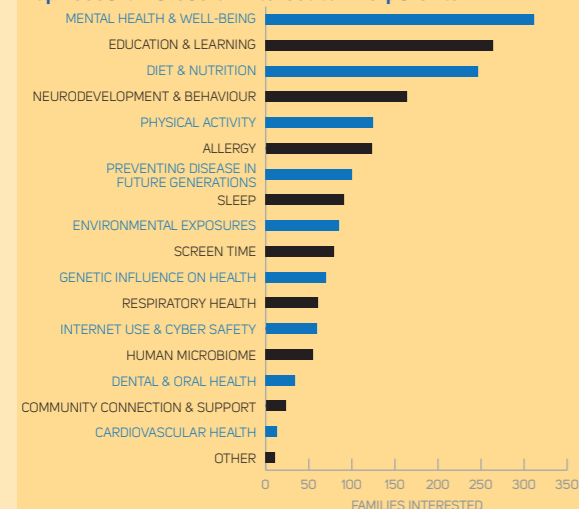


## BIS Primary School review: Design based on parental feedback

At the BIS Primary School review we will be aiming to understand how early life factors relate to health of school aged children. By school age, we may start to see previous health issues resolve and different challenges arise. Generally, food allergy becomes less common, but other health issues related to the modern child's lifestyle may start to emerge.

You have told us what areas of BIS matter most to you as BIS parents, and we have used this information to carefully design our research focus for the BIS Primary School review. We found that BIS parents share the common interests when it comes to research focus, particularly mental health and well-being, education and neurodevelopment.

### Top research areas of interest to BIS parents



Using this information we are aiming to complete the following measures at the BIS Primary School review;

- > Mental health and well-being
- > Diet
- > Neurodevelopment
- > Physical activity
- > Allergy and respiratory health
- > Growth
- > Eye health
- > Dental health
- > Heart health

Reminder... do you still have one of these?



As part of the BIS Primary Schools review, we'll be asking BIS kids to wear a small activity monitor (belt) again. A reminder that these are expensive little gadgets! We last used these for the Preschool review and are still missing a few. If you have one or know if you may have lost one, get in touch. We can send you out a pre-paid envelope to send it back to us.



## The BIS Consumer Reference Group

Participant experience is very important to the BIS team. Your feedback and suggestions are crucial. We would like to float our ideas and get your opinion.

We are open to whichever way you prefer to provide feedback - such as web-based discussion groups, email, text or phone. We would be grateful for any level of contribution, so there is no minimum commitment required. If you are interested in helping out the BIS team by having your say, or for more details, please contact:

Nakita Clements, Project Coordinator  
Email: [BIS@BarwonHealth.org.au](mailto:BIS@BarwonHealth.org.au)

Please continue to let us know if there are any other topics you are interested in - we can look to include them in the next Study Update.

The Barwon Infant Study (BIS) is an ongoing collaborative research project conducted by researchers from: Barwon Health the Murdoch Children's Research Institute and Deakin University.

BIS is primarily funded by the National Health and Medical Research Council of Australia.

The preschool review received additional funding from Deakin University and the Barwon Health Foundation.



Thank you for your child and family's valuable contribution to improving the health of our community.



## Study Update 2019

### Dear BIS families

As we head into the New Year, we would like to share an update about the work that BIS has undertaken in 2019, as well as our plans for 2020 and beyond!

As you may recall, our honours student Solveig embarked on the BIS Data Linkage project. Performing data linkage will help BIS address numerous important research questions without placing an added burden on you as a participating BIS family. We have had an amazing response and we thank you once again for your support. We will share the work as it progresses, so be sure to like our Barwon Infant Study Facebook <https://www.facebook.com/barwoninfantstudy/> page to keep up-to-date.

In 2019 we also collected school enrolment information from over 80% of our BIS families. This information is vital as we are now approaching local primary schools to be involved in the BIS Primary School review.

We completed the first Primary School study visit at the very friendly Point Lonsdale Primary School, seeing five of our BIS children during school hours on the BIS bus. We had a really wonderful time completing our first school visit and can't wait to park the BIS bus at your child's school.

We will first liaise with your child's primary school to arrange suitable dates before contacting you to provide detailed information about the review and offer your family the opportunity to participate. The team are very much looking forward to seeing the BIS children as big school kids in the New Year!

We hope you enjoy reading below about our findings to date. Thank you again for your time and commitment to improving the health of our community.

