

Long-term monitoring in primary care for chronic kidney disease and chronic heart failure: a multi-method research programme

Rafael Perera,^{1*} Richard Stevens,¹ Jeffrey K Aronson,¹ Amitava Banerjee,² Julie Evans,¹ Benjamin G Feakins,¹ Susannah Fleming,¹ Paul Glasziou,³ Carl Heneghan,¹ FD Richard Hobbs,¹ Louise Jones,¹ Milena Kurtinecz,¹ Daniel S Lasserson,⁴ Louise Locock,⁵ Julie McLellan,¹ Borislava Mihaylova,^{6,7} Christopher A O'Callaghan,⁸ Jason L Oke,¹ Nicola Pidduck,¹ Annette Plüddemann,¹ Nia Roberts,⁹ Iryna Schlackow,⁶ Brian Shine,¹⁰ Claire L Simons,⁶ Clare J Taylor,¹ Kathryn S Taylor,¹ Jan Y Verbakel^{1,11,12} and Clare Bankhead¹

¹Nuffield Department of Primary Care Health Sciences, University of Oxford, Oxford, UK

²Institute of Health Informatics, University College London, London, UK

³Institute for Evidence-Based Healthcare, Faculty of Health Sciences & Medicine, Bond University, Gold Coast, QLD, Australia

⁴Institute of Applied Health Research, College of Medical and Dental Sciences, University of Birmingham, Birmingham, UK

⁵Health Services Research Unit, University of Aberdeen, Aberdeen, UK

⁶Health Economics Research Centre, Nuffield Department of Population Health, University of Oxford, Oxford, UK

⁷Institute of Population Health Sciences, Barts and The London School of Medicine and Dentistry, Queen Mary University of London, London, UK

⁸Nuffield Department of Medicine, University of Oxford, Oxford, UK

⁹Bodleian Health Care Libraries, Knowledge Centre, University of Oxford, Oxford, UK

¹⁰Department of Clinical Biochemistry, John Radcliffe Hospital, Oxford University Hospitals NHS Foundation Trust, Oxford, UK

¹¹Department of Public Health and Primary Care, KU Leuven, Leuven, Belgium

¹²National Institute for Health Research (NIHR) Community Healthcare MedTech and In Vitro Diagnostics Co-operative (MIC), Nuffield Department of Primary Care Health Sciences, University of Oxford, Oxford, UK

*Corresponding author Rafael.perera@phc.ox.ac.uk

Declared competing interests of authors: Rafael Perera reports grants from the National Institute for Health Research (NIHR) Programme Grants for Applied Research programme [RP-PG-1210-12012: the early use of Antibiotics for at Risk CHildren with Influenza in primary care (the ARCHIE programme)], the British Heart Foundation (PG/17/49/33099), the NIHR School for Primary Care Research (Wittenberg_FR16), the NIHR Oxford Biomedical Research Centre (BRC) (IS-BRC-1215-20008) and the NIHR Community Healthcare MedTech and In Vitro Diagnostics Co-operative (MIC-2016-018) during the conduct of the study. Jeffrey K Aronson has co-authored and edited textbooks and written reviews, commentaries and medicolegal reports on various aspects of prescribing. He has provided expert reports on cases involving adverse drug reactions, most often for coroners, sometimes on behalf of private individuals, and occasionally for pharmaceutical companies. He was previously a member of the NIHR Journals Library Board from 2012 until it was disbanded. Amitava Banerjee reports personal fees from C.H. Boehringer Sohn AG & Ko. KG (Ingelheim am Rhein,, Germany), AstraZeneca plc (Cambridge, UK), Novo Nordisk A/S (Bagsværd, Denmark) and Pfizer Inc. (New York, NY, USA) outside the submitted work, all before 2017. He is a trustee of the South Asian Health Foundation (2014–present) and was a member of the Education Committee of the British Cardiovascular Society (2017–20). Carl Heneghan reports expenses and fees for his media work and expenses from the World Health Organization; and holds grant funding from the NIHR Oxford Biomedical Research Centre and the NIHR School for Primary Care Research Evidence Synthesis Working Group (project 390). He has received financial remuneration from an asbestos case. He receives expenses for teaching evidence-based medicine and is also paid for his general practitioner work in the NHS out of hours. He is Director of the Centre for Evidence-Based Medicine at the University of Oxford, Editor in Chief of the *British Medical Journal Evidence-Based Medicine* and a NIHR Senior Investigator. FD Richard Hobbs reports grants from a NIHR Professorship (NIHR-RP-R2-12-015) during the conduct of the study; reports personal fees and other from Novartis International AG (Basel Switzerland), C.H. Boehringer Sohn AG & Ko. KG; and reports grants from Pfizer Inc. outside the submitted work. Milena Kurtinecz is a GlaxoSmithKline plc (Brentford, UK) employee and owns company stock. GlaxoSmithKline plc provided access to limited placebo data for some analyses. Louise Locock reports membership of the NIHR Health Services and Delivery Research board during the lifetime of the study (2014–19). Julie McLellan reports occasional expenses for teaching evidence-based medicine. Borislava Mihaylova reports grants from Merck & Co. Inc. (Kenilworth, NJ, USA) outside the submitted work and support from the NIHR Oxford Biomedical Research Centre (IS-BRC-1215-20008) and NIHR HTA (17/140/02). Christopher A O’Callaghan receives standard academic grants from the Novo Nordisk Foundation (NNF15SA0018346), the Medical Research Council (MC_PC_17174), the European Foundation for the Study of Diabetes (grant 96111) and Diabetes Research UK (15/0005171). Annette Plüddemann reports grant funding from the NIHR School for Primary Care Research (SPCR) (NIHR SPCR Evidence Synthesis Working Group project 390) during the conduct of the study, and occasionally receives expenses for teaching evidence-based medicine. Clare J Taylor reports personal fees from Novartis International AG and Vifor Pharma (Glattbrugg, Switzerland), and non-financial support from F. Hoffman-La Roche Ltd (Basel, Switzerland) outside the submitted work. Clare Bankhead reports grants from Cancer Research UK (EDAG committee 27880), the NIHR Oxford BRC (Multimorbidity theme IS-BRC-1215-20008) and the NIHR School for Primary Care Research (Wittenberg_FR16) during the conduct of the study.

