

## The Development of an Evidence-Based Teledermatology Scale-Up Framework and Roadmap

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### ***Abstract***

**Introduction:** The objectives of South Africa's (SA) ehealth strategy recognise the value proposition that telemedicine holds for rural and urban referrals, but a lack of accepted and formalized scale-up implementation and financial planning has impeded unlocking these benefits. Because HIV/AIDS remains a major cause of morbidity and mortality in South Africa, and because skin pathology is often the first sign of an HIV/AIDS infection, swift, organised, and efficacious dermatology referral is essential. While there are examples of teledermatology, both synchronous and asynchronous, in South Africa's public health system these remain localised and have not been widely implemented or scaled-up and have not realised the intended telemedicine objectives. This has placed the public health system at a disadvantage in making the dermatology referral pathway neither effective nor efficient. This paper presents the development of an evidenced-based TeleDermatology Scale-up Framework (TDSF) and supporting roadmap to assist with ensuring sustainable scale-up.

**Methods:** Literature reviews were undertaken of teledermatology in SA, existing and related frameworks, and scale-up and implementation approaches for ehealth. These were supplemented by semi-structured interviews and observations of key stakeholders. A qualitative method with a design science research process model was used which consisted of five phases: The awareness phase confirmed the need for an evidence-based TDSF and supporting roadmap; the suggestion phase delivered a proposal on how to develop a TDSF; the development phase identified recommended design requirements and used these to identify and critique existing teledermatology or related scale-up frameworks; the evaluation phase assessed outputs of the development phase against the design requirements and validated the TDSF and roadmap with key teledermatology management stakeholders using a questionnaire with a 5 point Likert scale, and the conclusion phase used the validation results to finalise and communicate the TDSF and roadmap. The study was undertaken in the province of KwaZulu-Natal, where synchronous teledermatology has been ongoing between three rural hospitals and the local Medical School for more than 10 years and an informal instant messaging store and forward service has been running for more than 3 years.

**Results:** The literature reviews found no teledermatology scale-up framework, but did identify 'related frameworks' for scale-up of ehealth and general health interventions. Most of the related frameworks were too focussed on specific elements of scale-up, or were discussions. The study identified five TDSF components comprised of ten ehealth building blocks, six scale-up drivers, four scale-up continuum stages, three scale-up phases, plus scale-up activities and associated steps. In addition thirteen core concepts of equal importance were identified; evidence-based scale-up need, stakeholder management, legal and regulatory, ehealth governance, scale-up strategy,

detailed scale-up planning, mobilisation of scale-up resources, scale-up readiness, scale-up implementation, scale-up benefits realisation management, scale-up risk management, scale-up finalisation, and operational and scale-up sustainability plan. The core and sub-concepts were further characterised and described to enable design of the final evidence-based TDSF. A roadmap was prepared as a guide for the implementer with step-by-step instructions for application of the TDSF. The TDSF and supporting roadmap received an average Likert-scale rating of "4=Agree" when tele dermatology management stakeholders were asked if they found it useful as a guide to assist the South African public health system with tele dermatology scale-up. Discussion: A TDSF and supporting roadmap can contribute to scaling-up and achieving the benefits of tele dermatology. Implementation of the proposed evidenced-based TDSF and supporting roadmap is recommended. Conclusion: This study developed a TDSF and supporting roadmap that are evidence-based. The proposed approach and resultant TDSF and roadmap could be adapted to assist with ensuring scale-up and sustainability for other ehealth and or telemedicine practices in other locations.

Keywords: tele dermatology, scale-up framework, design science research model