



VR for diabetes foot health

A Virtual Reality (VR) training simulator for assessment and management of diabetes-related foot complications

Benefits

- Virtual "hands-on" training for physical assessment of complicated disease
- Self-directed training in a culturally-safe digital environment, based on gold-standard guidelines and developed by a multidisciplinary team of field experts
- Five training scenarios with scaled risk and complexity of patient presentation
- Mass-scalable education model with no need for in-room instruction

Background

Diabetes-related foot complications (DRFCs) in Australia cause > 5000 lower limb amputations, costing the health system > \$1.6B. Aboriginal and Torres Strait Islander people have a 3-to 6-fold increased risk of experiencing DRFCs and over 30 times the rates of amputation because of DRFCs. Patients living in remote locations are also disproportionately affected by DRFCs, with amputation rates more than ten times higher than in metro areas. Training gaps in assessment and management of DRFCs, as well as delays in triage and referral, are key drivers of poor outcomes. The development of culturally-appropriate training services for assessing and triaging DRFCs has the potential to vastly improve patient-centred outcomes for people living with diabetes in rural communities.

Technology overview

Our team have designed an education package that leverages commercially-available VR hardware to train local health workers to deliver better community health care to people affected by DRFCs. Using a virtual clinic modelled on a real Aboriginal Community-Controlled Health Organisation, and patient models based on Aboriginal patients and staff, trainees are presented with five cases in stepwise learning models for assessing foot risk in diabetes (low risk; medium risk; high risk; active wound; wound requiring ED referral). Learners are guided through how to perform assessment (e.g., how to find pedal pulses; how to detect neuropathy) and how to appropriately triage a patient based on their level of risk and active disease. This scalable training program has been demonstrated to empower the regional and Aboriginal health workforce to provide evidence-based assessment, monitoring, and treatment of DRFCs.

Our Virtual Waiting Room (Figure 1) is freely explorable with five patients at various stages of risk and foot complication. Our Virtual Clinic appointment with a high-risk patient, including assessment of risk and active foot disease (Figure 2) allows for full-3D views of the feet to guide assessment, and interactions with models and tools using VR head-tracking.





Figure 1: Virtual waiting room

Figure 2: Virtual assessment of risk and active foot disease

Development status

The product has been fully co-developed by a multidisciplinary team of experts in mixed-reality programming, graphic design, vascular health, podiatry, Aboriginal health, VR training and evaluation, and Aboriginal cultural safety. It has been trialled in partnership with Aboriginal practitioners at the Royal Adelaide Hospital and at three Aboriginal Community-Controlled Health Organisations throughout SA. Self-confidence scores from 29 healthcare participants across assessment and triage indices such as "I know how to identify a foot pressure lesion" and "I know how to provide foot self-care education"; improved from approximately 50% to 90% (Figure 3). Feedback on System Utility and Training Inventory scales was strongly positive



Figure 3: Self-confidence scores trial results

Opportunity

We are seeking a commercial partner with interest in delivering education and professional development to country communities. Future potential bundled products will include additional programs to address needs outside of diabetes foot care (e.g., kidney disease).

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