

ERA-ENVHEALTH



NEWSFLASH

Sharing initiatives to help tackle Environment and Health challenges in Europe

December 2023

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Get to know what our ERA-ENVHEALTH network members do.

Adrienne Pitman, ANSES, France

Next issue

EDITORIAL

Recent years have seen major increases in droughts and heat waves worldwide. Hotter and drier conditions due to climate change are drying out ecosystems and increasing the risk of wildfires, which are becoming more and more frequent and a major environment and health issue in many countries.

Little did we know, that this theme of Wildfires - Climate change and Health impacts, chosen for the ERA-ENVHEALTH 2023 open conference

would be such a topical subject as the summer of 2023 saw the northern hemisphere in never-ending blazes – from Canada to Hawaii to the Mediterranean, in an unprecedented scale of damage to the environment and health.

Wildfires simultaneously impact weather and the climate by releasing large quantities of carbon dioxide, carbon monoxide and fine particulate matter into the atmosphere. The resulting air pollution can cause a range of health issues, including respiratory and cardiovascular problems. High-intensity forest fires destroy flora and fauna. The destruction this leads to is undeniable. Swathes of forest and peatland are destroyed. Countless animals caught up in the flames and smoke perish. When the flames reach areas inhabited by people, many human lives and homes are lost. Forest fires can also impact the economy as many families and communities depend on the forest for food and fuel.

The 2023 Open Conference of the ERA ENVHEALTH network, magnificently hosted by Aveiro University on the 18th of October, addressed the environmental and health impacts of wildfires, including occupational health, and the mitigation and adaption strategies for policy decision support, to control those impacts in a future under climate change. Eight recognised researchers in the field from Europe (Portugal, the Netherlands, the Czech Republic, and France) and from Canada and the OECD presented recent projects and outcomes to better tackle wildfires and climate change for the protection of our health. You can find the abstracts from these presentations in this newsflash issue and we hope these will help in the future to better protect health and the environment from wildfires.



*Season's greetings
and Healthy 2024*

Discover our highlight of the month

Annual Open Conference of ERA ENVHEALTH, Forest Fires – Climate change and Health impacts

18 October 2023, Aveiro, Portugal



The Annual Open Conference of ERA-ENVHEALTH network was held on the 18th of October at the University of Aveiro, in Portugal. It was a great pleasure to welcome speakers from different parts of the world, and listen to their research findings on climate change and health impacts of forest fires.

The conference was organised in 3 sessions, according to the agenda on the right, focusing on the environment, climate change and health, respectively. The hybrid mode of the event brought the opportunity to have half of the speakers and of the participants online, with a total of around 70 attendees, from different countries.

It was a great opportunity to exchange experiences and opinions between the environmental and the medical and scientific community that culminated in an enthusiastic round table chaired by Carlos Borrego, a member of the ERA-ENVHEALTH network.



ERA ENVHEALTH Open Conference

Forest Fires – Climate change and Health impacts

October, 18th 14:00 – 18:15 WEST (Portuguese Time)

Carlos Borrego Auditorium, Dept Environment and Planning, University of Aveiro

Please click [here](#) to register in this event for free

| | | |
|--|--|--|
| 13:45 | Registration | |
| 14:00 | Welcome | Joana Ferreira, University of Aveiro, Portugal |
| Session 1 Environmental Impacts of Forest Fires | | |
| 14:15 | The effects of wildland fires on air quality | Ana Miranda, University of Aveiro, Portugal |
| 14:40 | Sensor network for a better picture of exposure in the impact area during incidents | Niels van Veen, RIVM, The Netherlands |
| 15:05 | Opportunities of satellite usage data to prevent damages from forest fires, case of Czech Republic | Miroslav Havranek, Charles University Environment Center, Czechia |
| Session 2 Forest Fires under Climate Change | | |
| 15:30 | Taming wildfires in the context of climate change | Marta Arbinolo, OECD, France |
| 15:55 | Climate change and wildfires – what does the future hold? | Michael Flannigan, Thompson Rivers University, Canada |
| 16:20 | Networking coffee | |
| Session 3 Health impacts of Forest Fires | | |
| 16:35 | Occupational and environmental risks of respiratory exposures to wildland fires | António Jorge Ferreira, Faculty of Medicine, University of Coimbra, Portugal |
| 17:00 | Wildfires - ANSES expertise and scientific issues on the health effects for the general population and workers | Alexandra Papadopoulou, ANSES, France |
| 17:25 | Tackling the increasing threat of smoke health impacts from forest fires and climate change | Filipa Esteves, ISPUP, Portugal |
| 17:50 | General Discussion | Chair: Carlos Borrego, University of Aveiro, Portugal |
| 18:15 | Closure | |



