



**Human Potential
1st Prenatal / Early Childhood Grant Call
2021 Call for Proposals**

Call opens: 11 October 2021
Submit LOI by: 8 November 2021

HP Programme Office (A*STAR)
Agency for Science, Technology & Research
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1. BACKGROUND

- 1.1. Human capital is Singapore's most valuable resource. With persistently low birth rates, ageing population, and a declining workforce, it is a national priority for Singapore to optimise each individual's potential from young and throughout life.
- 1.2. The vision of Human Potential (HP) research is to advance HP through health, biomedical sciences, and Science of Learning (SoL) research and applying this at critical junctures of an individual's life course. The desired primary outcome is for an individual to be provided the support and opportunity to develop optimally at **critical junctures** of one's life course, enabling one to achieve optimal health, wellbeing and/or learning capacity to contribute one's best to Singapore.
- 1.3. There are many opportunities to optimise Human Potential throughout the entire life course, but the nature and relative impact of interventions are likely to differ at various stages. There are three (3) strategic focus areas in which the HP programme centered around:
 - a) **Prenatal and early childhood** focusing on improving child's physical, cognitive and socio-emotional development and maternal health and well-being in order to optimise developmental outcomes and set the right trajectory for an individual's life course.
 - b) **Function and performance** during peri-pubertal, adolescence and adulthood with a focus on SoL to improve learning outcomes and upskilling of workers; and
 - c) **Healthy and meaningful longevity** to detect and prevent/delay physical and cognitive decline and transform the ageing experience.

2. OBJECTIVES AND SCOPE OF EARLY LIFE GRANT CALL

- 2.1. This grant call concerns '**Prenatal and early childhood**', within the life course **from preconception, pregnancy to early childhood (-1 to 6-year-old)**. A large body of evidence has demonstrated that early life development is critical in realising an individual's full developmental potentialⁱ. The early years are a critical period of rapid brain development with greatest plasticity and capacity for change, as well as for physical, socio-emotional, cognitive, and motor development. Interventions at this critical window of early life can most successfully safeguard and optimize life course trajectories, compared with interventions in adulthood. Nobel Laureate James Heckman showed that the highest rate of returns come from investments in quality early childhood development, yielding significant economic, health, social and education outcomes that strengthen the economy and reduce deficits from social spendingⁱⁱ. The World Health Organisation recently released guidelines and recommendations on improving early childhood development and supporting mental health of mothers^{iii,iv,v}.
- 2.2. The first Early Life Grant Call seeks to support targeted research in child and maternal health, with a preference for research which has in place a **clear pathway outlined for translation** and **evidence-based interventions** for greater health/societal and/or

economic impact. Research should deepen understanding of early child development, including but not limited to the correlation between brain, metabolic, behavioural trait development (including maternal/emotional interactions) and its link to long term development trajectories (e.g., physical health, academic achievement, social interaction/integration).

2.3. Applicants shall address at least one of the following **desired outcomes** in their Research Proposals, with preference to research that result in improving maternal and child well-being, as well as child health and learning:

- a) Improving child health, learning and well-being
 - i. Healthy children through the reduction of childhood obesity and other conditions such as myopia
 - ii. Emotionally stable, resilient children with high self-regulation
 - iii. Reduction in children requiring learning support
- b) Improving maternal health and well-being
 - i. Healthy mothers during and after pregnancy
 - ii. Healthy babies through improved maternal physical health
 - iii. Healthy babies through improved family mental wellness and emotionally stable and resilient mothers

2.4. Research areas of interest include the following:

- a) Child health, learning and well-being

Themes	Research areas
Physical Health	<ol style="list-style-type: none"> 1. Development of novel and effective interventions to reduce childhood obesity, associated metabolic disorders and other physical conditions like myopia. 2. Development of potential interventions to improve development of cognitive function in children.
Cognitive & intellectual development	<ol style="list-style-type: none"> 1. Development of novel tool kits or methods to determine early child cognitive and executive functions and interventions to improve learning outcomes and reduce need for learning support in Primary school. 2. Investigation of factors influencing cognitive development such as early exposure to electronic gadgets and sleep disruption.
Socio-emotional development and mental wellness	<ol style="list-style-type: none"> 1. Identification of modifiable early life factors (e.g. pre-school programmes, interactions with parents/caregivers) that affect socio-emotional development and resilience in pre-school children. 2. Development of novel tools or methods for assessments and interventions to improve socio-emotional development.

