

**Position Statement  
on  
Augmented Artificial Intelligence (Aul)  
(Approved by the Board of Directors: May 18, 2019; Revised: August 12, 2023)**

As the profession of dermatology integrates Artificial Intelligence (AI) into clinical practice, clinicians must adhere to general principles of human-centered design. Patients should always feel they are receiving the highest quality of care. Clinicians should spend time conducting work appropriate for their skills and training, while being able to delegate algorithmic tasks to machines, to enhance patient care. The position of the AAD is that Augmented Artificial Intelligence (Aul), where AI technologies work in harmony with dermatologists to improve patient care, is an important goal. Both healthcare recipients and clinicians should collaboratively engage in the development of Aul applications. Aul should not impede access to in-person dermatologic care if a patient desires such access.

Aul holds transformative potential in the care of skin with an impact on each of the Quintuple Aims (enhancing patient experience, improving population health, reducing costs, improving the professional fulfillment of care teams, and increasing diversity, equity, and inclusivity). Early AI efforts across medicine have shown promise and impact in expanding access to high-quality care. These include enabling novel insights into health and disease states as well as risk assessment, triage, diagnosis, and monitoring, supporting patient engagement, and improving care team efficiency. Each application of Aul in the care of skin conditions must be subject to the highest standards of privacy, ethics, quality, reliability, accuracy, data transparency, and governance, before implementation in healthcare delivery.

### **Defining High-Quality Aul**

The Academy supports the development of augmented artificial intelligence (Aul) technology provided that it is designed and evaluated in a manner that enables the delivery of high-quality care to patients.

### **Developing Augmented Intelligence Models in Dermatology**

#### **Model Development**

- Data used to generate Aul algorithms must be handled in accordance with patient privacy laws and ethical standards
- Aul algorithms must be developed using high-quality auditable data that is representative of the population on which it will be used.
- Aul algorithms used for the delivery of patient care must be subject to rigorous validation, clinical evaluation, and ethical review before deployment.

Key stakeholders including physicians and patient advocates must be involved in the development and design of these tools and should be included in the testing, validation, and implementation in clinical practice and patient care of these tools. The development of Aul technology relies on the collection and storage of large quantities of data. Compliance with the Health Insurance Portability and Accountability Act (HIPAA), all local rules for international datasets, and community/consensus ethical standards is critical. Data should be handled securely and ethically. Proper consent must be obtained when appropriate. All data handling including acquisition, transfer, and storage must be in accordance with patient privacy rules and ethical standards.

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The validity and generalizability of Aul technology are dependent on the quality and source of the data that is used to develop Aul models. The characteristics of these data sets influence the nature of the algorithms generated and carry the potential to extend bias to the delivery of clinical care if the data sets are not representative of the population in which AI algorithms will be used. Therefore, data used to train Aul models must be fully representative of the target population, auditable, and all data sources must be clearly and accurately identified. Data acquisition, consent practices, labeling methods, and characteristics of the training data set must be transparent.

Aul algorithms must be validated in a way that is publicly auditable. Appropriate labeling for the intended use of the algorithm should be stated, including any use-case restrictions. We support expanded efforts to improve transparency on how system decisioning occurs.

#### Clinical Deployment

After an AI algorithm has been evaluated on an independent, untampered test set, prospective validation and routine monitoring must be performed in the real-world setting where the model will be deployed.

For patient care algorithms, prospective clinical trials with relevant clinical endpoints based on intended use that are relevant to patient health should be performed. Both clinical effectiveness and patient safety should be demonstrated before using this technology for clinical decision-making. Care must be made in identifying potential biases which could arise in the design or deployment that could potentially exacerbate disparities in care, particularly among vulnerable and underserved populations. Data collected during model deployment can be used for model retraining and refinement in validation studies and post-deployment monitoring.

#### Post-marketing surveillance

- Appropriate post-marketing surveillance must be performed to ensure safety.

