IMPACT SUCCESS STORIES

HNN 3.0
HEALTH-NCP-NET

SynAir-G

> SynAir-G aims to reveal and quantify synergistic interactions between different pollutants affecting health, from mechanisms to real life, focusing on the school setting.

To achieve this vision, SynAir-G will construct and deploy novel and improved sensors of chemical and biological (allergens, microbes) pollutants.

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1. Describe your project through key words/key phrases that identify it.

The rising number and variety of **indoor air pollutants** is a growing concern, yet the potential **synergistic interactions** among them and their impact on human health remain largely unexplored. Populations that are particularly vulnerable to these pollutants include **children**, individuals with **allergies** and **asthma**, and those from **lower socioeconomic backgrounds**. SynAir-G seeks to quantify the interactions between different pollutants affecting health, with a particular focus on the school environment. The project will develop a comprehensive **multipollutant monitoring system**, advance environmentally friendly interventions, and disseminate the resulting knowledge in accessible and actionable formats to relevant stakeholders.
To realize these goals, **SynAir-G** is working on the development and deployment of novel sensors that can detect chemical and biological pollutants, such as allergens and microbes. These sensors are tested in real-world school settings across five European countries and will be ultimately integrated into a **multisensing** platform. Health data are collected from children using a **gamified application**. Children who are particularly vulnerable, such as those with allergies or asthma, will serve as sentinels to enhance the system's sensitivity, which will be capable of providing stratified alerts based on individual susceptibility. The system's analysis and response will be supported by explainable **AI**. Meanwhile, cell and mouse models are used to study the mechanisms and complex dose-responses of the synergistic effects of these pollutants.

2. In terms of impact, what will be the most tangible your project will achieve?

SynAir-G will deliver measurable impacts across multiple domains, directly enhancing health, policy-making, and environmental resilience. One of the most tangible results will be scientifically backed policy recommendations that enable evidence-based decision-making at the EU, national, and regional levels. By systematically investigating the synergistic effects of indoor air pollutants, we will provide actionable insights that have been previously overlooked, strengthening environmental, occupational, and public health policies, focusing on vulnerable populations such as individuals with asthma and allergies. SynAir-G will establish stratified thresholds and targeted response strategies, ensuring a measurable decrease in pollution-related health burdens by 2030. Moreover, we will deliver practical interventions to improve indoor air quality in schools, ensuring children experience healthier indoor climates.

Another critical achievement will be the strengthening of health system resilience through early detection and self-management strategies. Our real-time pollutant monitoring technology, combined with advanced evaluation of pollution synergies, will empower both citizens and healthcare providers to proactively mitigate risks, addressing environmental inequalities and reducing premature deaths. Finally, we aspire to enhance public understanding of environmental and health issues, ensuring that individuals, communities, and policymakers alike can take informed action.

3. **Please describe your project's overall impact, if applicable, at the European level.**

SynAir-G is poised to make a substantial impact on the European level, driving progress across scientific research, technological innovation, and societal well-being. SynAir-G is progressing towards understanding pollutant synergy mechanisms, setting the stage for a new frontier in environmental health research. By developing cutting-edge sensors and deploying innovative tools—including mobile applications, monitoring dashboards, and wearables—we develop deepened insights into how pollutants interact and exacerbate health risks. This knowledge will directly inform regulatory frameworks and intervention strategies, ensuring Europe remains at the forefront of evidence-based policymaking.

In addition, SynAir-G is developing novel sensors, an integrated multi-pollutant monitoring device and AI algorithms, enabling proactive health interventions.

In the long run, SynAir-G aspires to significantly improve public health across Europe, with a particular focus on children and vulnerable populations. Our approach integrates cross-examination of multiple environmental factors, patient feedback, and real-time exposure data, analyzed using AI-driven models. This will enables health professionals to make data-informed decisions, ensuring targeted interventions during critical time windows, such as extreme climate events or periods of high particulate matter exposure.
By protecting children's health today, SynAir-G contributes to safeguarding Europe's future, ensuring stronger, healthier generations and fostering resilience against environmental health threats.

4. As an applicant, what advice would you have wanted in the Horizon project design process? What support did you receive from National Contact point (NCP) and your organisation, and what improvement of support would you benefit from?

As an applicant, I would have appreciated early guidance on structuring a strong proposal, understanding evaluation criteria, and aligning with Horizon Europe priorities. Clear examples of successful applications and best practices are always valuable.
The National Contact Point (NCP) provided helpful insights on eligibility, funding rules, and proposal structuring, but more tailored feedback and hands-on workshops could enhance preparation.
Our organization offers administrative support and advice, but additional mentoring, internal peer reviews, and more dedicated time for proposal development would have been beneficial.
Improved support could include more interactive training, one-on-one consultations, and closer coordination between NCP and institutional support teams.

5. Please highlight aspects of your Horizon project's strengths that you consider important and that may constitute good practice for other applicants.

The key strengths of the SynAir-G project, which could serve as valuable best practices for other Horizon applicants, include:

- Focus on Vulnerable Populations: By prioritizing highly susceptible groups, such as children, individuals with allergies, and those with asthma, the project ensures that the most at-risk populations are the central focus of its research and interventions.
- Real-World Implementation: The deployment of novel sensors in real-world school environments across multiple European countries ensures that the project's findings and solutions are grounded in practical, everyday settings.
- Collaboration Across Multiple Countries: The international scope of the project, with participation from schools in five European countries, fosters cross-border collaboration and allows for the identification of shared and unique challenges related to air pollution.
- User-Centered Approach: The integration of gamified applications for health outcome monitoring, alongside personalized, susceptibility-specific alerts, demonstrates a user-centered approach that empowers individuals, particularly children, to actively engage with the project.
- Multidisciplinarity: The most challenging, but probably the most rewarding aspect is bringing together scientists from widely different disciplines from medicine to information technology, social sciences to mechanical engineering.

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