Best wishes for the year ahead,

**Pete Vuillermin,**  
Professor of Paediatrics,  
Deakin University | Barwon Health  
**Anne-Louise Ponsonby,**  
Professor of Epidemiology  
The Florey Institute of  
Neuroscience and Mental Health



### Meet Davey - our first feature BIS artist



Name: Davey

Age: 8

Favourite Colour: Red

Favourite thing to draw or paint: Anything to do with sport

If you were a superhero, what would your name be and what powers would you have:

The sports saviour - Soccer balls, basketballs and footballs coming out of my hands

How many brothers/sisters do you have:  
1 sister, 2 step brothers and 1 step sister

Best thing about going to school: Bookweek

What would you like to be when you grow up:  
AFL Footballer

Special talents: Football, running and drawing

Pets: Two dogs, Rosie at Mum's and Larry at Dad's

If you could choose any animal to be, what would you be and why: A lion because they are fast and strong and they are the king of the jungle.

Barwon Infant Study

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[bis@barwonhealth.org.au](mailto:bis@barwonhealth.org.au)

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WEBSITE  
[barwoninfantstudy.org.au](http://barwoninfantstudy.org.au)

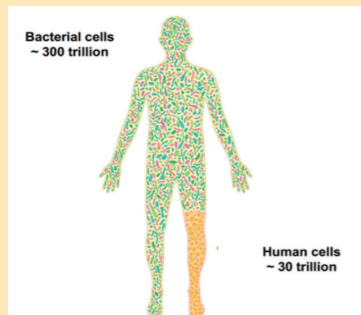
FACEBOOK  
[barwoninfantstudy](https://www.facebook.com/barwoninfantstudy)



## New Findings

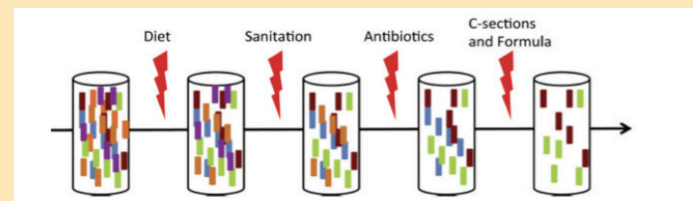
# Gut Bugs: an update on BIS microbiome studies

The collection of bacteria, yeast and fungi that live in and on animals is referred to as the microbiome. Animals and their microbiomes have co-evolved over billions of years, and there are many important cooperative arrangements between host and bacteria.



The bacteria that live in and on the human body play a vital role in our health. In fact you might be surprised to learn that your body has around 10 times the number of bacteria as it does human cells, over around 100 times as many bacterial genes!

### The modern environment is associated with the loss of diversity of the human microbiome



Sonnenburg et al, Cell Metabolism, 2014

BIS is trying to understand how the modern environment is changing bacteria present in our bodies. Factors thought to impact our microbiome includes changes in diet such as reduced dietary fibre intake, improved sanitation, smaller household numbers, antibiotic use, birth by caesarean section (c-section) and formula feeding.

A group of bacteria known as Prevotella are common in traditional communities and uncommon in Westernised communities like Australia. Prevotella are a particularly interesting group of bacteria because they ferment dietary fibre to produce molecules that have important anti-inflammatory properties.

Over the coming weeks, two important BIS papers will be published regarding Prevotella.

### “Maternal carriage of Prevotella during pregnancy associates with protection against food allergy in the offspring”

This paper will be published in Nature Communications showing that maternal carriage of Prevotella copri during pregnancy is strongly associated with protection against food allergy in the baby. In fact, among over 1000 pregnant women in BIS, only one mother that had more than a trace of Prevotella copri had a baby that developed food allergy.

### “Gut microbiota composition during infancy and subsequent behavioural outcomes”

In press with EBioMedicine 2020 this paper shows a link between babies carrying Prevotella at 1 year of age and better behaviour scores at 2 years of age. In particular, babies who carried Prevotella were less likely to display anxious behaviours.

We will post a link to BIS papers via our BIS Facebook page and website as they become available.



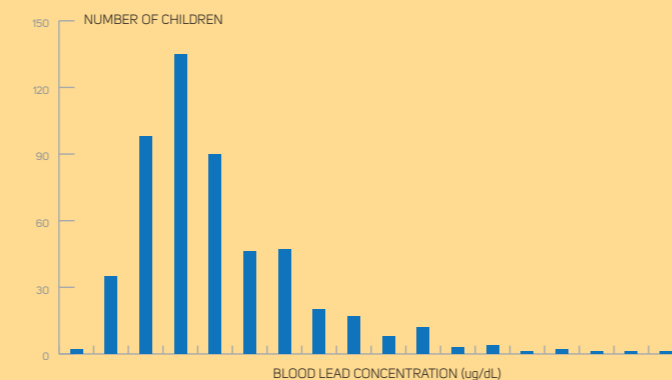
## Lead levels in the modern child

If you and your child participated in the BIS Preschool review, you may recall the BIS team talking about testing lead levels in your child's blood, if we completed a blood collection.

