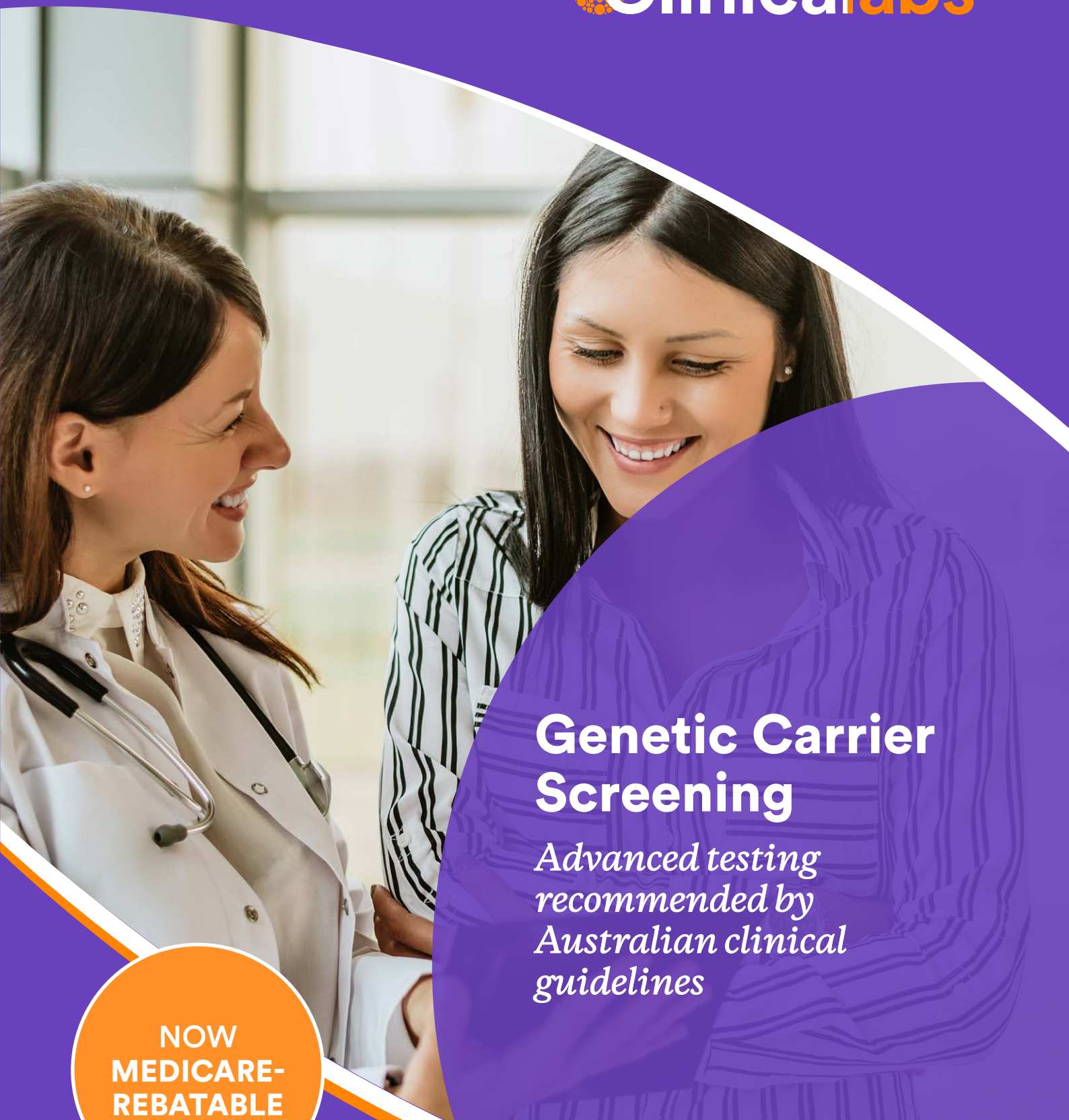
AUSTRALIAN Clinicallabs



Genetic Carrier Screening

Advanced testing recommended by Australian clinical guidelines

NOW MEDICARE-REBATABLE

A Cystic Fibrosis, Spinal Muscular Atrophy, and Fragile X Syndrome screening test

Genetic Carrier Screening, available at Australian Clinical Labs, provides patients with information regarding their chances of having a child with a genetic condition such as cystic fibrosis (CF), spinal muscular atrophy (SMA), or fragile X syndrome (FXS). If the patient or the partner has a family history of any of these conditions, the chance of being a carrier may be higher.

