

## Commentary

# The OMEGA-NET International Inventory of Occupational Cohorts

Manolis Kogevinas<sup>1,2,3,4,\*</sup>, Vivi Schlünssen<sup>5,6</sup>, Ingrid S. Mehlum<sup>7</sup> and Michelle C. Turner<sup>1,2,3,8</sup>

<sup>1</sup>Barcelona Institute for Global Health (ISGlobal), 88 Doctor Aiguader Rd., 08003 Barcelona, Spain; <sup>2</sup>Universitat Pompeu Fabra (UPF), 08002 Barcelona, Spain; <sup>3</sup>CIBER Epidemiología y Salud Pública (CIBERESP), 28029 Madrid, Spain; <sup>4</sup>IMIM (Hospital del Mar Medical Research Institute), 08003 Barcelona, Spain; <sup>5</sup>Department of Public Health, Environment, Occupation and Health, Danish Ramazzini Centre, Aarhus University, 8000 Denmark; <sup>6</sup>National Research Centre for the Working Environment, 2100 Copenhagen, Denmark; <sup>7</sup>National Institute of Occupational Health, 0363 Oslo, Norway; <sup>8</sup>McLaughlin Centre for Population Health Risk Assessment, University of Ottawa, Ottawa ON K1N 6N5, Canada

\*Author to whom correspondence should be addressed. Tel: +34-93-214-7332; e-mail: [manolis.kogevinas@isglobal.org](mailto:manolis.kogevinas@isglobal.org)

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## Abstract

In a recent count of cohort studies in Europe capturing information on occupation and/or occupational exposures, we estimated that there are more than 60 major studies with some type of occupational information that enrolled over 30 million persons. With few exceptions there have been no large-scale analyses systematically combining cohorts from this extraordinary resource. We present the development of an inventory of cohorts with occupational information in Europe and internationally and describe the online interactive tool with detailed information on existing cohorts. The OMEGA-NET inventory can be accessed at <http://occupationalcohorts.net/> includes cohorts, case-control studies nested within cohorts and intervention studies that are active or can substantiate that their data are potentially accessible; that include data on occupation and/or industry or at least one occupational exposure; and that have at least one follow-up, either already conducted or planned. We expect that this open access inventory will be an important prerequisite for use of this resource of existing studies for research and policy development.

**Keywords:** cohorts; network; occupation

In a recent count of cohort studies in Europe capturing information on occupation and/or occupational exposures, we estimated that there are at least 63 major studies with some type of occupational information

that enrolled over 30 million persons! (Turner and Mehlum, 2018). With few exceptions (Kivimäki *et al.*, 2015) there have been no large-scale analyses systematically combining cohorts from this extraordinary

resource. To a large extent this is likely due to a lack of knowledge and/or awareness of the availability of such data and even more so to the absence of systematic organization of the types of data available. OMEGA-NET has as its prime aim to support the use, at both the European level and beyond, of data generated by past and ongoing cohort studies. The development of an inventory of cohorts is a *first and important prerequisite* for such exploitation.

### The OMEGA-NET project

The Network on the Coordination and Harmonization of European Occupational Cohorts (OMEGA-NET) ([http://www.cost.eu/COST\\_Actions/ca/CA16216](http://www.cost.eu/COST_Actions/ca/CA16216)) is a 4-year COST Action currently with members from 33 European countries, four Near Neighbor Countries, and four international partner countries or organizations. COST Actions are networks funded by the EU dedicated to scientific collaboration, complementing national research funds. OMEGA-NET was created to optimize the use of occupational, industrial, and population cohorts in Europe, building on previous limited collaborations on specific topics. It seeks to advance: (i) collaboration utilizing cohorts with information on employment and occupational exposures, (ii) coordination and harmonization of occupational exposure assessment research, and (iii) facilitation of an integrated occupational health research strategy in Europe and globally. Among the key aims of OMEGA-NET are to create an inventory of cohorts with occupational information in Europe and implement an online interactive tool with detailed information on these existing cohorts.

### Aims of the OMEGA-NET inventory

The inventory aims to collect information on all ‘*active*’ cohorts in Europe and eventually globally that have data which can be used to explore relationships between occupation or work related exposures and health. The inventory is developed primarily for research purposes but will also be useful for policymakers to identify, for example, research capacities and knowledge gaps. Here we define cohorts that are ‘*active*’ as those that could potentially contribute to future research and data analysis efforts. Therefore, the inventory is not intended to be a compendium of all occupational health cohorts that have ever been assembled. A cohort that is unable to recover the original data or, for confidentiality reasons (unable to obtain appropriate research governance approvals), for example, could not provide information to a new research proposal will not be considered here. ‘Accessibility’ to

data is not synonymous with sharing data. Several of the cohorts, for example those based on national registers, may not share the primary data but may participate in new joint projects applying protocols for data harmonization, remote analysis, and pooling of results.

### Which cohorts are included in the inventory?

The focus of the inventory is European cohorts, but cohorts from other continents are actively encouraged to register and participate. The inventory includes cohorts, case-control studies nested within cohorts and intervention studies that:

1. Are active or can substantiate that their data are potentially accessible.
2. Include data on occupation and/or industry or at least one occupational exposure.
3. Have at least one follow-up, either already conducted or planned (therefore excluding cross-sectional studies).

