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### ► To cite this version:

Olivier Laurent, Philippe Renaud, Serge Dreuil, Claire Greau, Caroline Vignaud, et al.. Radiological component of the Exposome, multiple exposures, risks of cancer and other chronic diseases in the Constances cohort (CORALE). ERPW2021 - 5th European Radiation Protection Week, Nov 2021, Vienne, Austria. , 2021. irsn-04032729

**HAL Id: irsn-04032729**

**<https://irsn.hal.science/irsn-04032729v1>**

Submitted on 16 Mar 2023

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# Radiological component of the Exposome, multiple exposures, risks of cancer and other chronic diseases in the Constances cohort (CORALE).



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## Context

Throughout life, people are exposed to ionizing radiation (IR) at varying levels, via multiple natural and artificial sources, whether in the context of the residential environment, various activities (professional or other such as air travel) or for medical reasons (diagnostic or therapeutic procedures). The carcinogenic effects of IR are well documented at dose levels of 100 milliGrays (mGy) or higher. There is still controversy about the shape of the relationships between exposure and cancer risks at lower doses. In addition, the quantification of the effects of multi-exposure to IR and other cancer risk factors is poorly documented. Similarly, the relationships between exposures to IR at different stages of life (e.g., during childhood, puberty, etc.) and late health effects remain poorly characterized. Associations between low doses of IR and non-cancer chronic diseases also require better documentation.



## Objectives

- to carry out the broadest possible reconstruction of doses of IR from environmental sources (radon, terrestrial and cosmic radiation, food, nuclear installations and other artificial sources), medical (diagnostic and therapeutic procedures) and occupational exposures received by participants of the French Constances cohort since birth, following the logic of the exposome concept (for its radiological component).
- to estimate the risks of cancers and other chronic diseases potentially associated with the cumulative doses received (from several sources of IR and over time) taking into account the possible influence of multi-exposures to other risk factors.

## Methods

In order to reconstruct the annual doses of IR received by about 85 000 members of the French Constances cohort since their birth, reconstructions related to environmental, medical and occupational exposures will be performed by different units of IRSN in collaboration with the Constances cohort team (Inserm/UVSQ/UParis).

The statistical analyses (e.g., Cox models with time-dependent covariates) will benefit from the expertise of radiobiologists, supporting the exploration of specific hypotheses and interpretations. The use of advanced Bayesian probabilistic models allowing to deal with multi-exposures will be explored.

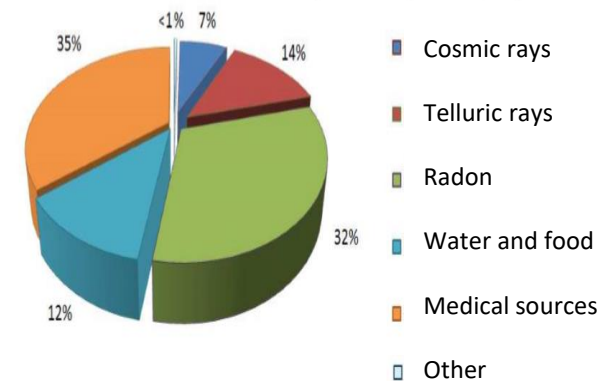
## Perspectives

The CORALE project will start in January, 2022. It is part of a broader long-term research programme, which will include investigation of the effects of other multi-exposures (e.g., IR and environmental exposures to chemicals) and the study of risks and exposure biomarkers through the Constances biobank.

## Funding

This project is funded by and the European Commission (RadoNorm <https://www.radonorm.eu/>) and the Fondation de France.

Average exposure to IR of the French population (IRSN 2015, 2021) <https://expop.irsrn.fr/>



Projet soutenu par



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