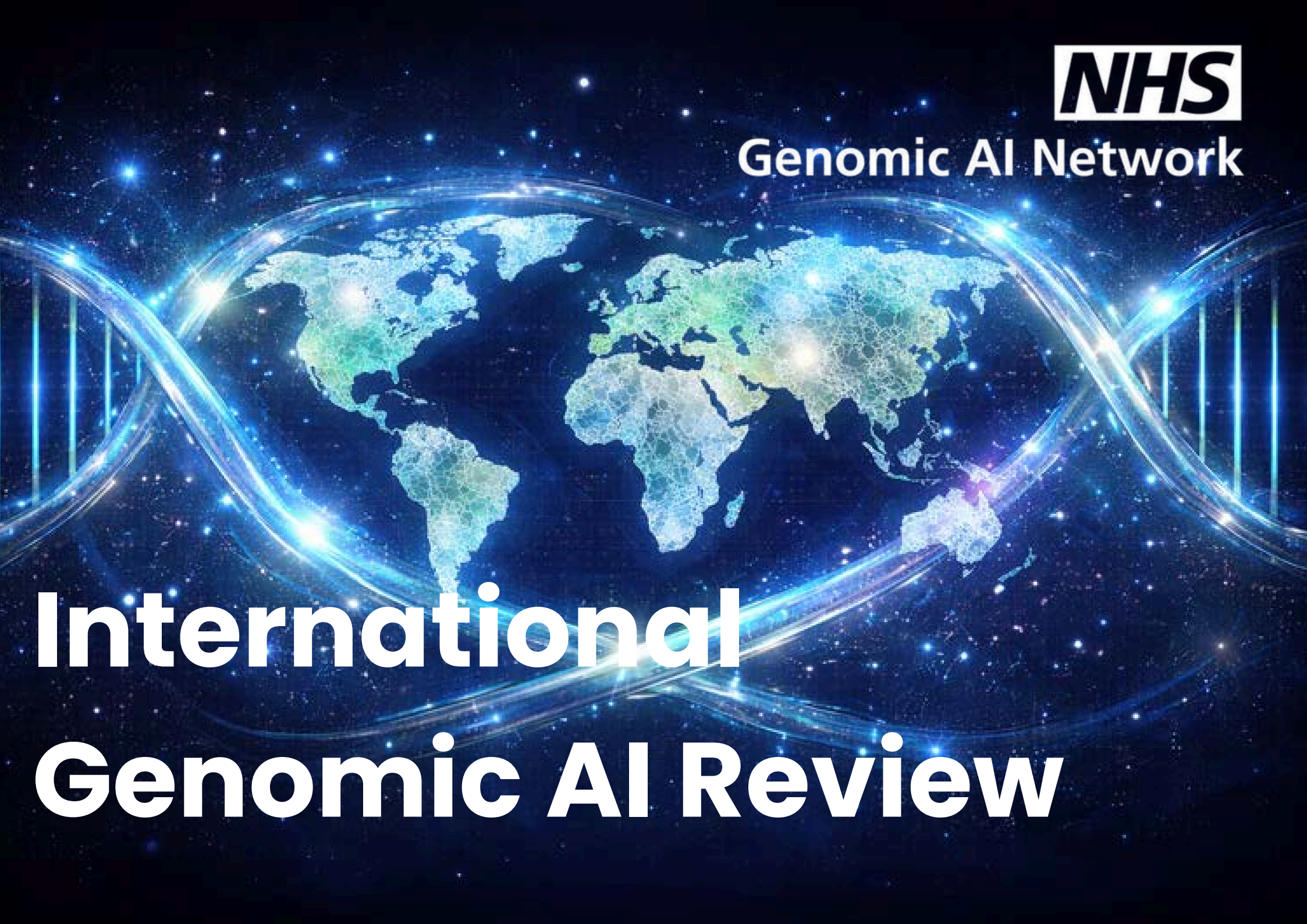

International Genomic AI Review

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Genomic AI Network

This document provides an overview of international genomics activity, focusing on countries, public programmes, and companies working in genomics and the development of Genomic AI tools. It highlights where large-scale sequencing, data infrastructure, and AI-enabled approaches to genomic analysis and interpretation are most advanced.

