INTEGRATING INNOVATION:
CHARTING THE COURSE FOR AI IN DERMATOLOGY

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BRITISH ASSOCIATION OF DERMATOLOGISTS
HEALTHY SKIN FOR ALL

CONTENTS

EXECUTIVE SUMMARY

Dermatology services in the UK are edging toward gridlock. Urgent referrals for suspected skin cancer are rising faster than in any other specialty,[1] while consultant numbers lag far behind demand.[2] Unless capacity is released, patients face longer delays for both routine care and potentially life-saving diagnoses.[5]

Artificial intelligence will not be a panacea, but if deployed with care it can help sift out low-risk lesions,[17] automate routine documentation and give specialists the space to focus on complex cases. Early successes in fields such as radiology show what is possible;[14] dermatology now needs policy that lets safe technology flourish while protecting patients.

This report from the British Association of Dermatologists explains how policy can convert that promise into practical benefit, alongside the implementation of appropriate safeguards. It maps five interlocking levers – regulation, digital plumbing, data access, market incentives and workforce skills – required to facilitate progress. Though not prescriptive, we highlight how coordinated action will determine whether AI eases pressure or compounds it.

Timing matters. The Government's forthcoming 10-Year Health Plan will set headline ambitions for the health system, but the real test will be the guidance, funding formulas and procurement regulations that follow. The recommendations in this report provide a framework to shape how the Plan is translated into practice. By influencing next-stage decisions – clinical commissioning and regulatory frameworks, reimbursement pathways, digital-infrastructure investments – we can ensure dermatology is a proactive pioneer and an early beneficiary of AI in clinical practice, rather than an afterthought.

Delay has a price: the pressure on dermatology services is on the rise. By acting now, the NHS could see today's bottleneck turned into tomorrow's blueprint for digital healthcare transformation. The British Association of Dermatologists, through multi-stakeholder input and its own expertise and clinical insights, has drafted a framework for success.

INTRODUCTION

Dermatology services in our NHS are under immense pressure.

One in four people in England and Wales see their GP about a dermatological condition every year,[1,2] with approximately 3.5 million dermatology hospital outpatient or day surgery attendances annually.[2] This is compounded by year-on-year escalation of demand for dermatology services.

The past ten years has seen a 170% increase in the number of people referred urgently for assessment by dermatology specialists.[3]

Furthermore, there has been an 82% increase in referrals to dermatology waiting lists from April 2021 to March 2024.[4] As of January 2025, the waiting list for dermatology services was 118% above its July 2020 level, one of the highest increases amongst all clinical specialties.[5,6] Addressing long patient waits is a core objective of the current Government.[7]

While systemic challenges – such as persistent staff shortages and the impact of the COVID-19 pandemic – have contributed to the pressures on dermatology services, technological solutions, particularly in artificial intelligence (AI), could enable increasingly beleaguered NHS services to tackle key issues.[8] Certainly, that is the hope of national policymakers who recognise the transformative role AI could have in reshaping healthcare delivery.[9]

AI is already applied within the NHS in several clinical diagnostic areas.[10] For example, in radiology and pathology, AI has been used to speed up image analysis and improve workflows, saving time so clinicians can better focus care where it is most needed, while also improving patient outcomes.[11] Multiple products are currently being used in a standardised IT environment, with careful testing and comparative analysis through large-scale trials. Clinical effectiveness, change in AI over time (drift), accuracy across diverse populations and cost efficiencies are all important factors to consider with implementation. In dermatology, by contrast, the use of diagnostic AI is less widespread, with no standardised IT environment or agreed frameworks. There is an absence of baseline data, no large-scale comparative studies, and only a few implemented-use cases.

Despite this relatively immature AI market in dermatology, products have been implemented in some centres which allow rejection of urgent GP referrals for patients with suspicious skin lesions, based on AI analysis of a photograph of the lesion. This triage system can take place without a 'second read' by the local dermatology team which would test the AI tool's accuracy in that region's specific patient population.[12] Furthermore, implications regarding full patient consent of this automated pathway have not been fully explored. Given the relative uncertainties, this type of diagnostic AI implementation remains unprecedented within the NHS. Though effective triage through AI shows promise, it is unclear at this stage how removing the 'human in the loop' may impact patient outcomes.[12]

If the UK is to capitalise on AI's potentially transformative power, we must focus on shaping an environment that fosters genuine innovation and healthy competition. This means creating a robust regulatory framework and reducing barriers to accessing datasets. In dermatology, this can be achieved by prioritising patient outcomes and system-wide benefits over specific technologies. The real value of AI lies in reducing unnecessary appointments, ensuring patients see the right professional at the right time, and supporting patients to self-monitor and manage their conditions.[14,15]

To achieve this vision, national policymakers should proactively seek to shape the AI landscape by:

- Establishing a transparent regulatory framework: This will provide clarity and build confidence in approved AI tools for both developers and clinicians.
- Investing in digital infrastructure: Seamless data flow and integration are essential for effective AI implementation.
- Clearly signalling market needs: National policymakers must define their requirements for new AI innovations in dermatology, allowing AI companies to compete to deliver solutions that genuinely address patient and system needs.
- Ensuring data availability: Access to high-quality, diverse datasets is crucial for developing and validating effective and unbiased AI algorithms.
- Prioritising workforce training: Equipping healthcare professionals with the skills and knowledge to effectively utilise AI is essential.

