

Use of AI in Identification of Sexually Transmitted Infections and Anogenital Dermatoses: A Systematic Review and Meta-Analysis

Authors:

Soe NN^{1,2}, Kusnandar II³, Latt PM^{1,2}, Fairley CK^{1,2}, Chow EPF^{1,2,4}, Maatouk I⁵, Johnson CC⁵, Shah P^{5,6}, Peters RPH⁵, Subissi L⁷, Zhang L^{1,2,8,9}, Ong JJ^{1,2,10}

¹ Melbourne Sexual Health Centre, Bayside Health, Melbourne, Victoria, Australia

² School of Translational Medicine, Faculty of Medicine, Nursing and Health Sciences, Monash University, Melbourne, Victoria, Australia

³ National School of Medicine, Doctor of Medicine, University of Notre Dame, Sydney, New South Wales, Australia

⁴ Centre for Epidemiology and Biostatistics, Melbourne School of Population and Global Health, The University of Melbourne, Melbourne, Victoria, Australia

⁵ Global HIV, Hepatitis and STIs Programmes, World Health Organisation, Geneva, Switzerland

⁶ UNAIDS Regional Support Team Asia Pacific, Bangkok, Thailand

⁷ Health Emergency Preparedness and Response Programme, World Health Organisation, Geneva, Switzerland

⁸ China-Australia Joint Research Centre for Infectious Diseases, School of Public Health, Xi'an Jiaotong University Health Science Centre, Xi'an, China

⁹ Phase I Clinical Trial Research Ward, The Second Affiliated Hospital of Xi'an Jiaotong University, Xi'an, China

¹⁰ Department of Clinical Research, London School of Hygiene and Tropical Medicine, London, United Kingdom

Background:

AI has demonstrated strong performance in dermatology, yet its application to sexually transmitted infections (STIs) remains unclear. This study aimed to assess the diagnostic performance of AI algorithms in detecting STIs and anogenital dermatoses from clinical images in sexual health.

Methods:

Six databases (IEEE Xplore, Embase, Scopus, Medline, Web of Science, and CINAHL) were searched for studies published from January 2010 to April 2024. Studies using AI to identify anogenital skin conditions from clinical images were included. Following PRISMA guidelines, two reviewers independently screened articles and extracted data. Quality was assessed using a modified QUADAS-2 tool and the CLEAR Derm checklist. A bivariate random-effects meta-analysis was conducted for conditions with more than three studies.

Results:

Of 5,381 studies screened, 140 met the inclusion criteria. Research was dominated by mpox (78.6%), while other anogenital conditions, including genital herpes (5.0%), genital warts (5.7%), scabies (5.7%), and molluscum contagiosum (4.3%), were understudied. Meta-analyses demonstrated high AI performance for mpox (sensitivity: 0.96 [95% CI, 0.93–0.97]; specificity: 0.98 [95% CI, 0.97–0.99]), herpes simplex (sensitivity: 0.91; specificity: 0.97), genital warts (sensitivity: 0.87; specificity: 0.98), psoriasis (sensitivity: 0.90; specificity: 0.98), and scabies (sensitivity: 0.89; specificity:

0.98). Study quality was variable, with high risk of bias identified in population selection (76.1%), reference standards (76.1%), and index tests (20.0%). Most studies relied on open-source datasets (86.4%), only 12.1% included external validation, and all but one remained at the proof-of-concept stage.

Conclusion:

AI shows promise for identifying STIs and anogenital dermatoses; however, significant research gaps remain. Future work should prioritise understudied STIs, improve data quality, conduct external validation, and validate models in clinical settings.

Disclosure of Interest Statement:

No conflicts of interest are declared by the authors in relation to this study.