

NERVE vibration perception threshold (VPT) monitoring: clinical and economic evaluation

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Aims

To evaluate the economic consequences of diabetic peripheral neuropathy—a driver of ulceration, amputation and substantial NHS expenditure—and the potential impact of the NERVE device on this disease burden. Earlier, objective screening using VPT—including sensitivity around 15—can identify large-fibre dysfunction before loss of protective sensation, enabling proactive risk stratification.

Methods

We implemented NERVE, a calibrated smartphone app paired with a probe, to record quantitative vibration perception threshold. Clinical accuracy and usability versus a reference neurothesiometer have been reported previously; here we emphasise the health-economic synthesis and pathway implications, drawing on the NIHR National Institute for Health Research health-economics report, statistical analysis and application protocol.

Results

In pathway modelling, NERVE would enable triage to preventive interventions (education, therapeutic footwear/off-loading, remote temperature monitoring) and supports longitudinal tracking. At scale, remote screening can shift assessment from reactive appointments to data-enabled monitoring, reducing primary-care utilisation.

Illustrative estimates indicate that preventing a single ulcer or amputation avoids material costs ($\approx$ £3,751 and $\approx$ £8,916, respectively) against a national burden approaching £1 billion per year; system-level adoption could release appointment capacity valued at $\sim$ £187 million annually. The economic logic follows the observed gradient in costs and outcomes with reduced vibration detection and the established cost-effectiveness of guideline-based foot programmes, making net savings plausible when earlier detection activates proven interventions.

Conclusion

With clinical performance established, NERVE's principal value lies in enabling earlier, scalable VPT-based risk detection and streamlined remote pathways that are expected to improve outcomes while delivering economic benefits for the National Health Service.

References

Armstrong DG, Boulton AJM, Bus SA. N Engl J Med. 2017;376:2367–75.

Bowering CK. Can Fam Physician. 2001;47:1007–16.

Kerr M, Rayman G, Jeffcoate WJ. Diabet Med. 2014;31:1498–504.

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Shibata M et al. Diabetes Res Clin Pract. 2020;165:108145