This report will analyse the opportunities and barriers surrounding the effective integration of AI in dermatology and provide policy recommendations for national policymakers to consider. Our focus will be on how to get AI implementation "right" to unlock its full potential, transform dermatology services and improve patient care.

METHODOLOGY

For this report, the British Association of Dermatologists commissioned 14 individual interviews across a mix of stakeholder groups – clinicians, industry and NHS representatives, health economists, and regulatory experts.

The interviews were conducted virtually via Microsoft Teams during November and December 2024. Each session lasted approximately 45 minutes and explored themes such as knowledge about diagnostic AI in dermatology, areas where diagnostic AI can be beneficial within dermatology, barriers to adoption or wider implementation, and the role of diagnostic AI in dermatology in relation to the NHS's 10-Year Health Plan. Data from these interviews were analysed using thematic analysis.

In addition to the interviews, extensive desk research was conducted to identify current barriers and opportunities within AI in dermatology. This research drew on a variety of sources including academic journals; reports from professional bodies (including the British Association of Dermatologists); think tank publications such as The King's Fund; as well as publications from the NHS and the Government.

We also facilitated a strategy workshop with colleagues from the British Association of Dermatologists and expert advisers in health innovation and public policy. The combination of insights generated from the interviews, and from our extensive desk research, helped to inform policy recommendations for the Government to consider.

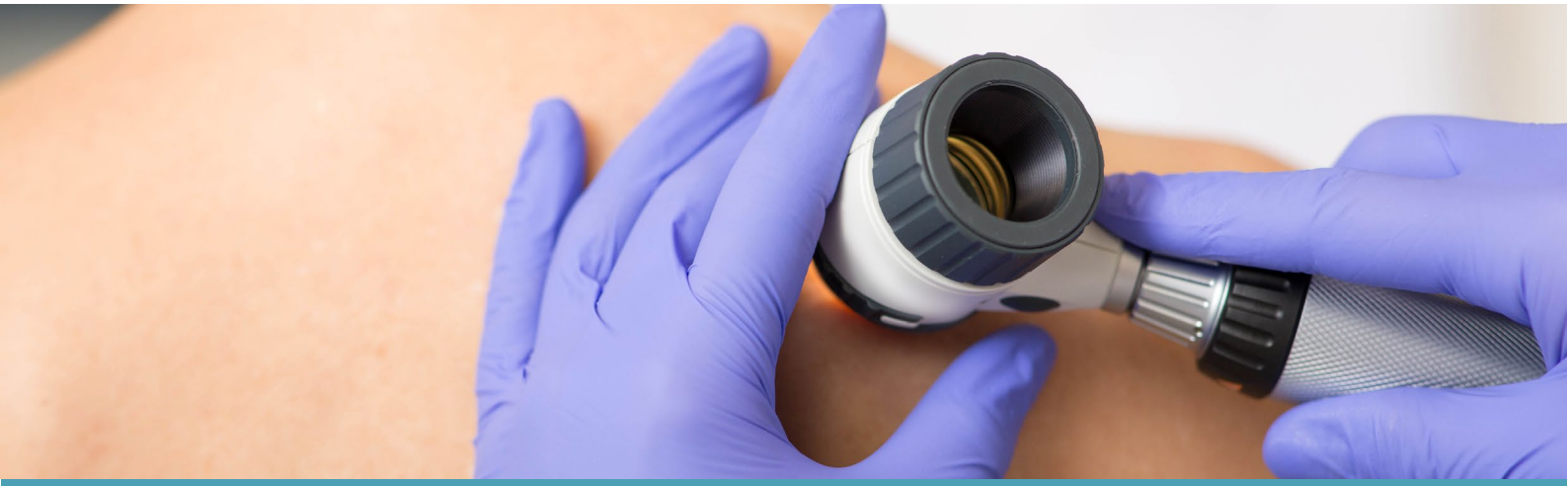
UNDERSTANDING UK AI APPLICATIONS IN DERMATOLOGY

CURRENT APPLICATIONS OF AI IN DERMATOLOGY

While the potential of AI in dermatology is significant, effective use is currently limited in the NHS.

