Living Labs and other participatory approaches applied to research on multiple environnemental exposures and chronic risks

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LILAS has allowed, through a cross-acculturation process and the co-construction of an analytic matrix of research methods, to develop consolidated grounds for the co-construction of future participatory research projects on multiple environmental exposures

Background

- The objectives of **environmental health research** are diverse (e.g.: identifying situations at potential risk, estimating exposures and effects, testing the effectiveness of preventive actions)
- Related methods are diverse as well.
- **Opportunities for greater implication of the civil society and related challenges differ at each step of such research activities**.

These aspects **need to be better** identified and **shared among academic, institutional researchers and civil society representatives.**

As a **preparatory step toward the co-construction of participative research projects** on multiple exposures and disease risks, the LILAS project **aimed to :**

- **co-construct**, among institutional researchers, academics and civil society representatives, **a mutual understanding** of the main problematics and **research methods in environmental health**, their stakes for different actors, but also the requirements, strengths and limitations of these methods
- **identify expected benefits and points of vigilance related to stronger degrees of participation** as part of such environmental health research projects.

Materials and Methods

- **33 institutional researchers, academics and civil society representatives** interested in multiple environmental exposures (chemical, radiological).
- **5 meetings** to collectively identify different types of study (including environmental epidemiology studies) and reflect about the added value, limitations, and methodological principles related to the introduction of growing participation as part of such studies.
- **Bibliographic search** to identify relevant examples,
- A**nalysis matrix co-constructed and filled by participants**, as in a « Living Lab mode » project.

Results

For **different types of studies** (studies for assessment of environmental exposures, identification of their determinants, interventions on these exposures, development of sensors, quantitative risk assessment, environmental epidemiological studies, experimental research, studies on the health of ecosystems…), the **matrix** (available here : https://hal-irsn.archives-ouvertes.fr/irsn-03222498 **lists**

- **expected benefits for** several categories of **stakeholders**,
- fundamental **methodological principles** and **practical constraints,**
- **advantages and limitations related to the use of participatory or more "classical" research approaches.**

This matrix can be **displayed as a poster in rooms where participants will be co-creating** research new projects, **to help reflexion and ensure the feasibility** of proposed projects.

Additional Results

Table 1. Extract from the full matrix: line dealing with prospective analytic epidemiological studies

General issue being addressed	Expected benefifs for:				Fundamental methodological requirements	Practical constraints	Classical approaches (without co-création)			Approches involving higher paticipation (ex : Community-Based Participatory Research, Living Labs)		
	Researchers	Authorities	People	Other stakeholders (e.g.,: physicians)			Expected contributions from people	Avantages of using a classical approach	Limiitations of using a classical approach	Expected contributions from people	Avantages of using a participatory approach	Limiitations of using a participatory approach
Lack of knowledge or proper quantification of health risks associated with some current or future exposures	Improve knowledge on the relationships between exposures and health risks Studies contributing to causality jugements Best possible design for exposure characterisation thanks to current and future exposure assessment tools and possibility to collect samples prospectively	Middle to long term: Responding to people's concerns about health effects related to some exposures Having reference data forto encourage risk assessments and take decisions	Contribute to science No direct benefit except if feedback and/or recommandations are given based on measured exposure estimates and/or health monitiring	Middle to long term: Responding to people's concerns about health effects related to some exposures Improve preventiion based on exposure estimates Treat diseases diagnosed during the follow-up	Clear and homogeneous inclusion and follow-up criteria Lack of selection, information and confouning biases Sufficient statistical power to detect effects Use of adequate statistical methods for analysis	Standardized and adequate estimates or measures of exposures, health and potential confounders Sufficient sample size and follow-up length and contrasts in exposures to get enough statistical power for analysis Ethical agreements Long-term funding Support from experienced specialists (biostatisticians, exposure scientists…)	Applying a protocol : answering questions, providing samples. Or simply providing agreement for pure record-based cohorts	Easier to get large samples Directly standardized collection of data Lower costs Some designs purely record-based largely avoid rercuitment biases	Risk of missing important aspects of exposures that people are aware of Missing richness of data that participative approaches can provide Risk of poorer appropriation of methods and results by participants	Cross-acculturation Understand requirements of epidemiological studies and considerations leading of not to causality judgements on exposure-health relationships. Integrate curent knowledge on the exposure-health relationships of interest Propose research questions, collectively evaluate their relevance and the ability of various rearch designs to answer these questions Participate to the development and implementation of the protocol, and possibly to analyses (depending on their technicity) and interpretations, with help from specialists.	Implication of populations Richer information /data Improved match between people's expectations or questions and research, provided that some methods are adequate to address these questions (see practical constraints column - local studies may not be sufficient in many cases). Larger societal vision of studied problems, opportunities to identify solutions collectively Possibily more sustained participation over the long term thanks to stringe direct interest	Heavier and probably more expensive work (coordination, authentification and standardisation of data, protocol evolutions as new resarch questions arise…) Potentially smaller populations than in classical cohorts due to the intense ressource requirements of participatory research Possible impact on representativity of having the most concerned and available people

Conclusions

LILAS has allowed, through a cross-acculturation process, to **develop consolidated grounds for the co-construction of future participatory research projects** on multiple environmental exposures. **Such a community-based research projects is now being developed**, in the Dunkerque area (France) : the **ORRCH-IDEeS** project.

References: Laurent, O., et al., Living Labs et autres approches participatives appliquées à la recherche sur les multi-expositions environnementales et les risques chroniques. https://hal.archives-ouvertes.fr/irsn-03222498/, 2021, IRSN: Fontenay-aux-Roses.