



Talk Lung Cancer...

A handbook for understanding
precision medicine

Overview

There are various types of lung cancer and the treatment discussions that follow a diagnosis can feel overwhelming. This handbook is designed to help you understand more about precision medicine as an option you might hear about.

It covers:

- What precision medicine is
- Who it might be right for
- Important considerations before making decisions

This handbook also includes a section for notes, a glossary of common terms, and suggested questions to ask your healthcare team regarding precision medicine in lung cancer.



What is precision medicine and how does it work?

Each of us is unique. Precision medicine – sometimes called personalised medicine – is a healthcare approach that uses information about an individual, such as their genes, environment, lifestyle, or disease stage, to prevent, diagnose, or treat their condition.¹

This individual approach is still evolving, but it aims to improve outcomes by moving away from a ‘one-size-fits-all’ model, and instead treat with greater precision and potential success.¹ A significant milestone for precision medicine was the creation of the NHS Genomic Medicine Service in 2018, which aims to provide consistent and equitable access to genomic testing across the NHS in England.²

In lung cancer, precision medicine might be used to:

- Perform advanced diagnostic and screening techniques³
- Prescribe treatments that can identify a specific biomarker* – such as a genetic or genomic mutation – and target it to help stop cancer cells growing (which is what this handbook will largely focus on)⁴
- Train the immune system to recognise and attack cancer cells using a type of vaccine called an mRNA vaccine, which is currently being investigated in clinical trials⁵

*For more information on biomarkers, read this [handbook on biomarker testing](#).

Is precision medicine right for me?

If you receive a lung cancer diagnosis, your healthcare team will likely recommend a **biomarker test** as part of your treatment pathway.⁶ Most hospitals in the UK will have a set of biomarkers that they test for in order to help determine whether your cancer could be targeted with tailored treatment.⁷

If a biomarker is identified, several options may become available, such as more personalised and less invasive treatments, a better understanding of what's driving tumour growth, or eligibility for clinical trials.⁴

A negative biomarker test can indicate an absence of a specific actionable mutation, an inconclusive result which may require further tests, or a false-negative, meaning a mutation is present but the test missed it.⁸ If you receive a negative biomarker test result, you should discuss the findings and next steps with your healthcare team, as they will determine the best course of action based on your situation.

Did you know...?

Global data estimates that 60% of patients in Western populations and 80% among Asian populations with adenocarcinoma of the lung – the most common type of lung cancer – have a genomic mutation potentially targetable with precision therapies.^{9,10}



What to consider before making any decisions

Making informed choices about your treatment starts with understanding what's involved. This section outlines key factors to consider so you can feel prepared to discuss your options with your healthcare team and make decisions that reflect your individual needs.

- Eligibility for targeted treatments depends on several factors, including fitness for treatment, organ function, the type of lung cancer you have, the disease stage, and whether your cancer has changes (mutations) in certain proteins or genes.¹¹
- The gold standard for biomarker testing involves removing a sample of tissue from your lung cancer tumour through a biopsy (known as a tissue biopsy), and testing it in a laboratory.^{4,12} However, in some cases, doctors will take a sample of blood, known as a liquid biopsy or blood biopsy.¹¹ A liquid biopsy is generally simpler to perform and can, in some cases, deliver faster results.¹³ Liquid biopsies are expected to become more widely used in the coming years; however, availability may still vary between hospitals.¹²



What to consider before making any decisions

- The tumour's location may affect the ability of biomarker testing to provide clear results.¹⁴
- The biomarker testing process can take several weeks and a long wait for results may add to feelings of anxiety.¹⁴ It is important to have a conversation with your healthcare team about how long the analysis will take and where you can access support while waiting.
- While targeted treatments have shown promising results for many patients, they may not work for everyone.¹
- Precision medicine is still a developing area, and experts are learning more about how it can be used to treat lung cancer.¹