Image classification is a core function of the current use of AI in dermatology.[16] It involves training computer algorithms to analyse large datasets of images of skin lesions and categorise them based on pre-defined criteria, such as benign versus malignant (cancerous), or specific diagnoses like melanoma, eczema, or psoriasis.[17] In theory, these algorithms identify intricate patterns and subtle visual cues within the images and are capable of detecting variations that indicate a particular condition.[18]

The potential benefits of AI-powered image classification in dermatology range from earlier and more accurate diagnoses to improved treatment planning and personalised medicine.[19,20] In theory, these technologies can also increase access to dermatological expertise by providing a valuable tool for initial screening and triage.[20]



IN FOCUS: SKIN ANALYTICS

Skin Analytics is a market-leading company providing diagnostic AI tools for skin cancer in the UK.[21]

It has developed the Deep Ensemble for Recognition of Malignancy (DERM), the first AI system classified as a medical device (AIaMD) that is intended for use in the screening, triage, and assessment of skin lesions suspicious for skin cancer.[22] A device captures both general and close-up (dermoscopic) images of skin lesions.[22] Utilising AI algorithms, DERM evaluates these dermoscopic images to diagnose lesions and determine whether a referral to a dermatologist is necessary.[22]

Skin Analytics indicates that NHS Secondary Care partners who use the technology have reduced the number of face-to-face urgent suspected skin cancer appointments by up to 95%.[23] Analysis suggests that DERM's diagnostic accuracy in identifying a cancer lesion may be comparable to a teledermatology or in-person dermatology assessment.[24]

The British Association of Dermatologists (BAD) has raised significant concerns about the use of DERM in NHS pathways,[25] due to a lack of externally validated comparative effectiveness and cost-effectiveness data for DERM. Given the large exclusion criteria for this technology (as set out by National Institute of Health and Care Excellence (NICE)) and limited data around diagnosing skin cancer among patients with darker skin tones, there are fears that its use risks widening inequity of access to face-to-face dermatology services.[26,27]

The 2025 NICE Artificial Intelligence (AI) technologies for assessing and triaging skin lesions referred to the urgent suspected skin cancer pathway: early value assessment (hereafter referred to as the NICE AI for Skin Cancer EVA report) has conditionally recommended DERM for use in the NHS in a post-primary care referral setting for three years, while further real-world evidence is collected.[27] Unusually, the report recommended that DERM can be used with or without a human (clinician) review of lesions that are identified as benign. The exception is for patients with black or brown skin, who must have a human review regardless of the AI decision.

THE POTENTIAL OF EFFECTIVE AI INTEGRATION

While current applications of AI in dermatology are limited in the NHS, AI holds the potential to improve dermatology services by enhancing efficiencies and helping to address capacity challenges.[28]
For example:

Better triaging and referral management: AI can play a crucial role in streamlining the referral process by identifying patients who genuinely need specialist care.[29] By analysing patient data and images, AI algorithms can improve triaging by prioritising urgent cases, reducing unnecessary referrals and freeing up specialist time for complex cases.[30] Perhaps most crucially, it has the potential to reduce waiting times and optimise the use of resources within dermatology services, especially considering NHS England data shows that only 6% of urgent referrals for suspected skin cancer from primary care result in a confirmed diagnosis of skin cancer, the remaining 94% are either non-urgent or non-cancer cases.[31] Current technologies, including DERM, are not addressing this unmet need as they sit in secondary care pathways.

Training algorithms on primary care datasets, could allow for the use of AI in primary care, which has the potential to reduce unnecessary referrals and reduce wait times for dermatology services.

Empowering patients through self-monitoring: AI-powered apps and tools can empower patients to self-monitor their skin conditions, enabling early detection of changes and prompting timely intervention.[32] These tools can also be used to improve teledermatology services by providing remote diagnostic support and allowing clinicians to monitor patients remotely.[33]

Reducing healthcare costs and improving efficiency: By automating administrative tasks such as writing letters and reports, AI tools can free up clinicians' time, allowing them to focus on patient interactions and complex decision-making.[34] This could lead to significant cost savings for the NHS.[35]

IN FOCUS: HOW ANNALISE AI HAS SUCCEEDED IN IMPROVING RADIOLOGY DIAGNOSTICS

An example of an AI diagnostic tool which is being successfully implemented in the NHS outside of dermatology, is Annalise Enterprise CXR, a decision-support AI solution for interpreting chest X-rays. The tool, trained on the world's largest dataset of chest x-rays, uses deep learning to identify the suspected presence of up to 124 clinically relevant findings on chest X-rays.[36] The tool helps to streamline departmental workflow by identifying and categorising priority findings during image interpretation and has been in use at NHS Grampian since 2022. Its use has significantly reduced the amount of inpatient imaging sent to the radiology team, with early results showing a reduction in chest X-ray reporting times of up to 53% and an average decrease of nine days between initial imaging and treatment commencement for lung cancer patients.[37,38]

Regarding diagnostic capability, a 2021 study found that when used as an assist device, Annalise CXR significantly improved the ability for radiologists to perceive chest X-ray findings in a non-clinical environment.[39] Additionally, Annalise CXR's AI model classification alone was significantly more accurate than unassisted radiologists for 117 (94%) of 124 clinical findings predicted by the model and was non-inferior to unassisted radiologists for all other clinical findings.[35]

Despite not being specific to dermatology, Annalise CXR's AI model represents a significant breakthrough in the application of AI to medical imaging. The success of Annalise CXR at NHS Grampian provides a valuable example of how AI can be successfully integrated into existing clinical pathways, paving the way for wider adoption of similar AI-powered diagnostic tools across various medical specialties.[36]

BARRIERS TO SAFE AND EFFECTIVE AI USE

Integrating AI into dermatology faces several interconnected challenges that must be addressed to ensure safe and effective implementation. Based on an analysis of our strategy workshop and interview findings, these barriers can be broadly categorised as: poorly defined regulatory frameworks; a lack of joined-up digital infrastructure; data availability; care pathway development; and workforce considerations.

