European Human Exposome **NETWORK**

The world's largest project network studying the impact of environmental exposure on health

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NEWSLETTER

Understanding and addressing policy challenges - join us on 1st June 2023!

Welcome

It's been a busy start to 2023 for all the European Human Exposome Network (EHEN) projects. In addition to progressing our research activities and holding annual meetings, we have also prepared progress reports for our funder, the European Commission (EC). All projects and the EHEN board also had review meetings with the EC to assess progress and outputs so far. These reports and meetings provide a chance to reflect and highlight areas for improvement going forward.

One current focus is organising the EHEN annual meeting for the network partners at the end of May, and the public event taking place on 1st June 2023 in Leuven, Belgium and online. We'll be joined by representatives from the World Health Organization and the EC Directorate-General for Environment and for Research and Innovation. We hope to see you there!

In this issue of the newsletter, we share more on the public event and introduce our new blog series. You can also read progress updates from each project, as well as hear about the latest news, events, publications and toolbox development from across EHEN.

We welcome any feedback on this newsletter so please do not hesitate to contact us.

Peter Hoet and Sylvain Sebert,
EHEN Coordination Team

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Million euros from the European Commission

Exposome Research: Understanding and Addressing Policy Challenges

1 June 2023 at 09:00 - 12:00 CEST

Join us for this public event in Leuven (Belgium) or online!

As part of our 2023 annual meeting, EHEN is hosting an open event to facilitate a two-way exchange between policymakers, researchers and other stakeholders with an interest in the health effects of environmental exposures. This event includes presentations from European policymakers and EHEN researchers on topics such as tackling health at a global level, the Zero Pollution Action Plan, and occupational health and safety.

Find out how exposome research can help you

Attendees will have the opportunity to listen to, question, and network with other policymakers and multi-disciplinary researchers.

The aims of the event are to:

- understand policymaker and other stakeholders' needs, issues and challenges;
- to understand more about the related polices and the key questions within these policies that EHEN could potentially answer;
- to raise awareness of and explain the human exposome;
- to introduce the type of information and evidence the EHEN projects will deliver and how this could be used by stakeholders.

We want to hear about the policy challenges you face in your field of work

Who should attend?

Policymakers, NGOs, citizens, patient representatives, researchers

Join us for "Exposome Research: Understanding and Addressing Policy Challenges" on 1st June 2023 at 09:00 -12:00 CEST.

Register by 26th May 2023 to join us in person in Leuven (Belgium) or online!

Let's work together more effectively to address the challenges

To ensure we maximise the success of this event, we would also like to ask those of you working in the policy field to complete our short survey to enable us to understand more about your policy challenges and how EHEN can help. Scan the QR code below, even if you cannot attend the event! Thank you.

What are your policy challenges and how can EHEN help you?

Latest News

EHEN Toolbox updates

The EHEN Toolbox is a key resource for all stakeholders interested in the human exposome. It collates the wide variety of tools being developed by the EHEN projects and is updated regularly.

One recent new tool from ATHLETE is a web application where associations between over 100 environmental exposures (in pregnancy and childhood) and multi-omics signatures (DNA methylation, mRNA, miRNA, proteins, metabolites) can be queried. This forms part of the paper on Multi-omics signatures of the human early life exposome.

EHEN Blog Series

We have been working on a new EHEN blog series to raise more awareness of the different aspects of exposome research. The first focuses on participant engagement in exposome research projects and the second explores the challenges, opportunities and lessons learnt from using Artificial Intelligence (AI) in exposome research. Watch this space for more blogs!

#1: Challenges of participant engagement in exposome research projects

One of the challenges of conducting exposome research with volunteers is how to organise and manage participant consent over the long term. This issue of participant facing governance is being explored by the EHEN Ethics and Law Working Group in an online questionnaire to find out how researchers working with data cohorts are addressing consent and participant facing governance in practice.

In the blog, Daniel Groos, coordinator of the EHEN Ethics and Law Working Group, explores this issue in relation to the Danish consumer cohort. This cohort is exemplary for how diverse datasets are used in exposome research. The project investigates how food and daily supermarket products (e.g. cleaning products) can affect the health of Danes. Read more.

We encourage anyone working with data cohorts to complete the online questionnaire. Your input is much appreciated.

