# House of Lords Science & Technology Committee consultation – Innovation in the NHS: personalised medicine and AI

## Royal College of Pathologists response – April 2026

## About the Royal College of Pathologists

The Royal College of Pathologists is a professional membership organisation with charitable status concerned with all matters relating to the science and practice of pathology. The College is a charity with over 13,000 members worldwide. The majority of members are doctors and scientists working in hospitals and universities in the UK.

The College oversees the training of pathologists and scientists working in 17 different specialties, which include cellular pathology, haematology, clinical biochemistry and medical microbiology. Although some pathologists work in laboratories, many work directly with patients in hospitals and the community. Together, they are involved in the majority of all diagnoses and play an important role in disease prevention, treatment, and monitoring.

## Response summary

- The Royal College of Pathologists (RCPath) welcomes the benefits that AI and personalised and genomic medicine technologies can bring to improving diagnostic capability across pathology specialties.

- Pathology services, which are overstretched and facing significant workforce challenges, could benefit hugely from the time and capacity saved by the potential benefits of these technologies.

- However, there remain concerns that patients do not yet fully trust the accuracy of these technologies. It is vital that clinicians, including pathologists, are involved in evaluation and oversight of the implementation of personalised medicine and AI, to

help highlight and solve any existing issues and to improve their efficacy and effectiveness.

- There also needs to be improvement in NHS data and digital infrastructure to be ready for implementation of AI and personalised medicine, protected time for training clinicians in the use of these technologies and sharing of examples of best practice of use of these technologies in pathology and other branches of medicine.

# Consultation response:

## *Personalised medicine and AI: the scientific background*:

**Artificial intelligence (AI):**

1. The College supports[i] the use of digital pathology and AI to improve patient care. AI has the potential to improve pathology diagnosis and/or provide novel prognostic or predictive information. It is applicable across different pathology specialties and will be applied differently in each one. Pathologists should be involved in the development of AI and take a leading role in its evaluation and deployment within healthcare.

2. AI is still a novel and relatively unproven technology in healthcare. Oversight from pathologists in the interpretation and analysis of results is critical at this stage in the development of these technologies. Additional work and research are needed in several areas related to AI, including:

    - Establishing the best ways to evaluate AI tools, including comparing the performance of AI tools which perform the same clinical task.
    - Developing safe ways to deploy and manage AI in clinical practice.
    - Developing common standards to ensure data interoperability and portability.
    - Developing ongoing quality control of AI in clinical practice.

3. Personalised medicine driven by AI has the potential to introduce efficiencies into pathology services[ii] by freeing highly trained pathologists from more routine and repetitive work – for example by searching lymph nodes for cancer (a task which

takes human pathologists a lot of time and effort), performing simple quantitative tasks, or by automatically ordering additional tests on patient samples prior to review by a pathologist, saving time. AI could also improve accuracy or consistency in pathology diagnosis and have a role in improving training and education in pathology.

4. Image analysis and artificial intelligence are already extensively employed in pathology research, for example to quantify tissue characteristics in disease and quantify tissue biomarkers (which involves measuring physical, structural and molecular properties using imaging). Work needs to be done to ensure there are not geographic and demographic inequalities in accessing the benefits of these technologies.

**Genomic medicine:**

5. Genomic medicine[iii] offers accurate diagnosis and tailored treatment for people with cancer, and with inherited diseases. The College's position is that:

    - The NHS should embed and promote fully funded end to end clinical pathways in genomic medicine. These are comprehensive, mapped frameworks that manage a patient's journey from initial referral through diagnosis, treatment and follow-up.

    - The true potential of genomics cannot be delivered without significant investment in staffing and equipment for pathology and genomic laboratories. Successful implementation of genomic medicine is dependent on sufficient resourcing and a workforce qualified to meet the service demands.

    - Whilst there has already been significant investment in genomics, there needs to be continued resource provision for the increased workload genomics will create for cellular pathology (the study of disease through microscopic examination). The workload increase will be driven by a higher demand to process and analyse histological samples for genomic testing, which will grow over time. Without this being addressed, there will be issues in providing the quality and level of genomic service desired. Standardisation of sample preparation and tumour assessment to optimise genomic testing is required.