REGULATORY FRAMEWORKS

A key barrier to the effective integration of AI in dermatology is the lack of a clear and robust regulatory framework. Expert advisors in health innovation and policy who attended our strategy workshop felt that the current regulatory environment for AI in dermatology is unclear, and that this hinders the adoption of suitable AI tools while inadvertently allowing unsuitable ones into the market. Some clinicians and industry representatives interviewed also suggested that this lack of clarity makes it difficult for clinicians to distinguish between reliable and unreliable AI tools, and that this might increase the risk of misdiagnosis, as has been evidenced in fields such as radiology.[40]

The workshop highlighted several key issues regarding the regulatory framework for AI diagnostic tools in dermatology, particularly around a perceived lack of transparency and clarity concerning inclusion criteria, intended purpose statements, and Approved Bodies.

Inclusion criteria refer to the specific conditions under which a medical device is deemed suitable for use, ensuring it meets safety and performance standards. Intended purpose statements, on the other hand, describe how a device is meant to be used according to its manufacturer's specifications.[41] These are critical components submitted during regulatory approval processes as they define the scope of a device's application.[41,42] Approved Bodies, designated by the Medicines and Healthcare products Regulatory Agency (MHRA), are organisations responsible for assessing whether medical devices meet UK regulatory requirements before they can be marketed.[41]

Workshop participants noted that intended purpose statements submitted to Approved Bodies are not made publicly available through either the MHRA or these bodies themselves.[42] This lack of accessibility creates challenges in evaluating whether devices are being used appropriately and within their approved scope. It was suggested that greater transparency around these documents would help clinicians better understand and trust AI diagnostic tools while ensuring compliance with their approved uses. Furthermore, the emergence of autonomous AI systems has intensified discussions around regulatory clarity.[43] These tools operate without requiring a second read by clinicians, which workshop participants and interviewees felt raised critical questions about liability, safety assurance, and their integration into existing care pathways.

Attendees also viewed regulatory frameworks as 'vague', contributing to the risk of premature implementation of AI diagnostic tools. The integration of these tools into publicly available apps has raised fears about potential risks stemming from inaccuracies, particularly in predicting skin cancer.[45] Studies indicate that these apps often exhibit poor sensitivity and specificity, leading to either false reassurance or unnecessary alarm for users.[20] Attendees emphasised the need for clearer information on approved AI diagnostic tools to facilitate their adoption in practice, while maintaining dermatological standards.

Additionally, industry representatives highlighted the lack of a proper classification system for AI diagnostic tools based on the risk associated with the tool. which they felt was essential for upholding safety norms within the NHS. Additional research shows this current lack of clarity in risk profiles makes them subject to interpretation, which can lead to inconsistent application of safety standards and increased uncertainty among clinicians regarding tool reliability.[45,46] A lack of a proper classification system might lead to existing regulations not being designed with AI capabilities in mind, creating a mismatch between rules and technological advancements.[47] While the Medicines and Healthcare products Regulatory Agency (MHRA) has made efforts to update its frameworks following the UK's departure from the EU, the transition to post-Brexit regulations has been slow, creating uncertainty for dermatologists and AI businesses.[49,50]

In 2022, the MHRA launched a plan called the AI in Medical Devices Change Programme Roadmap (AIaMD Roadmap) to clarify the rules for using AI in medical devices.[51] This roadmap had two main goals: 1) to set clear safety standards for software and AI tools used in healthcare, and 2) to provide clear guidelines for manufacturers to follow and show they meet those standards.[51] Since launching the roadmap, the MHRA has taken further steps to address regulatory challenges.[51] The MHRA also set out plans in 2024 to work with partners like NICE (National Institute for Health and Care Excellence) to streamline the process and avoid conflicting requirements.[51] However, our interviews with dermatology experts revealed that the absence of a robust regulatory framework could contribute to mistrust of AI diagnostic tools among clinicians.

Workshop attendees also highlighted the need for clearer standards from the MHRA regarding how approved diagnostic tools are evaluated. A key concern is figuring out who is responsible if an AI-assisted diagnosis goes wrong. The current rules are unclear, and this ambiguity can make some doctors hesitant to use AI.[52] Additionally, some attendees suggested that in some cases, AI tools aren't being used in line with their MHRA classification. The MHRA acknowledges these shortcomings and is currently updating its classification system for AI and software medical devices.[53]

Our findings show that the MHRA needs to deliver a more robust framework that addresses concerns around the regulatory framework for AI diagnostic tools. Approved Bodies should ensure that inclusion criteria and intended purpose statements are always reviewed by relevant domain experts, with classifications awarded appropriately.

The inclusion criteria and supporting evidence should be published and freely available for anyone to review. Given the growing adoption of fully autonomous diagnostic tools across healthcare settings globally, regulators must establish specific guidelines addressing their unique risks and benefits while ensuring they meet stringent safety benchmarks before widespread deployment.