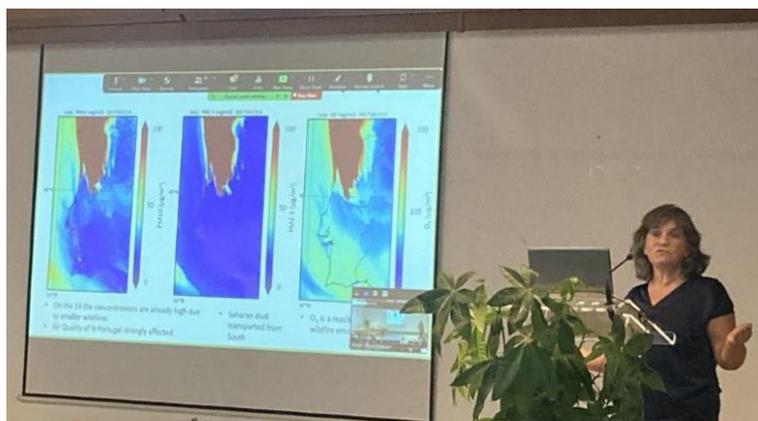
See talk details below

The effects of wildland fires on air quality

Ana Miranda, Tobias Osswald, Carla Gama,

CESAM & Department of Environment and Planning, University of Aveiro, Portugal

In recent times, many cities across the world have been affected by smoke from wildland fires. This smoke contains high levels of gaseous and particulate pollutants, which can pose a significant threat to human health. Exposure to such high levels of air pollution during wildfire events can lead to various adverse health outcomes, including respiratory problems and negative impacts on the cardiovascular system. Those who are most



vulnerable to smoke exposure are typically children, older adults, and firefighting personnel. Short-term exposure to high air pollution levels during a fire event can cause acute health problems such as rashes on the eyes, irritation in the nose and throat, and shortness of breath. These symptoms often lead to headaches, dizziness, and nausea, which can last for several hours.

The purpose of this study was to gain a better understanding of how smoke is emitted and dispersed during extreme wildfire events, and how it affects air quality. The October 2017 Portuguese wildfire events were used as a case study. Emissions were estimated based on a bottom-up and a top-down methodology, and their impact on AQ was assessed by a modelling approach. The WRF model was used to obtain high spatiotemporal meteorological conditions while CHIMERE simulated the chemical and physical processes that pollutants undergo within the atmosphere. The evaluation of the modelling system, namely regarding the chosen model parameterization and input data, was done by comparing results with measurements from AQ monitoring stations located in Portugal. Overall, the simulations compared well with the measurements.

The estimated emissions resulting from the wildfires were compared with the total national anthropogenic emissions for the entire year of 2017 in Portugal. This comparison revealed the extreme impact of the wildfires on the air quality levels throughout the year. The air quality results confirmed that the wildfires had a significant impact on the concentration levels of pollutants, particularly in the central and northern regions of Portugal. Based on the obtained data and the European legislation for the protection of human health, it is likely that the low air quality during the October 2017 wildfires had a strong negative impact on human health.