Questions to ask your healthcare team

- Am I suitable for biomarker testing? If so, what tests are available to me?
- What does the biomarker testing process involve?
- Will the results influence my overall treatment plan?
- Am I eligible for any targeted therapies?
- Are there clinical trials I might be suitable for?
- What are the potential side effects of targeted therapy?
- If I am prescribed a targeted therapy, will it affect my other treatments?
- How could precision medicine benefit me, beyond treatment options?
- Are there any lifestyle changes I should consider while waiting for my test results?
- How can I access more information about experimental treatments or emerging therapies?
- How does age or overall health affect the suitability for precision medicine?
- What are the long-term prospects of targeted treatments?
- How do I find out if a new treatment or clinical trial is available in my area?

Glossary

Key term	Sometimes called...	Definition
Actionable mutation	Actionable genomic event	A DNA change that, if detected in a patient's tumour, would be expected (or predicted) to affect a patient's response to treatment. ¹⁵
Biomarker	Molecular marker Biological marker	Characteristics of cancer cells that can be measured and used to detect or monitor a feature of lung cancer. ¹⁶
Biomarker testing	Genomic/genome/genetic profiling Genomic/genome/genetic testing Molecular testing Molecular profiling Somatic testing Tumour testing Tumour profiling	An extra diagnostic test to identify if biomarkers are present in your lung cancer cells.
Biopsy	Tissue removal Cell removal	A procedure where a small sample of skin, tissue or cells is taken from your body for testing. The sample can then be tested to diagnose different conditions, including cancer. ¹⁷
Clinical trial	Clinical study Medical research	A type of research that involves testing medicines to evaluate their impact on human health, including how new treatments work, whether they have manageable side effects, and how they compare to existing treatment options. ^{18, 19}

Key term	Also known as...	Definition
Genomic mutations	Genomic alterations Genomic variants Genomic rearrangements Gene fusion	Specific changes that may occur in cells, potentially disrupting normal cell function. ²⁰
Liquid biopsy	Blood biopsy Circulating tumour DNA test ctDNA	A mini-invasive sample collection method that uses blood or body secretions to detect genetic alterations or tumour cells. They may be used when a tissue biopsy isn't suitable, or to speed up treatment decisions. ^{11,12}
mRNA	Messenger RNA Messenger ribonucleic acid	A molecule that carries genetic instructions from DNA in the cell's nucleus to where the cell makes proteins. ²¹
mRNA vaccines	Messenger RNA vaccines	An emerging cancer treatment that uses messenger RNA to teach the immune system to recognise and attack proteins on cancer cells. ⁵
Precision medicine	Precision care Personalised medicine	A healthcare approach that uses the genetic information of a person's cancer to help provide targeted treatments. ²²
Targeted treatment	Targeted therapy Precision therapy	A type of treatment that can target a specific biomarker - such as a genomic mutation - to help stop cancer cells from growing. ⁴

Notes

[illegible]

