GeneSyte™

Non-Invasive Prenatal Screening

Healthcare Practitioner Fact Sheet

Genea
WORLD LEADING FERTILITY

Going to greater lengths for the answers that matter most.

Medical societies agree across the world that all pregnant women should be offered prenatal screening/ diagnosis for foetal abnormalities and that non-invasive prenatal screening (NIPS) is a major advance in screening methodologies.[1-5]

Genea offers the most accurate non-invasive prenatal screening to Australian patients, delivering peace of mind through fast, highly accurate results.

Genea's GeneSyte prenatal test provides reliable, comprehensive answers about the health of a developing foetus.

The test represents a major advancement in prenatal testing, providing accurate answers about fetal chromosomal health—without the risks associated with invasive procedures, such as amniocentesis or chorionic villus sampling (CVS). Performed as early as 10 weeks gestation, the test demonstrates superb sensitivity and specificity for the most prevalent trisomies.

Test performance in most common chromosomal aneuploidies[6]

	N	Sensitivity	95% CI	Specificity	95% CI
T21 Down syndrome	500	>99.9% (90/90)	96.0–100.0	99.8% (409/410)	98.7–100
T18 Edwards syndrome	501	97.4% (37/38)	86.2–99.9	99.6% (461/463)	98.5–100
T13 Patau syndrome	501	87.5% (14/16)	61.7–98.5	>99.9% (485/485)	99.2–100

*Sex chromosome mosaicism cannot be distinguished by this method (the occurrence of which is <0.3%). Patients with such mosaicism will have a sex chromosome result reported and will fall into one of the six categories (Monosomy X, XXX, XXY, XYY, XX, XY).

GeneSyte can also detect sex chromosome aneuploidies in singleton pregnancies—at no extra charge.

- Monosomy X (Turner syndrome)
- XXX (Triple X)
- XXY (Klinefelter syndrome)
- XYY (Jacobs syndrome)
- Fetal sex (XX or XY)—aids in risk stratification of X-linked disorders such as hemophilia

Test performance in most common sex aneuploidies*[7]

	N	Sensitivity	95% CI	Specificity	95% CI	Accuracy	95% CI
MX	508	95.0% (19/20)	75.1–99.9	99.0% (483/488)	97.6–99.7	-	-
XX	508	97.6% (243/249)	94.8–99.1	99.2% (257/259)	97.2–99.9	98.4%	96.9–99.3
XY	508	99.1% (227/229)	96.9–99.9	98.9% (276/279)	96.9–99.8	99.0%	97.7–99.7

XXX, XXY, XYY: Limited data of these more rare aneuploides preclude performance calculations.

Expansion into twin pregnancies.

Recently, the prenatal test has been expanded to include the option to test for T21, T18 and T13 in both monozygotic and dizygotic twin pregnancies. A test for the presence of the Y chromosome can be ordered for twins as well.

Committed to research.

Genea has been at the forefront of prenatal screening for the last 20 years and has been committed to developing new and improved screening options for patients during one of the most critical assessment stages of pregnancy.

During this time, Genea has gone from running the largest private cytogenetics lab and being the first laboratory to introduce First Trimester Screening in NSW, to being the first in NSW with the development and clinical application of Prenatal CGH Arrays. Providing better insight for both you and your patients has been at the centre of Genea's mission to deliver the most accurate, timely and accessible screening options.

Genea's focus on continuous improvement has now led to development and investment in the latest technology for non-invasive prenatal screening.