The document is intended to support horizon scanning and strategic awareness by capturing key global initiatives, emerging innovation, and areas of potential collaboration.

If you have any updates or new suggestions to add, please contact us at gstt.genomicainetwork@nhs.net. Your input will help keep this resource accurate, up-to-date and valuable t the community.

Last updated: March 2026

Executive Summary

Artificial intelligence is increasingly recognised as a key driver in the future of genomics, with growing global interest in using AI to accelerate genomic analysis, improve diagnostic pathways, and support precision medicine. Evidence from national genomics programmes, research initiatives, and industry analyses (see Reference List) indicates that AI applications in genomics are expanding across regions such as North America, Europe, and Asia-Pacific, supported by large-scale sequencing efforts and advances in computational biology.

As part of the work of the Genomic AI Network (GAIN), a horizon scanning exercise was undertaken to understand how other countries are approaching the intersection of genomics and artificial intelligence. The aim was to identify international examples of national genomics programmes, understand how AI is being integrated into genomic medicine, and explore potential models or lessons that could inform developments within the NHS Genomic Medicine Service.

The horizon scan was conducted using a structured review of publicly available information. Sources included official programme websites, government and institutional reports, research publications, and policy documents relating to genomic medicine and AI (see Reference List). In addition, professional networks and public communications channels, including LinkedIn posts and organisational announcements, were reviewed to capture emerging initiatives and collaborations that may not yet be formally published.

This review focused on countries with established national genomics programmes or population-scale sequencing initiatives. Across these programmes, references to AI were identified in a range of sources, including policy strategies, research programmes, and infrastructure descriptions. However, the level of detail varied significantly. In most cases, publicly available information describes strategic intent, research activity, or enabling infrastructure, rather than fully operational AI systems embedded in routine clinical care.

As a result, although several countries clearly recognise the importance of combining AI and genomics, there is limited publicly available documentation describing how these technologies are currently being deployed in routine healthcare settings. The findings therefore reflect a landscape that is still evolving, where national strategies often signal future direction rather than established clinical practice.
The list below summarises countries identified as having national genomics programmes or large-scale initiatives. These programmes represent important international efforts to advance genomic medicine and may provide useful insight as genomic AI capabilities continue to develop globally.

To complement this horizon scanning exercise, this report should be read alongside key outputs developed by GAIN. The AI Tools Log provides an overview of commercially available AI tools relevant to genomics, including examples of current use cases and deployments within the NHS and wider ecosystem. In addition, the AI in NHS Genomic Medicine Workflows reference guide outlines current practices, tools, and governance frameworks supporting the safe adoption of AI within NHS genomic pathways. Together, these resources provide a practical, system-level view of AI implementation, complementing the international perspective presented in this report.

