Exposogas

NEWSLETTER

INSIDE ISSUE 5

04/2021-07/2021

EDITORIAL

We are happy to deliver the 5th newsletter of the EXPOSOGAS project. This is a Horizon 2020 Twinning project that will promote the training and career development of researchers in the field of occupational and environmental health sciences. Special focus is paid on the general population in communities near oil and gas activities, as well as workers in this sector, using human exposome tools. We hope you will find this newsletter informative. If you have any questions or comments, please get in touch with us!

Konstantinos C. Makris, PhD
EXPOSOGAS project coordinator

What is EXPOSOGAS about?

EXPOSOGAS is a 3-year project funded by the European Union, which aims to develop the research capacity of the Cyprus International Institute for Environmental and Public Health (CII) in using the human exposome methodological tools. EXPOSOGAS will use the exposome framework for assessing, managing and communicating information about the overall health risk of hydrocarbons operations to workers and the general population.

What is the human exposome?

The human exposome is a relatively new framework for conducting research. The exposome concept was first coined by the cancer epidemiologist Dr. Christopher Wild in 2005, who defined it as the cumulative set of all non-genetic (i.e. environmental) exposures which an individual experiences from the moment of conception throughout their life. Thus, exposome studies focus on the effects of multiple environmental exposure and consequent health-related outcomes.

What is EXPOSOGAS interested in?

EXPOSOGAS is interested in oil/gas operations that often involve exposures to multiple chemicals and the collective impact on health that these multiple exposures have. Important operation stages of hydrocarbons occur throughout the industry lifecycle and include the preparation and installation, production, transport, storage, distribution, use and end of life activities and each of these will affect health differently, thus increased training is necessary in order to be able to establish how health is affected across the stages.

Why focus on the oil and gas industry in Cyprus?

The oil and gas industry in Cyprus is growing fast, especially with the recent discovery of the natural gas reserves in the Cypriot exclusive economic zone (EEZ). In order to increase the autonomy and energy independence of the Southern European region, the EEZ region is of primary importance. However, given the expansion of the oil and gas sector in Cyprus, there is also a need to similarly increase the capacity of the occupational and environmental health sciences in maintaining active surveillance of affected communities.

How will we do this?

Primarily by promoting the training and career development of CII researchers in the field of occupational and environmental health sciences through training that teaches them how to apply the exposome concept and related technologies on workers directly involved with oil/gas activities. EXPOSOGAS is actively trying to engage stakeholders and the general public to express their views as a means of furthering the exposomic framework.

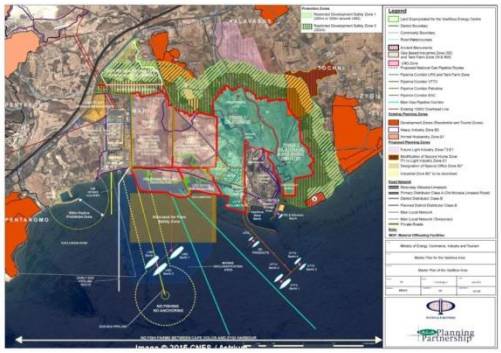
For more info, please visit our website and our Facebook page

Exposogas
APPLYING THE HUMAN EXPOSOME

PROJECT ACTIVITIES

Engagement with Stakeholders in the Vasilikos Energy Center (VEC), Cyprus

- This study describes the stakeholder engagement activities undertaken in the EXPOSOGAS project, focused on the Vasilikos Energy Centre (VEC), Cyprus.
- The main objectives of the activities were to: (a) identify stakeholders/key persons of organizations and entities involved with hydrocarbons activities in Cyprus, (b) assess their understanding, acceptance and (future) application(s) of exposome-based technologies, (c) evaluate their perceptions on environmental, safety and health risks related to the hydrocarbons activities (d) communicate with them the project outputs.



Map of the Vasilikos communities and the surrounding industrial area of Vasilikos (VEC) (Cyprus Department of Environment, 2015)

Key points

- All interviewed stakeholders expressed the immediate need for population health studies to be conducted for the VEC and its surrounding residential communities, including systematic measurements of gaseous pollutant emissions.
- Stricter policies by government about licensing, monitoring of hydrocarbon activities and proper/correct information to the public and mass media emerged as important needs.
- The usage of exposome concept was reportedly not practiced by the industry/SMEs, however small-medium industries in particular showed willingness to use it in the future, upon proper testing/evaluation of its utility.