Post-marketing surveillance must also be performed to ensure safety through routine evaluation after deployment as models may evolve (continuously learning or drift). The technology should improve outcomes important to patients, clinicians, and other health system stakeholders, and efforts should be made to measure and report these outcomes. Outcomes may include quality, cost, and/or efficiency of care delivery. Aul tools should be safeguarded from cyber threats that could harm the integrity of the products or the product's users.

#### **Future Directions**

Effective and ethical development and implementation of Aul will require continuous engagement, education, exploration of privacy, ethical and medical-legal issues, and advocacy.

#### Engagement

- Assess the knowledge, expectations, biases, and concerns of stakeholders about Aul.
- Conduct needs assessments/studies to direct Aul development and integration.
- Gather robust evidence to guide best practices, appropriate use, and clinically meaningful integration.

Engagement and collaboration with stakeholders are essential. Assessing and understanding knowledge, expectations, biases, and fears allow for more efficient development and more effective deployment of Aul technologies in healthcare. For patients and clinicians, studies on acceptability, feasibility, predictive accuracy, and clinical outcomes may identify areas of greatest need, adoption barriers, and adaptability of these tools to different clinical settings. These studies will guide the prioritization of Aul development and more seamless integration into clinical practice and the lives of patients and clinicians. Recognizing the most relevant research gaps to fill will guide the development of best practices, benchmarks, and a robust evidence base. With this

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information and experience, the Academy aims to collaborate with our public policy partners to promote high-quality, responsible application, and regulatory frameworks for these technologies.

#### Education

- Educate stakeholders on the advantages and limitations of Aul.
- Promote transparency and choice for patients when Aul is utilized in care.
- Educate clinicians on best practices and appropriate use for Aul.

Education and awareness of the promise and potential pitfalls of these technologies are needed for responsible, effective, and ethical integration in the healthcare system. Aul is a tool to be used in concert with overall clinician judgment. For patients and clinicians, there should be transparency and choice on how medical information is gathered, utilized, and stored and when, what, and how Aul technologies are utilized in their care process. There should be clarity in the synergistic roles of Aul and human judgment so that it is clear to the patient and provider when and how this technology is utilized to augment human judgment and interpretation. There should be improved clinician education about AI so that effective supervision to ensure accuracy and contextual applicability can be continuously performed. Ongoing education of clinicians on evidence-based best practices will promote competency and appropriate utilization of Aul to provide care that is safe, fair, and effective. The Academy encourages the continuing support of the rights and roles of patients and clinicians and the ongoing collaboration with public policy.

#### Privacy, Medical-Legal issues:

- Ensure PHI is protected and consent for any data usage and storage is transparent and compliant with community ethical standards.
- Advance patients' and clinicians' understanding of inputs, outcomes, and appropriate use of Aul.

Although the promise of Aul to improve health and wellness holds significant potential, issues related to privacy and medical-legal complications are amplified by technology that requires transmission of data beyond the confines of a clinician's institution and deployment in dynamic real-world settings.

Protected Health Information must be managed with effective safeguards to prevent inadvertent exposure. As with in-person medical care, transparency in consent for data usage is required and patients have the right to know whether their data will be de-identified or not. Assessing, mitigating, and allocating risk and liability among the Aul-manufacturer/designer, health system, clinician, and patient should be considered. Aul tools and systems should be explainable in a way that is intuitive and understandable by both clinicians and patients.

As Aul-powered algorithms augment our ability to diagnose, treat, and care for patients, Aul will introduce human-machine interactions such as automation bias and anchoring bias on clinicians. Awareness and continued research of human-machine interactions by clinicians create opportunities for education and intervention while dissemination of this information to third parties, such as insurance companies, employers, and malpractice carriers presents significant risk and potential liability.

#### Advocacy

- Collaborate with stakeholders and policymakers to create policies that will promote high-quality, inclusive, equitable, and accessible Aul.