Lead is a metal that can harm for developing brain. Following its 2015 review, the National Health and Medical Research Council recommended investigation of and reduction of lead exposure for people in Australia with blood lead levels above 5 µg/dL. No safe limit for children has been defined, and Australian data on levels in children were previously limited. The Barwon Infant Study has now provided new information. The geometric mean blood lead level in 523 pre-school children (mean age of 4.2 years) in the Barwon region of Victoria was 0.97 µg/dL. No children had levels above 5 µg/dL. Children living in houses 50 or more years old had higher levels.

The implications: Blood lead levels in this sample of children were low in comparison with previous Australian surveys. This is good news. Recommendations regarding minimising exposure to historical lead sources, including from old houses, remain appropriate.

### Below is a graph showing the distribution of blood lead levels in 523 children assessed during the pre-school review of the Barwon Infant Study.



You can find the full article in the Medical Journal of Australia:

### Pre-school child blood lead levels in a population-derived Australian birth cohort: the Barwon Infant Study

Symeonides C, Vuillermin P, Sly PD, Collier F, Lynch V, Falconer S, Pezic A, Wardrop N, Dwyer T, Ranganathan S, Ponsonby AL. Med J Aust. 2019 Nov 24.

## Planned bacterial metagenomic studies

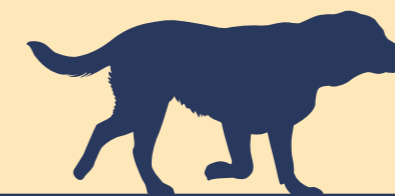
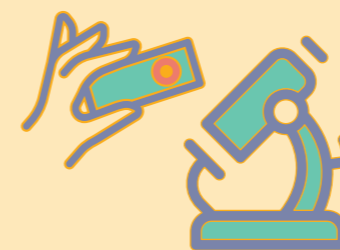


It is important that we now try and identify the underlying basis of these gut microbiome associations. With some very clever collaborators at the University of Copenhagen and the Beijing Genomics Institute (BGI), we plan to analyse the microbial DNA extracted from the BIS faecal samples using a cutting-edge technique known as metagenomics. Bacterial metagenomics studies will enable us to not only measure which bacteria are present, but also what they are capable of doing.

Although the metagenomic analyses of DNA extracted from faeces primarily measure bacterial genes, the process also produces some genetic data from the host i.e. the mother or baby in BIS. This is because, although the majority of faeces is composed of bacteria, there are some host/human cells present. We will follow the following process to ensure that our collaborators only have access to genetic data from the bacteria, and not genetic data from the BIS participants:

1. The DNA extracted from BIS faecal samples will be deidentified before transporting in the BGI for metagenomic sequencing. The metagenomic data will then be returned to Geelong.
2. Once we have confirmed we have securely stored the data in Geelong, our collaborators at BGI will delete all BIS data from their system.
3. We will then remove any human DNA sequence data in Geelong, and then provide our collaborators with a copy of the remaining data, which will be DNA from the bacteria only.

We will then work with the team from Copenhagen and BGI to make sense of what will be a vast, and internationally unique collection of bacterial metagenomic data. We are confident that we will learn a lot!



Please feel free to opt-out of the metagenomic studies of faecal samples already collected by BIS participants.

There is absolutely no pressure on you to participate in the bacterial metagenomics studies. If you are happy for BIS to use the samples you have already provided as part of your participation in BIS, you don't need to do anything.

If you would like more information about BIS metagenomic studies, please feel free to call Dr Pete Vuillermin on 0400 071 218.

If you do NOT wish for you or your child's samples to be included in the bacterial metagenomics studies please notify the BIS team before the 7th of February 2020 by completing the enclosed form and return it to the BIS team using the reply paid envelope or by sending an email to [bis@barwonhealth.org.au](mailto:bis@barwonhealth.org.au)

Want to stay informed of the latest scientific developments in BIS? Visit our website: [www.barwoninfantstudy.org.au](http://www.barwoninfantstudy.org.au)