

The ORIGINS Project

Annual Performance
Report 2023-2024

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The ORIGINS Project acknowledges the Aboriginal and Torres Strait Islander people as the Traditional Custodians of the land and waters of Australia. We also acknowledge the Nyoongar Wadjuk, Yawuru, Kariyarra and Kaurna Elders, their people and their land upon which we are located and seek their wisdom in our work to improve the health and development of all children.

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The ORIGINS Project

The ORIGINS Project (“ORIGINS”) goal is to discover how a child’s early environment influences the dramatically rising risk of chronic health conditions such as allergies, obesity, gut health, respiratory and mental health issues and neuro-developmental challenges. ORIGINS is a collaboration between **Telethon Kids** and **Joondalup Health Campus (JHC)**, and generously funded by the **Commonwealth Government through the Channel 7 Telethon Trust** and the **Paul Ramsay Foundation**.

ORIGINS information is being used by researchers around the world to identify and implement ways to reduce risks for children. The samples and information being collected, from complete family units, are creating a rich resource in the ORIGINS Biobank which (at the time of reporting) contains more than **403,000 biological samples linked to 24M+ data points**. We are already learning so much from our families.

The Aim of ORIGINS



ORIGINS aims is to improve the health of the next generation through a better understanding of how to optimise the early environment. Over a decade we aim to recruit 10,000 children, along with their families, when their mother is early in pregnancy at Joondalup Health Campus and collect biological samples, routine data and web-based questionnaires on physical and mental health, diet, physical activity patterns and a range of environmental factors, creating an extensive Biobank and Databank.

ORIGINS includes:

- **‘Active’ families** - undertaking multiple data and sample collections at specific time points.
- **‘Non-active’ families** - access to all routinely collected hospital data, opportunistic samples and linkage to government and non-government databases.

The data from the ORIGINS research platform - **Biobank and Databank** - will assess how early life exposures influence a child's growth, development and health. ORIGINS' significant Biobank (DNA, breast milk, urine, plasma and mononuclear cells) will build substantial additional future capacity to address critical questions (including genetic, epigenetic, metagenomic and metabolomic studies) as technologies and new avenues of investigation evolve.

Annual Performance Report 2023-2024

This Annual Performance Report outlines the progress made and deliverables achieved during the reporting period 1st July 2023 to 30th June 2024.

The ORIGINS Project Current Status

Since commencement in July 2017 (as at end of June 2024):

- The ORIGINS Project has welcomed **9,964 families**
- These families include:
 - **9,935** women (4,012 active and 5,923 non-active)
 - **9,658** babies (3,536 active and 6,122 non-active)
 - **2,590** partners (1,221 active and 1,369 non-active)
- That equates to 22,183 individuals
- We have completed many valuable assessments with our families, including
 - **2,598** assessments on one-year infants (83% of all eligible 1-year-olds)
 - **1,285** appointments with our three-year children (68% of all eligible 3-year-olds)
 - **527** 'Kids Checks' appointments with our five-year-olds (67% of all eligible 5-year-olds).
- The ORIGINS recruitment team has enrolled **1,547** mothers for two or more pregnancies
- Our **9,645** ORIGINS children are made up of **9,484** Singletons, **160** sets of Twins, **1** set of Triplets
- We have collected more than **403,700** biological samples
- The ORIGINS Biobank is one of the largest Australian biological cohort collections.
- We have collected more than **24 million** data points in the ORIGINS Databank
- **51** sub-projects have been integrated within ORIGINS, looking at multiple aspects of child and family health and development
- ORIGINS has supported **16** PhD students, **21** postgraduate and Doctor of Medicine and **17** undergraduate students
- Connected with over **700** national and international researchers who are actively engaged in ORIGINS.

Return on Investment

The ORIGINS Project infrastructure has been a catalyst for investment in nested sub-projects. The set-up of ORIGINS enables researchers to implement their research projects, leveraging a fully developed platform providing cost savings and economies of scale. ORIGINS recoups costs back into the Project, to sustain and increase the capacity of ORIGINS' resources. A degree of cost recovery is required from those requesting and granted use and/or access to the cohort.

To date the ORIGINS Project infrastructure has attracted independent grant funding in excess of \$18.5 million **which represents an outstanding return on original investment in the ORIGINS**

Highlights for the Year (1 July 2023 - 30 June 2024)

Funding and partnerships:

- The Stan Perron Charitable Foundation contributed \$1,034,547 in 2023/24 to support the ongoing implementation and development of ORIGINS. Additionally, they commissioned an independent review of ORIGINS to guide **strategic and sustainability planning**.
- The commencing of **funding support** from the Western Australian Future Health Research & Innovation Fund (through the Department of Health) acknowledging the role ORIGINS plays in developing research capacity building in WA.
- Strengthening of the **collaboration between ORIGINS, Raine and Busselton Health** studies, with a focus on a joint approach towards research funding and operational initiatives.