- These advances in genomics will also lead to new technologies such as the development of cancer vaccine hubs[iv] and associated trials. Pathologists and clinical scientists are integral in all cancer trials, and hence also embrace the opportunity to participate in delivering vaccine trials.

- Collaboration between different pathology specialties will be required to fully realise the impact that digital pathology will have on genomic testing in its potential to fight disease.

6. There is also a need to undertake further research in genomic medicine. It is essential that there is equity of access to genomic tests and treatment across the UK to truly benefit all patients. Without continued investment, vital innovation and research will suffer which will in turn lead to fewer patients benefiting from genomic testing. Evidence-based medicine is the cornerstone of these developments, and it is vital to integrate research and data collection into monitoring clinical outcomes for patients.

7. The College welcomes the commitment in the National Cancer Plan for England[v] that *"every cancer patient who would benefit from a genomic test will get one in a clinically relevant timeframe"*, which we believe will transform cancer outcomes.

8. In our response to the Cancer Plan consultation[vi], we highlighted that there needs to be continued resource provision for the dramatically increasing workload genomics creates. This includes provision for cellular pathology to process and analyse histological samples for genomic testing.

9. Without this being addressed, the ability to support the quality and level of genomic service desired will be severely limited. Samples need to be standardised to optimise genomic testing and need to be cost-effective to achieve good outcomes.

**Case study – Genomic testing for Lynch syndrome:**

10. Lynch syndrome affects between 1 in 279–400 adults and greatly increases the risk of cancers like colorectal and endometrial, yet fewer than 5% of cases in the UK are diagnosed. The National Cancer Plan highlights the case study of the partnership between NHS England with the NHS Genomic Medicine Service Alliances and

Cancer Alliances to launch a national transformation programme to tackle this. `Lynch Champions' (clinicians or a responsible individual in cancer multidisciplinary teams) were embedded in 95% of multidisciplinary teams across England, integrating Lynch syndrome testing into cancer pathways.

11. Following the transformation programme, 94% of newly diagnosed colorectal and endometrial cancer cases are now tested for Lynch syndrome. This enables family members to access preventative genomic testing and surveillance pathways, improving early detection and care.

12. The expansion of networks such as these is important to support the expanding NHS Genomics Medicine Service and to address equity of access to testing and trials, and inequalities in diagnosis and treatment for cancer and other serious illnesses.

## *The role of AI in personalised medicine:*

13. There is great potential that comes from recent advances in AI and genomics in predicting the effects of genetic variation in health. The scope to use AI in genomic medicine is incredibly broad and has real potential for assisting overstretched pathology services, and to revolutionise how illness is predicted and diagnosed.

14. AlphaGenome[vii], Google's genomics AI model for deciphering DNA function, has potential value due to its ability to make predictions about genetic variation. For example, the model has potential to improve diagnosis of rare and undiagnosed genetic diseases, to enhance cancer diagnostics and classification and to look at non-coding mutations and how they affect complex diseases.

15. All these benefits could allow an already overstretched and under resourced pathology workforce to focus more energy on cases where human oversight would best benefit the patient and their treatment. However, to effectively deploy personalised medicine and AI in practice, pathologists need to have a central role in the development, testing and ongoing evaluation of AI tools and their use.

16. The integration of extra data and information into a comprehensive diagnostic report requires a human expert. AI could be an additional source of diagnostic information

for the pathologist to integrate into the overall diagnostic picture, but oversight from pathologists in the deployment of these technologies is vital.

### *Health data research infrastructure:*

17. The NHS's digital and IT infrastructure represents a major barrier in the use of AI in pathology. For AI and other personalised medicine to be deployed successfully in the NHS, there is a need for investment both in the underlying digital pathology technology to create digital images (i.e. scanners, image management systems and storage) as well as the deployment and support of the AI tools themselves[viii].