Genetic Carrier Screening should be offered to every woman or couple

Australian clinical guidelines (RANZCOG & RACGP)[1,2] recommend offering genetic carrier screening for common genetic conditions, such as cystic fibrosis, spinal muscular atrophy, and fragile X syndrome, to every woman or couple who are either planning or in the first stage of pregnancy, regardless of their probability of having these conditions.

Ideally, screening is performed prior to conception to offer greater reproductive choice. Early detection is paramount as it allows more time for counselling and provides greater reproductive options for those at risk. With carrier screening for CF, SMA, and FXS being Medicare-rebatable, testing can be offered earlier during routine appointments, alongside other prenatal screening tests.

1. The Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG) Guidelines.
2. The Royal Australian College of General Practitioners (RACGP) Guidelines.

Genetic Carrier Screening – Now Medicare-Rebatable

Genetic carrier screening for cystic fibrosis (CF), spinal muscular atrophy (SMA), and fragile X syndrome (FXS) is now fully Medicare-rebatable. These Medicare items now make genetic carrier screening accessible to the wider Australian population; the test is covered once in an individual's lifetime. For Medicare eligibility criteria, please visit antenatal.clinicallabs.com.au/doctor/carrier-screening.

Clinical Labs is pleased to offer patients two expanded carrier screening options at an additional out-of-pocket cost. Please refer to page 5 of this brochure for further details.

NOW MEDICARE-REBATABLE

"These Medicare items now make genetic carrier screening accessible to the wider Australian population."

About CF, SMA and FXS

Genetic Carrier Screening gives patients information regarding the chances of their child having cystic fibrosis (CF), spinal muscular atrophy (SMA), or fragile X syndrome (FXS).

- One in 20 individuals are carriers of at least one of these conditions;
- 90% of carriers do not have a family history;
- One in 160 couples will be found to be at risk of having an affected child.

Cystic fibrosis (CF)

Approximately 1 in 25 individuals are carriers of CF. Clinical Labs' CF screening covers more than 75 common mutations in the CFTR gene. CF affects about 1 in 2,500 individuals and is a severe autosomal recessive genetic condition that causes lung and gastrointestinal problems.

Spinal muscular atrophy (SMA)

SMA is an autosomal recessive inherited neuromuscular disease historically associated with high morbidity and mortality. Approximately 1 in 35 people are carriers of SMA. Clinical Labs' SMA screening identifies deletions of the SMN1 gene (one copy), which account for approximately 96% of the mutations in this gene. SMA affects about 1 in 6,000 people.

Fragile X syndrome (FXS)

FXS, an X-linked condition, is the most common inherited form of intellectual disability, affecting approximately 1 in 3,600 men and 1 in 6,000 women. Approximately 1 in 330 people are carriers of FXS.

FXS carrier screening is recommended for females, as it is inherited in a different way to CF and SMA. Female patients who have the gene change (number of CGG triplet repeats) in the FMR1 gene are found to be at risk of having a child affected by FXS, as the abnormal gene may expand over generations.

Genetic Carrier Screening in General Practice

By Dr Caroline Rogers

Dr Caroline Rogers has been a GP on Sydney's Northern Beaches for the last 20 years and has been working at South Steyne Medical Centre in Manly since 2021. Her practice focuses on women's health and chronic disease, with a special interest in proactive, preventative care.

