

**Title**

Effectiveness of strategies to encourage general practitioners to accept an offer of free access to online evidence-based information: A randomised controlled trial.

**Authors**

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## **ABSTRACT**

**Objective:** To examine the effectiveness of seven different interventions designed to increase the proportion of general practitioners (GPs) accepting an offer of free access to an online evidence-based resource.

**Participants:** 14,000 Australian GPs were randomly selected and randomly assigned to seven intervention groups, with each receiving a different letter.

**Interventions:** Seven different strategies were used to encourage GPs to accept an offer of two years free access to an online evidence based resource (*BMJ Clinical Evidence*). The first group received a standard letter of offer with no experimental demands. Groups 2-7 received a standard letter of offer outlining the requirements of the study. They were asked to 1) complete an initial online questionnaire 2) agree to complete a 12 month follow up questionnaire and 3) agree to having data about their usage of the online evidence-based resource provided to researchers. Groups 3 -7 also had additional interventions included in the letter of offer: access to an online tutorial in use of the resource (Group 3); provision of a pamphlet with statements from influential opinion leaders endorsing the resource (Group 4); offer of eligibility to receive professional development points (Group 5); offer of eligibility for a prize of \$500 for registration at a medical conference of their choice (Group 6); and a combination of some of the above interventions (Group 7).

**Main outcome measures:** GPs acceptance of the offer of 2 years free access to an online evidence based resource.

**Results:** In the group with no research demands 27% accepted the offer. Average acceptance across all other groups was 10%. There was no advantage in using additional strategies such as financial incentives, opinion leader support, offer of professional development points or an educational aid over a standard letter of offer to increase acceptance rates. Relative to non-responders, responders were more likely to be younger, male, to have graduated in Australia, UK or Ireland, to have graduated more recently and practice in a highly accessible geographic location.

**Conclusion:** This study showed low acceptance rates of the offer of access to the on-line resource when there was an associated requirement of response to a short on-line questionnaire and non-obtrusive monitoring of GP behaviour in terms of accessing the resource. If we are to improve care and encourage

evidence based practice we need to find effective ways of motivating doctors and other health professionals to take part in research that can inform our implementation efforts.

**WORD COUNT**

**401**

## INTRODUCTION

Access to high quality evidence-based resources is a necessary first step if doctors are to change clinical practices in line with best available evidence.[1-3] The rapid speed of scientific research brings daily breakthroughs. An extensive review of health and medical journal articles published in Medline between 1978-2001 revealed that by 2001 the average number of articles published per year was 442,756.[4] Clinicians not only lack the time to locate and review such extensive numbers of journal articles, but many also lack skills necessary for locating them.[5, 6] Even when relevant literature is located, clinical research does not always easily translate into practical advice for clinicians.[7] Given the volume of research produced and the skills required to locate and interpret relevant current evidence, it is apparent that research knowledge needs to be synthesised into a practical and accessible format for clinicians. Over recent years electronic methods have increasingly been used to provide this kind of information to clinicians, and a number of countries have invested in national licenses for various clinical resources.

One resource that claims to assist clinicians in overcoming the barriers to finding and reviewing best evidence is *BMJ Clinical Evidence*. This is available online and provides summaries about the prevention and treatment of selected clinical conditions commonly seen in primary and hospital care settings. These summaries of conditions are produced using comprehensive reviews and evaluations of the literature.[8]

In Australia the National Institute of Clinical Studies, now an institute of the National Health and Medical Research Council, was established to improve health care by getting the best available evidence from health and medical research into everyday practice. As part of its brief to make evidence more accessible to clinicians, the Institute undertook a study, funded by the Australian Government, to examine the acceptance by Australian general practitioners (GPs) of an offer of free access to the online version of *BMJ Clinical Evidence* and its subsequent use. A number of general practice leaders and organisations had strongly advocated that this resource should be freely available to general practitioners. The cost of a single user 12 month subscription is approximately \$300AUD. Participants in the study were offered free access to the resource for 2 years.

