

Automated analysis of free-text comments and dashboard representations in patient experience surveys: a multimethod co-design study

Carol Rivas,^{1,2*} Daria Tkacz,¹ Laurence Antao,¹
Emmanouil Mentzakis,³ Margaret Gordon,⁴
Sydney Anstee¹ and Richard Giordano¹

¹Faculty of Health Sciences, University of Southampton, Southampton, UK

²Department of Social Science Research Unit, University College London, London, UK

³Economics within Social Sciences, University of Southampton, Southampton, UK

⁴PicoMeg Ltd, London, UK

*Corresponding author c.rivas@ucl.ac.uk

Declared competing interests of authors: none

Published July 2019

DOI: 10.3310/hsdr07230

Plain English summary

Free-text comments and dashboard representations in surveys

Health Services and Delivery Research 2019; Vol. 7: No. 23

DOI: 10.3310/hsdr07230

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

Plain English summary

Health surveys, such as the Cancer Patient Experience Survey (CPES), often include 'free-text' questions. There is no easy way to summarise these, so NHS trusts use them in ad hoc ways. The CPES collects over 70,000 free-text answers each year. An automated approach was developed to analyse these, called rule-based information retrieval, or 'text engineering'. This approach sorts comments into themes. A website was also developed that summarises the number of comments patients make on each theme in the CPES. Theme names can be clicked on to show original comments. Associated information pages were added, so the overall website is called an information 'toolkit'. Linking automated text analysis with a toolkit like this is novel and helps health-care teams to consider the comments and make improvements to the patient experience as a result.

Rule-based information retrieval depends on word lists and word-finding rules. A mix of 'stakeholders' (patients, partners, carers and NHS staff) were asked to send us ideas on words to include, for example, outcomes of health care that might have been overlooked. Health staff and patients then met and talked together in specially designed workshops to help us to develop the toolkit in ways that were meaningful for both patients and staff. These groups also decided on the toolkit theme names and ranked them by importance.

The rule-based information retrieval approach is over 80% accurate in sorting CPES free text into themes; this is very good, because even two humans sorting data into themes often do not reach better agreement than this. The approach does not perform very well with free text from a survey that focuses on issues of daily life rather than health services, but it was believed that, with further work, this approach can be made as accurate for this and other surveys.

A specially designed health economics survey was used to explore what features of the toolkit health-care professionals preferred, and to value the toolkit. The toolkit was tested on 13 staff members in three UK NHS trusts (in Leeds, London and Wessex), who considered it to be very useful. The toolkit will be freely available via a Southampton website for health service use. The information retrieval process will be available for a small amount of money to cover maintenance costs (keeping it updated) and the costs of necessary continued information retrieval work.

Health Services and Delivery Research

ISSN 2050-4349 (Print)

ISSN 2050-4357 (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 HS&DR archive is freely available to view online at www.journalslibrary.nihr.ac.uk/hsdr. 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 *Health Services and Delivery Research* journal

Reports are published in *Health Services and Delivery Research* (HS&DR) if (1) they have resulted from work for the HS&DR programme or programmes which preceded the HS&DR programme, and (2) they are of a sufficiently high scientific quality as assessed by the reviewers and editors.

HS&DR programme

The Health Services and Delivery Research (HS&DR) programme, part of the National Institute for Health Research (NIHR), was established to fund a broad range of research. It combines the strengths and contributions of two previous NIHR research programmes: the Health Services Research (HSR) programme and the Service Delivery and Organisation (SDO) programme, which were merged in January 2012.

The HS&DR programme aims to produce rigorous and relevant evidence on the quality, access and organisation of health services including costs and outcomes, as well as research on implementation. The programme will enhance the strategic focus on research that matters to the NHS and is keen to support ambitious evaluative research to improve health services.

For more information about the HS&DR programme please visit the website: <http://www.nets.nihr.ac.uk/programmes/hsdr>

This report

The research reported in this issue of the journal was funded by the HS&DR programme or one of its preceding programmes as project number 14/156/15. The contractual start date was in November 2015. The final report began editorial review in July 2017 and was accepted for publication in December 2017. The authors have been wholly responsible for all data collection, analysis and interpretation, and for writing up their work. The HS&DR 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, NETSCC, the HS&DR 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 HS&DR programme or the Department of Health and Social Care.

© Queen's Printer and Controller of HMSO 2019. This work was produced by Rivas *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 Honorary Professor, University of Manchester, and Senior Clinical Researcher and Associate Professor, 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 Director, NIHR Dissemination Centre, 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

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