

The impact of promoting revised UK low-risk drinking guidelines on alcohol consumption: interrupted time series analysis

John Holmes,^{1*} Emma Beard,^{2,3} Jamie Brown,^{2,3}
Alan Brennan,¹ Inge Kersbergen,¹ Petra S Meier,¹
Susan Michie,² Abigail K Stevely¹ and Penny Buykx^{1,4}

¹School of Health and Related Research, University of Sheffield, Sheffield, UK

²Department of Clinical, Educational and Health Psychology, University College London, London, UK

³Cancer Research UK Health Behaviour Research Centre, University College London, London, UK

⁴School of Humanities and Social Science, University of Newcastle, Newcastle, NSW, Australia

*Corresponding author john.holmes@sheffield.ac.uk

Declared competing interests of authors: John Holmes received funding for related work outside this study from Public Health England, Systembolaget (Stockholm, Sweden) and Alko (Helsinki, Finland). Jamie Brown received unrestricted grants for unrelated work on smoking cessation from Pfizer Inc. (New York, NY, USA). Alan Brennan received additional funding for related work outside this study from Public Health England. Petra S Meier received additional funding for related work outside this study from Public Health England. She was also an unremunerated member of the Chief Medical Officers' drinking guideline development group. Susan Michie received grants from the National Institute for Health Research (NIHR) Public Health Research (PHR) and NIHR Programme Grants for Applied Research (PGfAR) programmes, as well as personal fees for Doctor of Philosophy (PhD) vivas and editorial and consultancy work from NIHR, for related work. Abigail K Stevely received personal funding and non-financial support from the University of Sheffield and grants, personal funding and non-financial support from the NIHR School for Public Health Research outside the submitted work. Penny Buykx received funding for related work outside this study from Public Health England.

Published October 2020

DOI: 10.3310/phr08140

Scientific summary

Revised UK low-risk drinking guidelines on alcohol consumption

Public Health Research 2020; Vol. 8: No. 14

DOI: 10.3310/phr08140

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

Scientific summary

Background

Health authorities in most high-income countries publish guidelines for low-risk alcohol consumption. The UK's Chief Medical Officers revised the UK's drinking guidelines in January 2016 to state that people can keep their risks from alcohol consumption to a low level by consuming no more than 14 units per week (1 unit = 10 ml or 8 g of ethanol) [Department of Health and Social Care (DHSC). *UK Chief Medical Officers' Low Risk Drinking Guidelines*. London: DHSC; 2016]. The previous guidelines had recommended that men did not regularly consume more than 3–4 units per day and that women did not regularly consume more than 2–3 units per day.

Aims and objectives

Primary aim

To evaluate the impact that promoting revised UK drinking guidelines has on alcohol consumption behaviour.

Objectives

1. To document the timing, audience and content of major promotional activity following the publication of the revised guidelines.
2. To use interrupted time series analysis of monthly survey data to assess whether or not trends in alcohol consumption behaviour, as a primary outcome, changed following publication and promotion of the revised drinking guidelines.
3. To undertake subgroup analyses to examine whether or not there are variations in intervention effects across groups of the population defined by age, sex and socioeconomic status.
4. To use difference-in-difference methods to examine whether or not direct and frequent exposure to promotion of drinking guidelines increases their effectiveness.
5. To undertake pathway analyses to validate theorised capability, opportunity and motivation to change behaviour, and behaviour itself.
6. To assess the cost-effectiveness of any identified effects on alcohol consumption using the Sheffield Alcohol Policy Model framework.

During the project, the objectives were amended as follows in consultation with the Project Steering Committee. First, as we identified no large-scale promotional activity relating to the guidelines beyond the announcement of the revisions, the first objective was abandoned. This was replaced with a new objective to conduct a review of the scale and content of news media coverage relating to the guidelines. Second, preliminary analyses showed no changes in the primary outcome measure and, in the absence of any promotional activity, we decided not to conduct a cost-effectiveness analysis. Third, the lack of any substantial change in the outcome measures meant that we did not pursue the difference-in-difference analysis or pathway analyses.

Intervention

The announcement of new UK low-risk drinking guidelines in January 2016.