Acknowledgments: The authors are grateful for the financial support of the Foundation for Science and Technology, I.P., through national funds, under the SmokeStorm project (PCIF/MPG/0147/2019), and CESAM (UIDP/50017/2020 + UIDB/50017/2020 + LA/P/0094/2020). The authors also acknowledge the financial support of the FirEUrisk project, which has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101003890

Sensor network for a better picture of exposure in the impact area during incidents

Niels van Veen

RIVM Dutch National Institute for Public Health and the Environment, The Netherlands

Incidents that cause long-term emissions (such as smoke) raise many questions and concerns among nearby residents. Locally, it is up to the safety region (fire department) to answer these questions. They have measuring equipment and measuring teams that can be deployed during an incident. Nevertheless, the measurements remain in fact static snapshots for which (many) measurement personnel are needed. The effect area is dynamic that is constantly changing due to various factors, such as weather conditions and emissions.

Technical developments have greatly increased the possibilities to measure with sensors at different locations. In this way, a local measurement network could be established to continuously monitor air quality at relevant locations and to track the course of the incident in real time. However, these new possibilities are until the project DESIRE hardly applied at incidents in the Netherlands.

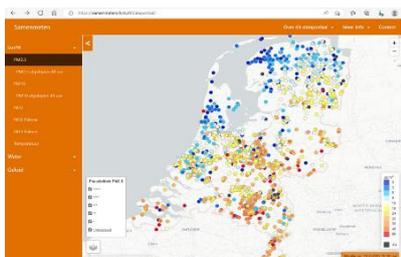
The DESIRE project was set up by the RIVM to use sensor kits to get a better picture of long-term exposure of people in a larger area. These sensor kits are equipped with sensors for measuring particulate matter fractions PM 2.5 and PM 10 as well as the gases CO, CO₂ and volatile organic compounds (VOC). Measured data including location is transmitted live to a database, which can be used with a GEO application to assess various measured values. The overall picture of all measurement data together gives more insight into where potential exposure is occurring.

The project is still in the pilot phase and contains some teething problems. When the system is operational, the measurement results from the sensor kits should be able to contribute in imaging the next situation:

- Prolonged fires with an impact area
- Monitoring air quality in forest and wildfires
- Some industrial emissions
- Some incidents involving chemicals

The impact area information can contribute in:

- Optimization of measurement strategy with more advanced equipment
- Extrapolating advanced measurement data to a broader field for an indicative picture
- Knowledge development on relationships between different emitted substances in relation to fire development and extinguishing activities
- Better interpretation to recipients between hazardous substance emissions and hazardous substance exposures



Project DESIRE (DE inzet van Sensoren bij Incidenten in de Regio = THE deployment of Sensors at Incidents in the Region)

Opportunities of satellite usage data to prevent damages from forest fires, case of Czech Republic Forest Fires under Climate Change

Miroslav Havranek

Charles University Environment Center, Czechia

This talk focused on the dangers that forest fires pose to Central Europe, based on examples of cases from Czech Republic. The usage of satellite data for forest fires prevention, management and monitoring was addressed as well as its suitability for the identification of forest fires starters. It was discussed not only the usage of current tools from Copernicus family (EFFIS) but also possible new development using Geostationary satellites from Meteosat family.



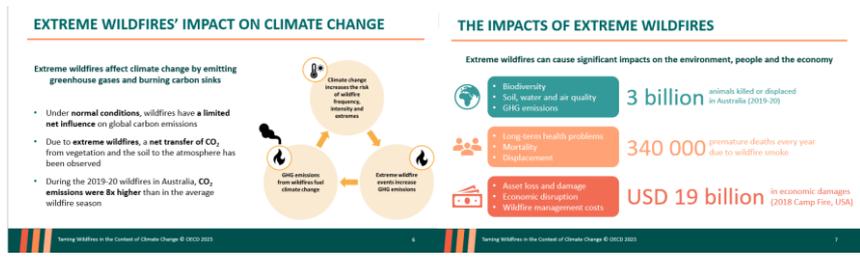
Taming wildfires in the context of climate change

Marta Arbinolo
OECD, France



Wildfires are becoming more frequent and more severe in many regions of the world. Globally, the duration of the wildfire season has increased by 27% since 1979 and the number of extreme wildfires is on the rise, with many of the most extreme wildfires ever recorded having occurred in the last few years. While ecosystem degradation, rural land abandonment and careless human activity are all important drivers of wildfire risk, attribution studies have increasingly shown the links between extreme wildfires and climate change. Increasingly extreme wildfires come with growing social, environmental and economic impacts, putting human health and wellbeing at risk. Every year, at least 340 000 premature deaths are associated with wildfires and most recently, the 2023 extreme wildfires in North America put around one-third of the United States' population under air quality alerts. These trends show the urgent need to tackle wildfire risk in the context of climate change, integrating preventative actions and climate change adaptation through a whole-of-government effort in wildfire management.

