Melbourne Children's Sleep Centre
Ward 4E, Level 4, Monash Children's Hospital
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Ph: 8572 3592 Fax: 8572 3878
http://www.monashchildrenshospital.org/sleep

Melbourne Children's Sleep Centre

Current Research 2025

About us

Medical research helps us understand health problems better and improve our care of patients in the future. Improvements in our knowledge of how the body works, in health and in sickness have led to huge improvements in medical care over the last 100 years. We are constantly striving to understand the conditions we treat better, discover new treatments, and improve the way we care for patients. The Melbourne Children's Sleep Centre has had an active research partnership with the Department of Paediatrics at Monash University for the past 20 years, obtaining over $5 million in funding from the National Health and Medical Research Council of Australia and producing over 100 research publications. We often approach parents of our patients to ask whether they are interested and willing to be involved in some of the research we are carrying out.

What's involved?

Parents/caregivers and children can become involved in our research in several different ways. When caregivers come in for their child's sleep study, they are asked if they are willing for the results to be used for research. In certain cases caregivers will be approached by research staff *before* their child's sleep study to see if they are willing to take part in research studies which require additional measurements to those usually carried out. In some studies we advertise for participants from the community. In every case, caregivers receive information in writing about the study they are being asked to be involved in, and if they are willing to take part, they are asked to sign a consent form. All involvement in research is voluntary and the decision to participate or not does not affect the care your child receives from the Melbourne Children's Sleep Centre. All information collected is kept completely confidential. By agreeing to participate in our research you and your child will be helping to improve the treatment of children with sleep disorders in the future.

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Current research you may be (or have been) asked to take part in

Alternatives to hospital sleep studies

Staying in hospital overnight for a sleep study is time consuming and can be stressful for some children and parents. We are undertaking a number of studies looking at alternatives to sleep studies in hospital that can be performed at home. *Please note that we do not endorse nor recommend these devices – we are using them for research purposes as they are not currently part of standard clinical practice.*

Home sleep apnoea test

We want to assess the accuracy and tolerance of a sleep study done in the home for children with suspected obstructive sleep apnoea. We will ask some children to participate by having their parents apply a limited number of sensors using a portable device for one night at home. Children will then have a hospital sleep study so that we can compare the results and know whether this is an investigation we may be able to offer for patients in the future.

WatchPAT

The watchPAT is a portable sleep device worn on the finger and wrist that is also used to investigate sleep and breathing but its accuracy and tolerability in children is not known. We are asking some children to wear the watchPAT simultaneously with their in hospital sleep study so that we can compare the results and know whether this device may be able to be used for sleep assessment in children.

SleepImage ring

The SleepImage is a ring worn on the finger that measures sleep quality, breathing during sleep and sleep patterns. We are investigating if this could be a helpful investigation to determine sleep disorders in children with neurodevelopmental disability (such as autism spectrum disorder) who often find hospital sleep studies difficult. We are asking children with neurodevelopmental disability to wear the SleepImage ring for one night at the same time as their hospital sleep study so that we can compare results. This will guide us as to whether this device could be used in the home for sleep assessment for children who can not tolerate multiple sensors, but are at higher risk of many different sleep disorders.

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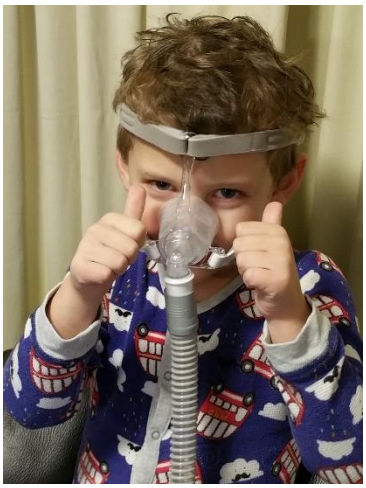
Use of machines to support children's breathing while asleep



A small number of children need support for their breathing using a machine while they sleep, known as CPAP (Continuous Positive Airway Pressure) or BiPAP (Bilevel Positive Airway Pressure). We are a specialist centre caring for this group of children and are constantly reviewing our procedures with the aim of improving our care of patients. This includes collecting data on how many hours each child uses their machine and how much their condition has improved since they started using the treatment. We are also investigating CPAP treatment settings and the use of titration sleep studies, to improve how readily we find the optimal settings (unique to each child) for those using this therapy.

Understanding the effects of obesity and obstructive sleep apnoea on cardiovascular risk in childhood

Over a quarter of Australian children are now overweight or obese and a third of these will have obstructive sleep apnoea. Having both a breathing difficulty during sleep and overweight or obesity increases the chances of cardiovascular disease such as high blood pressure, even in children. Unfortunately adenotonsillectomy, which is the most common treatment for obstructive sleep apnoea, is not as effective in children with obesity. We are using novel methods to examine heart rate, breathing and oxygen levels in children with obstructive sleep apnoea and obesity so that we can work towards developing better treatment options that are individually tailored to each child.

Temperature variations during sleep

The quality and quantity of sleep are very closely related to variations in body temperature. We will ask some children to wear small temperature sensors on their chest and feet during their in hospital sleep study, so that we can assess how temperature variations overnight are related to sleep.

Sleep problems in special populations

Down syndrome

Did you know that children with Down syndrome are up to 10 times more likely to have breathing problems during sleep compared to other children? We are interested in understanding more about how sleep problems affect children with Down syndrome. Breathing problems during sleep affect daily activities in children, and detecting and treating the breathing problems will often improve daytime wellbeing in these children. We are also investigating how the cardiovascular system is affected by breathing disturbances in sleep in children with Down syndrome.

Prader-Willi syndrome

Children with Prader-Willi syndrome have higher rates of breathing difficulties during sleep as well as other sleep problems such as excessive daytime sleepiness. They also have different physiological responses to challenges compared to other children. We are

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performing a number of analyses to understand the control of heart rate and breathing in children with Prader-Willi syndrome and in particular we are wanting to better understand the effect of growth hormone therapy, which is often prescribed for children with Prader-Willi syndrome.

Also we aim to understand the mechanisms causing excessive daytime sleepiness in children with PWS. Spectral analysis of brainwave activity recorded during sleep can provide a more sensitive measure of sleep disruption. Better understanding of brain activity during overnight sleep may provide markers to highlight those at risk of excessive daytime sleepiness and may open doors to specific treatments that improve sleep quality and daytime wellbeing.

Understanding sleep micro-structure, brain activity and excessive daytime sleepiness

The brain is very complex, mysterious and it is still not fully understood. Currently we mainly use electro-encephalogram to measure brainwave activity, which is part of the recording during a sleep study. We are investigating the importance and occurrence of certain brain activity patterns such as sleep spindles and spectral power analysis of the electro-encephalogram as this can provide a more sensitive measure of sleep disruption. This has implications for understanding excessive daytime sleepiness, neurocognition and brain development.

Excessive daytime sleepiness can have a huge impact on a child, their learning, their social life and their family. These disorders are not well understood and can be a problem in those with Prader-Willi syndrome but also other children. We are using questionnaires, actigraphy (a measurement of movement to detect sleep and wake) and other analyses of brain activity to investigate differences in children with excessive daytime sleepiness, with the hope that this will help guide future targets for diagnosis and treatment.