Not all doctors offered access to an evidence based resource will be interested in accepting or using the resource. We wanted to investigate whether any particular strategy would encourage doctors to accept this offer of free access.

## **METHODS**

### *Objectives*

The objectives of this study were to:

1. Examine the effectiveness of different strategies designed to encourage GPs to accept an offer of free access to an online evidence based resource.
2. Compare the characteristics of those who accepted the offer and those who did not.

### *Participants*

Participants were randomly selected by Medicare Australia, the Australian government agency responsible for processing claims and reimbursements to the public for visits made to GPs. At the time the study was undertaken, there were 22,996 doctors listed by Medicare Australia as providing general practice services. Of these, 18,262 doctors were deemed eligible for participation in the study on the basis that they were classified by Medicare as being in active practice (having the primary speciality of general practice and making at least \$1000 of Medicare claims in the preceding quarter). The socio-demographic characteristics of these GPs is shown in Table 1. From this group a random sample of 14,000 GPs was selected and randomly allocated using computer-generated randomisation, to one of seven groups, stratified by age group, sex and location, as determined by the Accessibility/Remoteness Index of Australia (ARIA).[9]

### *Procedure*

Medicare Australia forwarded an invitation letter from NICS to the selected GPs offering two years free access to the online version of *BMJ Clinical Evidence*. Using Medicare for this process ensured complete coverage of the GP population as it possesses the most accurate, current and reliable contact information on Australian GPs due to its role in processing claims and payments to GPs.

The letter stated Medicare Australia would provide NICS with de-identified grouped data on the characteristics of those GPs who accepted the offer and of those who rejected or didn't respond to the offer. Groups 2-7 received letters which indicated that if GPs accepted they would be asked to complete an initial online survey and a subsequent 12-month follow-up survey; and to consent to NICS receiving information about their use of the online evidence-based resource from the publishers. They were assured that individual practitioners would not be identified in any reports or publications arising from the study.

All seven groups were given 4 weeks to return the consent form, via a reply paid envelope or fax. GPs in Group 1 who returned their consent form within 4 weeks were eligible for inclusion in the study. GPs in Groups 2-7 who returned their agreement form within 4 weeks and completed the online survey by the specified date were eligible to participate in the study.

Once the acceptance form was returned, GPs received a confirmation email specifying a date they would receive their account details to log onto the online evidence-based resource. Confirmation emails sent to Groups 2-7 contained additional instructions on how to complete the online survey. Personalised reminder emails were sent to GPs who had not completed the questionnaire. All GPs eligible to participate were emailed their account details to the online evidence-based resource with instructions on how to access the site.

### *Interventions*

Each intervention was specifically designed, based on current literature, to encourage GPs to accept the offer and participate in the study. The interventions were also designed to be practical and cost effective options that could be replicated by other researchers interested in undertaking studies with health practitioners.

### *Group 1: No experimental demands.*

This group was offered 2 years free online access to the evidence-based resource and was only required to return the consent form to be eligible. They were not required to consent to their individual usage data of

the resource being released for analysis. This group allows the uptake rate, without any associated experimental requests, to be examined.

*Group 2: Standard invitation.*

This group was offered 2 years online free access, provided they completed an online questionnaire and agreed to complete a 12-month survey and allow data about their usage of the resource to be provided to the researchers. Comparisons between Group 1 and 2 provided an opportunity to evaluate the effect that study demands had on response rate.

*Group 3: Tutorial.*

Although the integration of computers into general practice has increased considerably over the last decade, barriers to their use still exist, with many GPs still lacking confidence, skills, training and technical support.[10-12] In an effort to reduce technical barriers, Group 3 was offered access to a short, downloadable tutorial specifically developed by NICS to demonstrate how to access and search the site of the evidence-based resource. The NICS' online tutorial consists of an interactive flash movie and requires Adobe flash player 8. Tutorial topics include instructions on how to login, search for keywords, search for frequently searched conditions, print, use help option, contact the publishers, access resources, update details, and log out.