Operational:

- Completion of recruitment for active families (a total 4,012 women recruited). We will continue tracking these ORIGINS children until they turn five years of age.
- **1,082 new families** were recruited into ORIGINS
 - **1,080** non-active and **2** active families
- **1,165 new children** joined ORIGINS in 2023-2024. The difference in number of pregnancies and children is due to mother being pregnant at the time of reporting, loss of pregnancy or withdrawal before birth.
- Women birthing at Joondalup Health Campus can still participate in ORIGINS, but only as non-active participants. The ORIGINS team continue to recruit ORIGINS non-active participant families; they can also sign up for some sub-studies.
- **8 new sub-projects** have been approved by the ORIGINS Scientific Committee and Project Management Group to be nested within ORIGINS.
- **12** research papers were published on ORIGINS related research.
- **9 PhD students** currently working on projects in ORIGINS. This represents a 40% increase in higher degree research students since 2021.
- **The ORIGINS Showcase event** (May 2024) brought together researchers, clinicians, healthcare professionals and community members to hear the latest findings from ORIGINS sub-projects, as well as discussing the current issues that impact on young children and families.
- The **ORIGINS Data Catalogue** was launched, as a set of live Power BI reports to assist external researchers, stakeholders, and participants to keep up to date with the ORIGINS Biobank and Databank collections.

Key challenges over the last 12 months and how these were addressed

- **Compliance and retention** of participants continues to be a challenge for ORIGINS, as is for many large-scale research studies. To address this, we have employed a dedicated participant engagement team member who is tracking and assisting families to complete their data and sample collections. This has had a significant impact on the rates of completion over the past two months.
- The **ORIGINS Biobank** comprises one of the largest Australian cohort collections (more than 400,000 samples) and presents our staff with continuing logistical challenges in ensuring we appropriately balance the utilisation and protection of this precious resource. Nonetheless, the Biobank is contributing to many successful funding applications, analysis and publications.
- Family situations often change after the first few years, with parents returning to the workforce, as well as other pregnancies or older children. Time restrictions impact on parents' ability to complete ORIGINS questionnaires. Regular reminders are sent to families. Additionally, we are planning to split the questionnaires into smaller components, issued at more frequent timepoints.
- Unfortunately, non-attendance at clinic assessment appointments is due to family members being too unwell to attend. Whenever possible, they are recalled back at a future date.
- There is the ongoing challenge of resourcing a complex, multi-site project. General costs have escalated, and we are reforecasting our expenditure but will have to adjust and refine our project plans in line with the remaining funds. We are also seeking additional funding opportunities.

Project Opportunities for the next 12 months

- A number of **key mapping activities** will be completed by the end of 2024 including: data and sample compliance (for non-active participants); participant retention (for non-active and active participants); sub-project participation and communication touch points (for non-active and active participants).
- In 2025, ORIGINS will undertake **strategic and business planning** with the primary focus on research prioritization and a conceptual framework which will be used to guide ORIGINS and sub-projects. As part of this an **inter/national scientific advisory group** will be established.
- Continuation of **operational funding support** from the Western Australian Future Health Research & Innovation Fund (through the Department of Health) will assist with the operational and research costs associated with running a large-scale project.
- We anticipate reaching the target of **recruiting 10,000 participant families** into ORIGINS by the end of 2024.
- We will **complete all 1-year Kids Checks** for the non-active cohort by the end of 2024. The 3- and 5-year Kids Check will continue beyond the end of 2024.
- Planning for the next wave of data and sample collection “**The Primary School Years**” will be undertaken and piloted in 2025.
- To expand and enrich the ORIGINS databank, we will pursue **data linkage** for active and non-active participants.
- The **ORIGINS Biobank** is initiating the large-scale conversion of biological samples to cross-cohort microbiome, inflammation and metabolomic datasets with the generous support of the Stan Perron Charitable Foundation. This initial analyses of a subset of the specimen collection to generate data that can be more readily accessed for research, will significantly expand the utility of the platform and leverage expansion to additional multi-disciplinary and multi-omic initiatives across the entire collection.

Participant Recruitment & Retention

ORIGINS’ active participants are pregnant women (and the non-birthing partner, where possible) who are recruited with informed consent early in their pregnancy to collect detailed environmental and psychosocial data through questionnaires, medical records, diagnostic tools, and collection of biological samples.



When the child is born, they are also consented as an individual. ORIGINS families are contacted at multiple touchpoints throughout their ORIGINS journey by the ORIGINS team.

Non-active participants are recruited when the child is born, and their pregnancy data is collected retrospectively. Non-active pregnant women may also be recruited during pregnancy but may choose to provide the project only with routine data, rather than become a full active participant who is contacted at regular intervals. (See [page 2](#) for a more detailed explanation of active vs non-active ORIGINS participants)

Participant Consent Recruitment 2023-2024

Participant Recruitment (No. signed consents)	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total in reporting period	Project Cumulative Total
Active pregnancies consented	2	0	0	0	0	0	0	0	0	0	0	0	2	4,012
Non-active pregnancies consented	121	80	74	76	65	53	79	109	77	107	129	110	1,080	5,923
Total pregnancies consented:													1,082	9,935
Active partners consented	0	0	0	0	0	0	0	0	0	0	0	0	0	1,094
Non-active partners consented	2	2	1	0	1	0	5	19	6	15	11	4	66	1,496
Total partners consented:													66	2,590
Active babies consented	5	0	0	0	0	0	0	0	0	0	0	0	5	3,535
Non-active babies consented	115	88	81	101	72	54	68	105	94	122	139	121	1,160	6,110
Total babies consented													1165	9,645

ORIGINS Child Appointments: Active Participant Families Only (June 2023-July 2024)