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Genomic AI Network

Organisation	Location	Category	Website	Genomic AI Initiative
Australian Genomics	Australia	National Genomics Programme	www.australiangenomics.org.au	Australian Genomics is a national collaborative network focused on translating genomic research into clinical practice, supporting projects across diagnostics, data sharing, and implementation within the healthcare system. There is clear evidence of emerging AI-related activity, though not as a single coordinated “genomic AI programme.” For example, the PAGI (Program in Advanced Genomic Investigation) uses machine learning to analyse large combined genomic and clinical datasets, aiming to uncover new disease insights and support precision medicine. In addition, platforms such as Shariant enable real-time sharing and comparison of variant interpretations across laboratories, including automated processes to identify discrepancies. While not labelled as AI, this type of structured, large-scale data infrastructure supports future AI and advanced analytics. More broadly, Australian Genomics has developed national tools and datasets (e.g. PanelApp, consent and data-sharing platforms) that facilitate large-scale data integration and standardisation, which are key prerequisites for AI applications in genomics.
Genomics England	United Kingdom	National Genomics Programme	www.genomicsengland.co.uk	Genomics England is a national organisation supporting genomic medicine within the NHS, combining large-scale genomic, clinical, and health data to enable both research and clinical translation. There is clear evidence of AI and advanced analytics being used, although not always framed as a single standalone programme. The Genomics England Research Environment provides access to one of the largest linked genomic and clinical datasets, enabling researchers to apply machine learning and data science methods at scale. In addition, initiatives such as the Multimodal programme (part of Cancer 2.0) explicitly use AI and machine learning to analyse combined genomic, imaging, and clinical data. These approaches aim to improve prediction of patient outcomes and support more personalised cancer care. AI is also referenced in areas such as variant prioritisation and diagnostic support, helping clinicians identify relevant genetic findings more efficiently and accurately.
Genome Canada	Canada	National Genomics Programme	www.genomecanada.ca	Genome Canada is a national funding and coordination body supporting large-scale genomics research and innovation across Canada, with a strong emphasis on collaboration between academia, healthcare, and industry. AI is primarily embedded within research programmes rather than deployed as standalone clinical tools. Genome Canada has funded a growing portfolio of projects combining genomics with computational biology and machine learning, with over 75 AI-related projects supported since 2018 through bioinformatics and data-driven research initiatives. A key example is the Canadian Precision Health Initiative, which aims to sequence over 100,000 genomes and build a large, diverse national dataset to enable data-driven and AI-supported approaches to personalised healthcare. More broadly, programmes such as CanCOGeN (pathogen genomics) and other large-scale research investments focus on data generation, sharing, and interdisciplinary collaboration, creating the infrastructure needed for AI applications in genomics

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Genomic AI Network

Organisation	Location	Category	Website	Genomic AI Initiative
NHGRI	United States	National Genomics Programme	www.genome.gov	The National Human Genome Research Institute (NHGRI), part of the National Institutes of Health, leads national genomics research efforts in the United States, with a strong focus on advancing genomic science and its clinical applications. AI is primarily positioned as an enabling technology within research programmes. Initiatives such as MAGen (ML/AI Tools to Advance Genomic Translational Research) explore how machine learning can improve prediction of how genetic variants lead to disease, using large multimodal datasets. At a broader level, programmes like Bridge2AI focus on developing AI-ready biomedical datasets, standards, and best practices to support wider adoption of AI across genomics and health research. NHGRI and NIH are also actively exploring the responsible use of AI, including governance, data privacy, and risks associated with using large-scale genomic datasets in AI models.
PRECISE	Singapore	National Genomics Programme	www.npm.sg	Singapore's National Precision Medicine (NPM) Programme, led by Precision Health Research, Singapore (PRECISE), is a coordinated national effort to integrate genomics into healthcare at population scale. While AI is not always described explicitly as a standalone clinical tool, it is embedded within a broader data-driven precision health strategy. The programme has sequenced up to 100,000 individuals and links genomic, clinical, and lifestyle data to enable large-scale analysis and support future data-driven healthcare. Key initiatives such as SG10K/SG100K focus on building national genomic datasets and developing advanced analytical tools for variant interpretation and disease risk prediction. These platforms provide the foundation for applying machine learning and AI to population-level genomic data. The current Phase III programme is focused on translating these insights into clinical settings, evaluating how genomic data can support decision-making in real-world healthcare and enable more targeted and preventive care.
Danish National Genome Center	Denmark	National Genomics Programme	www.ngc.dk	The Danish National Genome Center (NGC) is a national infrastructure established to support precision medicine by integrating whole genome sequencing into the healthcare system and creating a centralised national genome database. AI is not typically described as a standalone clinical tool, but is enabled through strong national data and computing infrastructure. A key component is a national supercomputer and cloud environment, designed to store, link, and analyse large-scale genomic and clinical datasets, including patient records and imaging data. In parallel, Denmark is investing in broader AI capability, including national supercomputing resources and data gateways to enable secure, large-scale health data analysis. Overall, Denmark's approach is focused on building secure, high-performance data infrastructure and national datasets, creating the conditions for AI-driven genomics, with most applications currently positioned within research and system-level analytics rather than routine clinical deployment.