Next step - Scientific Symposium with the stakeholders

- The symposium aims to facilitate the exchange of views and suggestions for future sustainable management of hydrocarbons in the VEC while preserving public health and the environment in the VEC and its surrounding areas.
- The findings of the recent stakeholder consultation analysis will be presented and a discussion of the immediate needs and proposed actions will follow.
- Interested in learning more and attending this symposium? Please contact: Ms. Eleni Kleovoulou at eg.kleovoulou@edu.cut.ac.cy

For more info, please visit our website: www.exposogas.eu and our Facebook Page

Webinars

Webinars are scheduled frequently for Public Health young researchers. These webinars include the use of novel technologies such as sensors, big data and smart phone applications for the assessment of the external exposome; human biomonitoring, omics platforms and bioinformatics, for the internal exposome, and toxicokinetic models that can help bridge the relationship between the external and internal exposomes. The following three webinars have recently taken place.

Dr. Tanjia Krone's webinar on April 26, 2021.

Questionnaires in practice part 1: From question to questionnaire

Dr. Tanjia Krone, PhD, Statistician at TNO, The Netherlands presented a webinar on April 26, 2021 on the topic "Questionnaires in practice part 1: From question to questionnaire". This webinar was based on questionnaire research which included examples on tips and tricks for the development of questionnaires, how to code your questionnaire and how to analyse the data.
Find more here

Dr. Tanjia Krone's webinar on May 13, 2021.

Questionnaires in practice part 2: From answers to results

Dr. Tanjia Krone, PhD, Statistician at TNO, The Netherlands continued the series of these training with the webinar "Questionnaires in practice part 2: From answers to results", on May 13, 2021. This webinar was the follow-up of the earlier webinar presentation by Dr. Krone about the development of a questionnaire. During this webinar the focus was on data analyses (and cleaning) coming from questionnaire data.
Find more here

Dr. Evangelos Handakas' webinar on June 10, 2021.

"Ultra-processed food modifies the metabolome in children: the ALSPAC cohort"

Dr. Evangelos Handakas, Research Associate, in Computational Epidemiology in the Department of Medicine at Imperial College London presented a webinar on the study "Ultra-processed food modifies the metabolome in children: the ALSPAC cohort", on June 10, 2021. The aim of the study was to investigate the associations between ultra-processed food (UPF) consumption and the metabolome and their role in overweight and obesity risk, in early childhood and adolescence in a large British Cohort. The results showed that citrate, small, medium and large very-low-density lipoproteins(VLDL) were positively associated with UPF consumption. At adolescence, UPF consumption was negatively associated with small, medium and large HDL. Additionally, diets with a higher proportion of UPF at the age of 13 years was negatively associated with DHA and omega-3 fatty acids, tyrosine, BCAAs leucine, valine and isoleucine, and large very-low-density lipoproteins (VLDL).
Find more here

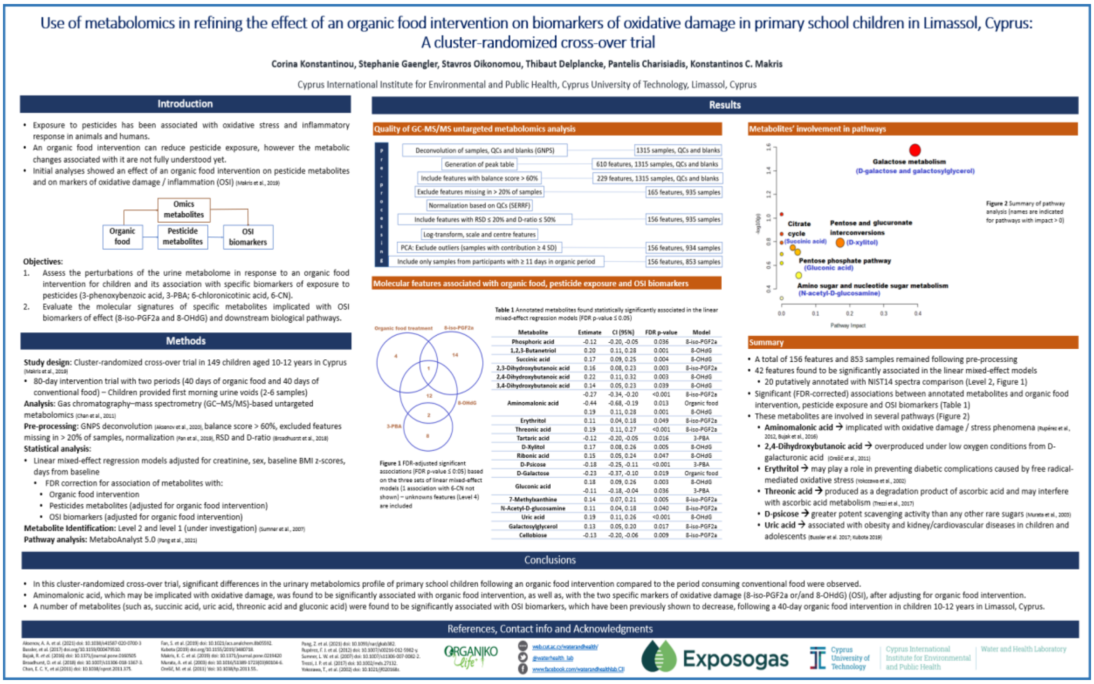
You can get informed about upcoming webinars through our platforms:

Exposogas
APPLYING THE HUMAN EXPOSOME

Presentations, courses, conferences

Metabolomics 2021 conference

An EXPOSOGAS team presented our work in the Metabolomics 2021 conference! Check out our poster #55 on *the use of metabolomics as a key exposomic tool* in refining the effect of an organic food intervention on biomarkers of oxidative damage in children.



- In this cluster-randomized cross-over trial, significant differences in the urinary metabolomics profile of primary school children following an organic food intervention compared to the period consuming conventional food were observed

- Aminomalonic acid, which may be implicated with oxidative damage, was found to be significantly associated with organic food intervention, as well as, with the two specific markers of oxidative damage (8-iso-PGF2a and 8-OHdG).

- A number of metabolites (such as succinic acid, uric acid, threonic acid and gluconic acid) were found to be significantly associated with oxidative damage markers, which have been previously shown to decrease, following a 40-day organic food intervention in children 10-12 years in Limassol, Cyprus.

For more info, please visit our website: www.exposogas.eu and our Facebook Page

Exposogas
APPLYING THE HUMAN EXPOSOME

Publication

We are delighted to announce that our open access publication on a scoping review of technologies for exposome-based risk assessment in the oil/gas industry has been published in the Annals of Work Exposure and Health

Number of articles retrieved from Pubmed and Scopus	Personal sensors	External exposure modelling	PBPK modelling	Biomonitoring and biomarkers	Omics and bioinformatics	Total
Articles screened by title:	27	17	15	27	92	178
Articles screened by abstract:	16	14	10	23	29	92
Articles included in scoping review:	9	11	10	20	22	72

Introduction

Oil and gas workers have been shown to be at increased risk of chronic diseases including cancer, asthma, chronic obstructive pulmonary disease, and hearing loss, among others. Technological advances may be used to assess the external (e.g. personal sensors, smartphone apps and online platforms, exposure models) and internal exposome (e.g. physiologically based kinetic modeling (PBK), biomonitoring, omics), offering numerous possibilities for chronic disease prevention strategies and risk management measures. The objective of this study was to review the literature on these technologies, by focusing on: (i) evaluating their applicability for exposome research in the oil and gas industry, and (ii) identifying key challenges that may hamper the successful application of such technologies in the oil and gas industry.

Methods

A scoping review was conducted by identifying peer-reviewed literature with searches in MEDLINE/PubMed and SciVerse Scopus. Two assessors trained on the search strategy screened retrieved articles on title and abstract. The inclusion criteria used for this review were: application of the aforementioned technologies at a workplace in the oil and gas industry or, application of these technologies for an exposure relevant to the oil and gas industry, English language and publication period 2005—end of 2019.

Results

In total, 72 articles were included in this scoping review with most articles focused on omics and bioinformatics (N = 22), followed by biomonitoring and biomarkers (N = 20), external exposure modeling (N = 11), PBK modeling (N = 10), and personal sensors (N = 9). Several studies were identified in the oil and gas industry on the application of PBK models and biomarkers, mainly focusing on workers exposed to benzene. The application of personal sensors, new types of exposure models, and omics technology are still in their infancy with respect to the oil and gas industry. Nevertheless, applications of these technologies in other occupational sectors showed the potential for application in this sector.

Discussion and conclusion

New exposome technologies offer great promise for personal monitoring of workers in the oil and gas industry, but more applied research is needed in collaboration with the industry. Current challenges hindering a successful application of such technologies include (i) the technological readiness of sensors, (ii) the availability of data, (iii) the absence of standardized and validated methods, and (iv) the need for new study designs to study the development of disease during working life.

- The work was published in the journal “Annals of Work Exposures and Health" (https://doi.org/10.1093/annweh/wxab039)
- Funding by the EXPOSOGAS project, H2020 Research and Innovation Programme (Grant #810995)

CONTACT US

EXPOSOGAS FINAL CONFERENCE

Exposogas

- Upcoming **EXPOSOGAS** final conference in **December 2021**
- Announcement for more information about the conference will be made in September on social media and project's website

Stay informed