18. There is also a need to develop common standards to ensure digital systems can interoperate and be portable, to achieve this, investment is needed. Currently there is growing use of digital pathology in the NHS, with considerable variation in adoption across different institutions and countries. There is also a need to invest in training pathologists to understand and use AI, genomics and other new technologies. Without this investment, the current picture of inadequate systems will continue to hinder the ability of the NHS to unlock the diagnostic potential of AI to streamline and improve pathology services.

19. Work by the Academy of Medical Sciences[ix] suggests that patients strongly support the use of AI in healthcare provided it improves quality and frees up time for doctors to spend with patients. However, there is also mixed public understanding and literacy regarding AI, as well as ongoing debates around AI ethics and safety, both of which could affect patient and public support in the future[x] [xi] [xii] .There is a need, therefore, for more engagement with patients about the potential use of AI in their healthcare to maintain broad public support.

20. The use of AI in clinical work may raise ethical challenges for pathology around patient privacy, autonomy, health equity and trust. These applied ethical questions speak to broad societal values and addressing them will require ongoing multi-stakeholder dialogue across medical specialties, computer science, the social sciences, public policy, as well as patient and public involvement.

21. RCPath and the Royal College of Radiologists made several recommendations in 2024 in how Government could update health data and research infrastructure to support AI implementation[xiii]:

- Develop a plan for the robust validation of AI algorithms, which must include the provision of Secure Data Environments (SDEs). Funding will be needed to both deliver the infrastructure to enable the collection of the necessary data.
- Establish standard processes for the implementation of AI applications in the NHS, so NHS organisations can avoid unnecessary duplication of effort.
- Establish professional standards for the audit and quality assurance of AI tools in health settings, to be performed at regular intervals following implementation.
- Implement the Hewitt Review's[xiv] recommendations for the recruitment of Digital, Data and Technology (DDaT) staff into the NHS.
- Support NHS pathology services to become fully digitised. We estimate that £200-300 million over five years would be required to reach the goal of full digitalisation[xv].

22. Similarly, we think there is a role for NHS England (NHSE) (or the Department of Health & Social Care) to:

- Simplify and standardise information governance processes to speed up the rate of implementation of AI. NHSE should support imaging networks to formulate comprehensive Data Protection Impact Assessment (DPIA) forms for each AI use case, which could then be shared with individual organisations.
- Collect data and collective learning from current and upcoming AI implementation initiatives, such as the AI Diagnostic Fund. Bodies such as NICE will be crucial for doing this work.
- Set up audit processes to collect real world data on AI applications to assess their long-term health effects.

- Continue the existing work to establish expert teams, as part of the Frontline Digitalisation Programme, to assist individual organisations or Integrated Care Systems (ICSs) to implement AI applications, according to nationally agreed and standardised processes.

- Expand the NHS Digital Academy to ensure all clinicians have access to AI training. This should cover assessment, implementation, audit and service evaluation, data security, information governance and ethics.

**Case study: The National Pathology Imaging Co-operative (NPIC):**

23. New standards for AI and other digital health technologies that are being developed should be reviewed and adhered to in the development, evaluation and deployment of personalised medicine tools. The National Pathology Imaging Co-operative (NPIC) have created an open-source public register of AI based pathology tools[xvi] to support the implementation of AI in diagnostic services. This is a public register for digital pathology AI tools, the first comprehensive, up-to-date and independent database where stakeholders can easily access information about AI-based medical devices.

24. The open access register provides a central resource on AI-based digital pathology products and outlines product details, regulatory status, and clinical evidence of performance.

25. The team identified and reviewed the 26 AI products with regulatory approval for image analysis, the majority of which focused on breast and prostate pathology. Of these, only half had publicly available evidence on clinical validation. These studies were typically funded or authored by the manufacturers of these products, and only 15% included testing on data from patients in the UK.

26. NPIC's ambition is that the register will enhance accessibility and support informed decision making for pathologists and other stakeholders. By maintaining and expanding this resource, the team aim to support the informed and safe implementation of AI based tools in clinical practice, ultimately enhancing patient care and outcomes.

27. A similar approach across different clinical and medical specialties could ensure public safety and confidence in the use of AI and other digital technologies in medicine, particularly where that may involve personal data.