Methods

Timeline of promotional activity

We generated a list of 23 organisations that would potentially promote the guidelines and then developed an internet-based questionnaire to survey each organisation on their promotional activities. Our monitoring of media content relating to drinking guidelines indicated that no organisation was engaged in substantial promotional activity so we initially sent the questionnaire to named contacts in only five key organisations from our list in June 2017. The questionnaire covered the following areas: type of promotional activity, communication platform, aspect of the guidelines communicated, timing and frequency of promotional activity, supplementary activities, target audience, whether or not promotional content was interactive, actual or estimated cost of activity, audience reached, and a request for the creative brief or associated documents. The survey results were analysed descriptively.

Review of news media coverage

Search strategy

The review focused primarily on newspaper coverage. We conducted three separate searches of the Nexis 'UK publications' database for articles published between 1 February 2014 and 31 October 2017. We excluded Scottish newspapers from the search. Search terms were Alcohol guidelines OR drinking guidelines OR alcohol units (search 1); 14 units OR 21 units OR 2–3 units OR 3–4 units (search 2); and alcohol recommendations OR alcohol limits OR alcohol guidance OR alcohol advice (search 3). We also used Google (Google Inc., Mountain View, CA, USA) to search the news websites of two leading broadcasters, the BBC (British Broadcasting Corporation, London, UK) and Sky (Sky UK, London, UK), using the same search terms.

Inclusion and exclusion criteria

To be included in the final sample, articles had to mention the guidelines, in full or in part, or comment on the process of developing the guidelines. The review excluded articles in local newspapers and those that discussed guidelines or recommendations only for drink-driving or drinking in pregnancy. One researcher undertook headline and full-text screening.

Data extraction

We extracted publication name, source type (e.g. broadsheet/quality press, online only), publication date and what aspects of the guidelines were mentioned (e.g. 2–3 units a day for women, having drink-free days).

Analysis

The analysis had quantitative and qualitative components. The quantitative analysis coded a stratified random sample of 500 articles by their primary topic, the primary role of the guidelines in the article and the overall tone. The qualitative analysis selected a stratified random sample of 100 articles for thematic coding and then took further samples of 100 articles until we reached data saturation.

Interrupted time series analyses

Data

The analyses use data from the Alcohol Toolkit Study, a monthly repeat cross-sectional survey of nationally representative samples of 1700 adults (aged ≥ 16 years) per month living in private households in England. We use data from March 2014 to October 2017.

Measures

The primary outcome was alcohol consumption behaviour as measured by Alcohol Use Disorders Identification Test – Consumption score. Secondary outcome measures were average weekly alcohol consumption measured by graduated frequency questions, alcohol consumption per capita adult

derived from alcohol taxation data and number of hospitalisations for alcohol poisoning (*International Statistical Classification of Diseases and Related Health Problems*, Tenth Revision: T51.0, T51.1 and T51.9) and assault (*International Statistical Classification of Diseases and Related Health Problems*, Tenth Revision: X85–Y09).

Further secondary outcomes were influences on behaviour change, specifically whether or not drinkers were aware of guidelines, whether or not they knew what the guideline was, places they had been exposed to the guideline in the past month, and 10 questions assessing drinkers' capability, opportunity and motivation to change their alcohol consumption behaviour.

Respondents were divided into population subgroups defined by sex, age (16–34, 35–64 and ≥ 65 years) and social grade, which is an occupation-based measure of socioeconomic status that classified respondents as AB (high), C1C2 (intermediate) or DE (low). We used the graduated frequency measure to create three alcohol consumption groups: moderate drinkers, consuming < 14 units per week; increasing-risk drinkers, women consuming between 14 and 35 units per week and men between 14 and 50 units per week; and high-risk drinkers, women consuming > 35 units per week and men consuming > 50 units per week .

Covariates in the main evaluation analyses were monthly retail price indices for four beverage categories (on-trade beer, off-trade beer, on-trade wine and spirits and off-trade wine and spirits) and monthly average temperatures taken from the Met Office's Hadley Centre Central England Temperature (HadCET) data set.

Analyses

Descriptive statistical analyses compare outcome measures pre and post intervention based on the average response of all respondents surveyed within those time periods. Comparisons between subgroups are based on post-intervention data only.