As GPs, we are ideally placed to discuss genetic carrier screening with patients. Over the last few years, I have started offering this test as part of my routine pre-conceptual and pregnancy planning consultations. When discussing carrier screening with patients, I often use the analogy of rhesus status. Just like rhesus testing, the screening is done once and has implications for pregnancy care. Knowing about it sooner rather than later allows us to put plans in place to manage and prevent pregnancy complications. It is only necessary to test the partner if the patient tests positive.

The advantage of obtaining the results of genetic carrier screening before a pregnancy begins is that it reduces the stress and anxiety which can be associated with waiting for results while pregnant. If the test is positive for one or more genetic mutations and the partner also needs to be tested, the wait can be weeks. If this process is only initiated at the initial antenatal visit, we are often well into the second trimester before the patient knows for certain what the outcome is. This can significantly impact the joy and well-being many couples hope and expect to experience during this time.

Pre-pregnancy testing allows this to happen in a much less time-sensitive and emotionally charged environment. The patient and their partner can be referred to a genetic counsellor to discuss the nature of the conditions being screened for, if necessary, and their options in terms of pregnancy planning. This includes discussing preimplantation testing if a positive result is found for both parties.

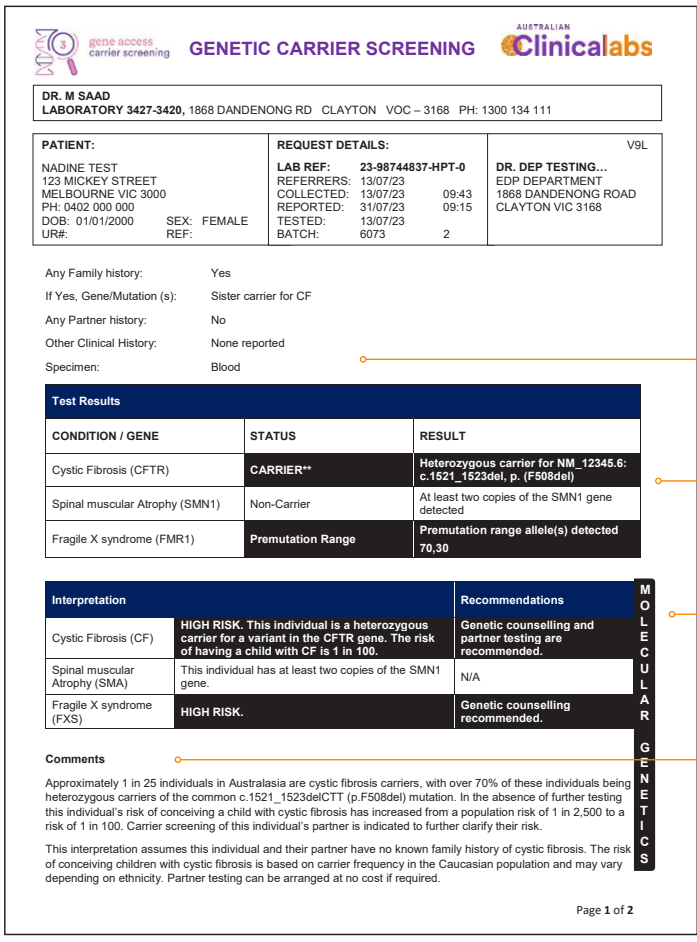
As this is a once-in-a-lifetime test, and once cost is no longer a barrier, I anticipate it being raised more often during pill checks and cervical screening appointments with younger women who are not actively considering a pregnancy but would like to have this information to help them plan future fertility choices.

