

- PRESS RELEASE -

## Cognitive Performance and Stress Worsen on High-Pollution Days in Barcelona

*These are the preliminary results reached by the CitieS-Health citizen-science research project, which involved the participation of 300 local volunteers over several months*

**Barcelona, 14 September 2021.** Cognitive performance and stress worsen on high-pollution days in Barcelona. These are the preliminary results of [CitieS-Health](#), a European **citizen-science** study coordinated by [Ideas for Change](#) and the Barcelona Institute for Global Health ([ISGlobal](#))—a centre supported by the “la Caixa” Foundation—with the goal of measuring **how pollution affects the mental health** of people in the city. The study took place over several months, with the voluntary participation of nearly **300 residents**, who enabled the researchers to **collect information on habits and mobility** over the course of 160 days.

Research has shown that people have **greater difficulty concentrating** on the days when air pollution is highest. Specifically, reaction time and cognitive performance can drop by about 5% on a high-pollution day compared to a day with clean air. On days with higher levels of pollution, **stress levels also increase** by roughly 0.5 (on a scale of 0-10) compared to a clear day. The study also found that, on high-pollution days, the cognitive health of people living close to a **green or blue space** (such as the sea) is less affected than that of people living farther away, whereas the relationship between air pollution and cognitive well-being does not seem to vary with noise exposure. The findings of the study are currently being written up in a scientific article for validation via the peer-review process.

### Citizen Data and Public Data Support the Findings

The analysis conducted by the CitieS-Health team used citizen data provided by study participants. For two non-consecutive weeks, participants took a **test of attention span and processing speed** and answered a series of questions on **stress level, mood and sleep quality** via an app. In many cases, participants also provided their GPS mobility data to estimate the correspondence between pollutant concentration and time spent in different parts of the city. In addition, more than 260 volunteers wore a **passive sampling device** to measure the accumulated NO<sub>2</sub> concentration they were exposed to over the course of a week.

To compare the sample and establish correlations, the results were cross-checked against public data such as the average pollutant concentrations collected by the stations in Barcelona’s Air Pollution Monitoring and Forecasting Network, as well as the city’s strategic municipal noise map and land-use maps.

### Citizen Proposals to Be Presented at Park(ing) Day 2021

The public’s interest in the effects of pollution on mental health was evident throughout the project. In fact, **Barcelona residents themselves chose the subject of analysis** for this study. In 2019, a participatory process involving more than **1,000 inhabitants of Barcelona** found that mental health was the issue that generated the most interest.

The results of the study are just the first step towards remedying the situation. At the online presentation of the research findings, four dialogue sessions were held with city residents. With the support of local communities that are active in promoting citizen science and sustainable habits in the city, participants discussed ideas for actions that could be implemented by private citizens and public bodies alike to help address important issues.

The areas identified for exploration were **art and greening** to counteract pollution and its effects on mental health (in collaboration with Enverdim), **sustainable mobility** to improve health and quality of life (with contributions from WeCount), how our **data** can contribute to future health research (with the support of Salus Coop) and **healthy habits** to foster emotional well-being and mental health (coordinated by #PaulaDivulga).

The citizen recommendations will be presented on 17 September as a part of Park(ing) Day Barcelona 2021—a community-driven intervention to reclaim public space—and shared with the relevant government bodies to raise awareness. A stand set up at Carrer Padilla 230 will host an interactive and participatory visualisation of the study's findings, the steps followed during the experiment, the final conclusions and a compilation of citizen actions to combat air pollution and improve mental health.

### **About CiteS-Health**

CiteS-Health aims to place citizens' concerns at the heart of the environmental epidemiology research agenda by addressing health issues that matter to everyday people. Groups of citizens from five cities across Europe will design and conduct experiments to explore how pollution in their living environment is affecting their health. The project will develop an interactive toolkit featuring customised tools and best practices so that the studies can be replicated elsewhere by researchers, individuals and citizen groups. The project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement number 824484.

[www.citieshealthbcn.eu](http://www.citieshealthbcn.eu)

### **About ISGlobal**

The Barcelona Institute of Global Health (ISGlobal) is the result of an innovative alliance between the "la Caixa" Foundation and academic and government institutions. The Institute was set up to contribute to the work undertaken by the international community to address global health challenges. ISGlobal has consolidated a hub of excellence in research and medical care that has its roots in work first started in the world of health care by the Hospital Clínic and the Mar Health Park and in the academic sphere by the University of Barcelona and Pompeu Fabra University. ISGlobal's work model is based on generating knowledge through its scientific programmes and research groups and translating this knowledge into practice and policy through its Education, Policy and Global Development departments. ISGlobal is accredited as a Severo Ochoa Centre of Excellence and is a member of CERCA, the Catalan Government's network of research centres.

### **About Ideas for Change**

Ideas for Change is a consulting and research company dedicated to high-impact innovation. It specialises in the design of open and contributory business models as well as the exponential growth of organisations in the digital environment. The company also has extensive experience in the development of citizen participation strategies, sharing-economy initiatives and data-economy projects.

[www.ideasforchange.com](http://www.ideasforchange.com)

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