



Dermatology Meets Deep Learning: AI’s Role in Modern Skin Care

A Narrative Review

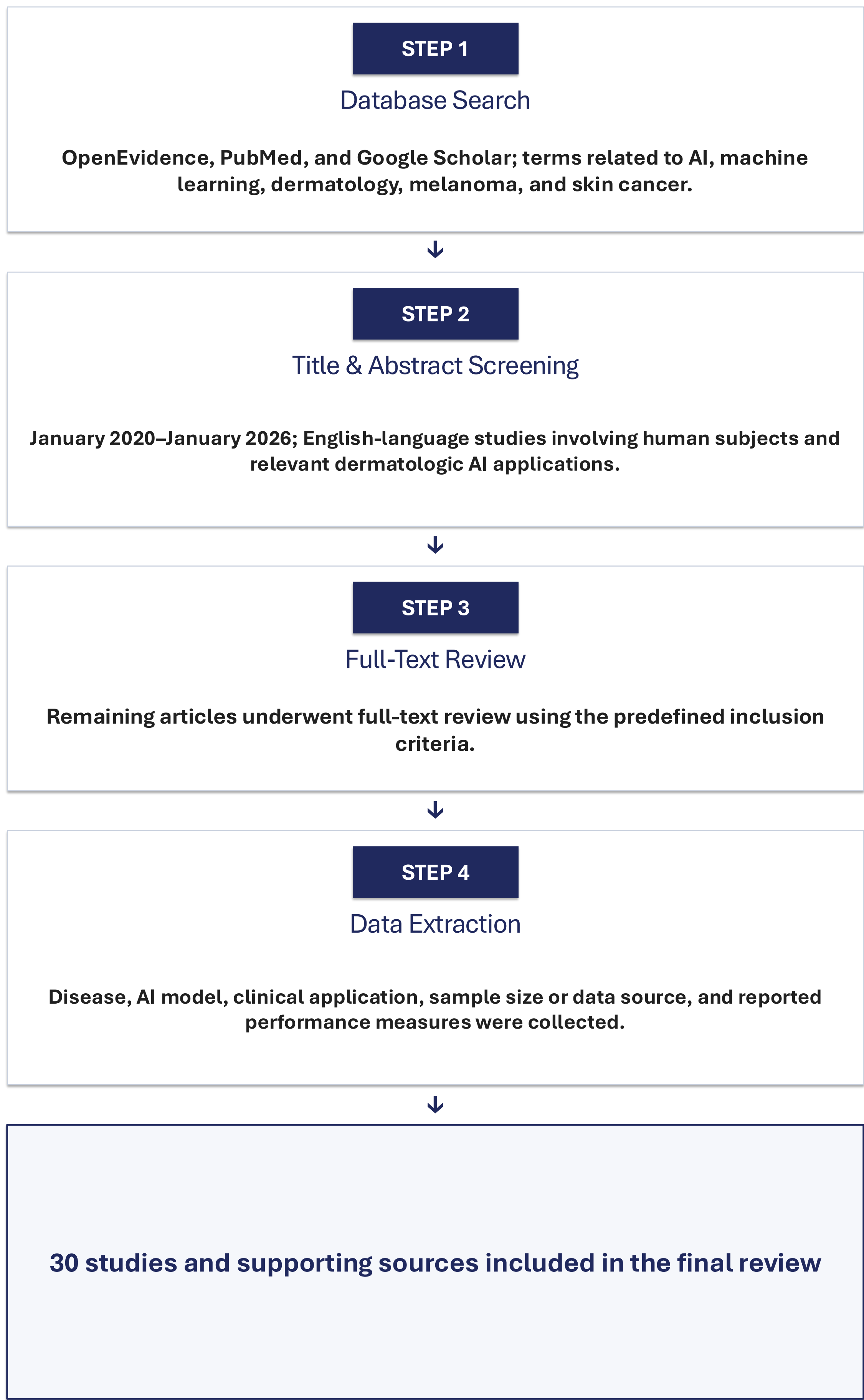
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BACKGROUND

- AI applications in dermatology have **expanded beyond workflow optimization** to diagnosis, treatment, and disease monitoring.
- AI has demonstrated strong performance in skin cancer detection, **particularly melanoma and nonmelanoma skin cancers**.
- Applications extend beyond cancer to **inflammatory skin disease, wound assessment, and tele-dermatology**.
- This review evaluates the **clinical utility, diagnostic performance, and limitations** of AI across dermatology.