Interpretation of results

CF and SMA

There are two possible outcomes when being tested for CF or SMA. Screening results may indicate your patient is either:

- **A CARRIER**: This means the test has identified that the patient carries a change in a copy of the CF or SMA gene. If this occurs, then testing of the patient's partner for this condition(s) is recommended to further clarify the risk of having a child affected by that condition.
- **A NON-CARRIER**: This means that the patient was not found to carry any of the common gene changes tested for. Negative results can significantly reduce the risk of having an affected child with those conditions.



gene access carrier screening **GENETIC CARRIER SCREENING** Australian Clinicalabs

DR. M SAAD
LABORATORY 3427-3420, 1868 DANDENONG RD CLAYTON VOC – 3168 PH: 1300 134 111

PATIENT:	REQUEST DETAILS:		V9L
NADINE TEST 123 MICKEY STREET MELBOURNE VIC 3000 PH: 0402 000 000 DOB: 01/01/2000 SEX: FEMALE UR#: REF:	**LAB REF:** **23-98744837-HPT-0** REFERRERS: 13/07/23 COLLECTED: 13/07/23 09:43 REPORTED: 31/07/23 09:15 TESTED: 13/07/23 BATCH: 6073 2		**DR. DEP TESTING...** EDP DEPARTMENT 1868 DANDENONG ROAD CLAYTON VIC 3168

Any Family history: Yes
If Yes, Gene/Mutation (s): Sister carrier for CF
Any Partner history: No
Other Clinical History: None reported
Specimen: Blood

Test Results

CONDITION / GENE	STATUS	RESULT
Cystic Fibrosis (CFTR)	**CARRIER****	**Heterozygous carrier for NM_12345.6: c.1521_1523del, p. (F508del)**
Spinal muscular Atrophy (SMN1)	Non-Carrier	At least two copies of the SMN1 gene detected
Fragile X syndrome (FMR1)	**Premutation Range**	**Premutation range allele(s) detected 70,30**

Interpretation		Recommendations
Cystic Fibrosis (CF)	**HIGH RISK. This individual is a heterozygous carrier for a variant in the CFTR gene. The risk of having a child with CF is 1 in 100.**	**Genetic counselling and partner testing are recommended.**
Spinal muscular Atrophy (SMA)	This individual has at least two copies of the SMN1 gene.	N/A
Fragile X syndrome (FXS)	**HIGH RISK.**	**Genetic counselling recommended.**

MOLECULAR GENETICS

Comments

Approximately 1 in 25 individuals in Australasia are cystic fibrosis carriers, with over 70% of these individuals being heterozygous carriers of the common c.1521_1523delCTT (p.F508del) mutation. In the absence of further testing this individual's risk of conceiving a child with cystic fibrosis has increased from a population risk of 1 in 2,500 to a risk of 1 in 100. Carrier screening of this individual's partner is indicated to further clarify their risk.

This interpretation assumes this individual and their partner have no known family history of cystic fibrosis. The risk of conceiving children with cystic fibrosis is based on carrier frequency in the Caucasian population and may vary depending on ethnicity. Partner testing can be arranged at no cost if required.

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FXS

The table below shows the four different types of test results from FXS carrier screening based on the number of CGG repeats detected.

Possible FXS test results	Number of CGG repeats identified
Normal Range	5-44 repeats
Intermediate Range	45-54 repeats
Premutation Range	55-200 repeats
Full Mutation Range	>200 repeats

Women with repeats within the normal range are not at increased risk of having a child affected with FXS. Women in the intermediate or premutation range are not affected by FXS (although they may present with clinical disorders), and they may pass on the risk to future generations or be at increased risk of having children affected by FXS. Women with repeats in the full mutation range are at increased risk of having children affected with FXS and should be offered a referral to a clinical geneticist or genetic counsellor for expert advice.

Gene Access Carrier Screening Report

Clinical History: includes family/partner history.

Status: includes genes detected for CF, SMA & FXS.

Interpretation: includes clinical recommendations.

Comments: includes pathologist's comments in relation to the findings of the report.

Genetic counselling

For positive cases (tested by Clinical Labs), Clinical Labs offers one genetic counselling session per couple at no cost. Any follow-up consultations, if necessary, will incur an out-of-pocket fee.

- Clinical Labs will notify the referring clinician and provide contact details for the genetic counselling service.
- The referring doctor can either contact the genetic counsellor to schedule the appointment, or the consultation can be organised through the lab.
- Appointments are conducted over the phone and are generally available within 48 hours of referral. During the call, which lasts 15-20 minutes, the genetic counsellor will discuss the risk of having a child carrying this condition with the patient and their partner. It is also optional for the referring clinician to be on the call.