The presentation will outline the key findings and recommendations of the new OECD flagship report [Taming Wildfires in the Context of Climate Change](#), providing a global assessment of changing wildfire risk under climate change. It will shed light on the complex drivers behind the growing incidence of extreme wildfires and the attribution effect of climate change, as well as on the environmental, social and economic impacts of wildfires by illustrating the losses and costs observed during recent extreme wildfire events and projected for the years to come. In conclusion, building on selected country examples, the presentation will show how countries' policies and practices can help adapt to changing wildfire risk, with a view to reducing the occurrence and impacts of extreme wildfires and building long-term resilience.



POLICY RECOMMENDATIONS

1. PROTECT AND RESTORE WILDLAND ECOSYSTEMS

Healthy ecosystems are more resilient and less prone to wildfire risk and impacts

- Protecting ecosystems such as forests and peatlands from illegal activity and unsustainable land use changes is critical for wildfire risk prevention
- Restoring degraded ecosystems (e.g. smothering tree diversity, sweetening peatlands, controlling invasive species) and managing them sustainably can reduce fire vulnerability
- Better monitoring and enforcement are needed

2. MANAGE FUEL IN THE WILDLAND-URBAN INTERFACE

Fuel management contains wildfire risk by limiting the amount of vegetation available to burn

- Prescribed and cultural fire performed under safe conditions can reduce fuel loads
- Buffer zones around key assets are essential
- Fire breaks can reduce fuel continuity and limit wildfire spread
- Engaging private stakeholders to encourage action and management and meeting compliance are key to the success of these measures

3. ADAPT LAND-USE AND BUILDING REGULATIONS

Land-use and building regulations are essential to protect lives, livelihoods and assets

- Land-use planning can limit urban sprawl in the WUI and reduce human exposure to wildfires
- Building codes that mandate the use of non-combustible materials and structural protections can minimize damage to physical assets
- Adapted construction design, operation and management can strengthen resilience of whole communities and economies

THANK YOU!

For more information: <https://www.oecd.org/era/2023/09/01/taming-wildfires-in-the-context-of-climate-change/>

Join the discussion: @OECD_2023 #WildfireResilience

4. IMPROVE WILDFIRE RISK ASSESSMENT

Wildfire risk assessment is the basis for all wildfire management decisions

Wildfire risk index in the United States

- Mapping wildfire hazard, exposure and vulnerability is key to inform decision making vs. with or without risk
- Integrating climate projections in wildfire needs is indispensable to understand future risks
- Participatory processes can enhance the acceptance and ultimately the use of expert-informed risk assessments

5. DEVELOP A WHOLE-OF-GOVERNMENT APPROACH

Coordination and collaboration across sectors and levels of government are essential

- Central coordinating agencies facilitate collaboration and exchange across sectors and levels of government for wildfire prevention and response
- National wildfire management strategies define clear roles and provide overarching policy frameworks (e.g. better coherence, better fire response, better land)
- Mainstream wildfire prevention into sectoral policies to build synergies and ensure policy alignment (e.g. climate, forest, land-use)

6. SECURE APPROPRIATE FUNDING

Closing the gap between wildfire prevention and suppression funding is critical to strengthen long-term resilience