a) Maternal health and well-being

Themes	Research areas
Metabolic Health	<ol style="list-style-type: none"> 1. Identification of early factors with life course impact on maternal metabolic health. 2. Development of novel and effective interventions for improving maternal metabolic health outcomes during and after pregnancy (e.g. reduce rate of mother diagnosed with gestational diabetes mellitus from progressing to pre-diabetes/type 2 diabetes).
Mental Wellness	<ol style="list-style-type: none"> 1. Identification of early factors with negative or positive life course impact on maternal mental health. 2. Development of novel diagnostics for early detection of women/mothers at risk of anxiety and depression. 3. Development of novel and effective interventions for improving maternal mental health outcomes during pregnancy (e.g. reduce anxiety/depression). 4. Development of tool kits or methods for improving mother/child emotional interaction and assess its influence on child development.

- 2.5. Where possible, researchers should leverage **health and biomedical science (HBMS), social science and science of learning research capabilities** in the proposals to strengthen utility and impact.
- 2.6. The research proposal should articulate the proposal's potential for translational impact to address important gaps in national policy and practice in health, education and social services. Applicants shall clearly articulate the underlying time for translation, the impact on optimal health/societal/economic outcomes, the efficiency and overall impact where possible.
- 2.7. Grant call will prioritize applications in areas that provide evidence for innovation in policy/practice/service in early childhood development and maternal outcomes such as:
- a) Neuroscience-informed and mechanism-defined interventions/platform technologies/tool kits
 - b) Advanced data analytics and computational modeling to identify 'at-risk' individuals or critical mediational pathways as novel targets for intervention
 - c) Innovation in technologies (e.g. biosensors, AI-solutions) that provide tool kits to inform assessment of risk/outcome in relevant population
 - d) Leverage available data as opportunities to validate new approaches
 - e) Innovation in the development of computation strategies for large data set analysis to enhance the value of existing data sets towards priority areas
 - f) Scalable lab and clinical methods that can be deployed for use in natural environments
 - g) Low cost mobile wearable devices and home based systems to assess interplay of cognitive development, social and physical interactions

- 2.8. Proof-of-concept studies/trials should discuss how they can be scaled up for larger trials/intervention studies.
- 2.9. Research Proposals with identified relevant public sector/industry partners (e.g., through collaboration or provision of Letters of Support from partners stating their intended contributions/deployment interests) shall be considered favourably. Such contributions may include in-kind services (e.g. labour, materials), cash, or a combination of the two towards the project.
- 2.10. There are two types of grant categories available, to seed a strong pipeline of novel and cutting-edge research and establish a vibrant early life research ecosystem for developing effective interventions/programmes and strengthen research-policy-practice nexus.

b) **Category 1 – Investigator Research Grants:**

- i. Funding support for each Research Proposal awarded shall be capped at a quantum of **up to S\$1 million for a period of up to 3 years**.
- ii. Research Proposals should seed novel and cutting-edge research that can contribute towards a richer pipeline of possible pilot trials for subsequent grant calls. For example, proposal may aim to **identify** screening parameters or modifiable intervention targets (e.g., creating potentially scalable methods and quantitative measurement tools for optimizing promotion, prevention, screening and therapeutic interventions).

c) **Category 2 – Collaborative POC/Pilot Studies Grants:**

- i. Funding support for the awarded Research Proposal shall be capped at a quantum of **up to S\$5 million for a period of up to 3 years**.
- ii. Research Proposals should mount programmatic and collaborative research to achieve near- to mid-term impact. For example, proposal may aim to **verify** the accuracy/utility/efficacy of possible screening parameters or modifiable intervention targets in scalable natural environment.

