, noise and accidents. Adverse health effects such as cardiac, pulmonary, gastrointestinal, eye, skin and musculoskeletal symptoms have been found in workers sorting and recycling electronics and plastics. Nevertheless, little is known about the exposure and health effects of those workers. Therefore, this study carried out in Sweden, Denmark and Portugal, aims to assess exposure to biological and chemical hazards and explore possible negative health effects in waste management workers; work together with companies to find solutions to prevent exposure and health risks among workers; and, evaluate the risk and safety management measures put in place by exposure assessment.

Who can participate?
Companies and workers involved in recycling/waste management processes are invited to participate in the study. All participants will be informed about the aims of the study and the participation will be voluntary.

What does the study involve?
Upon the agreement of the company and the participants, a visit to the workplace will be scheduled to perform an examination. The examination will involve a lung function test, donation of two urine (one after days off from work and one after shift) and blood samples, wearing an air pump to collect dust near a breathing zone, filling in the questionnaire, and for some participants also ergonomic examination to evaluate strains on muscles and joints. Carried out will be also educational workshops for participants and company managers.

What are the possible benefits and risks of participating?
There are no direct benefits for the individuals or companies participating in the study. The indirect benefit may be the assessment of exposure to metals and chemicals in the workplace which will help to give guidance to reduce such exposure. At different stages of the study, the

findings and results will be reported back to the company as well as to individuals. None of the examination methods cause any major discomfort. However, some may experience mild pain during blood sampling.

Where is the study run from?
The study is run by researchers at Lund University, Sweden, with centres in Sweden, Denmark and Portugal.

When is the study starting and how long is it expected to run for?
The study will start at the beginning of 2025 and will run for 4 years until the end of 2028.

Who is funding the study?
The study is funded through different funding agencies:
1. At the European level, Horizon Europe through funding INTERCAMBIO and PARC projects (No 101137149 and 101057014, respectively)
2. At the study arm level:
- In Sweden by the Swedish Government Research Council (FORMAS) and Swedish Research Council for Health Working Life and Welfare (FORTE, no: 2021-01757);
- In Denmark byArbejdsmiljøforskningsfonden (The Working Environment Research Fund)

Who is the main contact?
Prof Karin Broberg (Principal investigator), karin.broberg@med.lu.se

Contact information

Type(s)
Public, Scientific, Principal investigator

Contact name
Prof Karin Broberg

ORCID ID
https://orcid.org/0000-0002-5862-468X

Contact details
Division of Occupational and Environmental Medicine, Lund University, Scheelevägen 2
Lund
Sweden
22363
+46 73 782 37 50
karin.broberg@med.lu.se

Additional identifiers

Protocol serial number
Swedish study arm: GreenMetalWaste Danish study arm: Genanvend Portuguese study arm: Plastic-Waste

Study information

Scientific Title
INTERCAMBIO WP8: Interventions to promote mental and physical health in changing working environment: waste management/recycling workers

Acronym
INTERCAMBIO WP8

Study objectives
1. Workers and employers are able to suggest preventive measures that can improve existing ones in terms of protecting workers' health from the effects of waste exposure.
2. There is a sizable percentage of waste workers who do not perceive waste exposure as a health risk.
3. Waste exposure is associated with the presence of waste-related illness symptoms.
4. Implementing a preventive intervention is effective in reducing the exposure level and prevalence of waste-related illness symptoms.

Ethics approval required
Ethics approval required

Ethics approval(s)
Approved 03/09/2025, Swedish Ethics Review Authority (Etikprövningsmyndigheten Box 2110, Uppsala, 750 02, Sweden; +46 10-475 08 00; registrator@etikprovning.se), ref: Dnr 2025-04794-01

Primary study design
Interventional

Study design
Multicentre interventional study

Study type(s)
Prevention

Health condition(s) or problem(s) studied
Mental and physical health

Interventions
This is a multicentre interventional study that conducts three cross-sectional cohorts within the waste management industry in Sweden, Denmark, and Portugal at the baseline phase and follows up to co-create interventions within 1-4 selected companies per country.

• Intervention*
Intervention methodology cross-cutting over study arms
• Baseline phase: will recruite 100 recycling workers from different companies and collect data on:
- questionnaire (demographic and socioeconomic information, data on symptoms related to lung and musculoskeletal problems, data on work tasks etc.),
- occupational observational protocol (data on work tasks, personal protective equipment, ventilation etc.)
- personal air measurements of inhalable and/or respirable dust fraction
- analyses of chemicals (i.e. metals) in blood, urine and air samples

- bioaerosols (only DK study arm)
- lung function test
- ergonomic measures on a subset of workers (SE and PT study arm)

• Intervention phase I: report back to the companies the baseline results (inhalable/respirable air, occupational assessment and selected chemicals in biological samples) along with recommendations on how to improve the work environment.