ORIGINS One-Year Appointments	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total 2023-2024 FY
One-year appointment: expected based on birth date	55	45	47	41	30	47	36	44	48	50	64	67	574
One-year appointment: actuals at one-year	43	42	36	33	26	35	26	29	34	41	46	49	440
Percentage Completion	78%	93%	77%	80%	87%	74%	72%	66%	71%	82%	72%	73%	77%
ORIGINS Three-Year Appointments	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total 2023-2024 FY
Three-year appointment: expected based on birth date	63	53	47	43	42	37	50	40	62	60	34	38	569
Three-year follow up: actuals at three-year	30	27	34	31	25	22	31	24	36	39	15	20	334
Percentage Completion	47%	51%	72%	72%	60%	60%	62%	60%	58%	65%	44%	53%	59%
ORIGINS Five-Year Appointments	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total 2023-2024 FY
Five-year appointment: expected based on birth date	34	28	55	39	51	36	32	44	41	43	42	34	479
Five-year follow up: actuals at five-year	26	17	43	30	34	30	22	32	26	31	20	16	327
Percentage Completion	76%	61%	78%	77%	67%	83%	69%	73%	63%	72%	48%	47%	68%

Due to participant and appointment availability, participant families often do not attend clinic the corresponding month of their birthday. Therefore, attendance and compliance is measured 6 months of the appointment due date.

ORIGINS Biobank

The ORIGINS Biobank comprises one of the largest Australian cohort collections and we are pleased to report this is now translating to successful funding applications, analysis and publications.

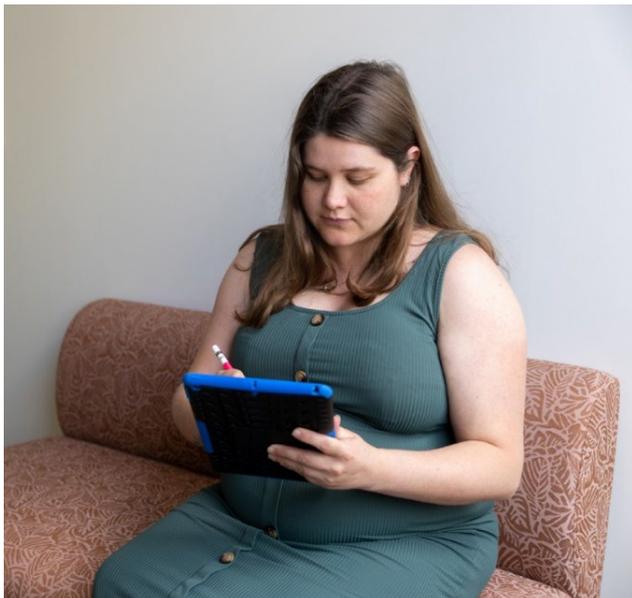
The ORIGINS Biobank collects biological samples from participant families at 10 timepoints across five years. The Biobank currently contains over 403,000 samples and this will continue to grow to an estimated 700,000 individual samples by 2027.

Key Activities in Reporting Period

- Sample collections, including a comprehensive set of blood, buccal, saliva, urine, stool, hair and dust, are steadily growing. Antenatal and birth collections are now completed for active participants, and accumulative figures for collections are as follows;
 - **1,529, 1,952 and 3,230** collections at the 20-week, 28-week and 36-week gestation timepoints respectively.
 - **1,105** collections from non-birthing partners.
 - **2,552** cord blood collections from at the time of birth
 - **1,897** placental sample collections at the time of birth
 - **2,141** meconium collections after birth
 - **805** colostrum collections after birth
 - **3,510** collections of opportunistic routine blood samples from both active and non-active children after birth with cord blood gases, dried blood spots (research Guthrie cards).
 - **1,998** collections at two or four months of age, and **1,696** collections at six months of age, including urine, stool and breast milk.
 - **431** children and **395** mothers participating in certain sub-projects have also provided bloods when the child reached four and/or six months of age.
 - We have conducted **2,361** biological collections from our one-year-olds, **1,200** from our three-year-olds, and **550** from our five-year-old cohort – this includes cheek swabs, saliva, stool and urine, and bloods from some.
- **1,242** specimens were released between July 2023 and June 2024 to **4 sub-projects**. Over the project's duration, a total of **10,216** specimens have been released to **17 sub-projects**.
- The **first publication detailing the ORIGINS Biobank** was published in the *International Journal of Environmental Public Health* in June 2023.



ORIGINS Databank



ORIGINS is collecting a wealth of administrative, biological, physiological, clinical and assessment data from the ORIGINS families. The data is collected over thirteen timepoints beginning from 20 weeks' gestation through to five years of age to enable tracking of the child's development. ORIGINS is in a unique position to **link and integrate data from multiple sources** to enable development and maintenance of a comprehensive longitudinal databank. Data provided to researchers is de-identified and encrypted.

Data derived from samples ('omics data such as metabolomics, transcriptomics, proteomics) and microbiome analyses will need external supercomputing storage capabilities. All data are linked through unique identifiers to track individual participants as well as family units.

In 2023-2024 a total of **5,334 online questionnaires** were completed by ORIGINS participants.

Key Activities in Reporting Period

- The **ORIGINS Data Catalogue** was launched in October 2023, as a set of live Power BI reports to assist external researchers, stakeholders and participants to keep up to date with what is held in the ORIGINS Biobank and Databank. The ORIGINS Data Catalogue is made up of five sections, such as an ORIGINS overview, measurement library, biobank overview, subproject breakdown and advanced search page.
- Improvements have been made to the **integrated AWS research cloud**, which extracts, links, ingests, integrates and stores ORIGINS' complex data on the TKI Amazon Web Services (AWS) cloud-based data warehouse.
- Work is underway to **integrate omics data** with participant data in the integrated AWS research cloud.
- A total **9 data extracts** were cleaned and provided to ORIGINS sub-projects for their research.
- The ORIGINS data platform received data back from **two ORIGINS sub-projects**.