Please note: The genetic counselling request must be made within two weeks of receiving the partner's CARRIER test results. For FXS, only pre-mutation and full mutation cases are offered genetic counselling.

Extended Carrier Screening Tests Available

Comprehensive Carrier Screening

Clinical Labs offers a comprehensive test that involves screening up to 460 genes, which is appropriate for individuals of all ethnicities who want an expanded assessment of their risk of having a child with a genetic condition. Comprehensive Carrier Screening evaluates an individual's carrier status for more than 100 inherited conditions.

Our Comprehensive Carrier Screening includes:

- Screening for 100+ inherited conditions, including up to 460 genes
- Over 90% of conditions recommended by the American College of Obstetricians and Gynecologists (ACOG) and the American College of Medical Genetics and Genomics (ACMG)
- Genetic conditions which are more common in individuals of Ashkenazi Jewish ancestry
- Serious childhood-onset conditions, some of which appear on newborn screening
- Enhanced testing, including full gene sequencing with deletion and duplication analysis leading to a 99% detection rate for most genes
- Actionable results; no reporting of variants of unknown significance

Ashkenazi Jewish Carrier Screening

An individual's risk of being a genetic carrier for certain conditions can vary depending on their ethnicity. For example, Caucasian individuals are at higher risk of being carriers of cystic fibrosis, and people of Asian and Mediterranean ancestry are at increased risk of being carriers of blood disorders called thalassaemia. Ashkenazi Jewish Carrier Screening is a test that can determine whether your patient is a carrier of any of the eight genetic conditions that are more common in people of Ashkenazi Jewish ancestry. Importantly, being a carrier of one of these eight conditions does not impact your patient's own health, but it may increase the likelihood of having a child affected by the condition.

Our Ashkenazi Jewish Screening includes:

- Tay–Sachs disease
- Canavan disease
- Niemann–Pick disease
- Bloom syndrome
- Cystic fibrosis
- Fanconi anaemia
- Familial dysautonomia
- Mucolipidosis IV

Genetic Carrier Screening Testing at Clinical Labs

	 gene access carrier screening	 COMPREHENSIVE carrier screening	 *Ashkenazi Jewish* carrier screening
Genetic conditions	CF, SMA & FXS	100+ inherited conditions	Eight genetic conditions listed above
Cost	Fully Medicare-rebatable once in the patient's lifetime	See website for latest pricing	See website for latest pricing
Turnaround time	5–7 business days	7–9 weeks	7–10 business days
Request form	Request forms for our Genetic Carrier Screening tests can be found at: antenatal.clinicallabs.com.au/doctor/carrier-screening. **Please include any family history of relevant genetic conditions.**		

Ordering Genetic Carrier Screening with Clinical Labs

How to order

For Gene Access (CF, SMA & FXS) testing, please complete the Clinical Labs Genetic Carrier Screening Request Form located at antenatal.clinicallabs.com.au/doctor/carrier-screening. This form is also available as an .rft file that can be uploaded to Medical Director and is now hosted as a template in Best Practice. It can be found under the name "Genetic Carrier Screening Request Form." Please also provide any relevant family or partner history when completing the request form.

Testing locations

Your patients can visit any of our 1,300 collection centres for their carrier screening blood test. Locations can be found at clinicallabs.com.au/location.

Turnaround time

Results for Gene Access (CF, SMA & FXS) testing will be available within 5-7 business days from the time we receive the sample at our laboratory.

Test cost

Genetic carrier screening for CF, SMA, and FXS is now fully Medicare-rebatable for female patients who are pregnant or planning pregnancy. If the female patient is found to be a carrier, the reproductive partner of the patient can then be tested for CF or SMA to determine the couple's reproductive risk of having a child with CF or SMA. The test for each condition is covered once in an individual's lifetime. For Medicare eligibility criteria, please visit antenatal.clinicallabs.com.au/doctor/carrier-screening.

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