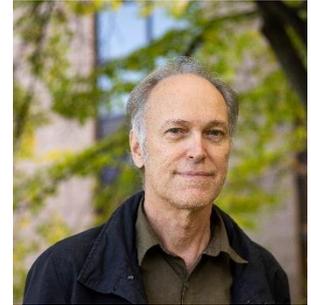
- Wildfire prevention budgets need to match those used for suppression - vs Annual
- Sufficient and stable public funding for wildfire prevention must be ensured
- Incentives for private investments in wildfire prevention investments are key
- Securing affordable insurance coverage for wildfire in high-risk areas remains a challenge (e.g. "high-risk wildfire" insurance in California)

Growing prevention spending in Portugal, 2017-2021

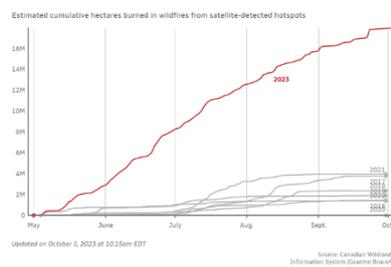
Climate change and wildfires – what does the future hold?

Michael Flannigan

Thompson Rivers University, Canada



The 2023 Canadian Fire Season



- Uncharted territory – area burned, geographic coverage, record breaking temperatures, atmospheric blocking, and extremely early start in some regions.
- Evacuations 200,000
- Emissions
- Expenditures over 2 Billion \$

Federal data forecasts grim wildfire season this summer | CBC News

Summary

- **More extreme fire weather and regionally more fire activity in the future and our fire management approaches have to adapt to this new reality.**
- **May be entering new territory with no historical analogues. High intensity fires outside the typical fire season. We can not rely only on our experience.**
- **Fire and society interactions will increase in the future. We have to learn to live with fire and smoke.**



Photo credit: Chris Schwarz, Government of Alberta



David Peterson @DrDavePeterson · 21h
Update: As of 11 July, 2023 is now the most active year of the last decade (2013-2023) for total #pyroCb activity in Canada (90 events) and worldwide (102 events). That's a lot of fire generated-storms! Previous maximums were in 2021, with 50 pyroCbs in Canada and 100 worldwide.

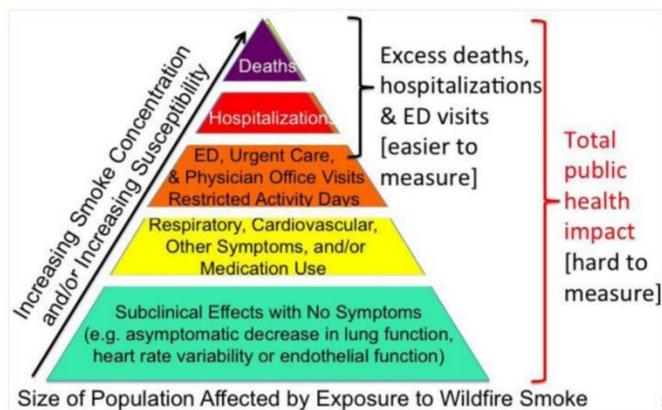
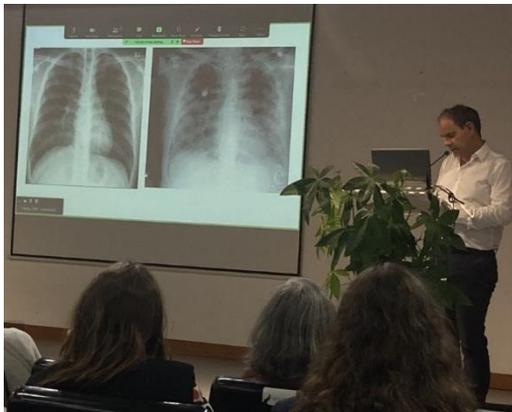
David Peterson @DrDavePeterson · Jul 10
Already 85 #pyroCb events in Canada during the 2023 fire season, which exceeds the second highest total of 50 in 2021 (dataset begins in 2013). Nine pyroCbs occurred on 9-10 July alone. There have been 97 pyroCbs worldwide in 2023. Four more will make 2023 the most active year.