*Group 4: Opinion leaders.*

Literature is mixed as to whether using opinion leaders to endorse evidence-based decision aids can improve uptake [13-15] . Group 4 received a pamphlet containing supportive statements regarding the benefits of the online evidence-based resource from leaders of various Australian general practice and medical organisations. A variety of well known opinion leaders were used in an attempt to overcome difficulties in clearly identifying individuals and organisations that might be perceived as influential by a majority of the selected GPs. Statements made included:

“As a rural or remote medical practitioner you often have to manage complex conditions without nearby specialist support. *Clinical Evidence* provides some of the very best evidence-based support for you in an electronic format.”

“*Clinical Evidence* is a trusted source of summarised evidence-based clinical information that is presented in an easy to read format. It provides clinicians with answers to many of the important questions which arise during our consultations.”

“As a GP and educator I face questions every day. Patients and learners have questions. I have questions. I see *Clinical Evidence* as a great resource to improve the quality of the answers we find.”

*Group 5: Acquisition of professional development points.*

To maintain access to certain Medicare payments every triennium GPs must earn 130 RACGP professional development points (undertaking a minimum of two Category 1 activities) or 100 Australian College of Rural and Remote Medicine (ACRRM) professional development points. GPs can gain these points through a range of activities, with the category one activities generally being more time intensive and therefore worth more points. Consequently, offering professional development points to GPs for their participation in an activity might increase GP involvement. Group 5 were offered eligibility to earn 30 Category 1 points through the RACGP or 20 points through the ACRRM. To receive these points GPs were required to develop learning objectives, regularly use the online resource for a 12 month period and then complete a survey about the extent to which they met their learning objectives.

*Group 6: Eligibility for a prize.*

Various types of monetary incentives are widely used by pharmaceutical companies to recruit GPs to studies; such incentives may also increase the uptake of education material and improve response rates in mailed questionnaires.[16-19] Members of the sixth group were informed that doctors who agreed to participate would be eligible for a prize of \$500 towards registration for a medical conference of their choice.

### *Group 7: Combination intervention.*

Some studies have shown that multifaceted interventions are more effective than single interventions when encouraging clinicians to use evidence.[20, 21] Group 7 received a combination of interventions comprising of the opinion leaders' pamphlet, access to the online tutorial and eligibility to earn professional development points through participating in the study.

### *Statistical Methods*

Data on response status by intervention group and by age, sex, country of graduation, years since graduation and ARIA were provided by Medicare in table format (to protect GP's privacy).

Baseline characteristics (age group, sex, country of graduation, years since graduation and ARIA) of all doctors selected for inclusion in the study were compared between intervention groups. To investigate factors associated with take up of the offer, response rates were compared between intervention groups, and between levels of sociodemographic variables. Because of small numbers in some cells, some categories of age, years since graduation and ARIA were combined. All comparisons were undertaken using the chi-square test (as all variables were categorical).

It was anticipated that 10%-50% of GPs would take up the offer of free access to an online evidence-based resource. A sample of 2000 per group (14,000 in total) would allow a detectable difference in response rates between groups of 3%-7% and differences in characteristics between responders and non-responders of at least 15%, depending on response rates (assuming 80% power and 5% significance level).

## **RESULTS**

Age, gender, country of graduation, years since graduation and area of residence were similar among the seven intervention groups. Of the 14,000 letters mailed, Medicare reported that 71 letters were return to sender rate (0.5%). There were 2105 (15%) signed acceptance forms returned. Of the 1570 GPs assigned to Groups 2-7 who accepted, 1228 went on to complete the online questionnaire, which when combined with the 535 GPs assigned to Group 1 who accepted, gives a final acceptance rate of 12.5% (n=1763).