FOTOFINDER: WHY INTENDED USE MATTERS

FotoFinder is a skin imaging system that provides solutions in video dermoscopy, a diagnostic tool used to examine skin lesions. One of its products, the Moleanalyzer Pro, employs artificial intelligence (AI) to assist in assessing skin lesions for early detection of melanoma.[44] The device has received a CE Class IIA marking, indicating it meets EU safety and performance standards as a medical device for diagnostic use.

Moleanalyzer Pro was initially one of the chosen diagnostic AI technologies by the recently published NICE AI for Skin Cancer Early Value Assessment (EVA) report to assess if it could reduce unnecessary urgent suspected skin cancer referrals to secondary care.[46] However, in the final NICE AI for Skin Cancer EVA report, the committee agreed that Moleanalyser Pro was out of scope for the assessment as the intended use was for assessing pigmented lesions, designed to help inform a clinical decision.[54]

This case highlights how transparency and clarity around intended use are necessary to ensure clinicians, regulators, and other relevant bodies understand where AI tools can be safely and effectively applied and underscores the importance of adhering strictly to these guidelines when integrating AI into clinical pathways.[55,56]

The intended use statement is important as it defines the specific context and scope under which regulatory approval was granted. Deploying this technology in settings or for use cases outside of its approved scope should be considered research rather than routine clinical practice, with all the governance and ethical constraints that come with this.[57]

IMPROVING DIGITAL INFRASTRUCTURE AND DATA AVAILABILITY TO DELIVER A COMPETITIVE MARKETPLACE

A lack of digital infrastructure

Modernised digital infrastructure is essential for any new technologies to be integrated effectively into existing care pathways, as is recognised by the NHS and Department of Health and Social Care.[58,59] However, interviewees, including industry representatives and clinicians, suggested that NHS digital infrastructure is currently ill-equipped to adopt AI tools in dermatology. This view was also backed up by our desk research. The NHS App, for example, despite its wide user base of 33.6 million users as of 2022, lacks the capabilities to facilitate AI-assisted diagnostics and secure image storage.[60] The Government itself has recognised the importance of modernising digital infrastructure in the NHS to support the integration of new technologies, including AI capabilities, as evidenced by several key policy initiatives and substantial financial commitments.[61,59]

Workshop attendees warned of the challenges of incorporating AI innovations into existing NHS digital infrastructure due to significant differences in digital skills and resources between NHS trusts, and a lack of connection between AI systems and existing patient records.[52] In 2022, the Government stated an ambition for ICSs to have more core digital capabilities, including electronic health records, and for these to be in place by March 2026.[62] However, some parts of the NHS have been much slower to adopt new technology than others.[63]

That said, there have been several initiatives to support digital and AI developments in the NHS.[64] For instance, The Artificial Intelligence (AI), Imaging and Radiotherapy Equipment, Associated Products and Diagnostic Imaging Framework Agreement forms part of a wider solution designed to support elective recovery (though it is worth noting this does not include dermatology).[65] NHS England has also invested over £100 million since 2018 to digitise NHS pathology labs and establish digital pathology Centres of Excellence.[66,67] However, more comprehensive solutions are needed to create a robust digital foundation for AI integration, particularly within diagnostics, whether in dermatology or other specialties.

Data availability hindering the development of NHS datasets

At present, there is no global standard for collecting and analysing skin data for AI, unlike other medical fields like radiology, which use the Digital Imaging and Communications in Medicine (DICOM) system.[20] Consistency in data collection allows datasets to be interoperable, meaning that they can be combined, compared, and used across different systems. The lack of standardised and comprehensive data has hindered AI development in dermatology.[45] Skin data is often collected without consistent methods for recording its purpose, anonymisation, or labelling.[68]

A lack of interoperability makes it challenging to pool data, which hinders efforts to develop data pipelines.[70] Currently, there are multiple research groups involved in skin AI developing such pipelines.[69]

A key component of interoperable data is the consistency of metadata, structured information that provides context to the primary data. Interviewees emphasised the importance of capturing this data.[70] For example, images of skin cancer can be used to train AI diagnostic tools, but without consistent metadata (such as a patient's lesion site, age, and sex), these images become far less valuable.[71]

Clinicians interviewed stressed the importance of linking data relating to the same patient to generate useful insights. In addition, creating new data for skin diseases requires careful curation and accurate labelling, which is time-consuming and, above all, expensive.[72] As a result, AI models often rely on small, incomplete datasets.[73]

The clinicians we interviewed noted an under-representation of black and brown skin tones in current datasets, an issue which is supported by published data.[74] This raised concerns amongst interviewees that AI tools may be less accurate for these groups, worsening existing health inequalities. Research shows this under-representation in AI training data can have tangible consequences.[75] Interviewees also highlighted equality and inclusion issues, noting that people with darker skin tones have previously been excluded from datasets and AI deployment, further exacerbating health inequalities.