Organisation	Location	Category	Website	Genomic AI Initiative
SynHG project (synthetic human genome)	United Kingdom	Synthetic Genomics / Research	https://www.manchester.ac.uk/about/news/new-project-to-pioneer-the-principles-of-human-genome-synthesis/	The University of Manchester is part of the Synthetic Human Genome (SynHG) project, a UK-wide research initiative aiming to develop the tools and technologies needed to synthesise human DNA from scratch. While not a clinical AI deployment, the project reflects a cutting-edge intersection of genomics, engineering biology, and AI-enabled approaches. It focuses on building large sections of the human genome, including the ambition to create a fully synthetic human chromosome, to better understand how genetic sequences function and influence disease. AI and machine learning are highlighted as enabling technologies within this space, supporting genome design, data analysis, and advanced modelling of biological systems. These approaches are expected to accelerate discoveries in areas such as gene function, disease mechanisms, and future therapeutic development.
BGI Genomics	Shenzhen, China	Sequencing services & clinical genomics	https://www.bgi.com/global	BGI Genomics is one of the world's largest genomics organisations, providing sequencing and precision medicine services across more than 100 countries, with a strong focus on integrating research, production, and clinical application. AI is more explicitly embedded within its precision health and multi-omics platforms. For example, BGI has developed AI-powered health management systems that integrate genomic, clinical, and lifestyle data to support disease risk prediction, early diagnosis, and personalised health interventions. These platforms combine genomics with broader "multi-omics" data (such as microbiome and imaging data), using AI to generate individual health profiles and identify potential disease risks at scale.
Saudi Human Genome Program	Saudi Arabia	National Genomics Programme	https://www.vision2030.gov.sa/en/explore/projects/the-saudi-genome-program	The Saudi Genome Program (SGP) is a national initiative under Vision 2030 aiming to build a comprehensive genetic database of the Saudi population to support the diagnosis and prevention of hereditary diseases. AI is increasingly positioned as an enabling technology within large-scale genomic data analysis. The programme focuses on generating and analysing population-level genomic data, with AI and machine learning used to identify disease-associated variants, predict genetic risks, and support precision diagnostics. At a system level, the SGP contributes to a broader national strategy that integrates genomics with digital health and AI infrastructure, including national data platforms and initiatives supporting personalised medicine.

Organisation	Location	Category	Website	Genomic AI Initiative
Turkish Genome Project, Health Institutes of Turkey	Turkey	National Genomics Programme	https://tgd.tuseb.gov.tr/en/	The Turkey National Genome and Bioinformatics Project, led by the Health Institutes of Türkiye (TÜSEB), is a national initiative focused on sequencing genomes and analysing the molecular basis of disease to support personalised medicine. The programme has established national infrastructure, including the Turkish National Genome Center, and is generating whole genome sequencing data with associated analysis pipelines and secure data storage systems. However, based on publicly available information, there is no clear evidence of specific, named AI tools or genomic AI initiatives being implemented within this programme. The work is primarily described in terms of genomics, bioinformatics, and data analysis pipelines rather than explicit AI or machine learning applications. There are broader national signals of interest in AI in healthcare within Türkiye, including discussions around data-driven healthcare and AI-enabled systems, but these are not clearly linked to operational genomic AI use within the project itself
Genomics Medicine 2025	France	National Genomics Programme	https://pfmg2025.fr/en/2025-french-genomic-medicine-initiative/	The French Genomic Medicine Initiative 2025 (PFMG2025) is a national programme aimed at integrating whole genome sequencing into routine healthcare, particularly for rare diseases and cancer, and ensuring equitable access to genomic medicine across France. The initiative focuses on building a national infrastructure for genomic sequencing, data storage, and analysis, alongside strengthening the link between research and clinical care. However, based on publicly available information, there is no clear evidence of specific, named AI tools or formal genomic AI initiatives within the programme. While the plan emphasises the ability to process and interpret large volumes of genomic data, and recognises the importance of advanced analytics, AI is not explicitly described as a distinct or deployed component.
deCODE Genetics	Iceland	National Genomics Programme	https://www.decode.com/	deCODE genetics is a global leader in human genomics, based in Iceland, and is known for its large-scale population genomics approach, combining genetic, clinical, and genealogical data from a significant proportion of the population. While AI is not always explicitly described, it is strongly reflected through statistical modelling, and large-scale data integration.