There was a statistically significant difference in acceptance among the groups, with acceptance highest in Group 1 – no experimental demands - (27%) and lowest in Group 5 – offer of professional development points - (8.0%) and Group 7 – combined interventions - (8.5%). Acceptance rates were similar for Groups 2-7 ranging from 8.0% to 12% (Figure 1).

INSERT FIGURE 1 HERE

INSERT TABLE 1 HERE

Given the large sample size, there was adequate power to detect small differences in socio-demographic characteristics between responders and non-responders. Relative to non-responders, responders were more likely to be younger, male, to have graduated in Australia, UK or Ireland, to have graduated more recently and practice in a highly accessible geographic location.

## **DISCUSSION**

In this study, acceptance of a free online information resource (that would usually require payment for access and that had been identified by a number of general practitioner groups as potentially useful and valuable) was significantly lower among groups asked to complete online questionnaires and consent to usage data being monitored compared to the group with no experimental demands.

All groups offered the resource needed to make some effort to respond – they were required to complete and return an acceptance form by mail or fax so that they could be registered to log on to the resource. Twenty seven percent of the doctors in Group 1, who received a letter offering the resource without the need for study participation, accepted. In contrast, on average only 10% of doctors offered free access in return for study participation accepted this offer.

Low cost strategies designed to provide additional incentives to participate in the study (such as endorsement by opinion leaders) or reduce barriers to acceptance (such as offer of an online tutorial in use of the resource) were no more effective than a standard letter of offer.

The differences in characteristics of doctors responding to the offer and those not responding may reflect more the attractiveness of the offer of an online resource than willingness to participate in the research. We hypothesised that doctors in rural areas of Australia would be less likely to accept the offer due to limited broadband access, however research indicates rural GPs are more likely to access the internet despite having poorer access).[22] Younger doctors are more likely to be interested in an on-line resource than those who are older.[23, 24]

### **Strengths and Limitations**

This is a very large population study investigating the effectiveness of different strategies designed to encourage GPs to accept an offer of free access to an online evidenced based resource and to participate in a study of its use and value. The study provided 14,000 GPs with the opportunity to access an online evidence-based resource at no financial cost to them. The strategies used in an attempt to encourage

participation were low cost and could be used by researchers or other organisations interested in recruiting GPs to studies or encouraging GP uptake of a variety of resources. The collaboration with Medicare Australia provided information that would otherwise be unobtainable on non-responders to the letter of offer.

There were some limitations to this study. Doctors were only approached by letter which, because of privacy concerns, was not sent directly from researchers but forwarded by Medicare Australia, the government agency responsible for processing claims for GP reimbursement. This method of approach may have influenced acceptance of the offer. There would have been some contamination of the sample, with some doctors within the same practice receiving different letters of offer. The offer of acquisition of professional development points for participation in the study (Groups 5 and 7) was made halfway through the 2005 to 2007 triennium when many GPs may have already acquired the compulsory number of points. Because doctors in Group 1 were not required either to complete online surveys or to agree to their usage of the resource being monitored we do not know whether there would be a difference in doctors' willingness to participate if only one of these requirements was in place.

### **Implications of results**

The study provides baseline data on what level of acceptance can be expected when offering GPs a free resource in return for participation in a study which requires them to respond to an on-line questionnaire and to agree to information about non obtrusive monitoring of their behaviour. Additional low cost incentives including offer of continuing education points, opinion leader endorsement, offer of an on-line tutorial or offer of entry into a lottery for money to be used on conference attendance made no difference to acceptance of the offer.

### **Conclusion**

Whilst this study was based on an Australian GP population, the findings have general implications for researchers, medical educators and policymakers. Funding of universal access to free on-line resources may not be cost-effective if calculations of cost are based on total population eligible to use the resource rather than the much smaller number likely to be interested.

It is of critical importance to find ways of increasing the probability that general practitioners will access information regarding best evidence practice. Unless GPs access best evidence resources there is little chance that they will read them and potentially change their clinical practice. Getting them to agree to access is a first necessary step.