CASE STUDY – NHS SCOTLAND'S AI SKIN CANCER CONSORTIUM

NHS Scotland has created a standardised data pipeline using Digital Imaging and Communications and Medicine (DICOM) – a technical standard for digital storage and transmission of medical images. This is a model that could be replicated across the UK. The process includes standardised data capture, labelling, and storage in a secure data environment. Over time, this will ensure the development of a large NHS dataset which can be used to test or train AI tools.

NHS Scotland's AI Skin Cancer Consortium has been running an international competition for AI companies to apply to improve the diagnostic ability of their AI using the real-world data captured by the consortium.[76]

This group is now being expanded into a UK-wide consortium, led and funded by the BAD, to build a larger, combined database for skin AI development. This supports the NHS ambitions to help clinicians apply best practice, eliminate unwarranted variation across the whole pathway of care, and support patients in managing their health and condition.

This would be the first step in the development of an assurance platform to independently test claims made by AI developers. This was a key requirement identified by workshop participants. It would allow NHS clinicians and managers without relevant expertise in AI to procure AI diagnostic tools, knowing that there has been independent validation.

Data silos and data sharing

The effectiveness of AI diagnostic tools in the NHS, particularly in areas such as dermatology, relies on large, comprehensive, and diverse datasets. However, despite efforts to create the NHS Federated Data Platform, ongoing data silos make it difficult and expensive to build high-quality datasets.[76,72] Many challenges with data silos are due to technical or organisational roadblocks that prevent the linking of existing data. The NHS has a wealth of data, but it is scattered across different systems and in different formats.[72] These barriers can be challenging to overcome, but projects such as NHS Scotland's AI Skin Cancer Consortium provide a case study for how this can be done.

Additionally, concerns were raised among interviewees about what happens to patient data once it is inputted into an AI diagnostic tool. One NHS representative we interviewed pointed out the lack of national guidelines, a point supported by the National Data Guardian's report, which outlines the need for clearer national guidelines on data sharing and data usage.[78] This lack of standardisation creates local variations and challenges for clinicians responsible for data use decisions. These concerns have been echoed across the wider clinical community; in 2024, 33% of surveyed clinicians said that data security was now the main IT concern for healthcare professionals.[77]

Encouraging a competitive marketplace

Workshop attendees described an 'unhealthy marketplace' for diagnostic AI in dermatology, attributing this in large part to a lack of high-quality dermatological data and significant barriers to data access. A competitive marketplace is important as it encourages the development of innovative and cost-effective diagnostic AI that aligns with NHS pathways, rather than forcing the NHS pathways to adjust to inflexible or misaligned technologies.

Attendees acknowledged that companies which have invested in collecting or acquiring large, high-quality datasets understandably benefit from a competitive advantage. However, they also argued that the current barriers to data access are so high that they risk entrenching market dominance among a small number of well-resourced firms. This can inhibit broader innovation, particularly among start-ups and SMEs that may lack the data needed to develop and validate clinically useful tools. From a public interest perspective, it was suggested that the Government could play a constructive role in levelling the playing field by improving the availability of curated, high-quality dermatology datasets for AI development and offering targeted support such as grants. This could stimulate a more competitive, diverse, and innovation-friendly market aligned with NHS priorities.

Attendees also pointed to barriers existing in and around procurement and reimbursement processes and highlighted the need to develop simplified and standardised procurement guidelines for local NHS systems so that evidence-based innovations can be delivered appropriately, including within dermatology.

There was recognition of this issue in Lord Darzi's recent Independent Investigation of the NHS in England, and some action has been undertaken by NHS Shared Business Services, through a tender worth £150m covering the use of artificial intelligence in medical imaging and analysis to speed up diagnosis.[79,80] However, it remains a significant obstacle to delivering a more competitive marketplace that supports the needs of the NHS.

The current NHS digital infrastructure is insufficient to support the widespread integration of AI tools in specialties like dermatology. Variability in digital maturity across NHS trusts and limitations within existing platforms, such as the NHS App, hinder seamless adoption of innovative technologies. While there are ongoing government initiatives and funding commitments aimed at advancing digital health capabilities, a more unified and strategic approach is required to modernise infrastructure comprehensively. This includes ensuring interoperability across systems and addressing disparities in technological readiness to enable effective deployment of AI diagnostic tools that improve patient care.

Fragmentation within the NHS data ecosystem underscores the critical need for dismantling silos and enhancing data-sharing frameworks. Establishing a National Data Library could serve as a pivotal step toward creating standardised, interoperable datasets that adhere to robust governance standards like DICOM for medical imaging. Such an initiative would not only facilitate innovation by providing high-quality training datasets for AI models, but also ensure equitable representation of diverse populations within these datasets.

Expanding projects like the NHS Scotland AI Skin Cancer Consortium could further accelerate progress by encouraging collaboration between stakeholders while promoting transparency and inclusivity in data collection.

To foster innovation and competition within the digital diagnostics market, particularly in dermatology, the Government must actively create conditions conducive to growth. This involves simplifying procurement processes, incentivising smaller companies through grants or funding programs, mandating interoperability standards for all approved tools, and establishing independent assurance platforms where claims made by developers can be validated against real-world NHS datasets before implementation. A competitive marketplace would drive cost-effective solutions tailored to meet patient needs while encouraging continuous improvement through healthy competition among providers.