The primary evaluation analyses use segmented regression generalised additive models. We model the trend in Alcohol Use Disorders Identification Test – Consumption score in the pre-intervention period, any immediate step change in Alcohol Use Disorders Identification Test – Consumption scores when the guidelines were introduced and any change in the trend in the post-intervention period relative to the pre-intervention period. All models were adjusted for seasonality.

Secondary evaluation analyses used the same approach with the two alternative alcohol consumption measures and the hospitalisation measures as the dependent variables. As the Alcohol Toolkit Study included only graduated frequency questions from November 2015, the data series was not long enough to model the pre-intervention trend for this measure and, instead, we conducted a simple pre/post analysis.

Further secondary analyses using the primary outcome (Alcohol Use Disorders Identification Test – Consumption scores) involved (1) using an iterative procedure to identify any statistically significant alternative break points in the Alcohol Use Disorders Identification Test – Consumption trend, other than January 2016; (2) testing for an immediate, short-term pulse effect in Alcohol Use Disorders Identification Test – Consumption scores following the guideline announcement and, in unplanned analyses, testing how long the identified pulse effect lasted; (3) testing whether quadratic or cubic models provided a better fit to the data than linear models; and (4) in unplanned analyses, mitigating higher than anticipated levels of variability in post-intervention Alcohol Use Disorders Identification Test – Consumption scores by extending the post-intervention period until February 2018 using newly available Alcohol Toolkit Study data.

Results

Timeline of promotional activity

None of the initial five organisations surveyed reported undertaking any substantial promotional activity relating to the revised guidelines between January 2016 and June 2017. They also reported no knowledge of any substantial promotional activity by other organisations or any planned activity within the study period. Given this, we judged that surveying other organisations was unwarranted and so we discontinued this work.

Review of news media coverage

The review identified 997 eligible articles from 29 publications. Drinking guidelines were mentioned regularly in news articles across the study period, and the number of articles per week peaked when the revised guidelines were announced in January 2016. The peak was largely due to articles discussing the guidelines directly, whereas outside this period articles were more likely to mention the guidelines in the context of more general news about alcohol or health.

Analysis of the 500 articles coded quantitatively showed that 19.4% of articles discussed the guidelines directly, but guidelines were more usually mentioned in more general articles relating to alcohol (60.2%) or health (16.4%). The purpose of articles mentioning the guidelines was usually to promote health (50.0%) or provide context for drinking (20.8%), with 14.8% of articles discussing the merits of the guidelines and 6.8% of articles informing the public of the revisions. Most articles (83.4%) were neutral in tone and only 14.4% were negative in tone, but 77.8% of these negative articles discussed the merits of the guidelines.

The qualitative analyses identified four themes. The first was factual reporting of the guidelines, with guidelines being mentioned only briefly in a factual manner and without linking them to broader themes. The remaining three themes were found in articles with a negative tone as these were the main article type to discuss the guidelines in depth. These three themes were (1) the guidelines are not based on the best available science and should not exist in their current form, (2) the guidelines threaten autonomy and should not exist at all and (3) alcohol advice is changing constantly and it is unclear what advice to follow.

Interrupted time series analyses

Descriptive analyses showed that 87.0% of drinkers were aware of the guidelines post intervention, but only 23.9% of drinkers could identify the guidelines as ≤ 14 units per week (or ≤ 2 units per day). Among drinkers able to give a correct or incorrect figure for the guideline, 76.5% reported exposure to this guideline in at least one place in the last month during the post-intervention period, with 39.1% reporting exposure via television or radio, 22.1% via product labels and 17.6% via newspapers or magazines. With regard to drinkers' capability, opportunity and motivation to change their behaviour, drinkers were least likely to give positive responses to items asking whether or not they believe that they can regularly drink only 2 units per day without risking serious harm (35.6%), track their units (25.9%), are trying to avoid drinking excessively (39.6%) and are concerned by drinking too much (23.8%). There were no substantial and sustained changes in the influences on behaviour change across the study period.

Drinkers in social grades D and E were less likely than those in grades A and B to be aware of and know the guidelines; find it more difficult to drink at moderate levels and are less motivated to do so; and are less sure where to get advice on cutting down. Increasing and high-risk drinkers are more likely than moderate drinkers to be aware of and exposed to the guidelines but are not more likely to know what they are. Increasing and high-risk drinkers are also less likely to say that 2 units is the most that they can drink without harming their health; find it harder to drink at moderate levels and are less motivated to do so; and are less likely to track their units.