3. ELIGIBILITY CRITERIA

- 3.1. Researchers from all Singapore-based institutions of higher learning (IHLs), public sector agencies and public hospitals are eligible to apply. Funded R&D projects must be conducted in Singapore.
- 3.2. Grant proposals should only be submitted by one lead Principal Investigator (PI).
- 3.3. The lead PI must have a minimum of 0.7 FTE primary appointment with an eligible organisation and have a laboratory or research programme that carries out research in Singapore.

- 3.4. For Category 1 (Investigator Research Grants), young, mid or senior investigators can apply. Young researchers (who have completed their PhD or MBBS/MD/BDS within the past 7/10 years respectively) are strongly encouraged to work with a mentor for research guidance if they have not received external competitive funding exceeding \$500,000 (direct cost only) within the past 5 years to conduct their own research project as the PI.
- 3.5. For Category 2 (Collaborative POC/Pilot Studies Grants), the lead PI should be able to demonstrate relevant scientific / technical background and have a good track record as an independent PI in leading and coordinating research programmes, as well as achieving productive research outcomes such as award of nationally competitive funding, substantial publication records in the past 3 years).
- 3.6. Proposed research should not be already funded by other local or international grants or funding schemes. Research Proposals being considered for funding by other agencies will not be considered under the present call. PIs will need to declare other funding sources during the application.
- 3.7. Collaboration with foreign organisations and experts in the capability of a Co-investigator or a Collaborator is allowed, but no funding will be allocated to the foreign Co-investigator/Collaborator who are operating out of Singapore. Successful applicants are not allowed to contract out whole or part of the funded research to any Co-investigator or Collaborator whether they are local or international.

4. PROPOSAL REQUIREMENTS AND FUNDING

- 4.1. Singapore-based IHLs, public sector agencies can qualify for up to 100% funding support of approved qualifying direct and indirect costs of a project. Funding support for indirect costs of up to 30% of the total approved qualifying direct costs will be allowed, subjected to the approval from A*STAR's HP Programme Office (PO).
- 4.2. Final funding support and amount will be at the sole and exclusive discretion of the HP PO based on the scope and projected outcomes of the research.
- 4.3. Applicants shall comply with national regulations as well as Terms and Conditions and National Research Fund Guide.
- 4.4. All R&D work must be conducted in Singapore, and all assets acquired with the funding must be located in Singapore and maintained within the control of the Institutions.
- 4.5. Intellectual Property (IP) management: All researchers and research organisations shall follow and apply the National IP Protocol principles and framework.

5. APPLICATION

- 5.1. This call for proposals has a two-stage process. Lead PI is required to submit a Letter of Intent (LOI) and shortlisted applicants will be invited to submit a full proposal.
- 5.2. The Lead PI is required to submit an online application via the Integrated Grant Management System (IGMS). Separate submissions outside of IGMS will not be

considered. Once PIs have submitted their documents online, their applications will be routed to the Director of Research (or equivalent) of their respective Host Institution for online endorsement.

- 5.3. Please download and refer to the manuals and training guides from the IGMS at <https://researchgrant.gov.sg/Pages/faqs.aspx> for all instructions and guidelines on the submission process.
- 5.4. The Research Administrative Office from IHLs or Research Entities are required to ensure information submitted by their researchers for the grant call are compiled according to the requirements set out. Incomplete submissions will be rejected.
- 5.5. It is mandatory for applications to be lodged in the IGMS system and endorsed by **0900 hrs. on 8 November 2021 (Singapore time) for LOIs and 0900 hrs. on 27 December 2021 (Singapore time) for full proposals**. Late submissions or submissions from individual applicants without endorsement from the Host Institution will not be entertained.
- 5.6. The following documents are required for the submission.