To understand how to improve practice we need to be able to engage health professionals in research about changing behaviour.[25] Despite the offer of a free resource worth about \$600 (for 2 years access) only 10% of doctors were willing to accept the resource when required to participate in a study of their use of the resource and its perceived value to them. General practitioners are often asked to recruit their patients to studies but are less frequently asked to participate in studies of their own behaviour. Patients who participated in research are motivated by a variety of factors from altruism – the belief that others may benefit from the knowledge gained – through to hope that participation in research will improve the care they receive and favourably influence their outcome.[26] If we are to improve care and encourage evidence based practice we need to find equally effective ways of motivating doctors and other health professionals to take part in research that can inform our implementation efforts.

## **Word Count**

**2924**

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**Author Contributors:**

HB obtained funding for the study, prepared ethics applications, contributed to the design of study, data analysis and interpretation, and writing of paper.

CD undertook statistical analysis and contributed to drafting of results section.

EL contributed to writing of paper, project management, data management, ethics amendments and progress and final reports, development of online questionnaires, contributed to data analysis and interpretation.

RSF was responsible for design of study, and contributed to data analysis, interpretation and writing of paper.

All authors acknowledge that they have approved the final version of the paper submitted.

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## Declaration of competing interest

**Name:** Heather Buchan

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<b>Financial competing interests</b>	
1. In the past five years have you received reimbursements, fees, funding, or salary from an organization that may in any way gain or lose financially from the publication of this manuscript, either now or in the future? Is such an organization financing this manuscript (including the article-processing charge)? If so, please specify.	No
2. Do you hold any stocks or shares in an organization that may in any way gain or lose financially from the publication of this manuscript, either now or in the future? If so, please specify.	No
3. Do you hold or are you currently applying for any patents relating to the content of the manuscript? Have you received reimbursements, fees, funding, or salary from an organization that holds or has applied for patents relating to the content of the manuscript? If so, please specify.	No
4. Do you have any other financial competing interests? If so, please specify.	No

<b>Non-financial competing interests</b>	
1. Are there any non-financial competing interests (political, personal, religious, ideological, academic, intellectual, commercial or any other) to declare in relation to this manuscript? If so, please specify.	No

## Declaration of competing interest

**Name:** Emma Lourey

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8. Do you have any other financial competing interests? If so, please specify.	No

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## Declaration of competing interest

**Name:** Rob Sanson Fisher

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### Financial competing interests

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No

12. Do you have any other financial competing interests? If so, please specify.

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### Non-financial competing interests

3. Are there any non-financial competing interests (political, personal, religious, ideological, academic, intellectual, commercial or any other) to declare in relation to this manuscript? If so, please specify.