Summary II

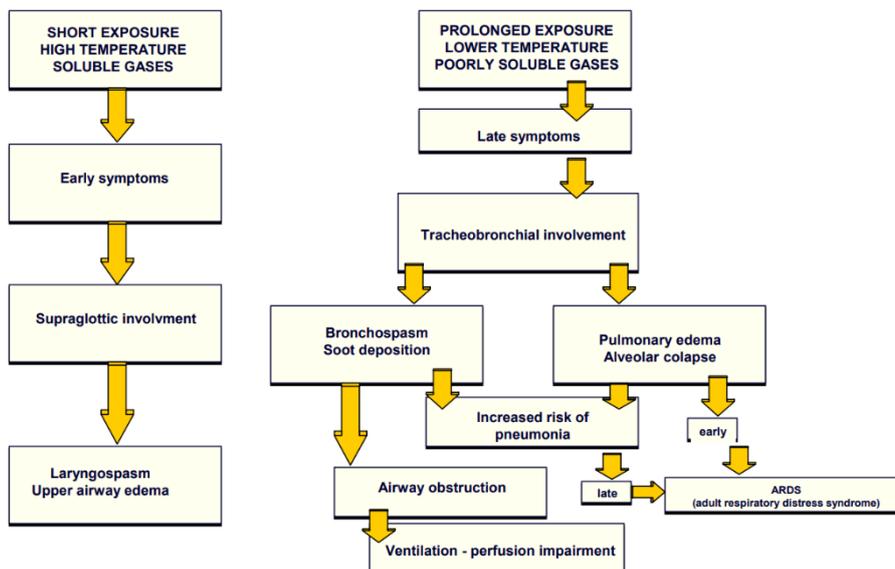
- We will see higher intensity fires and more Pyrocumulonimbus (PyroCBs – fire generated thunderstorms)
- More wildfires burning into and through the night
- **Fire is a multi-faceted issue and will need multi-prong approaches.**

Occupational and environmental risks of respiratory exposures to wildland fires

António Jorge Ferreira, Faculty of Medicine, University of Coimbra, Portugal



Cascio WE. Wildland fire smoke and human health. *Sci Total Environ.* 2018 May 15;624:586-595.



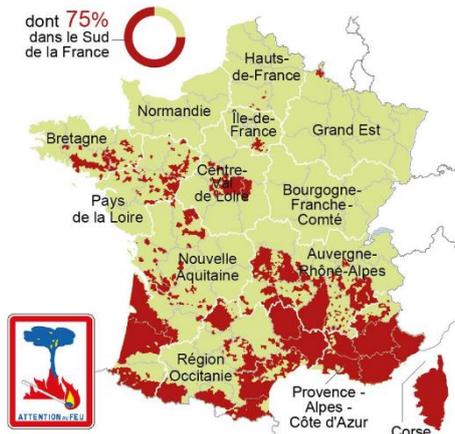
Wildfires - ANSES expertise and scientific issues on the health effects for the general population and workers

Alexandra Papadopoulou, ANSES, France

FEUX DE FORÊT | LES COMMUNES EXPOSÉES

6 152 communes classées à risque de feu de forêt

dont 75% dans le Sud de la France



Source: ministère de l'Environnement.

VISACTU

According to the GIEC report published in 2007, projections of the impact of climate change in many regions point out an increase in droughts and heat waves, which in turn will increase the frequency of uncontrolled fires. Many short-term respiratory effects were reported by the WHO (2000) following large wildfires in California, South-East Asia and Brazil. But there is a lack of data on health effects related to repeated exposures and to soil contamination. In 2010, the French public authorities requested to produce a state of knowledge on air pollution from wildfires and related health effects on the general population and firefighters to implement the appropriate regulations to prevent or manage wildfires situations. After a bibliographic collection of the main literature reviews and of 212 original studies published later, Anses expertise has drawn conclusions in 2012 on air

pollution, soil pollution, woodsmoke toxicity, exposure and health risks of the general population and firefighters, classified into 4 categories (established points, emerging points, points under discussion, absence of knowledge) according to the number of publications and the convergence and/or power of the results. An update of this work is currently being updated to include the most recent data and knowledge.