No.	Attachment	Naming Convention
1	Letter of Intent	Lead PI's name_LOI_Project title
2	Research Proposal	Lead PI's name_RP_Project title
3	Budget template, Work Contribution and KPI	Lead PI's name_BCI_Project title
4	Curriculum Vitae	Lead PI's name_CV_Project title
5	International Peer Reviewers	Lead PI's name_IPR_Project title

- 5.7. Applicants are to note that where relevant privileged or confidential information is needed to help convey a better understanding of the project, such information should be disclosed and must be clearly marked in the proposal.
- 5.8. Applicants may direct queries by email to hppo@hq.a-star.edu.sg if questions are not addressed in the FAQ section of the grant call.

6. SELECTION AND AWARD PROCESS

- 6.1. Submitted proposals will be subjected to review by international and local scientific experts, as well as an evaluation panel. Where appropriate, proposals may also be sent to relevant national agencies and industry resource persons for additional review. Privileged or confidential information shall be clearly marked as such in any of the submission documents.
- 6.2. Proposals will be evaluated based on the following criteria:
 - a) Contribution to Grant Objectives
 - i. Relevance, scientific value, and amount of contribution of proposed research in addressing the challenge(s) posed.
 - b) Scientific Excellence and Innovation
 - ii. Quality and significance of proposed research, including the potential for breakthrough/innovation to advance knowledge and understanding within

its own field or across different fields

- c) Application & Deployment in Singapore (primary)
 - iii. Potential and feasibility for application and translation of research outcomes/solutions with local agencies or organisations (public and/or private sectors) and beyond Singapore.
- d) Execution Strength and Technical Competency of Research Team (for collaborative POC/Pilot grants)
 - iv. Quality of plans for execution and delivery of research goals, including the appropriateness of proposed milestones, deliverables, and reasonableness of budget.
 - v. Quality, significance, and relevance of recent research record of the research team, including likely multi-disciplinary research, synergy in delivering research and potential for international leadership

- 6.3. All projected output and achievements of the proposed research are expected to commensurate with the level of funding requested. The HP PO may require proposals to be revised or combined as it sees fit to enhance research outcomes, ensure competitiveness, facilitate integration of research concepts and technologies, and optimise resources. The HP PO is under no obligation to award research grant in whole or in part to any proposal and its decision on project and funding support will be final and shall be abided by the applicants.
- 6.4. The HP PO bears the sole and exclusive discretion for the selection of reviewers and evaluators and shall not be liable for the release of information concerning proposals to third parties by individuals involved in the review process. Should circumstances arise, the HP PO reserves the right to modify the review process.
- 6.5. Applicants shall agree that they shall not take legal action against the HP PO, the Peer Reviewers, or any members of the evaluation panel in relation to their role in evaluating and deliberating the project proposal.
- 6.6. A Letter of Award will be sent to the Host Institutions of successful applicants, as named in the proposal, and copied to the Lead Investigator(s) and Co-Investigators, if any.
- 6.7. Successful applicants will be notified of in-principle approval for the award of the grant by Mar 2022.

APPENDIX 1 – NON-FUNDABLE DIRECT COST OF RESEARCH

Information on non-fundable direct costs of research is appended in the tables below. This list is adapted from the A-STAR Grant Guidelines 2020 Annex. Applicants are to note that the list is subjected to revision.

Type of Expenses	Description
Salaries of Lead PI / Investigators / Visiting Professors & researchers/ Collaborators/ general administrative support staff	Not allowable unless specifically provided for in the grant and approved by Grantor.
Teaching buy outs	Not allowable for the hiring of substitutes to perform the Investigators' teaching duties.
Stipend top-up for existing post-graduate scholarship holders	Not allowable.
Undergraduate stipend and tuition support	Not allowable.
Costs related to general administration and management.	Not allowable unless specifically provided for in the grant and approved by Grantor. This includes common office equipment, such as furniture and fittings, office software, photocopiers, scanners and office supplies.
Costs of office or laboratory space	Not allowable unless specifically provided for in the grant and approved by Grantor. This includes renovation/outfitting costs, rent or depreciation of buildings and equipment, and related expenditures such as water, electricity, waste disposal and building/facilities maintenance charges.
Personal productivity tools & communication expenses	Not allowable, unless the use of mobile phones and other form of smart devices were indicated in the methodology for the Research.
Audit fees (Internal and external audit) and Legal fees	Not allowable.