## *Deployment in practice:*

**How to successfully deploy AI in NHS pathology services:**

28. For the successful deployment of AI in the NHS[xvii], there is a need for investment both in the underlying digital pathology technology to create digital images (i.e., scanners, image management systems and storage) as well as the deployment and support of the AI tools themselves. Lack of investment is a key barrier to adoption of these technologies at pace.

29. Investment in new technologies offer the potential to automate simpler tasks, including administrative ones. This would free up clinician time for more complex cases, leading to a boost in productivity of pathology services, delivering knock-on positive benefits to patient outcomes, who could access diagnostic test results more quickly.

30. The pathology workforce needs to be an educated competent user of digital technologies, including AI, so should be equipped with the ability to evaluate and use AI safely. This includes an understanding of AI so that pathologists can use their expertise and judgement to decide how to incorporate AI tools into their diagnostic process.

31. There is also a need for higher-quality evaluation frameworks for AI and personalised medicine. This would ensure that any issues presented during deployment are identified, mitigated and lessons learned are communicated across and between different health services. This will help to mitigate any challenges of public trust in use of AI systems in healthcare, by ensuring that the use of AI and personalised medicine tools is scrutinised whilst the technology is still novel, and its full clinical applicability in practice is still being understood.

32. Attempts to standardise approaches for best practice in these areas have been useful but ultimately aimed at academic researchers, rather than clinicians in

everyday practice[xviii]. To effectively address these problems, the College endorses the recommendations of the Health Foundation, as applicable to pathology services:

- The creation of digital pathology innovation centres, allowing access by in-house clinicians and scientists, and by supplier partners, to test ideas using patient-level data.
- A balanced approach to digital pathology – with the involvement of pathologists throughout development.
- A centre or unit focused on AI governance, including standard agreed rules for testing AI in real-world contexts. As mentioned in response to other questions, we believe that NICE would be best placed to deliver this work.
- Built-in training for pathology staff on how to develop, test and use AI effectively, in protected time that does not impinge on their vital clinical work.

**The effect of pathology workforce issues on digital pathology adoption:**

33. Workforce issues within pathology are a clear barrier to adopting innovation in the NHS. Workforce planning is crucial to align staffing with demand in a complex system. By ensuring sufficient pathology capacity, bottlenecks are reduced, turnaround times improved and unnecessary testing and delays are minimised – enhancing productivity and improving patient care[xix].

34. The pathology workforce is essential to delivering the 3 shifts in the 10 Year Health Plan but there is concern that the Government will struggle to meet the scale and ambition of its agenda without investment in the pathology workforce. Government-led pathology workforce planning coordinated across regions and specialties is essential to ensuring the right workforce is in place to deliver proposed innovation.

35. Barriers to proper workforce planning include fragmented, inconsistent workforce data, limited national pathology workload capture and siloed local reporting. Existing LIMS (Laboratory Information Management Systems) and pathology messaging (e.g. PMIP EDIFACT (Pathology Messaging Implementation Project Electronic Data Interchange for Administration, Commerce and Transport)) systems cannot fully

track complex, emerging or specialised workloads. Without investment in interoperable IT, robust data collection and dedicated workforce planning, pathology services cannot reliably match supply to growing demand or improve productivity. Therefore, updating IT and digital infrastructure systems may also have the positive consequence of increasing productivity in pathology services, which will allow clinicians more time to explore service innovation.

36. There is a particular urgent need to address these concerns in genomic testing in cancer services. Only 3% of services who responded to the RCPath 2025 Workforce Census reported always meeting the 14-day national target for National Optimal Lung Cancer Pathway (NOLCP) genomic testing[xx]. Meanwhile, 76% of survey respondents report that they still receive paper requests for results because of poor IT interoperability, fragmented reporting pathways and outdated LIMS.

**Effectively addressing patient concerns about AI & technology:**

37. To encourage uptake of personalised medicine in the NHS from a patient perspective, it is vital that technology adoption acknowledges anxieties that exist by ensuring effective human oversight. While 55% of the public say technology improves care quality, only 38% believe the same about AI[xxi]. This also trails considerably behind the views of NHS staff, of whom 80% supported the use of AI for patient care, compared to just 54% of the public. There are also demographic factors in trust to consider, with women, younger people and people from poorer socioeconomic backgrounds less likely to be positive about the effect of technology and AI on care quality.

