

# Non-contact infrared thermometers compared with current approaches in primary care for children aged 5 years and under: a method comparison study

Ann Van den Bruel,<sup>1,2\*</sup> Jan Verbakel,<sup>1,2</sup> Kay Wang,<sup>1</sup>  
Susannah Fleming,<sup>1</sup> Gea Holtman,<sup>1,3</sup>  
Margaret Glogowska,<sup>1</sup> Elizabeth Morris,<sup>1</sup>  
George Edwards,<sup>1</sup> Fatene Abakar Ismail,<sup>1</sup>  
Kathryn Curtis,<sup>1</sup> James Goetz,<sup>1</sup> Grace Barnes,<sup>1</sup>  
Ralitsa Slivkova,<sup>1</sup> Charlotte Nesbitt,<sup>1</sup> Suhail Aslam,<sup>1</sup>  
Ealish Swift,<sup>1</sup> Harriet Williams<sup>1</sup> and Gail Hayward<sup>1</sup>

<sup>1</sup>Nuffield Department of Primary Care Health Sciences, University of Oxford, Oxford, UK

<sup>2</sup>Academic Centre for Primary Care, University of Leuven, Leuven, Belgium

<sup>3</sup>Department of General Practice and Elderly Care Medicine, University Medical Centre Groningen, University of Groningen, Groningen, the Netherlands

\*Corresponding author [ann.vandenbruel@kuleuven.be](mailto:ann.vandenbruel@kuleuven.be)

**Declared competing interests of authors:** Ann Van den Bruel was a member of the Health Technology Assessment (HTA) Maternal, Neonatal and Child Health panel, and was a member of the Diagnosis and Screening Methods group from 2015 to 2018. Gail Hayward was a member of the HTA Commissioning Board. Susannah Fleming was funded under a Programme Grants for Applied Research programme grant with number RP-PG-1210-12003 [Monitoring Long-term Conditions in Primary Care; URL: [www.journals.library.nihr.ac.uk/programmes/pgfar/rp-pg-1210-12003](http://www.journals.library.nihr.ac.uk/programmes/pgfar/rp-pg-1210-12003) (accessed June 2020)] while working on this report.

Published October 2020

DOI: 10.3310/hta24530

## Plain English summary

Non-contact thermometers: a method comparison study (METRIC)

Health Technology Assessment 2020; Vol. 24: No. 53

DOI: 10.3310/hta24530

NIHR Journals Library [www.journalslibrary.nihr.ac.uk](http://www.journalslibrary.nihr.ac.uk)

## Plain English summary

General practitioners commonly measure children's temperature using a thermometer placed in the armpit or ear canal. New 'non-contact' thermometers use infrared light to measure temperature without touching the child. They are easy to use and there is no risk of passing on infections. However, we do not know how well they measure temperature compared with thermometers that use the armpit or the ear.

This study aimed to compare two non-contact thermometers with current thermometers. We measured children's temperature with all thermometer types, and asked children and their parents about their views.

The study was performed in general practices in Oxfordshire with children aged  $\leq 5$  years who had come to see their general practitioner because they had recently become unwell.

Both the cheaper and more expensive non-contact thermometers gave slightly lower temperature readings on average than current thermometers. The vast majority of readings ranged from 1.6 °C lower to 1.3 °C higher than current thermometers. The detection of fever of at least 38 °C was low to moderate for both non-contact thermometers.

Most parents did not think that their child was distressed by having their temperature taken using any of the thermometers, but the armpit thermometer was rated as the least comfortable. When interviewed, parents were more negative about the armpit thermometers, although still willing to use them if they were recommended by doctors.

Although we found that the readings from the different thermometers did not match, we do not know whether the non-contact or the current thermometers were giving readings that were closer to the real temperature of the child. To understand this, we would need to do a study that included a more invasive procedure for temperature assessment.

ISSN 1366-5278 (Print)

ISSN 2046-4924 (Online)

Impact factor: 3.370

*Health Technology Assessment* is indexed in MEDLINE, CINAHL, EMBASE, the Cochrane Library and Clarivate Analytics Science Citation Index.

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

Editorial contact: [journals.library@nihr.ac.uk](mailto:journals.library@nihr.ac.uk)

The full HTA archive is freely available to view online at [www.journalslibrary.nihr.ac.uk/hta](http://www.journalslibrary.nihr.ac.uk/hta). Print-on-demand copies can be purchased from the report pages of the NIHR Journals Library website: [www.journalslibrary.nihr.ac.uk](http://www.journalslibrary.nihr.ac.uk)

## Criteria for inclusion in the *Health Technology Assessment* journal

Reports 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 report

The research reported in this issue of the journal was funded by the HTA programme as project number 16/45/01. The contractual start date was in December 2016. The draft report began editorial review in April 2019 and was accepted for publication in October 2019. 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' report 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 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, NETSCC, 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, NETSCC, the HTA programme or the Department of Health and Social Care.

© Queen's Printer and Controller of HMSO 2020. This work was produced by Van den Bruel *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](http://www.journalslibrary.nihr.ac.uk)), produced by Prepress Projects Ltd, Perth, Scotland ([www.prepress-projects.co.uk](http://www.prepress-projects.co.uk)).

## Editor-in-Chief of *Health Technology Assessment* and NIHR Journals Library

---

**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 Senior Clinical Researcher, 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** Professor of Wellbeing Research, University of Winchester, UK

**Professor John Norrie** Chair in Medical Statistics, University of Edinburgh, 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

**Professor Martin Underwood** Warwick Clinical Trials Unit, Warwick Medical School, University of Warwick, UK

Please visit the website for a list of editors: [www.journalslibrary.nihr.ac.uk/about/editors](http://www.journalslibrary.nihr.ac.uk/about/editors)

**Editorial contact:** [journals.library@nihr.ac.uk](mailto:journals.library@nihr.ac.uk)