# UK unveils Foresight AI model trained on 57 million NHS patients to predict future health risks



In a groundbreaking initiative, the United Kingdom has developed a generative AI model, named Foresight, which is trained on the medical histories of nearly its entire population. This ambitious project, utilising deidentified health data from 57 million NHS patients, targets the prediction of over a thousand possible future health diagnoses, including hospital admissions and critical events such as heart attacks. By leveraging one of the most extensive datasets in the world, comprising more than 10 billion medical events from 2018 to 2023, Foresight represents an extraordinary leap towards population-level predictive healthcare.

The model, a collaborative effort led by researchers from University College London and King's College London, alongside NHS England, the British Heart Foundation (BHF) Data Science Centre, and Health Data Research UK, is built on Meta's LLaMA 2 architecture. The training is conducted within NHS England’s Secure Data Environment, supported by cloud infrastructure from giants like Amazon and Databricks. Unlike many AI systems that rely on curated datasets, Foresight is distinguished by its foundation in real-world clinical data, fundamentally reshaping the landscape of predictive health analysis.

This initiative holds considerable promise for preventative medicine, providing tools that could identify at-risk patients long before conventional diagnostics are initiated. Such capabilities may function similarly to diagnostic weather systems, enabling practitioners to foresee and mitigate health complications proactively. Dr Chris Tomlinson from UCL emphasised the significance of representative data, stating, “AI models are only as good as the data on which they’re trained. If we want a model that can benefit all patients, with all conditions, then the AI needs to have seen that during training.” The project's broad inclusion of diverse health scenarios aims to address disparities in healthcare access, particularly for minority groups and rare diseases that are often overlooked in traditional research.

However, such vast undertakings also tread carefully along ethical boundaries. Critics have raised concerns regarding the absence of opt-out provisions, lack of patient redress, and the absence of clear metrics, suggesting that while the project aspires to be a cornerstone of innovative healthcare, it risks ethical overreach. Transparency around the handling of personal health data becomes paramount, as public trust in AI systems hinges not only on their efficacy but also on their responsible implementation. Recent discussions have highlighted the ongoing tension between innovative health technologies and the need for regulatory frameworks that safeguard individual rights.

The evaluation phase of Foresight aims to assess its ability to accurately predict health outcomes from retrospective data, signalling a potential paradigm shift in healthcare strategy from reactive to anticipatory care. The project operates under pandemic-era provisions that allow broader data use, but the implications of GDPR on data privacy remain an undecided concern, necessitating careful consideration of regulatory compliance and ethical data governance.

Earlier iterations of the Foresight model demonstrated its capacity to map health trajectories using data from smaller NHS Trusts, showing promise in recognising patient health patterns. As Professor Richard Dobson noted, expanding the model's scope to a national scale offers exciting opportunities for deeper insight and enhanced predictive power, potentially revolutionising both local and national health services.

As Foresight progresses, the plan to integrate richer data sources, such as clinicians’ notes and results from diagnostic tests, is a significant next step. This enhancement could facilitate a transition from mere disease prediction to holistic analyses of aging and health—metrics that consider biological aging, inflammation levels, and resilience indicators are essential for a more comprehensive understanding of health outcomes.

Engagement with patients and public contributors remains critical to the Foresight project’s governance model. Feedback from stakeholders has stressed the importance of transparency and public benefit, ensuring that the benefits of such advanced research reach those whose data power it. As one public contributor highlighted, the project's focus on ethical use of AI is vital for its success in improving healthcare access and patient outcomes.

The lessons learned from Foresight could inform future healthcare innovations, offering a national prototype for integrating AI into predictive health systems. Dr Vin Diwakar from NHS England underscored the transformative potential of AI, asserting that it could accelerate targeted interventions and personalised patient care frameworks. As the science of aging interfuses with healthcare delivery, the ability to operationalise expansive risk data will be increasingly pivotal.