ORIGINS Research Translation and Collaboration

Collaboration and engagement are fundamental elements of ORIGINS at every level. We have **strong links with other birth cohorts** locally, nationally and internationally and are working towards developing a global cohort network to harmonise and enhance research capacity.

ORIGINS information is being used by **researchers all around the world** to identify and implement ways to reduce risks for children and to answer many questions about the development of chronic health conditions.

Find out more about how we collaborate with our partners on the new **[ORIGINS Project website – collaborators tab](#)**.

For it to be valuable, our research needs to contribute to the global understanding of disease, influence policy and practice, build capacity and collaboration, and must have a direct effect on the lives of children, and we are already seeing this happen through ORIGINS. We are **ensuring our research is translated into real-life outcomes** that make a tangible difference to communities, now and in the future.

As well as enabling strategic long-term research capacity, **ORIGINS is a ‘responsive’ system with ‘real-time’ feedback** to parents and their children, and translation to clinical and diagnostic services. This opportunity to intervene early could potentially change the long-term health trajectory of these children.

When needed, ORIGINS provides **referral to appropriate services** for participants – mother, partners and infants. Examples of early identification and referral that we have assisted our families include developmental delay, allergic disease, unhealthy growth trajectory, sleep problems, as well as psychosocial and mental health issues.

Key Activities in Reporting Period

- We have continued to build and support the **research capacity** of The ORIGINS Project Team, and have continued to disseminate ORIGINS research activities, through publications and presentations.
- In the reporting period, **12 research papers** were published on ORIGINS related research.
- Of the **51 current or completed** nested sub-projects, **23** have direct contact with ORIGINS participants.
- Sub-projects that **completed all participant recruitment** during this reporting period include ACE Infant Feeding.
- Realtime, responsive feedback has enabled early identification of the following:
 - Positive skin prick test results:
 - 1 Year: 37 out of 349 (11%)
 - 3 Years: 63 out of 312 (20%)
 - 5 Years: 112 out of 344 (33%)Overall, **212** positive skin prick tests at the 1-, 3- or 5-year clinic appointments (i.e. approximately **21%** of the cohort seen).
 - Referrals by ORIGINS Paediatric team: 76 (i.e. approximately 8% of the cohort) paediatric referrals on identification of infant abnormalities such as developmental delays, including hearing, vision and speech.

Nested Studies – ORIGINS Sub-Projects

As well as ORIGINS long-term core research, there are multiple **clinical trials, early interventions and shorter-term research studies** that sit within ORIGINS. Known as sub-projects, these studies look at multiple aspects of child and family health and development. See recruitment numbers in tables below.

Sub-Project Recruitment Numbers Total

Study	Recruited	Recruitment Status
5 Year Developmental Follow-Up	284	Ongoing
ACE	98	Completed
ADAPTS	60	Completed
AERIAL/NOSE	466	Completed
BENEFIT	108	Completed
CARE-Dads	503	Completed
CASHEW	196	Completed
CEED	778	Completed
COCOON	419	Completed
CUB	103	Completed
Dental Screening	42	Completed
Early Moves	2301	Completed
ENGAGE	13	Completed
Flourishing Child	511	Completed
Flourishing in Fatherhood	216	Ongoing
Happy Parenting Program	18	Ongoing
IRON CHILD	151	Ongoing
Kindy Readiness	223	Ongoing
LONG COVID	73	Ongoing
Mast Cell	28	Completed
Mums Minds Matter	76	Completed
Nature Play and Grow	25	Completed
NEVISENSE	622	Ongoing
PLAN	57	Completed
PLANET	52	Completed
Positive Family Foundations	0	Withdrawn
PrEggNut	188	Completed
SCREEN ORIGINS	57	Completed
SYMBA	652	Completed
SunPreg	48	Completed
TALK	501	Completed
Time out for Wellbeing	164	Completed
TUMS	197	Completed

Stakeholder & Community Engagement

ORIGINS is a community project with global implications; therefore, community collaboration is essential. We have created extensive relationships with a range of stakeholders and community groups and continue to work in **collaboration for mutual long-term benefit**.

We work closely within existing and newly established partnerships that allow us to spread our reach further, to achieve more and to learn from each other.

Key Activities during the reporting period

- ORIGINS Facebook group grew to **357 members**
- The ORIGINS **Twitter (X) page featured over 50 tweets** and various sharing of content.
- **ORIGINS Showcase event** was held in May 2024 with over 250 attendees who spent the afternoon listening to presentations from national and local researchers as well as participating and round table discussions about key issues facing children and families in the primary school years.
- A video promoting ORIGINS' **Primary School Years follow-ups** was developed and shared with collaborators and community members at the ORIGINS Showcase in May 2024.
- The **ORIGINS Participant Reference Group** reviewed and provided feedback and input on three new sub-projects, as well as attending the ORIGINS Showcase event in May 2024.
- ORIGINS hosted the **Wanneroo & Surrounds Early Year Network meeting** where over 25 members heard updates from ORIGINS sub-projects and participated in discussion regarding future research projects and translation opportunities.
- Several **new partnerships** have been developed in 2023/24 including: Department of Education, HBF, The Equity Project, Goodstart Early Learning, Scibase Research Institute.
- **Media:** ORIGINS featured in Telethon Kids Impact Report, The West Australian, Perth Now, CH7 News, as well as the social media channels of Telethon Kids, JHC, HBF, and City of Wanneroo, along with posts shared by many other collaborators.