Organisation	Location	Category	Website	Genomic AI Initiative
Hamad Medical Corporation	Qatar	Clinical Partner	https://hamad.qa	Hamad Medical Corporation (HMC) is Qatar's main public healthcare provider and plays a central role in advancing precision medicine, including genomics and clinical research. There is some evidence of AI being applied within genomics, although not as clearly defined standalone programmes. AI tools are reported to support the analysis of complex genomic data, linking genetic findings with clinical information and helping generate diagnostic insights more efficiently. More broadly, HMC is integrating AI into clinical workflows and precision medicine initiatives, including pharmacogenomics and personalised care pathways, alongside collaborations with national programmes such as the Qatar Precision Health Institute. However, based on publicly available information, there are no clearly named or formally described genomic AI initiatives comparable to dedicated programmes seen in some other countries. Instead, AI appears as an enabling capability within wider genomics, precision medicine, and digital health efforts.
The Tohoku Medical Megabank project	Japan	National precision medicine programme	https://www.megabank.tohoku.ac.jp/english/	The Tohoku Medical Megabank Project (ToMMo) is a large-scale national initiative in Japan focused on building population-level genomic datasets to support personalised medicine. It has sequenced the genomes of around 100,000 individuals and established integrated biobanks linking genomic, clinical, and environmental data. AI is not clearly defined as a distinct component within the programme. Instead, the focus is on large-scale data generation, integration, and advanced analytical platforms, such as the dbTMM database, which combines genomic and clinical data to enable research into disease risk, gene–environment interactions, and population health.
GenomDE, German Federal Ministry of Health	Germany	National Genomics Programme	https://www.bundesgesundheitsministerium.de/en/en/international/european-health-policy/genomde-en.html	The genomeDE initiative is Germany's national strategy for genomic medicine, aiming to integrate genome sequencing into routine healthcare, particularly for rare diseases and cancer. The programme focuses on building a national data infrastructure, including genome data centres, clinical data nodes, and secure platforms for storing and linking genomic and clinical data. However, based on publicly available information, there is no clear evidence of specific, named genomic AI initiatives within genomeDE. The programme is primarily described in terms of data infrastructure, governance, and large-scale genomic data use rather than explicit AI or machine learning applications