#2: Artificial Intelligence, environmental exposures and autoimmune diseases

In recent years, there has been a growing interest in the use of artificial intelligence to uncover patterns and correlations of disease in large datasets, especially within EU funded projects. Kenneth Kastaniegaard, CEO at Biogenity and partner in EXIMIOUS, shares his experiences working with AI in the exposome context in this second EHEN blog. Kenneth's team aims to discover potential pathways from occupational exposure towards development of autoimmune disease by analysing nationwide data with AI technologies, focusing on rheumatoid arthritis. Read more.

Project Blogs

Two blog posts, More friend than foe? Linking food microbiome and human health and The eaten exposome. Findings in type 1 diabetes, were published on the HEDIMED website in December 2022 and April 2023.

Events

Other Event News

EPHOR and EXIMIOUS will be chairing a session on "Multidisciplinary approaches in Exposome research" at the 12th International Symposium on Biological Monitoring in Occupational and Environmental Health (ISBM-12), taking place 21st-23rd June 2023 in Porto. Several researchers will present their work within the joint session.

Key updates from ATHLETE include:

- In January, the fifth annual consortium meeting was held in Barcelona, bringing together 140 researchers. Read a summary here.
- What's the ATHLETE project all about? Watch this interview with Martine Vrijheid, coordinator of ATHLETE, about why research on the exposome is so important.
- Revisit the recording of a webinar where Dr. Kelly Ferguson (NIEHS) presented her work on prenatal exposure to nonpersistent chemical mixtures and fetal growth.
- @ATHLETEexposome is now on Twitter!

EPHOR's latest updates include:

- A session on the development of the European job exposure matrix for exposure assessment in occupational research was held at EPICOH 2023.
- New tools will be added to the Working Life Exposome Toolbox - We Expose soon.
- Data collection in two field studies on shift work and respiratory effects is progressing and will finalise this year.
- If you want to keep up to date with the EPHOR project, please follow us on LinkedIn and now on Twitter @EphorEu95393!

Key updates from Equal-Life include:

- The consortium meeting was held in April in Stockholm and several publications saw light.
- A round of stakeholder interviews was conducted with the aim to connect with a broad range of stakeholders. A co-design session and two fora have been organised with stakeholders. Several focus group discussions were organised aimed at the ethical implications of exposome research.
- Activities have continued on designing and developing the toolkit modules.
- Bio-samples available in two cohorts were analysed and linked to risk of psychopathology. These outcomes will be related to physical and social exposures and validated on biomarkers available in other cohorts/studies.

EXIMIOUS is preparing for its next General Assembly, taking place 1st-2nd June in Leuven following the EHEN conference. Latest updates are:

- The third EXIMIOUS Newsletter was published in April 2023. In it, we explore how parrots have become an invasive species in Barcelona and why their presence is of interest to two cohorts studied in EXIMIOUS: the park workers (occupational cohort) and the hypersensitivity pneumonitis cohort (disease cohort).
- The latest work from EXIMIOUS was presented at two international conferences. Read about it in our news piece From data management to exposure to crystalline silica: EXIMIOUS presents at the EPICOH and SOT 2023.

EPHOR Project Coordinator Anjoeka Pronk chairing a session at EPICOH 2023

The EXPANSE project is leading the Dutch part of an Urban Labs Study, the 'Exposome Panel Study'. The aim is to collect as much data as possible in different countries and environments over the next few years to try and answer questions such as "Of all the environmental factors, what are the most important health determinants?" and "To what extent does the environment determine our behaviour". A recent interview with researchers Anke Huss and Ayoung Jeong explains more.

Study participants receive a package of measurement tools, including an air quality measurement sensor that can be attached to a bicycle.

HEDIMED
Human Exposomic Determinants of Immune Mediated Diseases

Key updates from the HEDIMED include:

- Scientific analyses of biological samples continue in multiple partner laboratories.
- An in-person consortium meeting was held in Malmo, Sweden in December 2022.
- A smaller more focused meeting on the practical steps to reach the cross-disease and cross-cohort overarching goals, evaluating the exposome's influence in the development of type 1 diabetes, celiac disease, asthma, and allergy, was held at the start of May 2023 in Copenhagen.
- The personas for the key project stakeholders have been developed and will be published on the website at the end of May, along with HEDIMED's next newsletter.

human exposome assessment platform

The "Swamped?" video tutorials on exposome data are aimed at scientific researchers and undergraduates. They are each under five minutes long, and feature HEAP researchers sharing their experiences of what can go wrong when managing research data, and how to avoid such pitfalls through FAIR data principles.