ORIGINS Staff, Volunteers & Students

Crucial to ORIGINS are the staff, volunteers, and students. They are the drivers of the Project, led by the Project Directors and senior project management team. The ORIGINS Project team members demonstrate passion and commitment generated from a strong belief in ORIGINS' vision and aims.

Staff

- There are approximately **35** staff working within The ORIGINS Project, many of whom work in a part-time capacity. This includes clinical, administrative, management, technical and research staff. Staff are employed through either Telethon Kids Institute or Joondalup Health Campus via Ramsay Health Care. Meet the Management team on [The ORIGINS Project website](#)
- We actively work to **build ORIGINS Project Team members capacity**, offering mentoring programs and professional development opportunities. Staff undertook a range of internal and external training opportunities during the year.

Students & Volunteers

- **5** students are **progressing manuscripts** for publication.
- **4** volunteers assisted data cleaning and research and translation.
- ORIGINS has supported **7** placement and/or internship students from Curtin University, UWA, McCusker Internship, and Princeton University (New York).
- **8** students have **presented their research project and/or results at conferences** and other events and forums to report and share knowledge.



APPENDICES

Appendix One: ORIGINS Sub-Projects

Current & Completed ORIGINS Sub-Projects

Sub-Project	Type	Impact/Focus	Status 30 June 2024 (N)	Grant Value
A family's journey at JHC: Analyses of routinely collected data	Observational	JHC mother and father profiling	Ongoing	<i>In-kind (ORIGINS)</i>
A Five-Year Developmental Follow-up	Observational	Speech and language outcomes of 5-year-olds	Recruitment ongoing (284/600)	~ \$35,000 <i>And in-kind (ORIGINS; ECU)</i>
ACE Infant Feeding: Helping new mums to be better breast feeders	Randomised Controlled Trial	Breastfeeding	Recruitment completed (98)	~ \$140,000
ADAPTS: Antibiotic Dysbiosis and Probiotics Trial in infants	Randomised Controlled Trial	Gut health in infants	Recruitment completed (60)	~\$110,000
AERIAL: Airway Epithelium Respiratory Illnesses and Allergy	Observational	Asthma	Recruitment completed (466)	~\$3,000,000
BEACHES: Built Environments and Child Health in Wales and Australia	Observational	Built environment, physical activity and childhood obesity	Reviewing data	~\$800,000
BENEFIT: Breastfeeding and Eating Nuts and Eggs for Infant Tolerance	Randomised Controlled Trial	Reducing infant egg and peanut allergies	Recruitment Completed (108)	~\$180,000
The BioMood study: A PILOT study assessing the association between Mediterranean diet, microbiome, metabolome, inflammation and mental health during pregnancy	Observational	Diet, microbiome, inflammation and mental health	Commencing sample analysis	~\$40,000
CARE-Dads: Cardiovascular Risk Evaluation in Expectant Fathers	Observational	Cardiovascular and mental health of fathers	Project completed (503)	~\$320,000 <i>And in-kind (ORIGINS)</i>
The Cashew Study: Introducing cashew nuts during infancy	Randomised Controlled Trial	Reducing infant cashew allergies	Recruitment completed (196)	~\$50,000 <i>And in-kind (ORIGINS)</i>
COCOON: The COVID Community compassion study: Assessing virus transmission, immunity development and wellbeing of families during COVID-19	Observational	COVID-19	Recruitment completed (419)	~\$150,000 <i>And in-kind (ORIGINS)</i>
ORIGINS Community Wellbeing during the COVID-19 Pandemic	Observational	Mental health during COVID-19	Ongoing	<i>In kind (ORIGINS)</i>
CUB/Baby AICES - A randomised-controlled trial of a parent-mediated intervention for optimising social and	Randomised Controlled Trial	Parenting education and child development	Recruitment completed (103)	~\$41,000

Sub-Project	Type	Impact/Focus	Status 30 June 2024 (N)	Grant Value
communication development of newborns at increased familial risk of autism spectrum disorders				
Deciphering Bifidobacterium	Observational	Allergy, immunity, inflammation, nutrition, metabolism, environment, lifestyle, infections, vaccines and growth and development	Commencing sample extraction	~\$3,500,000
Dental screening: Tele-screening for early childhood caries detection during COVID-19 pandemic	Observational	Oral health	Recruitment completed (42)	~\$50,000
Diabetes during pregnancy and subsequent child development: A 3-year follow-up study	Observational	Diabetes	Commencing data extraction	~\$70,000
Early Moves	Observational	Neurodevelopmental assessment of general movements in babies	Recruitment completed (2301)	~\$4,200,000
The Engage Study: Discovering and delighting in your baby (pilot)	Single arm intervention trial	Parenting education	Project completed (13)	\$615,000
Fertility: Examining subfertility in a prospective birth cohort	Observational	Fertility in a population pregnancy cohort	Ongoing	<i>In kind (ORIGINS)</i>
The Flourishing Child	Observational	Mental health and wellbeing, growth and development, and environment & lifestyle	Recruitment completed (511)	<i>In kind (ORIGINS)</i>
Flourishing in Fatherhood	Observational	Cardiovascular and mental health of fathers	Recruitment ongoing (216/300)	~\$270,000
Gateway to Allergy Prevention	Observational	Food allergies, prebiotics	Commencing sample analysis and data extraction	~\$250,000
Generative AI	Observational	Artificial intelligence in disease recognition	Completed	~\$50,000
Global Scale of Early Development	Observational	Mental health and wellbeing and brain and behaviour	Ongoing	~\$250,000
Colostrum Exclusivity for Early Development (CEED)	Observational	Allergies, nutrition, growth and development	Data analysis	~\$161,000
Kindy Readiness: Preschool readiness in the ORIGINS cohort	Observational	Development, wellbeing and readiness for kindergarten	Recruitment ongoing (223/5000)	<i>In kind (ORIGINS)</i>
Mast Cell: Contribution of a novel mast cell subset to development of atopic disease	Observational	Allergies	Recruitment completed (28)	~\$100,000
Maternal Diet Quality	Observational	Nutrition and metabolism	Commencing data analysis	~\$12,500

