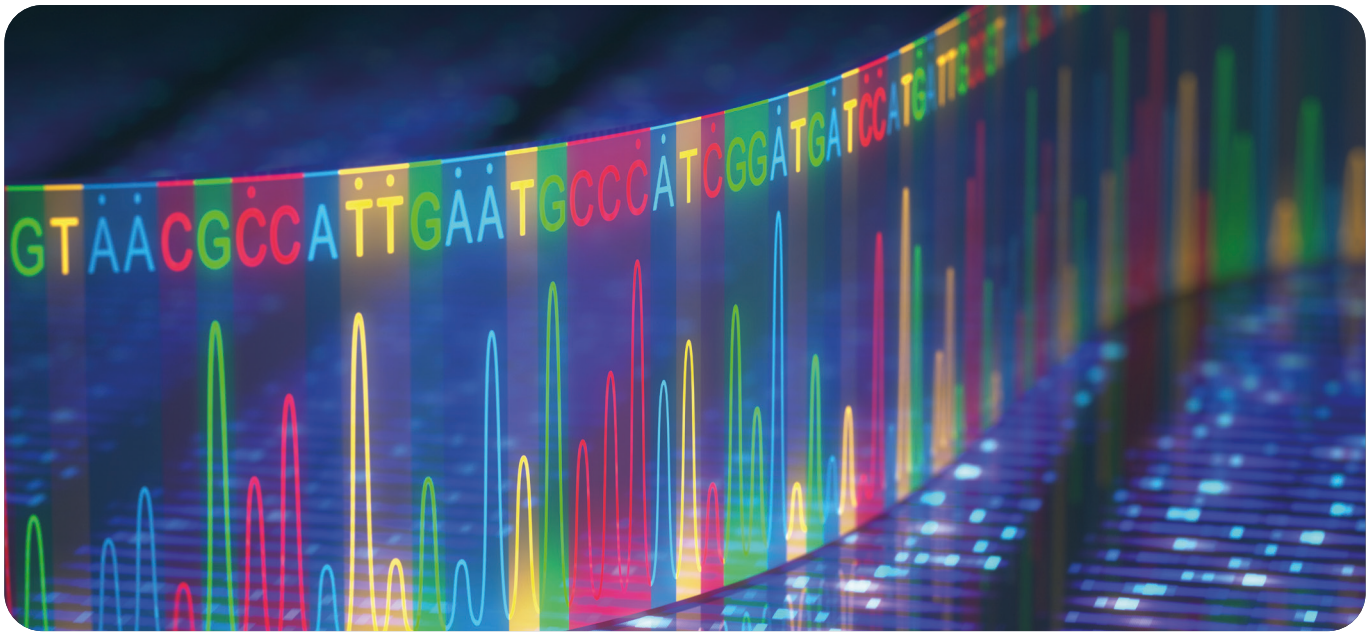
PATHOLOGY TESTS EXPLAINED

Information about pathology tests to help everyone take control of their health and make the right decisions about their care.

WHAT YOU SHOULD KNOW ABOUT
CHILDREN'S WHOLE GENOME AND WHOLE EXOME TESTING

If a child has been born with a disability or is delayed in their development and standard testing has been unable to find a cause, whole genome or whole exome sequencing could be the next step.

These tests are based on new technology that allows large amounts of DNA to be investigated at one time. By sequencing a child's whole genome or whole exome, less common genetic changes can be detected.



How does whole genome and whole exome testing work?

The genome is the entire set of DNA instructions found in your cells. Sequencing DNA means reading the order in which the building blocks that make up the DNA code are set out. In whole genome and whole exome sequencing these building blocks are read and compared with a reference sequence. If a difference is detected, it is investigated to see if it is a possible cause of the child's clinical condition.

Whole genome sequencing (WGS)

This reads all the building blocks of a person's DNA.

Whole exome sequencing (WES)

This only looks at the genes that code for proteins. These genes occupy about one per cent of the human genome – 99 per cent of the genome does not code for proteins and is not investigated. This test is done if a doctor thinks the cause of the clinical condition will be found in the protein coding genes as it is faster to perform than whole genome sequencing and does not cost as much.

What can your results tell you?

Our DNA is made up of chemical units called nucleotide bases. There are four different types and each have been given a letter – A, T, G and C. This is called the genetic alphabet.

Benign changes	Each letter in the genome is compared with a reference sequence. Most differences, which are called gene variants, don't cause any problems and are labelled *benign changes*.
Pathogenic variants	A genetic variant that is known to cause a particular condition is called a pathogenic variant. Finding a *pathogenic variant* will usually be sufficient for a child to be given a diagnosis as well as a treatment and management plan.
Likely pathogenic	Sometimes a gene variant is found that looks likely to be damaging, but there is not enough evidence to know for certain. These are reported *as likely pathogenic*.
Variants of uncertain significance (VUS)	Many gene variants will be found where the clinical significance of the change is not known. These are called variants of uncertain significance (VUS).
Trio studies	To help clarify if a VUS is the cause of a child's condition, it can be helpful to see if the same variant is present in either of the parents. This is called *trio studies*. If a healthy parent has the same VUS as the child, it is unlikely to be the cause. If neither parent has the VUS the change found in the child is a completely new variant – known as a de-novo variant.
What if you have inconclusive results?	Even after looking at all the building blocks in all genes the cause of the child's condition may not be found. Whole genome and whole exome sequencing tests are most powerful for the diagnosis of a pathogenic variant in just one gene. However, for some children there may be more than one gene involved or else the condition may not be genetic in origin.

Are these tests covered by Medicare?

Whole genome or whole exome sequencing are covered by Medicare for a child under 10 years of age with certain conditions to be determined by a specialist paediatrician. The test can only be ordered by a clinical geneticist or consultant physician practising as a specialist paediatrician, following consultation with a clinical geneticist.

Having a medical test

The choice of tests your doctor makes will be based on your medical history and symptoms. Make sure you tell them everything you think might help.

You play a central role in making sure your test results are accurate. Do everything you can to make sure the information you provide is correct and follow instructions closely.

Talk to your doctor about any medication you are taking. Find out if you need to fast or stop any particular foods or supplements. These may affect your results.

Questions to ask your doctor

Why does this test need to be done?
Do I need to prepare (such as fast or avoid medications) for the sample collection?
Will an abnormal result mean I need further tests?
How could it change the course of my care?
What will happen next, after the test?

For more detailed information on these and many other tests go to **pathologytestsexplained.org.au**

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www.pathologytestsexplained.org.au

Please use this QR code to access more information

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Pathology Tests Explained is managed by a consortium of medical and scientific organisations representing pathology practice in Australia. More details at: **www.pathologytestsexplained.org.au/about**

My Health Record

You'll find a direct link to the Pathology Tests Explained website embedded in the pathology results pages of your My Health Record.

Click on the link to find information about what your tests are investigating or measuring and what your results can tell your doctor.