No

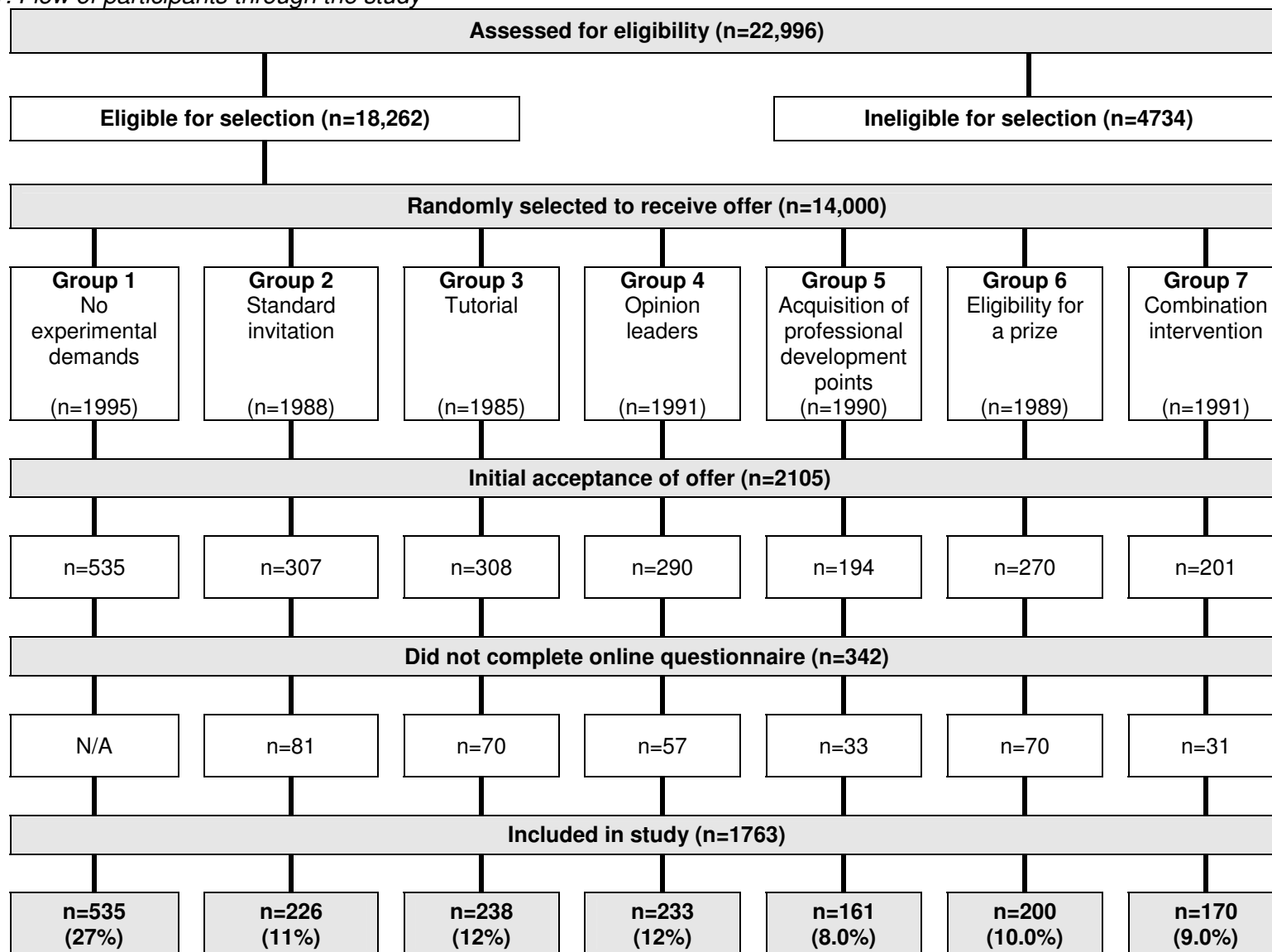
CONSORT Statement 2001 - Checklist   
**Items to include when reporting a randomized trial**

