Advancing NHS organisations with generative artificial intelligence

This is an introduction for National Health Service (NHS) organisations preparing to adopt the the use of Gen AI with Amazon Web Services (AWS).

AWS in healthcare

The Amazon Web Services (AWS) healthcare mission is to enable access and delivery of person-centred care in order to improve outcomes and lower costs by accelerating the digitisation and utilisation of healthcare data. Our aim is to help the National Health Service (NHS) and its partners develop cloud strategies to achieve more with less, modernise technology, and digitally transform back office and clinical services.

Harnessing Generative AI to strengthen the National Health Service

The UK's National Health Service (NHS) faces acute challenges around workforce shortages, care backlogs, and providing quality patient experience. Generative AI presents a timely opportunity to alleviate these pressures in a range of applications, aligning with priorities outlined in the NHS "Long Term Plan" and "What Good Looks Like" framework. Artificial intelligence (AI) is at a critical point of being adopted by the NHS. In other industries AI is already used widely, e.g. in facial recognition software on consumer devices, virtual assistants, and algorithms that provide results used in search engines and social media platforms. It promises many benefits to healthcare, such as helping with the complex decision-making and analysing the huge amounts of data being generated by digital health devices. It is predicted in the NHS AI Lab roadmap that the NHS will be one of the most affected workforce groups with supporting clinical and administrative staff with their daily routines. The power of Generative AI is the next step in NHS AI adoption and can assist NHS organisations workforce with:

Clinical tasks: By automating repetitive clinical administrative tasks, generative models can free up capacity within overburdened workforces to focus more on patient facing clinical care and reduce burnout. As virtual assistants, can help efficiently triage patient issues, provide self-service options to frequently asked questions, schedule appointments, and reduce wait times.

Administration: With advanced language understanding, generative AI can extract key information from patient records and diagnostic reports to ensure appropriate data reaches the right clinical team members to facilitate timely and well-informed decision making. By generating real-time care pathway optimisations and treatment recommendations based on the latest evidence and guidelines, it can enhance clinical effectiveness and consistency of care delivery across the system.

Patient engagement: As virtual health assistants, can engage patients directly through empathetic dialogue to gather symptoms, provide health education, encourage adherence to treatment regimens, and monitor ongoing conditions. This also creates opportunities to empower patients in self-management and shared decision making around their health, aligning with the NHS's priorities around patient experience.

Generative AI has the potential to enhance NHS capacity and productivity, support clinical quality, and improve patient experience. But realising this potential requires investment in curating high quality datasets, developing privacy-preserving data infrastructure, upskilling the workforce, and instituting responsible governance of AI systems across the health service. By leveraging AWS's secure, scalable and proven cloud infrastructure, the NHS can rapidly adopt, develop, deploy and manage generative AI applications to transform workflows.

NHS use cases for Generative AI

The NHS Long Term Plan sees AI as a key element in digital transformation '*to help clinicians in applying best practice, eliminate unwarranted variation across the whole pathway of care, and support patients in managing their health and condition*'. Some of the many ways in which AI is anticipated to touch on the NHS are:

Automation and service efficiency - Voice recognition software could transcribe consultations, freeing up more staff time to deliver care. Natural language processing could also automate some patient documentation workflows, to identify actions and help suggest and automate responses.

Medical Image Enhancement - Enhance and reconstruct medical images to aid in diagnosis or generate medical images to be used as synthetic data for refinement of ML models. Create automated reports from images, speeding clinical decisions and reducing clinician workload.

Precision (P4) Medicine - Predictive, Preventive, Personalised and Participatory Medicine incorporates multiple data sources such as the patient record, biometric data and genomic data. This can be used to calculate patient risk more accurately and can use pharmacogenomics predict an individual patient's response to medication. This promises to move from the traditional 'one-size-fits-all' form of medicine to a personalised, data-driven disease prevention and treatment methodology.

Personal Health Assistants – Patient interact conversationally with data via a chat bot to extract insights and make decisions faster.

Healthcare Document Summarisation - Summarize and generate insights from health documents such as medical papers and therapeutic research to help readers focus on key points of a document, transform unstructured text into standardized formats, and highlight important attributes to drive better decisions.

Generative AI powered by the AWS cloud

AWS brings proven experience in helping healthcare organisations globally apply generative AI to unlock innovation while protecting sensitive data. Services like Amazon Comprehend Medical and HealthLake extract meaningful information from unstructured medical text and data to fuel downstream analytics and Machine Learning (ML) use cases. But successfully leveraging AI in clinical settings requires more than just technology. AWS offers a comprehensive approach from cloud infrastructure to secure data stores to machine learning optimised frameworks for the responsible development and deployment of impactful healthcare AI.

Easier to get started

Get started faster with purpose-built generative AI services such as AWS HealthScribe and Amazon Bedrock — the easiest way to build and scale generative AI applications with foundational models.