Exposure and health effects / Established points

➤ Firefighters:

- High exposures to CO et PM (respirable fraction, PM_{3,5}, PM_{2,5}) and to a lesser degree to other respiratory irritants such as formaldehyde and acrolein
- Exposure increased by long work periods (> 10 hrs or even > 24 hrs when fighting widespread fires), as the use of Self-Contained Breathing Apparatus is often not possible, by the physical activity (pulmonary ventilation)



Exposure and health effects / Emerging points

➤ Firefighters:

- Decrease of respiratory function
- Increase of bronchial hyperreactivity and respiratory symptoms

➤ General public:

- PM₁₀ from vegetation fires may be considered at least as toxic as urban-generated PM₁₀ for short-term respiratory health
- Observed associations with short-term cardiovascular effects → cardiovascular diseases people as a sensitive sub-population.
- Observed associations between widespread fires near densely populated areas and the short-term non-traumatic mortality. But poorly documented and this relationship could not be linked solely to air pollution.

Exposure and health effects / Absence of knowledge

➤ Firefighters:

No studies on the long-term follow-up of respiratory or cardiovascular health

➤ General public:

- No studies investigating the relationship between exposure to smoke from open vegetation fires and delayed effects such as cancer or developmental disorders.
- Population size not known for people exposed to wildfire smoke in France

Tackling the increasing threat of smoke health impacts from forest fires and climate change

Filipa Esteves^{1,2,3,4}, J. Madureira^{1,2,3}, J. Pires^{1,2,3}, JP. Teixeira^{1,2,3}, S. Costa^{1,2,3}

¹ Environmental Health Department, National Institute of Health, Porto, 4000-055, Portugal

² EPIUnit - Institute of Public Health, University of Porto, Porto, 4050-600, Portugal

³ Laboratory for Integrative and Translational Research in Population Health (ITR), Porto, 4050-600, Portugal

⁴ Department of Public Health and Forensic Sciences, and Medical School, Faculty of Medicine, University of Porto, Porto, 4200-072, Portugal

Wildfires have a negative impact on the environment, ecosystems, and human health. Smoke from wildfires contains harmful pollutants such as particulate matter, carbon monoxide, nitrogen dioxide, and volatile organic compounds. These pollutants can cause immediate adverse health effects, mostly related to the respiratory system, such as wheezing, shortness of breath, coughing, and exacerbation of pre-existing health conditions (e.g., asthma, bronchitis, and chronic obstructive pulmonary disease). In addition to short-term health effects, exposure to smoke has also been linked to long-term population health effects. Epidemiological studies have shown a positive association between wildfire smoke exposure and both cardiorespiratory morbidity and all-cause mortality. This has been particularly evident in susceptible populations including children, older adults, and pregnant women. Thus, it is important to mitigate wildfires' impact on the human population through prevention and awareness actions. Recently, occupational exposure as a firefighter was listed as carcinogenic to humans (Group 1) by IARC. The proximity of firefighters to wildland fires exposes them to high levels of toxic compounds, making this activity one of the most dangerous in the world. Yet, evidence linking wildland firefighters' occupational exposure and health outcomes is still limited. Characterization of the workplace is an important step for a general perspective of potential risk factors that may influence the parameters considered in further analysis. The increasing risk of wildfires episodes and longer fire seasons highlight the need for occupational studies among these professionals who are commonly exposed to hazardous pollutants. Exposure assessment plays a central role in the identification, evaluation, and control of occupational risks. The exposure is usually assessed through environmental monitoring, where the chemical agents are quantified in environmental samples, as well as through biological monitoring, which consists in the measurement of biological endpoints, commonly called biomarkers. Scientific evidence has contributed for the establishment of measures related with firefighters' health promotion. Regular monitoring, surveillance and health promotion activities, the introduction of innovative firefighting techniques, safer personal protective equipment and the implementation of written policies and procedures such decontamination of fire station equipment and spaces are crucial.



