

Nutritional, psychosocial and environmental determinants of neurodevelopment and child mental health (COINCIDE)

Background and research goals

Sub-optimal neurodevelopment and adverse child mental health outcomes are important health challenges in India. A team science approach is critical to meet this challenge since knowledge, resources and skill sharing across domains of nutrition, psychosocial and environmental exposure assessments, and the assessment of the resulting child outcomes is essential to informing an integrated framework. Nutrition, psychosocial, and environmental pollutants exposures impact neurodevelopment and child mental health to varying degrees depending on their nature, timing, and extent of exposure. Moreover, these determinants are influenced by various socioeconomic factors at the individual and household levels, with children from low- and middle-income countries being 2-4 times more likely to be exposed to a variety of developmental risk factors compared to high-income countries. While there is limited evidence on the additive and interaction effects of nutritional and psychosocial exposures on neurodevelopmental outcomes, as well as evidence on the moderating effects of enriched environments on adverse effects of environmental pollutants exposure, evaluating the impact of the combination of nutritional, psychosocial and environmental factors on neurodevelopment and child mental health outcomes across the first decade of life has never been attempted in developing countries like India.



We aim to evaluate the individual and combined effects of nutritional, psychosocial and environmental determinants of neurodevelopment and child mental health in diverse settings of North and south India covering urban and rural locations, and to identify the processes by which these determinants are influenced by various axes of health inequalities.

Study setting: The COINCIDE study will extend the follow up of two prospective birth cohorts. The **MAASTHI birth cohort is based in urban Bengaluru** and is **managed by the IIPH-Bengaluru, PHFI team**. They will collect data on N = 1000 mother-child dyads. Children in this cohort will be aged 3-9 years across the period of data collection. The **SPRING birth cohort is based in rural areas (120 villages) in Rewari district, Haryana** and is **managed by the Sangath team**. They will collect data on 600 mother-child dyads, with child age ranging from 7-9 years across the data collection period. Historical data on key exposure and outcome measures is available in both the cohorts since the pregnancy period (for mothers) and from birth (for child).



Summary of Progress (Apr 2022 – Mar 2023)

The following progress has been made in the previous financial year:

A. Administrative and Financial

- a. COINCIDE has already received approval for the study from the Technical Advisory Committee of the Govt. of Karnataka and the Director of the National Health Mission (NHM) in Rewari, Haryana. IIPH-BLR, PHFI will apply for approval from the Bruhat Bengaluru Mahanagara Palike (BBMP) on an annual basis in order to collaborate with the health system with regards to referrals and biological sample collection from children in the Urban Primary Health Centres (UPHCs).
- b. Ethical approval received for IIPH-Bangalore for MAASTHI and Sangath for SPRING for all study components.
- c. Indemnity insurance has been purchased and will be renewed every July on an annual basis until the end of the study.

B. Scientific advisory group meetings

a. The first scientific advisory group meeting was organized in October 2021. This year, a set of three scientific advisory group meetings were organized in January-February 2023. Results of the pilot study was presented to the advisory group. All members expressed satisfaction on the progress made.



C. Creating an online presence for COINCIDE

a. The project website was launched in December 2022 (<https://projectcoincide.org/>). The website provides a summary of the study aims and objectives, study setting, methods and potential impact. The website aims to become a repository of the variety of study materials developed and used in the COINCIDE study as an example of what works in diverse settings of low- and middle-income countries like India. It also includes a “Contact us” page to encourage queries and potential collaborations.

b. COINCIDE also manages a Twitter handle (https://twitter.com/COINCIDE_2021) to provide regular updates about the project to the academic community on Twitter, and disseminate information related to conferences, webinars, courses, etc about all aspects relevant to COINCIDE.

c. We also publish a monthly newsletter that includes project updates, relevant conferences/talks/webinars and a section that highlights a recent publication from the group or relevant literature. This newsletter is shared with the advisory group to keep them updated on our progress on a monthly basis, as well as with teams who have expressed interest in keeping in touch with the COINCIDE group. The newsletter is also uploaded on the COINCIDE website in the ‘Resources’ tab, and Twitter.

D. Registration of PhD students

a. The COINCIDE project recruited two PhD candidates to lead the qualitative component of the study. Ms. Eunice Lobo (IIPH-Bangalore,PHFI) registered her PhD in Maastricht University, The Netherlands while Dr. Smita Todkar (Sangath) registered her PhD in Manipal University, Karnataka, India. Both will work in the MAASTHI cohort, Bengaluru and SPRING, Rewari respectively.



E. Preparation of study tools

a. The final toolkit to measure exposures and outcomes, compiled through multiple discussions with team members, external experts and the scientific advisory committee, was prepared. The entire toolkit along with the standard operating procedures were translated to Hindi and Kannada using a rigorous translation. They were also submitted to the Sangath institutional review board, and IIPH-Bangalore institutional ethics committee for review and approval.

b. Study flyers were developed, finalized and translated in Hindi and Kannada to share information about the study with various types of stakeholders and participants.

c. IEC booklets were developed, finalized and translated to Hindi and Kannada to share information regarding exposures and outcomes of interest with mothers after data collection. The content includes information on nutrition, child mental health, disciplining techniques, and parental well-being, common sources of indoor air pollution and lead and ways to mitigate exposure especially for children. IEC material for children above 7 years of age focused on improving literacy and numeracy skills.

d. Both cohort sites have identified and finalized referral pathways where children or mothers could be referred to if they met pre-defined referral criteria. For MAASTHI, this includes the National Institute of Mental Health and Neurosciences (NIMHANS), St. Johns' Research Institute (SJRI), and the District Early Intervention Centre (DEIC) that is part of the Rashtriya

Bal Swastha Karyakram (RBSK) referral pathway. For Rewari, this includes the Rewari Civil (District) Hospital and private paediatricians.

F. Pilot study

a. For the pilot study, a team of 4 field workers and 4 research assistants (2 per site) were recruited and trained on administration of the COINCIDE study toolkit using the REDCap software.

b. Data was collected on 65 non-cohort participants (N = 32 in MAASTHI [19 girls], N = 33 in SPRING [14 girls]) who lived in communities similar to the cohort participants from September-December 2022.



G. Initiation of data collection for the main study

a. Following the completion of the pilot study in December 2022, the study toolkit was further refined as required.

b. Data collection for the main study commenced in Jan 2023 in the SPRING cohort and in April 2023 in the MAASTHI cohort. We anticipate that data collection for the first sweep (N = 1000 in MAASTHI and N = 600 in SPRING) will be completed by March 2024.