Sub-Project	Type	Impact/Focus	Status 30 June 2024 (N)	Grant Value
Mediterranean Diet: The impact of a Mediterranean diet and physical activity in pregnancy on gestational weight gain and neonatal body composition at birth and weight at 1 year of age	Observational	Diet and body composition	Completed	~\$10,000
Mums Minds Matter: A three-arm pilot study of mindfulness vs self-compassion vs relaxation training for reducing stress and promoting wellbeing among pregnant women	Interventional	Maternal mental health	Recruitment completed (76)	~\$23,000
Nature Play & Grow: A pilot study of a family-based intervention to improve child health and well-being	Interventional	Nature relatedness	Recruitment completed (25)	~\$75,000
NDD: ORIGINS of Neurodevelopmental Risk and Resilience Project Amendments	Observational	Neurodevelopment	Commencing data extraction	~\$230,000
Newborn Nasal Sampling Evaluation (NOSE) Study (Pilot study of AERIAL)	Observational	Asthma risk	Recruitment completed (141)	Under AERIAL funding
PEAPOD: Maternal and neonatal factors affecting neonatal body fat percentage	Observational	Overweight & obesity	Commencing data analysis	In kind (ORIGINS)
Paediatric Burns: Understanding the long-term immune and metabolic impacts of paediatric burn trauma	Observational	Burns, infection & immunity	Data extraction & analysis	~\$120,000
The PLAN Project (pilot study): Pregnancy Lifestyle Activity and Nutrition	Randomised Controlled Trial	Overweight & obesity (mother and child)	Completed (57)	~\$275,000
PLAN Implementation at JHC	Observational	Overweight & obesity (mother)	Recruitment Completed (450)	~\$250,000
PLANET Project: Plastics in Pregnancy	Observational	Plastic contamination in samples	Recruitment completed (52)	~\$380,000
The PrEggNut Study: A Maternal diet rich in eggs and peanuts to reduce food allergies	Randomised Controlled Trial	Reducing infant egg and peanut allergies	Recruitment completed (188)	~\$100,000
A Respectful Approach to Early Parenting	Interventional	Developing the parent-child relationship	Recruitment ongoing (18/144)	~\$120,000
STARS: MRFF	Intervention	Neurodevelopment	Recruitment to start	~2,000,000
Screen ORIGINS: Longitudinal study of the multidimension influences and impacts of contemporary screen technology use over the first 5 years of life	Observational	Family screen technology use	Quantitative study: Completed Qualitative study: Recruitment completed (57)	~\$6,000

Sub-Project	Type	Impact/Focus	Status 30 June 2024 (N)	Grant Value
(quantitative & qualitative)				
STORK: A pilot retrospective observational study to assess biomarkers of stress and serotonin pathways in pregnant women in The ORIGINS Project	Observational	Maternal mental health	Commencing sample extraction	In-kind support from Australian National Phenome Centre and ORIGINS
The SunPreg Study: Measuring sun exposure in pregnancy and its association with the development of early childhood allergies	Observational	Benefits of sunlight exposure in pregnancy on maternal skin	Recruitment completed (48)	Student project
The SYMBA Study: Improving gut health (symbiosis) for allergy prevention	Randomised Controlled Trial	Reducing infant allergies	Recruitment completed (652)	~\$2,300,000
SYMBA-3	Observational	Reducing infant allergies	Awaiting data extract	~\$125,000
Testosterone and Language in Kids (TALK) Study	Observational	Cerebral lateralisation and early language development	Recruitment completed (501)	~\$700,000
Time Out for Wellbeing: an experimental study linked to the Mums Minds Matter Project	Observational	Maternal mental health	Recruitment completed (164)	~\$1,500
TUMS: Water quality and the microbiome study	Randomised Controlled Trial	Microbiome in infants	Recruitment completed (197)	~\$520,000
TOTAL FUNDING				~\$21,630,000

Additional indirect funding is incorporated within The ORIGINS Project from PhD and other students. In total there are 17 students, including **9 PhD students** currently working on projects in ORIGINS.

A further **eight new sub-projects** have been approved by the ORIGINS Scientific Committee and Project Management Group to be nested within ORIGINS. Two of these sub-projects have commenced, and six are awaiting funding, ethics and/or governance approval. A further **two sub-projects are under review** and awaiting final approval from the Scientific Committee and Project Management Group.

