

7. Future perspectives

7.1. LARGE-SCALE EXPOSOME RESEARCH

To be able to study the plethora of environmental pollutants and the many physical, lifestyle and social risk factors and their combinations, while, at the same time, incorporating high-dimensional omics data, it is critical that exposome research begins to look beyond simple, self-contained projects and starts to build a large platform for the efficient generation of evidence and the replication of findings. However, the field's research tools and data are currently scattered and information remains largely embedded in scientific publications. Efforts are underway though to harmonise existing exposome data across multiple locations and to make them readily accessible (both as regards omics and exposome-wide association studies or ExWAS, e.g. the HELIX database and, in the case of metabolomics data, COMETS). Multi-centre exposome research needs to implement the FAIR data infrastructure to ensure the findability, accessibility, interoperability, and reuse of exposome data. The ongoing EU Horizon 2020 LifeCycle Project, which consolidates European pregnancy and child cohort studies in one harmonised data sharing platform, has begun to implement the FAIR principles, building on 80,000 mother-child pairs at baseline in 15 cohorts from 10 countries across Northern, Eastern, Southern, and Western Europe (Figure 14). Other initiatives have been taken, including the Children's Health Exposure Analysis Resource (CHEAR) in the US, aimed at providing access to standardised laboratory tools for exposome research in children's health studies, so as to ensure the comparability and replication of findings. In 2019 this initiative was expanded to include its Data Repository, Analysis and Science Center.

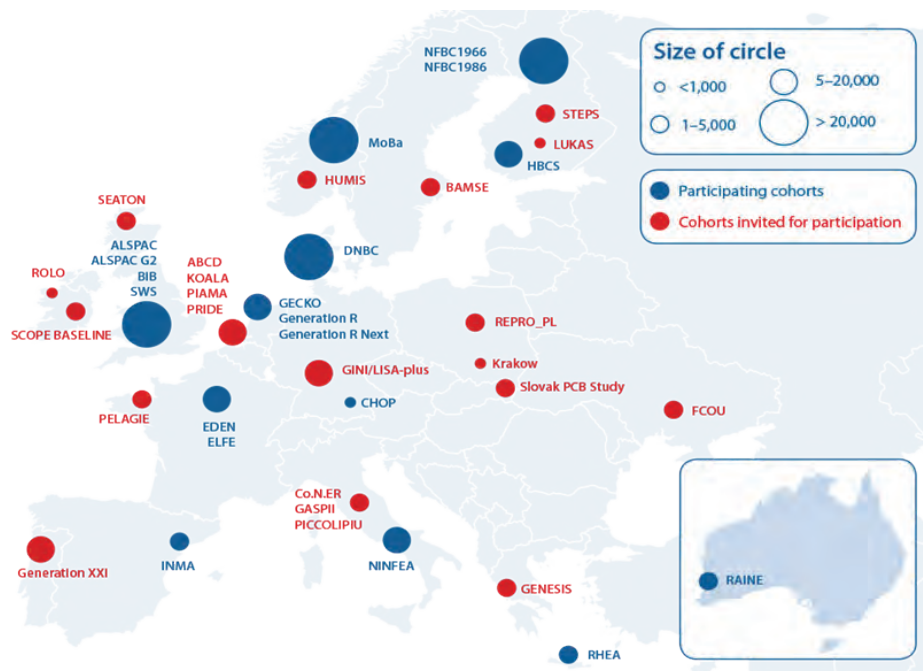


FIGURE 14. The EU Child Cohort Network.

SOURCE: EU Child Cohort Network, <https://euchildcohortnetwork.eu/>.

More recently, the International Human Exposome Network (IHEN) Project has been heralded as a ground-breaking endeavour in the realm of exposome research, insofar as it seeks collaboration and coordination at the global scale. This initiative, comparable to the Human Genome Project (1990-2003) in its scope and ambition, aims to map and understand the full breadth of environmental exposures encountered by individuals throughout their lives, akin to the genome's role in decoding genetic information.

7.2. EXPOSOME IN THE GLOBAL SOUTH

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While much of exposome research has been conducted in the Global North, there is a growing expectation that the concept will have to be increasingly applied to the Global South, a term coined by the UN Conference on Trade and Development (UNCTAD) to designate countries of low socioeconomic status and, while not strictly geographical (Australia and New Zealand, for example, lie