Ultimately, Foresight is not merely about harnessing data for predictive analytics; it signifies a crucial juncture in the journey toward a more proactive, informed approach to health management that could redefine longevity strategies for the 21st century.

### Reference Map

1. Paragraphs 1, 2, 3, 4, 5, 6, 7, 8
2. Paragraphs 1, 4, 5, 7
3. Paragraphs 5, 7, 8
4. Paragraphs 4, 6
5. Paragraphs 1, 7
6. Paragraph 1, 4, 5
7. Paragraph 5, 8

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## Bibliography

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2. <https://www.digitalhealth.net/2024/04/kings-college-london-ai-tool-to-predict-health-events/> - King's College London has developed an AI tool named Foresight, trained on NHS electronic health records, to predict future health events such as disorders, symptoms, medications, and procedures. The tool utilizes deep learning to analyze both structured and unstructured data, achieving a prediction accuracy of 68% to 88% in forecasting the next disorder in a patient's health timeline. This advancement aims to support clinical decision-making and improve patient care. ([digitalhealth.net](https://www.digitalhealth.net/2024/04/kings-college-london-ai-tool-to-predict-health-events/?utm_source=openai))
3. <https://www.digitalhealth.net/2024/09/nhs-warned-on-rollout-of-ai-powered-genomic-health-prediction/> - A report from the Ada Lovelace Institute and the Nuffield Council on Bioethics cautions against the mass implementation of AI-powered genomic health prediction (AIGHP) within the NHS. The report highlights potential risks, including privacy concerns, discrimination, and societal implications, recommending a targeted approach to AIGHP deployment under a robust regulatory framework. ([digitalhealth.net](https://www.digitalhealth.net/2024/09/nhs-warned-on-rollout-of-ai-powered-genomic-health-prediction/?utm_source=openai))
4. <https://www.bbc.co.uk/news/articles/cj620yl96kzo> - Researchers from the University of Leeds have trained an AI system called Optimise to analyze health records of over two million individuals. The AI identified more than 400,000 people at high risk for conditions like heart failure, stroke, and diabetes, many of whom had undiagnosed conditions or were not receiving appropriate medications. This approach aims to enable earlier interventions and reduce heart-related deaths. ([bbc.co.uk](https://www.bbc.co.uk/news/articles/cj620yl96kzo?utm_source=openai))
5. <https://transform.england.nhs.uk/ai-lab/> - The NHS AI Lab is an initiative by NHS England to accelerate the safe adoption of artificial intelligence in health and care. It brings together government, health and care providers, academics, and technology companies to promote the effective, ethical, and sustainable use of AI technologies within the NHS. ([transform.england.nhs.uk](https://transform.england.nhs.uk/ai-lab/?utm_source=openai))
6. <https://www.uclhospitals.brc.nihr.ac.uk/news/researchers-investigate-ability-their-new-ai-tool-predict-medical-events> - Researchers at UCLH, in collaboration with King's College London and other partners, are investigating the potential of an AI tool named Foresight to predict medical events. The tool is trained on NHS electronic health records and uses deep learning to recognize complex patterns, aiming to support clinical decision-making and improve patient care. ([uclhospitals.brc.nihr.ac.uk](https://www.uclhospitals.brc.nihr.ac.uk/news/researchers-investigate-ability-their-new-ai-tool-predict-medical-events?utm_source=openai))
7. <https://www.gov.uk/government/publications/data-saves-lives-reshaping-health-and-social-care-with-data/data-saves-lives-reshaping-health-and-social-care-with-data> - The UK government has published a strategy titled 'Data saves lives: reshaping health and social care with data,' outlining plans to promote the effective, ethical, and sustainable use of data and AI technologies within the NHS. The strategy includes the creation of the NHS AI Lab and support for AI projects aligned with the NHS Long Term Plan. ([gov.uk](https://www.gov.uk/government/publications/data-saves-lives-reshaping-health-and-social-care-with-data/data-saves-lives-reshaping-health-and-social-care-with-data?utm_source=openai))