Following an initial contact of 40 European cohorts for inventory and pooled analysis participation, this included 21 million cohort participants and of those about 650 000 are from occupational or industrial cohorts, 1 million from population cohorts and approximately 19 million from population cohorts based on registers. Most persons are enrolled in cohorts at the Nordic countries (20 million), while cohorts in central Europe (1 million), southern Europe (20 000), and international cohorts (20 000) enroll considerably fewer persons.

### How is information collected, stored, and used?

All information included in the inventory is collected from the cohorts using a web-based *OMEGA-NET Inventory Questionnaire*. Cohorts are identified through systematic web-based searches and personal records and knowledge of OMEGA-NET researchers. Researchers responsible for the cohorts are contacted through electronic means and are asked to register and complete the web-based questionnaire. If necessary, OMEGA-NET will work directly with cohort researchers, to complete the inventory questionnaire. Quality control of the completed questionnaires will be conducted by OMEGA-NET.

The information of the inventory is available through a searchable web database. Users will be able to search for specific exposures and outcomes, and extract information on the cohorts that have data for specific topics as well as basic information on the methods used to collect data.

## What type of information is collected?

The design of the web-based questionnaire and specification of information collected were developed through an international effort involving researchers and Working Group members in Europe, North America, and Australia (see acknowledgments).

Information is collected for the following main subheadings:

- *Identification and Basic Description* including: Cohort name, country/ies, Principal Investigator(s), cohort website, ethics approval, protocols, questionnaires and key papers, data access policy, interest in participation in pooled analyses of (European) occupational cohorts, main aim, study design, source population, comparators, inclusion and exclusion criteria, year(s) of enrollment, age range at entry, number of participants, and participation proportion at enrollment.
- *Outcome Follow-up* including: Type of follow-up (e.g. new data collection, use of registers), information collected in follow-up, participation proportion at last follow-up.
- *Occupational Exposures* including: Source of exposure data collected, occupational history/time frame, occupation and industry information, types of exposure measurements (e.g. personal, workplace), methods for exposure assessment, and a detailed listing of occupational exposures assessed (see below).
- *Outcomes Evaluated* including: Type of outcome data collected, outcome type, main diagnostic group (e.g. cancer), and other health related outcomes (e.g. work participation, sickness absence).
- *Biological Samples and Analysis* including: Type of biological samples collected (e.g. blood, urine, sputum, nails), biological processing (e.g. DNA, RNA), genetic, and other lab analyses (e.g. Genomics, Epigenomics, Metabolomics, biomarkers, etc.).
- *Other Information* including: Sociodemographic, lifestyle, residential history, and possibility for linkage to data registries/data enrichment via data linkage, and further data planned to be collected (a description of data collection efforts that are already or likely to be funded).

## Occupational exposures

A large part of the inventory covers exposure information including the following main categories:

- Dusts and Fibers
- Solvents
- Pesticides

- Metals and Metal Oxides
- Other Chemicals
- Engineered Nanoparticles
- Biological Factors
- Physical Agents
- Ergonomics, Physical Workload, and Injury Related
- Psychosocial Domains
- Organization of Work including Working Time
- Other

Each of these headings has subheadings that further specify a detailed listing of exposures. For example, *Dusts and Fibers* have the subheadings: Fibers; Inorganic dusts; and Organic dusts, with Inorganic dusts capturing: carbon black; cement; clay; coal dust; granular talc; inorganic dusts, not specified; quartz (quartz or crystalline silica containing dusts); silica amorphous; silicates; stone (natural or artificial); and other (specify).

In addition to the main inventory of occupational cohorts, a separate inventory is being constructed on occupational exposure assessment tools used by the cohorts (Peters *et al.*, 2020).

## Discussion

The main critical issues for the OMEGA-NET inventory is completeness of the information about included cohorts and quality of the submitted information. In addition, over the years, the initial information will have to be updated. The inventory does not incorporate primary cohort data, rather only cohort meta-data, and seeks to capture the majority of available cohorts with information on occupational exposures, many of them being non-occupational in their primary aim, and enough information to be informative when new research is being planned. Detailed information on each cohort, e.g. specific laboratory analyses, should be available by contacting the principal investigator of each cohort. The inventory seeks to incorporate information on both published and not yet published data. To this extent it overcomes a limitation of meta-analyses that are based mostly on published data. In addition, by facilitating access to primary data, the inventory promotes a more detailed use of the data and possibility of harmonizing protocols. There are several examples in occupational health that have done this type of harmonization, such as the AGRICOH cohort (Leon *et al.*, 2011), the breast cancer night-shift work pooled analysis of case-control studies (Cordina-Duverger *et al.*, 2018) or the working time pooled analysis (Kivimäki *et al.*, 2015).

Research in other fields, for example on child health, has developed inventories (see [www.birthcohorts.net](http://www.birthcohorts.net)) that led to the promotion of sharing of data between researchers and an impressive development of new collaborative research. The development of an inventory of occupational cohorts is a first and important prerequisite for an exploitation of the extensive information that has been collected worldwide on occupation and health and will be a major step to further develop research in an underfunded area and, eventually, promote workers' health.

### Call for cohorts to register

A call for cohorts to register has been opened: <http://occupationalcohorts.net/> (accessible also from <https://omeganetcohorts.eu/resources/inventory/>). Further information can be found by contacting the inventory organizers. Further funding will be requested to maintain and expand the Inventory over time.

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### Conflict of interest

No conflicts of interest declared.

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