Entertainment	No allowable.
Refreshment	Not allowable, unless this is related to a hosted conference or workshop, specifically approved by the Grantor for the Research.
Fines and Penalties	Not allowable.
Patent Application	Not allowable. This includes patent application filing, maintenance and other related cost.
Professional Membership Fees	Not allowable.
Staff retreat and team-building activities.	Not allowable.

APPENDIX 2 – FREQUENTLY ASKED QUESTIONS

Eligibility

1. What is the difference between a Co-Investigator and a Collaborator?

Co-Investigators are identified in the Letter of Award, but Collaborators are not. Therefore, Collaborators are not permitted to receive, directly or indirectly, any part of the funding, whether in cash or in the form of assets acquired using the funding or otherwise.

2. Do international Co-Investigators (e.g., from overseas universities and companies) qualify for funding?

Approved research must be conducted in Singapore. All expenses must be used in Singapore and maintained within the control of eligible research organisations. Co-Investigators who are not based in Singapore should work with eligible research organisations. Please refer to the info sheet for eligible research organisations.

Fund Use

3. What is the mechanism for fund disbursement?

Approved funds will be disbursed via reimbursement, subject to terms and conditions specified in the Letter of Award. Expenses (based on invoice or service rendered date) incurred before the project start date stipulated in the Letter of Award will not be reimbursed. All approved expenses (based on invoice or service rendered date) should be incurred before the project end date stipulated in the Letter of Award.

4. What items will not be funded?

Comprehensive guidelines, terms and conditions governing the use of approved funds will be made available in the Letter of Award. A list of non-fundable direct costs is provided in the APPENDIX 1 of this document.

The HP PO reserves the rights to reject items that are not fundable, not necessary, not reasonable, not relevant or not used for the approved research. The HP PO also reserves the rights to reject any claims that have resulted from changes to the approved research.

5. What constitute indirect costs?

Indirect costs in research are costs incurred from common or joint objectives. Hence it cannot be identified readily and specifically with a particular research project. It supports the research organisation to facilitate research activities e.g., provision of research space, research administration, and utilities.

Partnerships

6. Must intellectual property be shared?

Best practices should be observed when determining ownership of intellectual property, subject to Singapore laws, regulations, and policies governing the parties involved. Investigators are responsible for executing and managing research collaboration agreements (RCAs), where and when applicable, to deliver approved project milestones in a timely fashion. RCAs are not required for grant submission.

7. How can a non-eligible research organisation participate?

Please refer to the info sheet for eligible research organisations. Non-eligible research organisations may participate as a Collaborator. Collaborators may benefit from participating by providing in-kind or cash contributions to the project in exchange for intellectual property ownership, as delineated in a RCA. The party that is eligible for grant funding may use the funding to offset its contributions in the collaboration.

7. REFERENCES

ⁱ National Scientific Council on the Developing Child (2020). Connecting the Brain to the Rest of the Body: Early Childhood Development and Lifelong Health Are Deeply Intertwined Working Paper No. 15. Retrieved from www.developingchild.harvard.edu.

ⁱⁱ Heckman James. The Heckman Equation brochure; 2020. Retrieved from: <https://heckmanequation.org/resource/the-heckman-equation-brochure>;

ⁱⁱⁱ Lancet Development Series: Advancing Early Childhood Development: From Science to Scale; *Lancet*; 2018. Retrieved from: <https://www.thelancet.com/series/ECD2016>

^{iv} World Health Organization, United Nations Children's Fund, World Bank Group. Nurturing care for early childhood development: a framework for helping children survive and thrive to transform health and human potential. Geneva: World Health Organization; 2018

^v Improving early childhood development: WHO guideline. Geneva: World Health Organization; 2020.