LEPROSY: A FORGOTTEN PAST OR AN AI-GUIDED FUTURE?

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Background: Leprosy (Hansen's disease) is curable, yet 172,717 new cases were reported worldwide in 2024, 72% in South-East Asia (WHO, 2025). As nerve damage is often permanent, WHO uses grade 2 disability (G2D) as a marker of delayed detection. Reviews report median diagnostic delays of 12–36 months and G2D shares of 5.6 – 43.2%, often due to limited knowledge and misdiagnosis (Dharmawan et al., 2021; 2022). Karakalpakstan - Central Asia's historical endemic focus, with a leprosarium since 1933, now reports 95.5% of registered cases in northern districts (Eshboev & Utepbergenova, 2026).

Objective: To assess delayed leprosy detection globally and regionally, appraise evidence on AI-assisted screening, and propose a regional detection framework.

Materials and Methods: Four sources were combined: (1) WHO 2024 epidemiological data; (2) anonymized registry data (1933–2026) from the RSSPMCDC of Uzbekistan; (3) a semi-structured expert interview on detection barriers; (4) a systematic search of PubMed and WHO IRIS for AI diagnostic studies, case reports, and programme evaluations.

Results and Discussion: G2D shares varied regionally: 2.7% (South-East Asia) to 20.6% (Europe) vs. 5.3% globally, an ecological pattern suggesting poorer detection where leprosy is rare or passively found, versus active case-finding (e.g., India, PIB 2025). AI shows promise but faces limits: AI4Leprosy (Brazil) reached 90% accuracy (AUC 0.965) using images + clinical data (Barbieri et al., 2022); West African deep-learning models exceeded 70% accuracy on Fitzpatrick IV+ skin but suffered from small, imbalanced datasets (Yotsu et al., 2023). A review of 30 studies found no evidence of cross-regional transferability and few clinical trials (de Andrade et al., 2025); Dermatology AI underperforms on dark skin and rare diseases (Daneshjou et al., 2022), and photographs cannot capture nerve deficits. In the region, cases peaked mid-century; since 2000, <5 cases/year. The expert cited low clinical suspicion in primary care as the key barrier.

Conclusion: Conclusion. As leprosy recedes from clinical memory, vigilance must not follow. We position AI not as a diagnostic endpoint, but as an initial screening flag within a comprehensive cascade: image capture, AI risk stratification, clinical examination, laboratory confirmation, and contact tracing. We recommend integrating primary-care training with a prospective, locally validated AI pilot in the region, creating a scalable framework for other post-endemic regions.