Attendees also pointed to barriers existing in and around procurement and reimbursement processes and highlighted the need to develop simplified and standardised procurement guidelines for local NHS systems so that evidence-based innovations can be delivered appropriately, including within dermatology. There was recognition of this issue in Lord Darzi's recent Independent Investigation of the NHS in England, and some action has been undertaken by NHS Shared Business Services, through a tender worth £150m covering the use of artificial intelligence in medical imaging and analysis to speed up diagnosis.[79,80] However, it remains a significant obstacle to delivering a more competitive marketplace that supports the needs of the NHS.

DEVELOPING A CARE PATHWAY WHICH IS SOLUTION-AGNOSTIC

Capacity issues in dermatology will continue to persist, skin cancer rates continue to rise, and Cancer Research UK projections indicate there will be a 9% increase in melanoma incidence in the UK between 2025 and 2040.[82] This only accentuates the urgent need to establish robust care pathways that can accommodate the integration of AI into dermatology to tackle these challenges and find efficiencies that will address the growing burden.[81]

National policymakers appear to recognise the advantages of effectively triaging patients into specialist services, ensuring that those who need urgent care are prioritised.[82] However, prematurely introducing AI diagnostic tools, particularly in primary care settings, could inadvertently increase the workload for specialists if these tools lack sufficient accuracy or specificity, or if their integration is poorly managed. With NHS England reporting an 82% rise in dermatology waiting lists between April 2021 and March 2024,[3] there is a clear need for AI tools to improve, rather than worsen, capacity pressures.

Health economists and industry representatives we interviewed noted that AI diagnostic tools are currently used mainly as supplementary checks rather than as primary diagnostic methods. As a result, they often add a layer of verification without significantly shortening the care pathway. However, one of the key benefits of diagnostic AI is its ability to safely remove low-risk patients from the pathway at the earliest opportunity, improving efficiency, patient experience and equity.

To realise this potential, AI needs to be used earlier in the pathway, such as in primary care, or given greater autonomy. Both approaches require careful evaluation and appropriate safeguards. Current deployments fall short of these goals. Furthermore, there are no examples of autonomous diagnostic AI being used routinely in the NHS, other than in dermatology. To support safe and effective use, better long-term data collection is needed across the entire care pathway, including when compared against standard care pathways, to demonstrate both clinical and cost-effectiveness.

Findings from our interviews support the need for policymakers to set up a national framework for AI-enabled dermatology care pathways, incorporating adaptability, robust data collection, and equal access. This framework should address the current limits of AI tools in streamlining care pathways and should focus on improving the overall patient experience.

To achieve this, the framework should include mechanisms to evaluate AI performance against clinical benchmarks while ensuring transparency and inclusivity. Additionally, it must incorporate an independent assurance platform to test developers' claims using NHS datasets before deployment. This will build trust among clinicians and ensure safe integration of AI into dermatology services nationwide.

AI LITERACY AMONGST THE NHS WORKFORCE AND APPROPRIATE TRAINING

Clinical interviewees expressed mixed opinions regarding the impact of AI on dermatologists' skills and training. They, as well as health economist interviewees, voiced concerns about potential deskilling due to over-reliance on AI tools. However, interviewees also highlighted that AI could improve clinical focus by allowing practitioners to concentrate more on complex cases while complementing existing expertise.

The shift towards utilising digital technologies also requires equitable investment for both technologies and staff training to ensure healthcare professionals feel empowered by how digitisation can integrate into their work.[83] This view also came through strongly from the clinicians we interviewed, who highlighted the need to develop training programmes that help clinicians utilise new applications.

There is a clear need for AI-specific guidance, training, and education tailored to healthcare professionals, particularly in dermatology. Training programs should focus on improving AI literacy by equipping clinicians with the skills to use AI-assisted diagnostic tools responsibly and better understand their limitations.

Additionally, clinicians and commissioners must be trained to critically evaluate claims made by AI developers. Guidance should emphasise how to assess the safety, efficacy, and relevance of these technologies for their specific patient populations. This includes addressing challenges such as algorithm accuracy across diverse populations and ensuring equitable patient care. By integrating these elements into medical education programs and professional development initiatives, policymakers can ensure that healthcare professionals are prepared to leverage AI effectively while maintaining high standards of care.

CONCLUSIONS AND RECOMMENDATIONS

If well designed and implemented, the application of AI to dermatology services could present huge opportunities, helping to address capacity pressures and enhance patient care.

Benefits could include increased patient empowerment, enhanced early detection through the use of remote care and teledermatology, and reduced health inequalities, provided algorithms are trained on diverse datasets to avoid bias and ensure accurate diagnoses across all demographics. Furthermore, the use of AI has the potential to free up clinicians' time, reduce waiting times, and help reduce healthcare costs.

However, realising this potential requires a concerted effort to overcome systemic barriers. Our findings point to a complex interplay of factors that currently hinder the implementation of AI in dermatology.