The HEAP team also demonstrated the Hopworks informatics platform and the FAIR toolbox at open sessions for EHEN researchers at their Bring Your Own Data (BYOD#3) workshop. To build on this, the team will be hosting "Human Exposome Assessment Roundtables" in the second half of 2023 to show how Hopsworks can be used to gain new scientific insights by analysing large datasets as part of collaborative projects.

longITools

The latest updates from LongITools are:

- The team held its consortium meeting in Rotterdam in February 2023. Read a summary of the meeting and an update on project progress.
- A new video using a music mixer to explain the exposome has recently been published.
- A prototype personalised and precise monitoring system integrating exposome-based data from users, environmental sensors, and wearables to estimate an individual's risk of developing cardiovascular and metabolic diseases is now complete. Small scale testing will begin shortly.
- The project's 4th policy forum "Diabetes and the Exposome: Identifying Challenges and Solutions for Action" was held on 10th May. Recording here.

REMEDIA
IMPACT OF EXPOSOME ON THE COURSE OF LUNG DISEASES

REMEDIA organised a mega campaign during Autumn 2022. It was multidisciplinary work between biology and atmosphere physico-chemistry. The team set up an innovative experiment allowing the simulation of realistic complex urban polluted atmospheres coupled with biomass burning generation and then evaluated their impact in cystic fibrosis mice.

The team also presented their work at several conferences including:

- European Respiratory Society 2022;
- European Conference on rare diseases;
- International Society for Environmental Epidemiology (ISEE);
- Exposome Symposium;
- American Association for Aerosol Research (AAAR).

Publications and Project Findings

human exposome assessment platform

Recent HEAP publications have looked at the HPV virus, and why some women clear the virus while others do not, and the "BIBBOX", a FAIR toolbox and App Store for Life Science Research" a platform that supports researchers publishing datasets and the associated software in a FAIR manner.

ATHLETE
The Exposome from Evidence to Translation

Fernandes et al. (2023). School Based Interventions to Support Healthy Indoor and Outdoor Environments for Children: A Systematic Review. International Journal of Environmental Research and Public Health 20(3):1746.

Fabbri et al. (2023). Childhood exposure to non-persistent endocrine disrupting chemicals and multi-omic profiles: A panel study. Environment International 173:107856.

EPHOR

Hartikainen, E. et al. (2023). Working life expectancy and working years lost among users of part- and full-time sickness absence in Finland. Scandinavian Journal of Work, Environment & Health, 4054.

Publications

HEDIMED
Human Exposomic Determinants of Immune Mediated Diseases

Wicaksono W.A., et al. Modulation of the food microbiome by apple fruit processing. Food Microbiol. 2022 Dec;108:104103.

Wicaksono W.A., et al. Impact of Cultivation and Origin on the Fruit Microbiome of Apples and Blueberries and Implications for the Exposome. Microb Ecol. 2022 Dec 21.

longITools

ATHLETE
The Exposome from Evidence to Translation

Marques I., et al. (2023). Associations of green and blue space exposure in pregnancy with epigenetic gestational age acceleration. Epigenetics.

REMEDIA
IMPACT OF EXPOSOME ON THE COURSE OF LUNG DISEASES

Blayac, M., Lanone S. et al. The Impact of Air Pollution on the Course of Cystic Fibrosis: A Review. Front Physiol. 2022 Jun 2;13:908230.

Oubaya N. et al. Impact of the COVID-19 pandemic and associated lockdown measures on the management, health, and behavior of the cystic fibrosis population in France during 2020 (MUCONFIN). Front Public Health. 2022 Nov 14;10:978627.

Featured Publication

EXPANSE

Caspar W. Safarlou et al. The Ethical Aspects of Exposome Research: A Systematic Review. Exposome. 2023;, osad004.

Exposome research has emerged as a cutting-edge field for investigating human health and disease using big-data techniques, smart sensors, and multi-omics technologies. However, despite its potential benefits, the ethical considerations surrounding exposome research have not been widely discussed in the literature. To address this gap, PhD student and EXPANSE researcher Caspar Safarlou (UMC Utrecht) and colleagues conducted a systematic review of academic literature to explore the ethical aspects of exposome research. Their search yielded nine articles, none of which delved deeply into the ethics of exposome research.

Caspar says:

"By systematically evaluating related fields, the researchers identified five ethical themes that frequently arise in discussions of exposome research, including its goals, standards, tools, impact on participants, and consequences of its products. They identified three aspects of exposome research that require further ethical reflection, including the actionability of its findings, epidemiological or clinical norms, and potential for bias".

For more information visit the website:

https://www.humanexposome.eu/

And for details of upcoming exposome-related events visit:

https://www.humanexposome.eu/events/

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EHEN