Aul has the potential to transform our individual and collective experience of health, healthcare, and wellness. To achieve this potential, deliberate and diligent effort must be taken to engage and collaborate with stakeholders and policymakers. The Academy is committed to working with administrative and legislative colleagues to create policies that promote Aul that is high-quality,

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inclusive, equitable, and accessible. Through collaboration and research, the Academy strives to guide the design, implementation, and regulation of these technologies to augment care for all healthcare consumers, including those who are historically underserved.

#### New Technologies

New technologies such as large language models and diffusion models that are capable of generating responses to prompts should be evaluated carefully as they use large training datasets that often cannot be properly audited for fidelity, sources of bias, or the ethical use of patient information.

While prior AI technologies had more defined areas of potential uses and harms, novel technologies may not as transparently declare their potential uses and misuses, and therefore should be evaluated and used extremely cautiously given their broad applicability.

#### **Glossary:**

1. **AI (artificial intelligence)** refers to a machine with human capabilities. For example, a machine that can classify skin lesions at the level of a clinician would be considered to be artificially intelligent.
2. **Anchoring bias** refers to a cognitive bias that causes overreliance on the initial data presented. Within machine learning, anchoring bias also refers to bias in choices on metrics or training data sets used to develop a model.
3. **Aul (augmented intelligence)** is a newer term coined to incorporate the concept of the integration of artificial intelligence tools and systems with clinicians and into the healthcare delivery system to enhance our current capabilities.
4. **Automation bias** refers to human's tendency to favor information generated by artificial intelligence tools while ignoring or undervaluing contradictory information.
5. **Bias** occurs in observational data but takes on heightened importance in that Aul trained on data containing bias will produce tools and systems that amplify and codify those biases. This is exacerbated by the "black box" nature of Aul, which obscures how it arrived at its prediction.
6. **Big data** in the medical context refers to complex datasets often containing structured and unstructured fields as exists in electronic health records.
7. **Computer vision** is a field that crosses disciplines and aims to drive deeper understandings from visual data including images or videos and mimic tasks performed by the human visual system.
8. **Diffusion models** are a type of probabilistic model used in computer vision technologies to identify latent structures that can be modeled using data derived from digital images.
9. **HIPAA** refers to the Health Insurance Portability and Accountability Act of 1996 which required the creation of national standards to protect patient health information from disclosure with the patient's consent.
10. **Large language model (LLM)**: A large language model is an automated system that has been trained in an unsupervised fashion to predict words or sentences using the corpus of the web, books, and other content for training.
11. **Machine learning (ML)** refers to the use of computational and statistical tools, or **algorithms**, for identifying relationships in data and making intelligent predictions. Within the umbrella term of machine learning, **deep neural networks** are a specific type of machine learning that has been applied to image recognition. A wide variety of other models of machine learning exist and are chosen as appropriate for the task and characteristics of the data.
12. **Personal Health Information (PHI)**, also sometimes referred to as Protected Health Information, includes insurance information, patient's demographic information and characteristics, test and laboratory results, mental health conditions, medical histories, and other information collected by healthcare organizations and professionals.

13. **Supervised learning** refers to an approach where teaching the model involves using data where each data point is labeled with an output. For example, clinically annotated or histologic diagnoses associated with images of skin lesions. **Unsupervised learning** occurs when the model trains on the data itself, without any labeling.
14. **Training and Test Sets** refer to data used to develop artificial intelligence models are often split into a **training set**, which is the data from which the model learns. Subsequently, the model is evaluated on a **test set**, which allows an unbiased evaluation of the model. This test set is typically well-curated and importantly, does not overlap with the training set.

*This Position Statement is provided for educational and informational purposes only. It is intended to offer physicians guiding principles and policies regarding the practice of dermatology. This Position Statement is not intended to establish a legal or medical standard of care. Physicians should use their personal and professional judgment in interpreting these guidelines and applying them to the particular circumstances of their practice arrangements.*