

Devices for remote continuous monitoring of people with Parkinson's disease: a systematic review and cost-effectiveness analysis

Edward Cox,¹ Ros Wade,² Robert Hodgson,²
Helen Fulbright,² Thai Han Phung,¹ Nicholas Meader,²
Simon Walker,¹ Claire Rothery¹ and Mark Simmonds^{2*}

¹CHE Technology Assessment Group, University of York, York, UK

²CRD Technology Assessment Group, University of York, York, UK

*Corresponding author mark.simmonds@york.ac.uk

Published July 2024

DOI: 10.3310/YDSL3294

Plain language summary

Devices for remote continuous monitoring of people with Parkinson's disease: a systematic review and cost-effectiveness analysis

Health Technology Assessment 2024; Vol. 28: No. 30

DOI: 10.3310/YDSL3294

NIHR Journals Library www.journalslibrary.nihr.ac.uk

Plain language summary

Parkinson's disease is a brain condition causing loss of co-ordination and movement problems. Levodopa is the most prescribed treatment for early disease. Patients should be seen by a specialist every 6–12 months to assess their treatment needs. Wearable devices (like smart watches) may aid management by directly monitoring patients for disease symptoms including tremor and slowness of movement (bradykinesia), or side effects of treatment like involuntary movement (dyskinesia).

This assessment considered the clinical and economic value of five wearable devices: Personal KinetiGraph, STAT-ON, Kinesia 360, KinesiaU and PDMonitor. We searched medical databases to find all studies of the five devices. We assessed the quality of these studies and reviewed their results.

We found 77 studies of the devices. There was some evidence to suggest that Personal KinetiGraph can accurately measure bradykinesia and dyskinesia, leading to treatment modification in some patients, and a possible improvement in symptoms.

The evidence for STAT-ON suggested it may be of value for diagnosing symptoms, but there is currently no evidence on its clinical value. There was insufficient evidence for Kinesia 360, KinesiaU and PDMonitor to draw any conclusions.

An economic analysis was conducted to investigate whether using any of these technologies is economically viable. The economic analysis found that the quality-of-life benefits generated by remote monitoring devices were small relative to the additional costs of implementing them in the NHS. As such, none of the remote monitoring devices were good value for money when compared with the current standard of care.

ISSN 2046-4924 (Online)

Impact factor: 3.6

A list of Journals Library editors can be found on the [NIHR Journals Library website](#)

Launched in 1997, *Health Technology Assessment* (HTA) has an impact factor of 3.6 and is ranked 32nd (out of 105 titles) in the 'Health Care Sciences & Services' category of the Clarivate 2022 Journal Citation Reports (Science Edition). It is also indexed by MEDLINE, CINAHL (EBSCO Information Services, Ipswich, MA, USA), Embase (Elsevier, Amsterdam, the Netherlands), NCBI Bookshelf, DOAJ, Europe PMC, the Cochrane Library (John Wiley & Sons, Inc., Hoboken, NJ, USA), INAHTA, the British Nursing Index (ProQuest LLC, Ann Arbor, MI, USA), Ulrichsweb™ (ProQuest LLC, Ann Arbor, MI, USA) and the Science Citation Index Expanded™ (Clarivate™, Philadelphia, PA, USA).

This journal is a member of and subscribes to the principles of the Committee on Publication Ethics (COPE) (www.publicationethics.org/).

Editorial contact: journals.library@nhr.ac.uk

The full HTA archive is freely available to view online at www.journalslibrary.nhr.ac.uk/hta.

Criteria for inclusion in the *Health Technology Assessment* journal

Manuscripts are published in *Health Technology Assessment* (HTA) if (1) they have resulted from work for the HTA programme, and (2) they are of a sufficiently high scientific quality as assessed by the reviewers and editors.

Reviews in *Health Technology Assessment* are termed 'systematic' when the account of the search appraisal and synthesis methods (to minimise biases and random errors) would, in theory, permit the replication of the review by others.

HTA programme

Health Technology Assessment (HTA) research is undertaken where some evidence already exists to show that a technology can be effective and this needs to be compared to the current standard intervention to see which works best. Research can evaluate any intervention used in the treatment, prevention or diagnosis of disease, provided the study outcomes lead to findings that have the potential to be of direct benefit to NHS patients. Technologies in this context mean any method used to promote health; prevent and treat disease; and improve rehabilitation or long-term care. They are not confined to new drugs and include any intervention used in the treatment, prevention or diagnosis of disease.

The journal is indexed in NHS Evidence via its abstracts included in MEDLINE and its Technology Assessment Reports inform National Institute for Health and Care Excellence (NICE) guidance. HTA research is also an important source of evidence for National Screening Committee (NSC) policy decisions.

This article

The research reported in this issue of the journal was commissioned and funded by the Evidence Synthesis Programme on behalf of NICE as award number NIHR135437. The protocol was agreed in March 2022. The draft manuscript began editorial review in August 2022 and was accepted for publication in March 2023. The authors have been wholly responsible for all data collection, analysis and interpretation, and for writing up their work. The HTA editors and publisher have tried to ensure the accuracy of the authors' manuscript and would like to thank the reviewers for their constructive comments on the draft document. However, they do not accept liability for damages or losses arising from material published in this article.

This article presents independent research funded by the National Institute for Health and Care Research (NIHR). The views and opinions expressed by authors in this publication are those of the authors and do not necessarily reflect those of the NHS, the NIHR, the HTA programme or the Department of Health and Social Care. If there are verbatim quotations included in this publication the views and opinions expressed by the interviewees are those of the interviewees and do not necessarily reflect those of the authors, those of the NHS, the NIHR, the HTA programme or the Department of Health and Social Care.

This article was published based on current knowledge at the time and date of publication. NIHR is committed to being inclusive and will continually monitor best practice and guidance in relation to terminology and language to ensure that we remain relevant to our stakeholders.

Copyright © 2024 Cox et al. This work was produced by Cox et al. under the terms of a commissioning contract issued by the Secretary of State for Health and Social Care. This is an Open Access publication distributed under the terms of the Creative Commons Attribution CC BY 4.0 licence, which permits unrestricted use, distribution, reproduction and adaptation in any medium and for any purpose provided that it is properly attributed. See: <https://creativecommons.org/licenses/by/4.0/>. For attribution the title, original author(s), the publication source – NIHR Journals Library, and the DOI of the publication must be cited.

Published by the NIHR Journals Library (www.journalslibrary.nhr.ac.uk), produced by Newgen Digitalworks Pvt Ltd, Chennai, India (www.newgen.co).