• Evaluation of 1st intervention: selected will be 1-4 companies where an evaluation of intervention effectiveness will be carried out through repeated measures of inhalable/respirable air.

• Intervention phase II: within the selected 1-4 companies different risk and safety measures will be co-created together with each of the selected companies through workshops. Those measures will depend on the results from the baseline phase - primarily focusing on specific working tasks and related inhalable/respirable dust fraction levels and concentrations of specific metals in biological samples. Interventions will depend on the capabilities of companies (e.g. financial) and will also focus on improving workers` adherence to the already existing safety measures, specifically concerning the use and storage of personal protective equipment and hygiene practices (i.e. educational workshops on exposure risks at workplace, fit tests etc.).

• Evaluation of 2nd intervention: intervention effectiveness will be carried out through repeated measures of inhalable/respirable air and selected chemicals in biological samples, as well as questionnaires (data on main work tasks performed, and on lung, and musculoskeletal and mental health symptoms) will be assessed. Results of the repeated measures will be communicated back to the companies, through the organised workshop with managers and workers, and further measures, if needed, will be co-created.

Intervention Type
Other

Primary outcome(s)
1. Exposure to dust measured using personal inhalable and respirable dust measurements using PTFE membrane filters fitted with IOM-cassette (inhalable) and Higgins-Dewell Cyclone cassettes (respirable) at baseline and 6 months following the intervention
2. The levels of selected chemicals in air and biological samples measured using ICP-MS and LC-MS/MS analytical methods at baseline and following the intervention

Key secondary outcome(s)
1. Mental health and well-being measured using the WHO-5 Well-Being Index following the intervention
2. Physical health measured using a standard questionnaire related to lung, eye and musculoskeletal problems, at baseline, and following the intervention

Completion date
31/12/2028

Eligibility

Key inclusion criteria

1. Working in the recycling/waste management sector
2. Aged 18 years old and over

Participant type(s)
Employee

Healthy volunteers allowed
No

Age group
Mixed

Lower age limit
18 Years

Upper age limit
99 Years

Sex
All

Total final enrolment
0

Key exclusion criteria
Not able to sign the informed consent

Date of first enrolment
01/01/2025

Date of final enrolment
31/12/2026

Locations

Countries of recruitment
Denmark

Portugal

Sweden

Study participating centre
Division of Occupational and Environmental Medicine, Lund University
Department of Laboratory Medicine, Faculty of Medicine, Sölvegatan 19
Lund
Sweden
SE-22100

Study participating centre
Department of Design Sciences, Lund University
Faculty of Engineering, Klas Anshelms väg 20
Lund
Sweden
SE-223 62

Study participating centre
Institute of Environmental Medicine, Karolinska Institutet
Nobels väg 13, Solna
Stockholm
Sweden
SE-171 77

Study participating centre
Centre for Occupational and Environmental Medicine, Region Stockholm
Solnavägen 4
Stockholm
Sweden
SE-113 65

Study participating centre
Aarhus University, Department of Clinical Medicine – Occupational Medicine, Aarhus
Palle Juul-Jensen Boulevard 99, DK-8200 Aarhus N
Aarhus
Denmark
DK-8200

Study participating centre
NOVA National School of Public Health, Department of Environmental and Occupational Health, NOVA Univeristy Lisbon, Lisbon Portugal
Avenida Padre Cruz, 1600-407, Lisboa, Portugal
Lisbon
Portugal
1600-407

Sponsor information

Organisation
HORIZON EUROPE

Funder(s)

Funder type
Government

Funder Name
HORIZON EUROPE Framework Programme

Alternative Name(s)
Horizon Europe, Horizon Europe Programme, Framework Programme, Horizon Europe, EU Framework Programme, Horizon, Horizonte Europa

Funding Body Type
Government organisation

Funding Body Subtype
National government

Location

Results and Publications

Individual participant data (IPD) sharing plan
Swedish study arm: The results on the group level will be communicated to the companies and individuals in the form of a report.
Danish study arm: The results on the group level will be communicated to the companies and individuals in the form of a report and individual data to the individuals
Portuguese study arm: The data at the individual level will be communicated to the occupational medical doctor, who will communicate the results to the worker. Aggregated data, by task or task group, will be communicated to the company in a report.

IPD sharing plan summary
Stored in non-publicly available repository

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Study website	Study website	11/11/2025	11/11/2025	No	Yes