METHODS



RESULTS



Figure 3. Selected diagnostic performance metrics across skin cancer studies; values are study-specific and not pooled. [6–8, 20, 24]

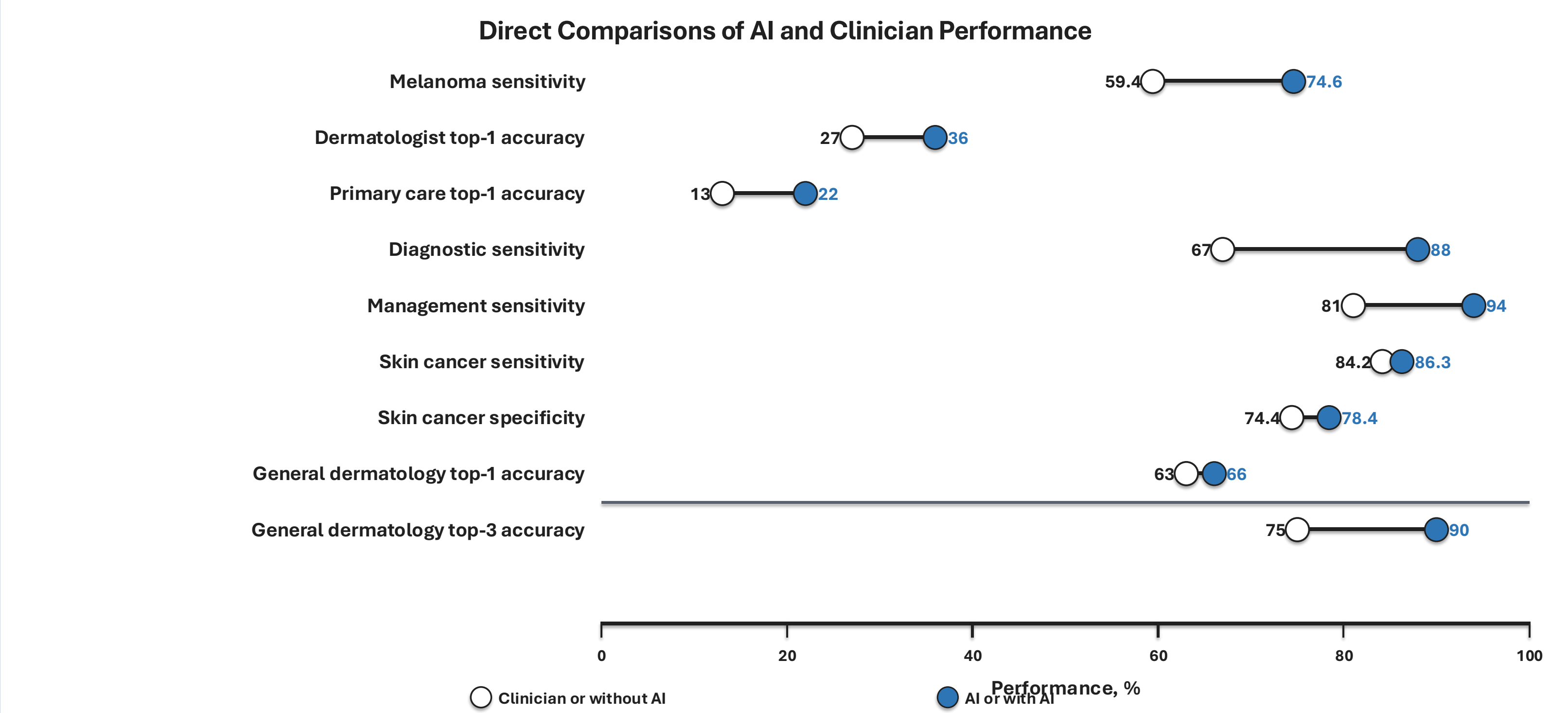


Figure 2. Direct comparative performance of AI and clinicians; values are study-specific and not pooled. [1–4, 8]