The primary evaluation analyses showed no significant step change in the level of Alcohol Use Disorders Identification Test – Consumption scores following the initial announcement of the new guidelines in January 2016. However, there was a change in the subsequent trend, such that Alcohol Use Disorders Identification Test – Consumption scores increased more rapidly after the announcement ($\beta = 0.008$, 95% confidence interval 0.001 to 0.015), and extending the primary analyses to February 2018 did not substantively change this result. However, secondary analyses identified an alternative break point, which indicated that this change in trend began in July 2015, 6 months before the announcement of the revised guidelines. Further secondary analyses showed that Alcohol Use Disorders Identification Test – Consumption scores were temporarily significantly lower for 4 months after the announcement and that quadratic or cubic segmented regressions models did not provide a better fit for the data than the approach used in the primary evaluation analysis. Analyses of secondary outcome measures showed no significant change in January 2016 in the level or trend of the graduated frequency or tax-based measures of alcohol consumption. The hospitalisation measures showed large step-change declines in both assaults (incidence rate ratio 0.927, 95% confidence interval 0.875 to 0.983) and alcohol poisonings (incidence rate ratio 0.846, 95% confidence interval 0.735 to 0.975) immediately after the announcement, but these did not align with findings for any other outcome measure and should be treated with caution.

Patient and public involvement

We conducted two patient and public involvement sessions with a panel of approximately 30 adult drinkers living in Scotland who had been recruited via social media. These sessions helped us to interpret the results of our evaluation analyses and confirmed our view that the guidelines had little impact on drinkers in the general population. One panel member also contributed to our Project Advisory Group.

Conclusions

The announcement of revised UK low-risk drinking guidelines was not subject to large-scale promotion by any organisation following the initial media launch, was not associated with substantial and sustained changes in most influences on behaviour change and was not associated with clearly detectable changes in drinking behaviour.

The UK Government's alcohol strategy states that it wants drinkers to use the guidelines to make responsible and healthy choices about their alcohol consumption. Our results suggest that this will require a large increase in the proportion of drinkers who can correctly state the guideline and also in the proportion of drinkers, particularly in lower socioeconomic and heavy-drinking groups, who have the capability, opportunity and motivation to change their drinking habits.

Future research should (1) identify the content and format of alcohol-related health promotion messages that would be most effective in achieving these requirements, (2) identify whether or not the content and format should be varied for the population subgroups of interest and (3) give attention to how best to design drinking guidelines to ensure that they function effectively as a behaviour change intervention, as opposed to a means of communicating information to the public.

Trial registration

This trial is registered as ISRCTN15189062.

Funding

This project was funded by the National Institute for Health Research (NIHR) Public Health Research programme and will be published in full in *Public Health Research*; Vol. 8, No. 14. See the NIHR Journals Library website for further project information.

Public Health Research

ISSN 2050-4381 (Print)

ISSN 2050-439X (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 PHR archive is freely available to view online at www.journalslibrary.nihr.ac.uk/phr. 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 *Public Health Research* journal

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

Reviews in *Public Health Research* 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.

PHR programme

The Public Health Research (PHR) programme, part of the National Institute for Health Research (NIHR), is the leading UK funder of public health research, evaluating public health interventions, providing new knowledge on the benefits, costs, acceptability and wider impacts of non-NHS interventions intended to improve the health of the public and reduce inequalities in health. The scope of the programme is multi-disciplinary and broad, covering a range of interventions that improve public health.

For more information about the PHR programme please visit the website: <https://www.nihr.ac.uk/explore-nihr/funding-programmes/public-health-research.htm>

This report

The research reported in this issue of the journal was funded by the PHR programme as project number 15/63/01. The contractual start date was in November 2015. The final report began editorial review in May 2019 and was accepted for publication in January 2020. The authors have been wholly responsible for all data collection, analysis and interpretation, and for writing up their work. The PHR 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 PHR 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 PHR programme or the Department of Health and Social Care.

© Queen's Printer and Controller of HMSO 2020. This work was produced by Holmes *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).

Editor-in-Chief of *Public Health Research* 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

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