Acknowledgments: This work received financial support from the project PCIF/SSO/0017/2018 by the Fundação para a Ciência e a Tecnologia (FCT), Ministério da Ciência, Tecnologia e Ensino Superior (MCTES) through national funds. Joana Pires work is supported by FCT under PCIF/SSO/0017/2018. Filipa Esteves, the recipient of the Ph.D. grant UI/BD/150783/2020, is supported by FCT and by the European Social Fund (ESF). The authors are grateful to the Foundation for Science and Technology (FCT, Portugal) for financial support by national funds in the scope of projects UIDB/04750/2020 and LA/P/0064/2020.

Learn about new initiatives

Launch of PARCopedia: the new community platform for chemical risk assessment professionals



The Partnership for the Assessment of Risk from Chemicals has launched PARCopedia, a new online knowledge base and community platform for people involved in chemical risk assessment.

The new [PARCopedia](#) platform supports knowledge sharing among professionals with the goal of innovating chemical risk assessment methodology towards Next-Generation Risk Assessment (NGRA), thereby supporting Europe in further reducing risks from chemicals for human health and the environment.

The platform is a not-for-profit, ad-free knowledge management and social media environment open to all who are involved in chemical risk assessment and have a general understanding of the chemical risk assessment process.

Signup to PARCopedia to:

- access information on chemicals, concepts, methods, and activities related to the innovation of chemical risk assessment on the PARCopedia WIKI,
- learn about information on news, events, and job opportunities from PARCopedia's dashboard,
- use their PARCopedia profile to provide others in the community with such information and to share their work and expertise with others,
- engage in discussions with other community members in PARCopedia's public and private groups.



[Sign up here](#)

Save the date for upcoming events

Research Perspectives on the Health Impacts of Climate Change

Monday 19 February 2024, 12:00 - Tuesday 20 February 2024, 16:30 (CET), Brussels, Belgium

This high-level conference will bring together researchers, policymakers and relevant stakeholders to reflect on the research needs in the field of climate change and human health.



[More information here](#)

World Circular Economy Forum 2024

April 15, 2024 to April 18, 2024, Brussels and online

WCEF2024 has joint forces with the European Circular Economy Stakeholder Conference 2024 (ECESC) which brings to the forum a dedicated track showcasing Europe's progress. In addition, the forum features a full day programme on 17 April curated by the Belgian EU presidency team including site visits to circular economy companies in Belgium



[More information here](#)

Next annual ERA-ENVHEALTH Open Conference

Autumn 2024

Watch this space!

The ERA-ENVHEALTH Network

What?

ERA-ENVHEALTH is an active transnational network including stakeholders in the Environment and Health field, stemming from a previous European-funded project, which ended in 2012. It is a forum to discuss challenges, visions and emerging issues.

Why?

The main purposes for the network are to share and exchange information and promote networking and joint activities (such as the annual open conference on specific topics of interest).



Join us!

The network is based on "contributing and sharing"; each organisation participates on a voluntary basis.

CONTACTS

<https://www.anses.fr/en/content/era-envhealth-network>

Do not hesitate to get in touch with the network either through your national contact point and member of the network or by contacting:

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Network members

| | Acronym | Name | Country |
|---|--------------------|--|----------------|
|  | ANSES | French Agency for Food, Environmental and Occupational Health & Safety | France |
|  | CNR | Italian National Research Council | Italy |
|  | EPA | Environmental Protection Agency | Ireland |
|  | FPS HFCSE | Federal Public Service Health, Food Chain Safety and Environment | Belgium |
|  | INSA | National Institute of Health Dr Ricardo Jorge | Portugal |
|  | PHAS | Public Health Agency of Sweden | Sweden |
|  | RIVM | National Institute for Public Health and the Environment | Netherlands |
|  | Swedish EPA | Swedish Environmental Protection Agency | Sweden |
|  | RECETOX | National Centre for Toxic Compounds in the Environment, Faculty of Science, Masaryk University | Czech Republic |
|  | UA | University of Aveiro | Portugal |
|  | UBA | German Environment Agency | Germany |
|  | UoWM | University of Western Macedonia | Greece |