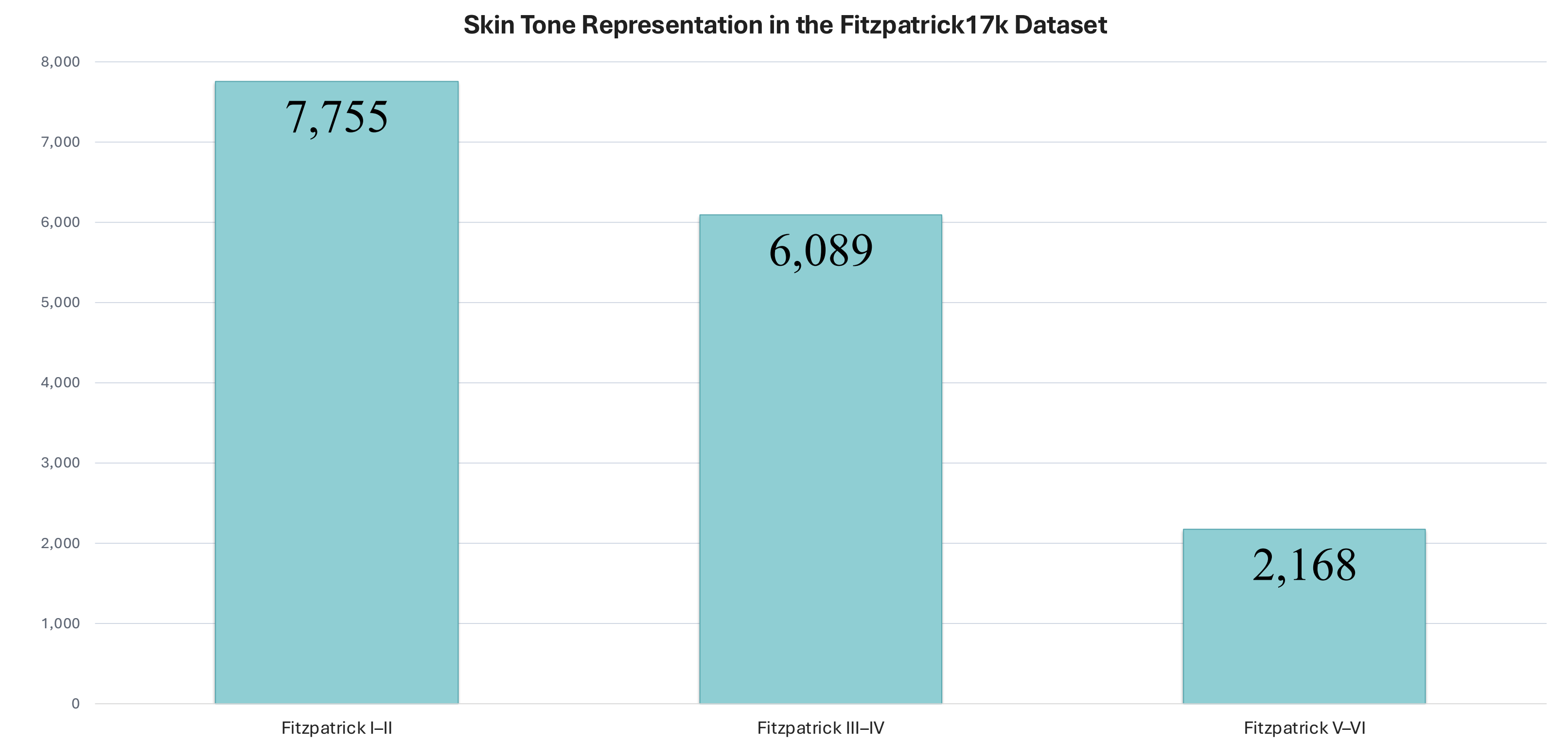
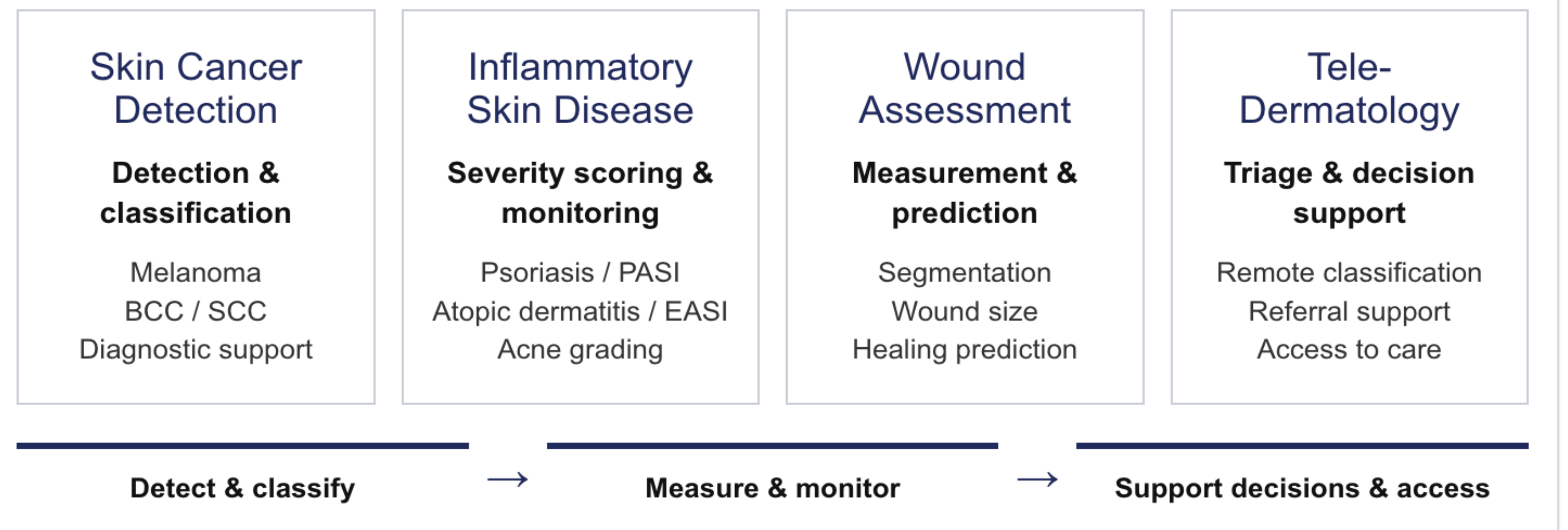
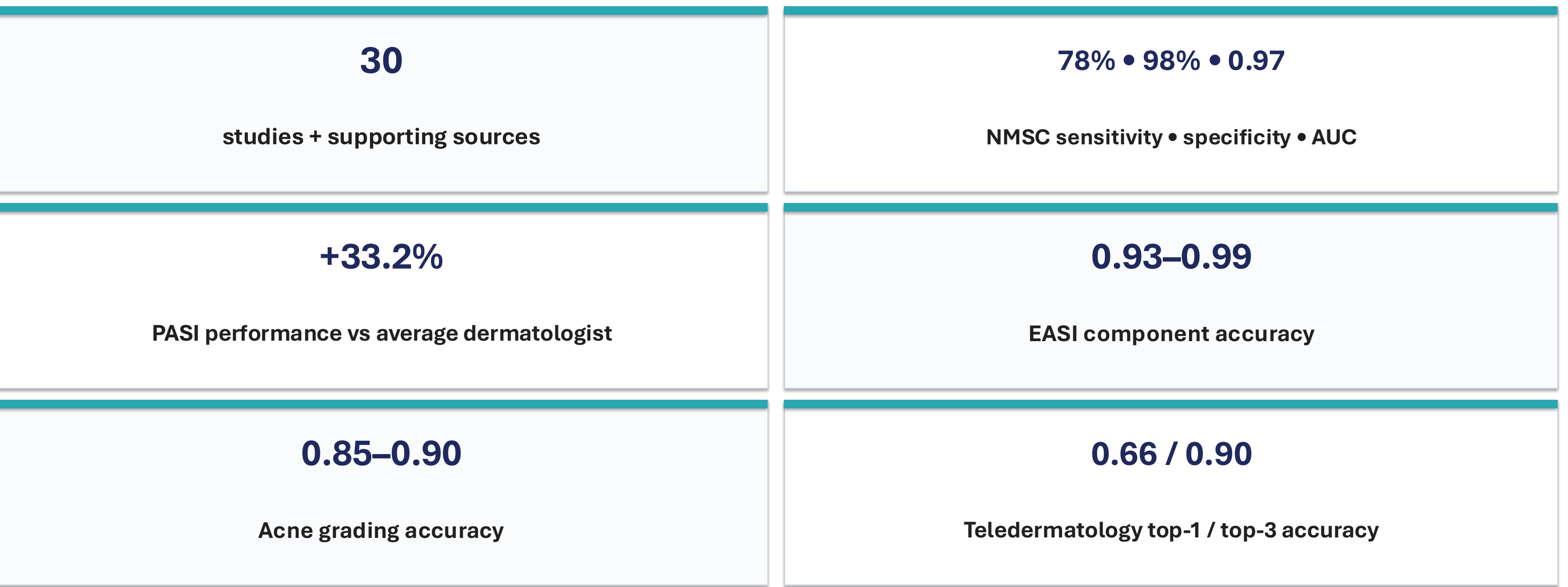


Figure 1. Fitzpatrick17k includes 7,755 type I–II images versus 2,168 type V–VI images; 565 unknowns are not shown. [17]

RESULTS: APPLICATION THEMES



KEY RESULTS



DISCUSSION

- High sensitivity often came at the **expense of specificity**, producing more false-positive findings and referrals.
- AI appears most practical as a **clinical adjunct or second read** rather than a stand-alone diagnostic system.
- Applications and reported outcomes varied by task, which **limits direct cross-study comparison**.
- Generalizability remains limited by **underrepresentation of darker skin tones, curated/internal datasets, and limited external validation**.
- Future studies should prioritize **diverse populations, prospective real-world testing, and preservation of physician autonomy**.

CONCLUSION

- AI demonstrates its **strongest and most consistent performance in skin cancer detection**.
- AI may improve **disease monitoring, clinical decision support, and access to dermatologic care**.
- Current evidence supports AI primarily as **an adjunct to clinicians rather than a replacement**.
- Further **diverse, prospective real-world validation and model development** are needed before broader implementation.

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