For a detailed description of each of the current ORIGINS sub-projects visit our website: <https://originsproject.telethonkids.org.au/sub-projects/>

Appendix Two: ORIGINS Research Dissemination: Publications, Papers and Presentations

Publications

1. Alexander, C., Amery, N., Salt, A., Morgan, C., Spittle, A., Ware, R. S., Elliott, C., & Valentine, J. (2024). Inter-rater reliability and agreement of the General Movement Assessment and motor optimality score-revised in a large population-based sample. *Early Human Development*, 106019. <https://doi.org/10.1016/j.earlhumdev.2024.106019>
2. Cuffe, C., Giglia, R., Cooper, M. N., Hill, J., Silva, D., Moorhead, A. M., ... & O'Sullivan, T. A. (2024). Study protocol for a stepped-wedge cluster (nested) randomized controlled trial of antenatal colostrum expression (ACE) instruction in first-time mothers: The ACE study. *Journal of Human Lactation*, 40(1), 80-95. <https://doi.org/10.1177/08903344231215074>
3. Davis, J. A., Ohan, J. L., Gregory, S., Kottampally, K., Silva, D., Prescott, S. L., & Finlay-Jones, A. L. (2023). Perinatal Women's Perspectives of, and Engagement in, Digital Emotional Well-Being Training: Mixed Methods Study. *Journal of Medical Internet Research*, 25(1), e46852. <https://doi.org/10.2196/46852>
4. D'Vaz N, Kidd C, Miller S, Amin M, Davis JA, Talati Z, Silva DT, Prescott SL. (2023). The ORIGINS Project Biobank: A Collaborative Bio Resource for Investigating the Developmental Origins of Health and Disease. *Int J Environ Res Public Health*, 20(13):6297. <https://pubmed.ncbi.nlm.nih.gov/37444144/>
5. Hood, R., Zabatiero, J., Silva, D., Zubrick, S. R., & Straker, L. (2024). "It helps and it doesn't help": Maternal perspectives on how the use of smartphones and tablet computers influences parent-infant attachment. *Ergonomics*, 67(2), 148–167. <https://doi.org/10.1080/00140139.2023.2212148>
6. Jones, J. M., Reinke, S. N., Mousavi-Derazmahalleh, M., Garssen, J., Jenmalm, M. C., Srinivasjois, R., Silva, D., Keelan, J., Prescott, S. L., Palmer, D. J., & Christophersen, C. T. (2024). Maternal prebiotic supplementation during pregnancy and lactation modifies the microbiome and short chain fatty acid profile of both mother and infant. *Clinical Nutrition*, 43(4), 969–980. <https://doi.org/10.1016/j.clnu.2024.02.030>
7. Kicic-Starceвич, E., Hancock, D. G., Iosifidis, T., Agudelo-Romero, P., Caparros-Martin, J. A., Karpievitch, Y. V., Silva, D., Turkovic, L., Le Souef, P. N., Bosco, A., Martino, D. J., Kicic, A., Prescott, S. L., & Stick, S. M. (2024). Airway epithelium respiratory illnesses and allergy (AERIAL) birth cohort: Study protocol. *Frontiers in Allergy*, 5. <https://doi.org/10.3389/falgy.2024.1349741>
8. Moumin, N. A., D'Vaz, N., Kidd, C., MacRae, A., Zhou, S. J., Richards, T., ... & Green, T. J. (2024). Urinary Ferritin as a Noninvasive Means of Assessing Iron Status in Young Children. *The Journal of Nutrition*. <https://doi.org/10.1016/j.tjnut.2024.04.040>
9. Parkin, K., Palmer, D. J., Verhasselt, V., Amenyogbe, N., Cooper, M. N., Christophersen, C. T., ... & Martino, D. (2024). Metagenomic Characterisation of the Gut Microbiome and Effect of Complementary Feeding on Bifidobacterium spp. in Australian Infants. *Microorganisms*, 12(1), 228. <https://doi.org/10.3390/microorganisms12010228>
10. Rowley, C. E., Lodge, S., Egan, S., Itsiopoulos, C., Christophersen, C. T., Silva, D., Kicic-Starceвич, E., O'Sullivan, T. A., Wist, J., Nicholson, J., Frost, G., Holmes, E., & D'Vaz, N. (2023). Altered dietary behaviour during pregnancy impacts systemic metabolic phenotypes. *Frontiers in Nutrition*, 10. <https://doi.org/10.3389/fnut.2023.1230480>
11. Stevens, R., Gorman, S., Arabiat, D., Christophersen, C. T., & Palmer, D. J. (2024). Associations between sun exposure, skin pH, and epidermal permeability in pregnancy: A longitudinal observational study. *Photochemistry and Photobiology*. <https://doi.org/10.1111/php.13920>
12. Parkin, K., Palmer, D. J., Verhasselt, V., Amenyogbe, N., Cooper, M. N., Christophersen, C. T., ... & Martino, D. (2024). Metagenomic Characterisation of the Gut Microbiome and Effect of Complementary Feeding on Bifidobacterium spp. in Australian Infants. *Microorganisms*, 12(1), 228. <https://doi.org/10.3390/microorganisms12010228>
13. Rowley, C. E., Lodge, S., Egan, S., Itsiopoulos, C., Christophersen, C. T., Silva, D., Kicic-Starceвич, E., O'Sullivan, T. A., Wist, J., Nicholson, J., Frost, G., Holmes, E., & D'Vaz, N. (2023). Altered dietary behaviour during pregnancy impacts systemic metabolic phenotypes. *Frontiers in Nutrition*, 10. <https://doi.org/10.3389/fnut.2023.1230480>