These challenges, including unclear regulatory frameworks, inadequate digital infrastructure, market limitations, and lack of a platform to permit competitive performance and comparison of AI solutions, demand a multifaceted approach if they are to be fully addressed.

To unlock the full potential of AI in dermatology, policymakers must address these barriers through clear regulations, robust digital infrastructure development, improved data sharing practices, and targeted training programs for clinicians. By tackling these interconnected challenges head-on and adopting the approach outlined in our recommendations below, we can ensure safe and equitable implementation of AI technologies to transform patient outcomes.

RECOMMENDATIONS

Improving the regulatory framework

1. The Medicines and Healthcare products Regulatory Agency (MHRA) should, as part of its strategic approach to AI, develop a robust framework for assessing AI tools (to include diagnostic tools in dermatology). This framework should ensure that the inclusion criteria and intended purpose statements are always reviewed by relevant domain experts, with classifications awarded appropriately. We also recommend that the inclusion criteria and supporting evidence be published and freely available for anyone to review.

2. The MHRA should work with domain experts and patient re presentatives to establish a consensus on the minimum accuracy standards that AI diagnostic tools must meet before they are adopted. This will foster a safer, evidence-driven environment while also streamlining regulatory approval processes.

3. The MHRA should engage with clinicians and patients to increase awareness regarding the importance of reporting adverse events relating to AI diagnostic technologies.

Building a digital infrastructure

4. The Department of Health and Social Care should ensure the necessary digital infrastructure is in place so that new technologies (including clinically proven diagnostic technologies) can be integrated effectively into existing pathways. More specifically, the 10-Year Health Plan should include a commitment for the NHS App to have the capability to provide clinically proven AI diagnostic tools to patients and sufficient data flow competences so that it can then direct patients to the right part of the patient pathway, while also providing a point of access and information point for patients to better understand the services being offered.

5. NHS policymakers should continue work to establish robust digital infrastructure across all NHS Trusts and address the current significant variation in digital maturity, capabilities, and data pipelines. This includes enforcing the baseline standard for all NHS Trusts through the Digital Maturity Assessment programme. By addressing the digital infrastructure disparities across NHS Trusts, there will be a more uniform approach for implementing properly approved diagnostic technologies and improving patient care.

Data availability, infrastructure and a competitive marketplace

6. The Government, working with domain experts and professional bodies, should put in place the conditions for a clearer, more competitive marketplace for all digital diagnostics. A more competitive marketplace with genuine interoperability would allow innovations to flourish to benefit care delivery and patient outcomes, including AI diagnostic tools in dermatology. This includes supporting the establishment of standardised datasets and frameworks for data sharing. More specifically:

- The Department of Health and Social Care should develop pathways that facilitate the adoption and reimbursement of clinically proven, innovative solutions. It should set out plans to improve the current procurement and reimbursement process within the upcoming 10-Year Health Plan, including the development of simplified, AI-specific procurement guidelines for NHS Trusts to address variability in digital maturity, so that evidence-based innovations are delivered appropriately, including within dermatology services.
- The Department of Health and Social Care should develop a centralised procurement framework for innovative digital solutions, including those relating to AI diagnostics in dermatology. Supporting the development and funding of a dermatology diagnostic AI assurance platform to assist in understanding AI performance should be prioritised. Such a platform would enable clinicians to independently test the claims made by AI developers against NHS datasets before adoption. Furthermore, the reimbursement structure should consider outcome-based payments or risk-sharing models at the national level. This approach would foster healthy competition among digital solution providers. NHSE England could also consider utilising mechanisms like the MedTech Funding Mandate to deliver safe and effective transformation.

Delivering a care pathway fit for the future

7. NHS policymakers, in collaboration with the clinical and patient community, should establish a national framework for AI-enabled dermatology care pathways. Learning from existing models, such as the pathway implemented in NHS Scotland, the framework should define core principles for pathway development, including adaptability to evolving technologies, and robust data collection and evaluation mechanisms. Critically, the framework must address potential biases and ensure equitable access to AI diagnostics, aligning with the NHS's commitment to reducing health inequalities and the NHS AI Lab's focus on ethical and inclusive AI development. Mechanisms must also be set in place to evaluate AI performance against clinical benchmarks. As part of this, consideration must be given to where in the patient pathway AI can deliver the greatest benefit – improving patient outcomes, increasing clinical capacity, and delivering a return on investment for the NHS.

Workforce and training

8. The Department of Health and Social Care, in collaboration with the relevant medical education bodies, should develop and implement modules within medical education programmes and professional development initiatives that improve AI literacy. This will enhance clinical competence in evaluating and using AI-assisted diagnostic tools, with a focus on addressing challenges such as algorithm accuracy across diverse populations and ensuring equitable patient care. The modules should also train clinicians and NHS procurement teams to critically evaluate claims made by AI developers regarding the safety, efficacy, and relevance of these technologies for their specific patient populations.

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We are the British Association of Dermatologists (BAD), the professional membership body for dermatologists in the UK, a registered charity dedicated to medical education, research, and professional practice and standards. The mission of the BAD is to champion dermatology in the UK for the public benefit.

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