Choose the right model for your use case

Choose from a wide selection of industry leading foundation models from Amazon, AI21 Labs, Anthropic, Cohere, Meta, and Stability AI in Amazon Bedrock. And customise foundation models with your own data to build more differentiated, personalised experiences.

Security and privacy from day one

With security and privacy built-in, your data remains protected and private when you customise foundation models. Learn more about responsible generative AI practices and what can be done to reduce the risks.

Most performant, low cost infrastructure

From the highest performance GPU-based Amazon EC2 P5 instances to our purpose-built accelerators AWS Trainium and AWS Inferentia, you get the most performant and low-cost infrastructure for generative AI.

The Gen-AI Journey

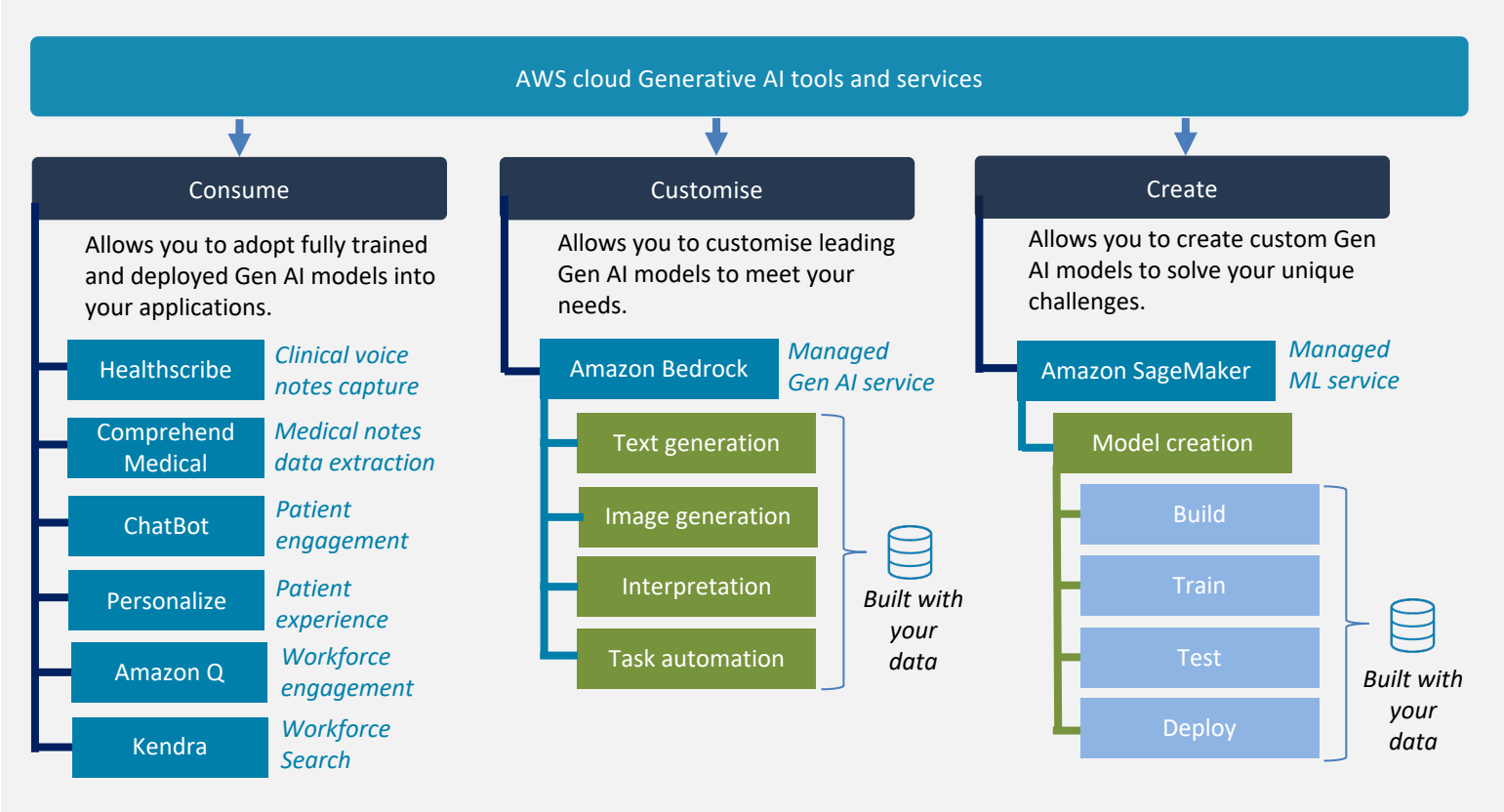
The AWS cloud helps the NHS fast-track AI adoption aligned to their mission of enhancing care quality and capacity, without compromising regulatory compliance, responsible AI practices or most importantly patient data privacy and trust. AWS allows NHS organisations to consume, customise and create Gen AI solutions dependent on the requirement and skills within your organisation.