Published August 2021

DOI: 10.3310/pgfar09100

Plain English summary

Long-term monitoring for kidney disease and heart failure

Programme Grants for Applied Research 2021; Vol. 9: No. 10

DOI: 10.3310/pgfar09100

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

Plain English summary

In the UK, long-term (chronic) conditions such as diabetes, high blood pressure and many others are often monitored and managed by general practitioners. It can be difficult for the NHS to decide how frequently a long-term condition should be monitored; more frequent monitoring is not always more useful. We studied chronic kidney disease and chronic heart failure. To complement our previous work on kidney disease in diabetes, we emphasise other kidney disease in this study.

For managing chronic kidney disease, we found that the number of tests used in the NHS has vastly increased, but, for most patients, the tests are unlikely to influence treatment. There are treatments that can prevent kidney disease getting worse, but they are usually treatments that most of the patients are already likely to be prescribed for other reasons (e.g. high levels of cholesterol or diabetes). When we combined estimates of the accuracy of the tests with this information about treatment options, we found that, among people with chronic kidney disease, it is hard to demonstrate benefits of annual monitoring that would be worth the health-care costs or the patients' time. We also found that patients can misunderstand the term 'chronic kidney disease'; for example, they may associate it with dialysis, kidney transplants and kidney failure, whereas these serious outcomes apply to only a very small number of people with late-stage chronic kidney disease.

Chronic heart failure, however, is always a serious condition urgently requiring careful treatment (e.g. blood pressure-lowering drugs). Monitoring is essential to prescribe appropriate treatment for each patient. At present, monitoring takes the form of regular check-ups (on blood pressure, weight, etc.). Previous trials have found that blood tests called natriuretic peptide tests, usually carried out at a hospital or a laboratory, could make monitoring more effective, and so improve patient health. We found that installing natriuretic peptide testing devices at general practice surgeries would be feasible, but the accuracy of these devices needs to be improved.

Programme Grants for Applied Research

ISSN 2050-4322 (Print)

ISSN 2050-4330 (Online)

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@nihr.ac.uk

The full PGfAR archive is freely available to view online at www.journalslibrary.nihr.ac.uk/pgfar. Print-on-demand copies can be purchased from the report pages of the NIHR Journals Library website: www.journalslibrary.nihr.ac.uk

Criteria for inclusion in the *Programme Grants for Applied Research* journal

Reports are published in *Programme Grants for Applied Research* (PGfAR) if (1) they have resulted from work for the PGfAR programme, and (2) they are of a sufficiently high scientific quality as assessed by the reviewers and editors.

Programme Grants for Applied Research programme

The Programme Grants for Applied Research (PGfAR) programme, part of the National Institute for Health Research (NIHR), was established in 2006 to fund collaborative, multidisciplinary programmes of applied research to solve health and social care challenges. Findings are expected to provide evidence that lead to clear and identifiable patient benefits, in the relatively near future.