<b>PAPER SECTION And topic</b>		<b>Descriptor</b>	<b>Reported on Page #</b>
<b>TITLE &amp; ABSTRACT</b>	1	<a href="#">How participants were allocated to interventions</a> (e.g., "random allocation", "randomized", or "randomly assigned").	2
<i>INTRODUCTION</i> Background	2	<a href="#">Scientific background and explanation of rationale.</a>	3-4
<i>METHODS</i> Participants	3	<a href="#">Eligibility criteria for participants</a> and the <a href="#">settings and locations where the data were collected.</a>	4
Interventions	4	<a href="#">Precise details of the interventions intended for each group and how and when they were actually administered.</a>	5-8
Objectives	5	<a href="#">Specific objectives and hypotheses.</a>	4
Outcomes	6	<a href="#">Clearly defined primary and secondary outcome measures</a> and, when applicable, any <a href="#">methods used to enhance the quality of measurements</a> (e.g., multiple observations, training of assessors).	2
Sample size	7	<a href="#">How sample size was determined</a> and, when applicable, <a href="#">explanation of any interim analyses and stopping rules.</a>	8
Randomization -- Sequence generation	8	<a href="#">Method used to generate the random allocation sequence, including details of any restrictions</a> (e.g., blocking, stratification)	4
Randomization -- Allocation concealment	9	<a href="#">Method used to implement the random allocation sequence</a> (e.g., numbered containers or central telephone), clarifying whether the sequence was concealed until interventions were assigned.	4
Randomization -- Implementation	10	<a href="#">Who generated the allocation sequence, who enrolled participants, and who assigned participants to their groups.</a>	4
Blinding (masking)	11	<a href="#">Whether or not participants, those administering the interventions, and those assessing the outcomes were blinded to group assignment.</a> If done, <a href="#">how the success of blinding was evaluated.</a>	4
Statistical methods	12	<a href="#">Statistical methods used to compare groups for primary outcome(s);</a> <a href="#">Methods for additional analyses,</a> such as subgroup analyses and adjusted analyses.	8-11
<b>RESULTS</b>  Participant flow	13	<a href="#">Flow of participants through each stage</a> (a diagram is strongly recommended). Specifically, for each group report the numbers of participants randomly assigned, receiving intended treatment, completing the study protocol, and analyzed for the primary outcome. <a href="#">Describe protocol deviations from study as planned, together with reasons.</a>	10
Recruitment	14	<a href="#">Dates defining the periods of recruitment and follow-up.</a>	4-5
Baseline data	15	<a href="#">Baseline demographic and clinical characteristics of</a>	10

		<a href="#">each group.</a>	
Numbers analyzed	16	<a href="#">Number of participants (denominator) in each group included in each analysis and whether the analysis was by "intention-to-treat".</a> State the results in absolute numbers when feasible (e.g., 10/20, not 50%).	8
Outcomes and estimation	17	<a href="#">For each primary and secondary outcome, a summary of results for each group, and the estimated effect size and its precision</a> (e.g., 95% confidence interval).	8
Ancillary analyses	18	<a href="#">Address multiplicity by reporting any other analyses performed,</a> including subgroup analyses and adjusted analyses, indicating those pre-specified and those exploratory.	8-11
Adverse events	19	<a href="#">All important adverse events or side effects in each intervention group.</a>	N/A
<i>DISCUSSION</i> Interpretation	20	<a href="#">Interpretation of the results,</a> taking into account study hypotheses, sources of potential bias or imprecision and the dangers associated with multiplicity of analyses and outcomes.	12-14
Generalizability	21	<a href="#">Generalizability (external validity) of the trial findings.</a>	12-14
Overall evidence	22	<a href="#">General interpretation of the results in the context of current evidence.</a>	12-14

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Figure 1: Flow of participants through the study



Note: initial numbers in groups may not total to 2000 each as there were 71 return to senders recorded by Medicare.

Table 1: Socio-demographic characteristics total eligible population

	18262	
<b>Age</b>	<b>N</b>	<b>%</b>
<35	1578	8.6
35 – 44	4548	25
45 – 54	6160	34
55 – 64	4355	24
65 +	1621	8.9
<b>Gender</b>		
Female	6779	37
Male	11462	63
<b>Country of Graduation</b>		
Australia	13369	73
UK/Ireland	1382	7.6
Asia	1750	9.6
Europe	406	2.2
Africa	761	4.2
Other	594	3.3
<b>Years since graduation</b>		
<5	268	1.5
5 – 9	1,478	8.1
10 – 19	4,629	25
20 – 29	6,450	35
30 – 39	3,953	22
40 +	1,484	8.1
<b>ARIA Classification</b>		
Highly Accessible	15,292	84
Accessible	1,805	9.9
Mod Accessible	538	2.9
Remote	144	0.8
Very Remote	135	0.7

Some data missing for gender and ARIA classification. Percentages may not add to 100 due to rounding.