Intended use in singleton pregnancies

This screening test is intended for patients at 10 weeks or greater gestation with singleton pregnancies who meet any of the following criteria:

- Advanced maternal age (≥35 years at delivery)
- Positive serum screen
- Abnormal ultrasound
- History suggestive of increased risk for T21, T18, or T13, or sex chromosome aneuploidy

Intended use in twin pregnancies

This screening test is intended for patients at 10 weeks or greater gestation with twin pregnancies who meet any of the following criteria:

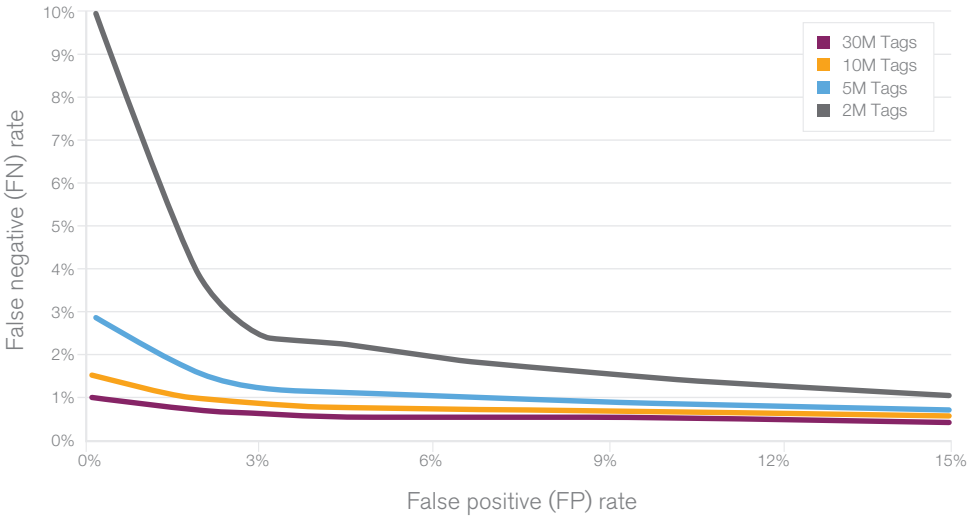
- Advanced maternal age (≥32 years at delivery)
- Positive serum screen
- Abnormal ultrasound
- History suggestive of increased risk for T21, T18, or T13

Taking a deeper look into the science of knowing.

The GeneSyte advantage — A more stringent and optimized approach to genetic sequencing.

Genea's GeneSyte leverages the power of Massive Parallel Sequencing (MPS) across the whole genome. The industry's deepest sequencing approach combined with a highly optimized algorithm provides a clearer, more reliable answer than other methods.

The science of deeper sequencing[11]



In this graph, shallower sequencing necessitates using foetal fraction (ff) estimates as compensation for weaker sequencing power. Without using ff estimates, the incidence of false negatives would be clinically unacceptable and result in higher numbers of sample rejections and delayed result time.

However, utilizing the power of deeper sequencing, GeneSyte gives your patients reassurance by:

- Eliminating unnecessary sample rejections
- Reducing the need for extra blood tests
- Removing requests for paternal samples
- Providing fast time to report (5-10 business days)[9]

The proof is in the data.

Our excellent NPV and PPV results are achieved without relying on variable ff estimates or other correction factors.[8]

	Positive Predictive Value	Negative Predictive Value
T21	0.994	0.9996

GeneSyte with enhanced SAFeR™ algorithm increases the specific signal of aneuploid chromosomes and hence improves the overall accuracy of classifying affected samples. The test output provides **definitive results, not a risk score,** and is not dependent on maternal age, maternal weight, gestational age (after 10 weeks) or ethnicity.

GeneSyte with SAFeR™	Available targeted sequencing tests
Definite, informative results	Ambiguous risk scores similar to serum screens
Lowest test failure rate (0.1%)[10]	High failure rates (5%–10% or greater)
Not constrained by patient factors or paternal sample	May rely on patient factors or require paternal samples to improve accuracy
Accepts egg donors	May exclude egg donors

Unlocking foetal chromosomal health—simply, safely, sooner.

An easy, non-invasive blood test delivering the answers you seek in just days.

GeneSyte is easy to order and needs only a simple blood sample. Simply complete Genea's Prenatal Request Form and advise your patient to attend a Genea collection centre for their blood test. Easy-to-read reports are available within 10 working days from sample receipt.