Organisation	Location	Category	Website	Genomic AI Initiative
Global Genomic Medicine Collaborative (G2MC)	Global	International Collaborative	https://www.nationalacademies.org/units/HMD-HSP-20-P-253	The Global Genomic Medicine Collaborative (G2MC), convened by the National Academies, is an international initiative focused on advancing the implementation of genomic medicine through global collaboration. The initiative acts primarily as a global coordination and knowledge-sharing platform, bringing together stakeholders across healthcare, research, policy, and bioinformatics to support the adoption of genomics in clinical care. Its work includes mapping global genomic activities, sharing best practices, and supporting implementation projects across different health systems. However, based on publicly available information, there is no clear evidence of specific genomic AI initiatives or tools being developed or deployed within G2MC. The focus is on collaboration, policy, and implementation of genomics rather than on AI-specific applications.
FinnGen	Finland	National Genomics Programme	https://www.finngen.fi/en	FinnGen is one of the largest population genomics programmes globally, combining genomic data with longitudinal health records from over 500,000 individuals (around 10% of the Finnish population) to study disease mechanisms and support precision medicine. The initiative is built on a highly integrated national data ecosystem, linking biobank samples with comprehensive health registry data, enabling large-scale genetic analyses across thousands of disease endpoints. However, based on publicly available information, there is no clearly defined or named genomic AI initiative within FinnGen. The programme is primarily described in terms of statistical genetics, bioinformatics rather than explicit AI or machine learning applications. That said, the scale and structure of the dataset, including millions of genetic variants and linked clinical data, strongly support the use of advanced analytics and AI-type approaches in research, even if these are not formally labelled as such.
Karolinska Institutet – PROMISE initiative	Sweden	National Precision Medicine	https://news.ki.se/new-swedish-initiative-to-integrate-research-and-healthcare	The Precision Omics Initiative Sweden (PROMISE) is a national programme aiming to integrate research and healthcare through large-scale genomic and multi-omics data, positioning Sweden as a leader in data-driven precision medicine. While not framed as a dedicated “genomic AI” programme, there is clear alignment with AI-enabled approaches. PROMISE focuses on building large, integrated datasets combining genomic and clinical data, alongside national infrastructure to support data sharing across healthcare and research. AI is referenced as part of the broader ecosystem, particularly in enabling analysis of complex multi-omics data and accelerating translation into diagnostics and treatment. In parallel, initiatives such as the Centre for AI Innovation at Karolinska Institutet support the development, testing, and implementation of AI solutions in healthcare, acting as a bridge between research and clinical practice.

Organisation	Location	Category	Website	Genomic AI Initiative
Tanawwo Network	Multiple (Qatar-led)	International Collaborative	https://www.qphi.org.qa/about-us/about-us	The Qatar Precision Health Institute (QPHI) is a national centre under Qatar Foundation, bringing together large-scale initiatives such as Qatar Biobank and the Qatar Genome Programme to support precision medicine at population level. AI is not characterised as an independent clinical tool, but is embedded within a broader multi-omics and data-driven precision health approach. QPHI focuses on collecting large-scale genomic, clinical, and biological data to enable advanced analytics and research, including genomics, proteomics, and metabolomics datasets. There is evidence of emerging use of AI, big data, and advanced analytics within research and training programmes, particularly in areas such as clinical trials, disease research, and population genomics. These initiatives aim to translate genomic insights into real-world healthcare applications and support personalised medicine. Overall, Qatar's approach is centred on building large national datasets and integrating genomics into a precision health ecosystem, with AI positioned as an enabling capability within research and system-level innovation rather than a widely deployed clinical solution
Pathogens Genomic Diversity Network Africa (PDNA)	Africa	Pan-African Genomic Network	https://pathogens-dna.org/	The Pathogens Genomic Diversity Network Africa (PDNA) is a collaborative network of African scientists focused on pathogen genomics, bioinformatics, and infectious disease research. AI is not described as a independent clinical tool.The network supports the generation and analysis of large-scale pathogen genomic datasets, which are essential for tracking disease outbreaks, understanding pathogen evolution, and informing public health responses. These activities align with broader applications of AI and machine learning in pathogen genomics, such as identifying variants, predicting antimicrobial resistance, and analysing large surveillance datasets.
Estonian Genome Project	Estonia	National Genomics Programme	https://genomics.ut.ee/en/content/estonian-genome-centre	The Estonian Genome Centre, part of the University of Tartu, is a leading national initiative supporting genomics research and personalised medicine, built around the Estonian Biobank, which contains genetic and health data from over 200,000 individuals. AI is explicitly referenced as part of research activity, though not as a separate clinical programme. The centre applies machine learning and data-driven approaches to large-scale genomic and multi-omics datasets, including work on polygenic risk scores, disease prediction, and analysis of health trajectories. Research areas such as systems biology, pharmacogenetics, and "hypothesis-free data mining using machine learning and AI techniques" highlight the growing use of advanced analytics to understand disease risk and population health.

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