References

1. Rolfo C, Denninghoff V. Globalization of precision medicine programs in lung cancer: a health system challenge. *Lancet Reg Health Eur*. 2023;36:100819.
2. NHS England National Genomics Education Programme. Genomic Laboratory Hubs. Available at <https://www.genomicseducation.hee.nhs.uk/genotes/knowledge-hub/genomic-laboratory-hubs>. Last accessed July 2026.
3. John A, Shah RA, Wong WB, Schneider CE, Alexander M. Value of Precision Medicine in Advanced Non-Small Cell Lung Cancer: Real-World Outcomes Associated with the Use of Companion Diagnostics. *Oncologist*. 2020;25(11):e1743-e1752.
4. Roy Castle Lung Cancer Foundation. Mutation driven lung cancer and its treatment. Available at <https://roycastle.org/app/uploads/2023/03/Biomarker-testing-in-lung-cancer-5-2022.pdf>. Last accessed July 2026.
5. Ramos R, Vale N. Emerging Immunotherapies in Lung Cancer: The Latest Advances and the Future of mRNA Vaccines. *Vaccines (Basel)*. 2025;13(5):476.
6. Bell D, Bryce R, Delfino R, Godin-Heymann N et al. Access to treatment-guiding biomarkers in the UK: surveys of cancer patients and healthcare professionals. *Future Oncol*. 2025;21(20):2625-2636.
7. NHS England. National genomic test directory for cancer. Available at <https://www.england.nhs.uk/publication/national-genomic-test-directories/>. Last accessed July 2026.
8. Adizie JB, Tweedie J, Khakwani A et al. Biomarker Testing for People With Advanced Lung Cancer in England. *JTO Clin Res Rep*. 2021;2(6):100176.
9. Friedlaender A, Perol M, Banna GL et al. Oncogenic alterations in advanced NSCLC: a molecular super-highway. *Biomark Res*. 2024;12(24).
10. Cancer Research UK. Types of lung cancer. Available at <https://www.cancerresearchuk.org/about-cancer/lung-cancer/stages-types-grades/types>. Last accessed July 2026.
11. Roy Castle Lung Cancer Foundation. What is a liquid biopsy and how can they help lung cancer patients? Available at <https://roycastle.org/what-is-a-liquid-biopsy-and-how-can-they-help-lung-cancer-patients/>. Last accessed July 2026.
12. Ma L, Guo H, Zhao Y et al. Liquid biopsy in cancer: current status, challenges and future prospects. *Sig Transduct Target Ther*. 2024;9: 336.
13. Swalduz A et al. LIBELULE: A randomized phase III study to evaluate the clinical relevance of early liquid biopsy (LB) in patients with suspicious metastatic lung cancer. *J Clin Oncol*. 2023;41(16):9019.
14. Pennell NA, Arcila ME, Gandara DR, West H. Biomarker Testing for Patients with Advanced Non-Small Cell Lung Cancer: Real-World Issues and Tough Choices. *Am Soc Clin Oncol Educ Book*. 2019;39:531-542.

References

15. Carr T, McEwen R, Dougherty B et al. Defining actionable mutations for oncology therapeutic development. *Nat Rev Cancer*. 2016;16(5):319-29.
16. The Institute of Cancer Research. Biomarkers. Available at <https://www.icr.ac.uk/research-and-discoveries/our-research/icr-research-themes/biomarkers>. Last accessed July 2026.
17. NHS. Biopsy. Available at <https://www.nhs.uk/tests-and-treatments/biopsy>. Last accessed July 2026.
18. World Health Organization (WHO). Clinical trials. Available at <https://www.who.int/health-topics/clinical-trials>. Last accessed July 2026.
19. Cancer Research UK. What are clinical trials? Available at <https://www.cancerresearchuk.org/about-cancer/find-a-clinical-trial/what-clinical-trials-are>. Last accessed July 2026.
20. Macmillan Cancer Support. Acquired and inherited cancer gene variants. Available at <https://www.macmillan.org.uk/cancer-information-and-support/worried-about-cancer/causes-and-risk-factors/genes-and-cancer>. Last accessed July 2026.
21. The Institute of Cancer Research. Cancer researchers are shining a spotlight on RNA. Available at <https://www.icr.ac.uk/research-and-discoveries/cancer-blogs/detail/science-talk/cancer-researchers-are-shining-a-spotlight-on-rna>. Last accessed July 2026.
22. Manchester Cancer Research Centre. Experimental and Precision Cancer Medicine. Available at <https://www.mcrcc.manchester.ac.uk/research/research-themes/experimental-and-precision-cancer-medicine>. Last accessed July 2026.

*For more information and resources on lung cancer, visit the
[Talk Lung Cancer hub](#).*

This handbook has been funded and developed by Johnson & Johnson in the UK, with thanks to the Roy Castle Lung Cancer Foundation for reviewing and advising on its contents.

The Talk Lung Cancer campaign has been developed by Janssen Pharmaceutica NV, with input from the following Patient Advocacy Groups and healthcare professionals.