14. Stevens, R., Gorman, S., Arabiat, D., Christophersen, C. T., & Palmer, D. J. (2024). Associations between sun exposure, skin pH, and epidermal permeability in pregnancy: A longitudinal observational study. *Photochemistry and Photobiology*. <https://doi.org/10.1111/php.13920>

Presentations

1. Desiree Silva (2023). THE ORIGINS Project: Creating a Platform to increase research capacity to better understand Childhood Neurodevelopmental Disorders [Oral presentation] WA Psychological Science Conference.
2. Desiree Silva (2023). Impact Showcase Event [Oral presentation]. ORIGINS Project Showcase
3. Desiree Silva (2023). An Update on the ORIGINS Project and Its Future Power [Poster presentation]. CAHS Symposium
4. Desiree Silva (2023). ORIGINS: Platform for Child Health Research [Oral presentation]. Thrive by Five WA Alliance
5. Desiree Silva (2024). ORIGINS Project: STARS Engagement and Recruitment [Oral presentation]. Ngala Banksia Grove
6. Desiree Silva (2024). The ORIGINS Platform: Future Sustainability [Oral presentation]. Health Department WA
7. Desiree Silva (2024). The ORIGINS Project: Primary School Years [Oral presentation]. Minister Tony Buti
8. Desiree Silva (2024). The ORIGINS Project: Faecal Microbiome [Oral presentation]. Redcross
9. Desiree Silva, J Davis (2024). ORIGINS Showcase Event [Oral presentation]. ORIGINS Showcase Event
10. Desiree Silva (2024). The ORIGINS Research Platform: Neurodevelopmental Disorders [Oral presentation]. Dr David Coghill, Murdoch University
11. Desiree Silva (2024). The ORIGINS Project: A Platform for Research Discovery [Oral presentation]. Paul Ramsay Foundation
12. Desiree Silva (2024). The ORIGINS Project: Primary School Engagement [Oral presentation]. Niel Smith, President of WA Primary Principals' Association
13. Desiree Silva (2024). WA Cohorts: The ORIGINS Project [Oral Presentation]. People WA Data Committee
14. Hancock et al (2024). AERIAL Cohort: Viral Susceptibility and Recurrent Wheezing in the First Year [Poster presentation]. TSANZSRS
15. Jackie Davis (2023). Engagement in a Digital Wellbeing Intervention for Pregnant Women [Poster presentation]. CAHS Symposium
16. Jackie Davis (2023). Evaluating perinatal women's engagement in digital wellbeing interventions in a birth cohort [Oral presentation] Australian Public Health conference
17. Jackie Davis (2023). Interventional cohort studies: "A little less conversation, a little more action" [Oral presentation] Australian Public Health conference
18. Jackie Davis (2024). The ORIGINS Project: A Platform for Research Discovery [Oral presentation]. CliniKids Scientific Forum
19. Jackie Davis (2024). The ORIGINS Project: A Platform for Research Discovery [Virtual]. Menzies Institute for Medical Research
20. Lisa Gibson (2023). The ORIGINS Project: Community Wellbeing and Experiences During a Pandemic [Poster presentation]. CAHS Symposium
21. Lisa Gibson, Jackie Davis, Desiree Silva, Susan Prescott (2023). Families from The ORIGINS Project: Community Wellbeing and Experiences During a Pandemic [Oral presentation] Australian Public Health conference
22. Lisa Gibson and Zenobia Talati (2023). The ORIGINS Project: A platform for research recovery [Oral presentation]. The University of Western Australia, School of Psychological Science Colloquium
23. Lisa Gibson, Davis, J., Silva, D. Yang, T., Dickerson, J., Wright, J., Goldfeld, S., Wake, M., Lingam, R. (2023). Interventional cohort studies: "A little less conversation, a little more action" [Oral presentation]. Australian Public Health Association

24. Lisa Gibson (2024). The ORIGINS Project: A Platform for Research Discovery. The Primary School Years [Oral presentation]. Language & Literacy in Young People (LaLYP) group, Curtin School of Population Health
25. Nivedithaa Divakara (2023). Maternal Prebiotic Supplementation Modifies Human Milk Immunological Composition linked to Allergy [Oral presentation]. APAAACI Congress
26. Nivedithaa Divakara (2024). Effect of Maternal Prebiotic Supplementation on Human Milk Immunological Composition [Virtual]. Cimmap (France-Online)
27. Patricia Agudelo-Romero (2024). Nasal and Amnion Methylomes: Biomarkers for Smoke Exposure and Maternal Asthma [Poster presentation]. American Academy of Allergy and Immunology Conference
28. Sarah Whalan (2023). Overcoming the challenges of big data: Integrating data from diverse sources to achieve strategic research insights [Oral presentation]. ARMS Conference
29. Thomas Iosifidis and Patricia Agudelo-Romero (2024). Methylome conservation in the amnion and newborn nasal epithelium: interrogating prenatal epithelial programming [Oral presentation]. TSANZSRS
30. Zenobia Talati (2023). The Flourishing Child: Findings from Phase 1 Stakeholder Engagement [Poster presentation]. CAHS Symposium
31. Zenobia Talati (2023). The Flourishing Child: developing a tool to support Western Australian children [Oral presentation] NOVA Annual conference 2023
32. Zenobia Talati (2023). Working together to unravel the origins of noncommunicable diseases. [Oral presentation] Australian Public Health conference