What will the results say?

- A positive result indicates that Genea's lab has detected one of the chromosomal conditions included in the screening panel. Pregnancies that are positive for aneuploidy will be clearly identified in the results - for example: "This pregnancy has screened as a Trisomy ## Male/Female Foetus".
    - If the result is positive, Genea recommends patients consider a diagnostic test (CVS or amniocentesis) to confirm or disprove the result as recommended by the Royal Australian New Zealand College of Obstetricians and Gynecologists (RANZCOG) and the Fetal Medicine Foundation of London.
    - A Genetic Counsellor from Genea is available to discuss the results with your patient to also support and advise them as they make a decision on next steps.
- A negative result means that none of these chromosomal conditions have been detected by this test. The guidelines, as mentioned above, recommend that no further invasive testing is required; however, it is important that your patient does not miss the first trimester foetal anomaly scan.

Know what a Genea GeneSyte test case looks like.

High-risk patient considering an invasive procedure

38-year-old woman with history of infertility who conceived via in vitro fertilization (IVF)

Genetic counselling to discuss testing options	– Invasive test—anxiety of procedural loss – Genea GeneSyte – Ultrasound
Patient elects Genea GeneSyte	– Chromosome 21—No Aneuploidy Detected – Chromosome 18—No Aneuploidy Detected – Chromosome 13—No Aneuploidy Detected – Normal ultrasound

Patient comfortable declining invasive testing due to high sensitivity of Genea GeneSyte and normal ultrasound result. Procedural risks avoided.

Knowledgeable support for your practice.

Genetic Counselling	Genea offers counselling for patients to discuss testing and implications of results.
Informed Consent	Genea believes strongly in patient education and provides extensive information in it's GeneSyte patient packs.
Laboratories	Our labs are NATA and RTAC accredited and follow all relevant national policies and guidelines.
Educational Support	Genea's staff have resources available to provide additional information and support for healthcare professionals looking for scientific and education material.

Get started with the Genea GeneSyte test today. To learn more, contact us at: (02) 9229 6444 or visit genea.com.au/genesyte

Limitations of test

The GeneSyte prenatal test is a highly accurate advanced screening test that is non-invasive. This test is designed to detect chromosome aneuploidies and is validated for chromosomes 21, 18, and 13, X and Y. The test is validated for singleton and twin pregnancies with gestational age of at least 10 weeks. Genetic counseling before and after testing is recommended. These results do not eliminate the possibility that this pregnancy may be associated with other chromosomal abnormalities, birth defects, or other complications. A negative test result does not preclude the presence of trisomy 21, trisomy 18, or trisomy 13, Monosomy X, XXX, XXY, and XYY. When an aneuploidy detected result is reported in a twin pregnancy, the status of each individual fetus cannot be determined. The presence or absence of Y chromosome material can be reported in a twin pregnancy; however, the occurrence of sex chromosome aneuploidies such as MX, XXX, XXY, and XYY, cannot be evaluated in twin pregnancies. There is a small possibility that the test results might not reflect the chromosomes of the fetus, but may reflect the chromosomal changes of the placenta (confined placental mosaicism), or of the mother (chromosomal mosaicism). Results of "Aneuploidy Detected" or "Aneuploidy Suspected" are considered positive and patients should be offered invasive prenatal procedures for confirmation. Chorionic villus sampling and amniocentesis provide diagnostic information.

References

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Additional studies

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Genea Level 3, 321 Kent Street, Sydney, NSW 2000 Australia
p (02) 9229 6444 **f** (02) 9229 6400
e genea.pathology@genea.com.au **w** genea.com.au/genesyte

Postal address: Genea CSR Level 3, 321 Kent Street, Sydney NSW 2000
Genea Genetics Pty Ltd ABN 82 074 545 681 atf Genea Genetics Unit Trust ABN 97 564 816 652

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