38. In order that the NHS can put patient care first, it is the view of the College that it is vital that there is oversight from human clinicians in the adoption of this technology. As personalised medicine and AI are rolled out in pathology services, pathologists must be involved in the dissemination and monitoring of technology. Ensuring that there is expert clinician involvement may increase patient trust in personalised medicine technologies as their use is expanded within the NHS.

## *Regulating AI and personalised medicine:*

39. A key improvement to the regulatory framework for personalised medicine would be establishing clear, pathology-specific regulatory pathways that recognise the unique validation needs of digital diagnostics, including requirements for demonstrating performance across diverse laboratory settings, instruments and population groups[xxii].

40. The UK could expand adaptive regulatory mechanisms—such as conditional authorisations or sandbox environments (e.g. Medicines & Healthcare products Regulatory Agency (MHRA) AI Airlock pilot[xxiii])—allowing promising pathology AI tools to be used in real-world NHS settings while ongoing evidence is gathered.

41. Pathologists are currently presented with manufacturers' claims but struggle to access system performance data that is independent of suppliers. Evidence submitted for device approval is often inaccessible, and many AI devices lack transparent evaluation data or an NHS specific validation.

42. The MHRA could support these improvements by:

- Reviewing recent publications and recommendations.
- Ensuring robust local NHS verification before deployment.
- Supporting a central register of UK AI devices.
- Requiring comparative evidence across diverse datasets.
- Addressing limited vendor transparency.

43. Validation of technologies is hampered by insufficient technical detail and self-verification processes such as CE kitemarking, which complicates comparison across systems. This is because some AI systems do not publicly provide detail on where their data came from, and pathology AI tools are based on internal compliance processes done by the manufacturers themselves. This suggests that there is currently a lack of appropriate regulation.

44. The role of pathologists in early evaluation of technologies should be clearer; shadow-mode testing and NHS-led evaluations are often complex to navigate regarding ethics and regulation.

45. The College believes that the development and deployment of AI in pathology must be a part of a wider collaboration between pathologists, computer scientists, regulatory bodies and industry. Whilst the NHS needs top computer and AI specialists, they are likely to earn far more in other private sector industries, making it hard to attract and retain talent. Successful use of AI in the short term may involve a pathologist as a 'human in the loop' to interpret and combine the outputs of an AI tool to get the right diagnosis.

46. To maintain high standards of diagnostic accuracy, pathologists should ensure that AI has been robustly evaluated before deployment, and adequately monitored during clinical use, including the use of post-deployment monitoring and quality assurance. Guidance on development, deployment, and monitoring of data-driven technologies is also available from the Health Research Agency[xxiv] should be followed.

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[ii] Royal College of Pathologists AI position statement (2023): https://www.rcpath.org/static/90e5e248-4ad3-4d61-8247223f9faffc80/RCPath-AI-position-statement-2022.pdf

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[iv] NHS England: NHS Cancer Vaccine Launch Pad: https://www.england.nhs.uk/cancer/nhs-cancer-vaccine-launch-pad/

[v] Department of Health and Social Care (2026): "The National Cancer Plan for England": https://www.gov.uk/government/publications/national-cancer-plan-for-england

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[vii] AlphaGenome: https://deepmind.google.com/science/alphagenome/

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[xvi] Royal College of Pathologists (2025) "Launched - First of its kind central register of AI-based pathology tools": https://www.rcpath.org/discover-pathology/news/firstofitskindcentralresourceofaibasedpathologytoolslaunched.html
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[xviii] Health Foundation (2026):" Testing and spreading AI in health care: the case for rapid revolution": https://www.health.org.uk/features-and-opinion/blogs/testing-and-spreading-ai-in-health-care-the-case-for-rapid-revolution?utm_source=newsletter&utm_medium=email&utm_campaign=Weekly_Newsletter_260323&dm_i=4Y2,96FFS,MVPDOA,12H40Y,1,0,0,0

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