AWS enables NHS organisations to consume generative AI services like Amazon HealthScribe for medical note taking, Amazon Comprehend Medical for information extraction from text and Amazon Personalise for personalised recommendations, while maintaining full control and privacy over sensitive patient data. No deep experience with generative AI is required to leverage these pre-built capabilities.

NHS organisations can also securely customise, evaluate and deploy the latest generative AI models from providers like Anthropic, Cohere, and Stability AI. These can be used for natural language processing, image analysis, report generation, process automation and more.

Creating custom large language models by leveraging SageMaker helps the NHS retain where required full ownership over model development lifecycle and how patient data is utilised. Robust encryption, identity and access controls, VPC isolation, and other security best practices provide reinforced guardrails to consume AI responsibly.

AWS accelerates NHS Gen AI adoption of leading generative AI innovations to drive better clinician workflows and patient outcomes, while safeguarding sensitive medical data through enterprise-grade security, privacy and responsible AI tooling.



While the NHS and healthcare organisations have been using AI and ML for years around analysing X-ray images, supporting patients on virtual wards and helping clinicians with prompting in clinical consolations, generative AI brings new possibilities to accelerate innovations, increase efficiencies, and improve outcomes across the health landscape. From generating new therapeutic candidates, to better matching patients with the right clinical trials and care pathways, to powering patient engagement applications. AWS makes it easier to access the services, data, models, and secure infrastructure needed to scale generative AI across your NHS organisation.

Empowering the NHS with Gen AI adoption

We're empowering NHS leaders, clinicians, technical and administration staff to build their knowledge and skills with generative AI to help meet the demand for innovation in healthcare. We now offer a collection of free and low-cost trainings to help people understand, implement, and begin using generative AI in the NHS.

Whether you're an executive interested in how generative AI can transform care delivery or a clinician seeking to use generative AI to boost efficiency, we have training to help build your knowledge and practical skills with generative AI services. Training can be taken at your desired pace and the way you like to learn—from brief, on-demand videos to hands-on, interactive challenges in a secure sandbox environment. See below for our digital, on-demand training offerings by audience—clinical and technical, and executive and nontechnical. While anyone can take any course, we designed them specifically for:

- Clinicians who want to use generative AI to assist with tasks like medical imaging analysis and patient record review
- Data scientists who want to train and deploy foundation models for healthcare applications
- Executives seeking to understand how generative AI can improve patient outcomes and reduce costs
- Technical and Administration Staff helping their customers better understand generative AI services and use cases in healthcare

Getting Started with Gen AI

Artificial intelligence (AI) is transforming healthcare, and Generative AI (Gen AI) represents the latest wave of innovation. As NHS organisations look to leverage these powerful technologies, a strategic approach is necessary to ensure effective implementation and positive outcomes. We recommend a four-step process of Learn, Engage, Create, and Productionise.

Gen AI adoption strategy

Learn	AWS will conduct sessions to provide some context around generative AI, discuss the art of the possible, review AWS and partner offerings, and learn more about your short- and long- term needs
Engage	AWS will help by conducting workshops to discuss your generative AI use cases, share how others are leveraging generative AI and enabling their science teams, and develop an experimentation plan
Try	AWS and AWS Partners will conduct a proof of concept to showcase the power and expanse of generative AI on AWS using customer data against a targeted use case and present the results to your key stakeholders
Productionise	AWS and AWS Partners will create an Execution Roadmap to facilitate you to develop and deploy their generative AI use cases in production, including considerations for scale & responsible use

With this tested approach, NHS organisations can tap into the promise of Gen AI in a thoughtful, responsible manner by focusing resources on the highest value applications. The future possibilities are inspiring if introduced judiciously.

AWS Generative AI Innovation Centre

The Generative AI Innovation Centre pairs organisations with AWS experts to imagine, identify, and implement generative AI solutions securely. It helps organisations select impactful use cases, integrate solutions into workflows, and scale implementations. The program benefits organizations looking to explore or expand their use of generative AI. Teams of AWS scientists and strategists with deep AI/ML expertise guide organizations through the generative AI journey.

The Generative AI Innovation Centre help you identify achievable use cases aligned to business priorities and estimate their value. Organisations receive hands-on help developing solutions, mapping requirements, employing best practices, and scaling to production. The centre shares knowledge to build internal capabilities. With expert guidance on feasibility, priority-setting, risk mitigation and clear paths to success, organizations can confidently pursue opportunities with generative AI. The goal is to collaborate closely with stakeholders, so organisations adopt solutions that deliver business value.

Get started

To get started contact your AWS account team to learn more on how we can:

- Support you on your cloud Gen-AI landscape
- Build your AWS Cloud business case
- Identify the best procurement route for your NHS Organisation
- Identify quick wins and opportunities

AWS resources

- Guidance for NHS Trusts Adopting AWS Cloud Services
- Generative AI in Healthcare and Life Sciences
- AWS for Health
- Healthcare Solutions

Get in touch

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