PGfAR is researcher led and does not specify topics for research; however, the research must be in an area of priority or need for the NHS and the social care sector of the Department of Health and Social Care, with particular emphasis on health and social care areas that cause significant burden, where other research funders may not be focused, or where insufficient funding is available.

The programme is managed by the NIHR Central Commissioning Facility (CCF) with strategic input from the Programme Director. For more information about the PGfAR programme please visit the website: <https://www.nihr.ac.uk/explore-nihr/funding-programmes/programme-grants-for-applied-research.htm>

This report

The research reported in this issue of the journal was funded by PGfAR as project number RP-PG-1210-12003. The contractual start date was in January 2014. The final report began editorial review in September 2019 and was accepted for publication in September 2020. As the funder, the PGfAR programme agreed the research questions and study designs in advance with the investigators. The authors have been wholly responsible for all data collection, analysis and interpretation, and for writing up their work. The PGfAR editors and production house have tried to ensure the accuracy of the authors' report and would like to thank the reviewers for their constructive comments on the final report document. However, they do not accept liability for damages or losses arising from material published in this report.

This report presents independent research funded by the National Institute for Health 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, CCF, NETSCC, PGfAR 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, NETSCC, the PGfAR programme or the Department of Health and Social Care.

© Queen's Printer and Controller of HMSO 2021. This work was produced by Perera *et al.* under the terms of a commissioning contract issued by the Secretary of State for Health and Social Care. This issue may be freely reproduced for the purposes of private research and study and extracts (or indeed, the full report) may be included in professional journals provided that suitable acknowledgement is made and the reproduction is not associated with any form of advertising. Applications for commercial reproduction should be addressed to: NIHR Journals Library, National Institute for Health Research, Evaluation, Trials and Studies Coordinating Centre, Alpha House, University of Southampton Science Park, Southampton SO16 7NS, UK.

Published by the NIHR Journals Library (www.journalslibrary.nihr.ac.uk), produced by Prepress Projects Ltd, Perth, Scotland (www.prepress-projects.co.uk).

NIHR Journals Library Editor-in-Chief

Professor Ken Stein Professor of Public Health, University of Exeter Medical School, UK

NIHR Journals Library Editors

Professor John Powell Chair of HTA and EME Editorial Board and Editor-in-Chief of HTA and EME journals. Consultant Clinical Adviser, National Institute for Health and Care Excellence (NICE), UK, and Professor of Digital Health Care, Nuffield Department of Primary Care Health Sciences, University of Oxford, UK

Professor Andrée Le May Chair of NIHR Journals Library Editorial Group (HS&DR, PGfAR, PHR journals) and Editor-in-Chief of HS&DR, PGfAR, PHR journals

Professor Matthias Beck Professor of Management, Cork University Business School, Department of Management and Marketing, University College Cork, Ireland

Dr Tessa Crilly Director, Crystal Blue Consulting Ltd, UK

Dr Eugenia Cronin Senior Scientific Advisor, Wessex Institute, UK

Dr Peter Davidson Consultant Advisor, Wessex Institute, University of Southampton, UK

Ms Tara Lamont Senior Scientific Adviser (Evidence Use), Wessex Institute, University of Southampton, UK

Dr Catriona McDaid Senior Research Fellow, York Trials Unit, Department of Health Sciences, University of York, UK

Professor William McGuire Professor of Child Health, Hull York Medical School, University of York, UK

Professor Geoffrey Meads Emeritus Professor of Wellbeing Research, University of Winchester, UK

Professor James Raftery Professor of Health Technology Assessment, Wessex Institute, Faculty of Medicine, University of Southampton, UK

Dr Rob Riemsma Reviews Manager, Kleijnen Systematic Reviews Ltd, UK

Professor Helen Roberts Professor of Child Health Research, UCL Great Ormond Street Institute of Child Health, UK

Professor Jonathan Ross Professor of Sexual Health and HIV, University Hospital Birmingham, UK

Professor Helen Snooks Professor of Health Services Research, Institute of Life Science, College of Medicine, Swansea University, UK

Professor Ken Stein Professor of Public Health, University of Exeter Medical School, UK

Professor Jim Thornton Professor of Obstetrics and Gynaecology, Faculty of Medicine and Health Sciences, University of Nottingham, UK

Please visit the website for a list of editors: www.journalslibrary.nihr.ac.uk/about/editors

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