Author's response to reviews

Title: Effectiveness and reach of a directed-population approach to improving dental health and reducing inequalities: a cross sectional study

Authors:

Lynn Brewster (lynn.hunter1@nhs.net)
Andrea Sherriff (andrea.sherriff@gla.ac.uk)
Lorna MD Macpherson (Lorna.Macpherson@glasgow.ac.uk)

Version: 3 Date: 18 July 2013

Author's response to reviews: see over
Dear Dr Pafitis,

Thank you for reviewing our manuscript:

**Effectiveness and reach of a directed-population approach to improving dental health and reducing inequalities: a cross sectional study**

By Lynn Brewster, Andrea Sherriff and Lorna Macpherson

We have now addressed Reviewer 2’s comments, item by item, which we attach to the bottom of this letter (our responses in red).

We have also made the requisite changes to the manuscript body which we have submitted online. We look forward to hearing from you in due course,

Yours sincerely,

Lorna Macpherson

Professor Lorna M D Macpherson
BDS, MPH, PhD, FDS, FRCD(Can), FFPH, FHEA
Professor of Dental Public Health
University of Glasgow Dental School
378 Sauchiehall Street, Glasgow G2 3JZ
Direct Line: +44 (0) 141 211 9751 Fax: +44 (0)141 353 1593
Email: lorna.macpherson@glasgow.ac.uk

The University of Glasgow, charity number SC004401
Reviewer's report
Title: Effectiveness and reach of a directed-population approach to improving dental health and reducing inequalities: a cross sectional study
Version: 2 Date: 24 June 2013
Reviewer: Paul Brocklehurst
Reviewer's report:
Major Compulsory Revisions

General
The authors use the term "1-sensitivity" and "1-specificity" extensively. I think this should be changed to false negatives, false positives, as this is more understandable for the reader i.e. those that were at increased risk and who were not targeted and those that were not at increased risk, but who were targeted.

The authors considered the terminology, and concluded that using (1-sensitivity) and (1-specificity) throughout the manuscript was more appropriate than false positives and false negatives, which are more commonly used in clinical studies. As this study was addressing 3 different outcome variables, using 4 different targeting (or screening) methods, we felt that the audience would more easily interpret the findings if the definitions of the measures under consideration were more explicit. We have clearly defined these measures in the methods, but agree with the reviewer that we should also state that (1-sensitivity) is analogous to the false positive rate, (1-specificity), the false negative rate. Therefore on page 10, within the Methods section we will add these definitions to parts (i) and (ii).

Abstract
Background
PPV = TP and FP, so the sentence “Effectiveness was determined by the positive predictive value (PPV) and explored in relation to 1-sensitivity and 1-specificity" is a little confusing; 1-sensitivity is the false negative rate and this term should be used. Simple rewording would suffice here.

Please see response above.

Results
SIMD is mentioned, which hasn't been defined before. This needs to be done.

Thank you for picking this up, this was an oversight. We will use the term deprivation in the abstract.

The acronym SIMD is expanded on Page 5 when first mentioned in body of manuscript, and is then fully defined in the methods section p7.

To make it clear for the reader, it might be better to insert "the false negative rate" in the following sentence: "Over all three definitions of increased-risk, there was no one method that minimised THE FALSE NEGATIVE RATE (1-sensitivity) although this was lowest when the method and definition of increased-risk were complimentary"

The authors will specify the different terminologies for (1-sensitivity) and (1-specificity) in the Methods, and will then use (1-sensitivity) and (1-specificity) throughout the body of the manuscript.

Statistical analysis
I think it would be helpful for the reader to define what a true positive for each definition after this sentence. "The PPV of each of the four methods was calculated using the three definitions of increased-risk." For example, is the true
positive a child with caries that has been identified from the basic dental inspection or a child that resides within local/national SIMD quintile 1?

I got rather confused re the dependent variables and independent variables and this may require slightly more explanation in the methods section. It seems that two of the dependent variables (PPV) relate to the SIMD measure, yet two of the models used use SIMD data to determine the PPV i.e. the SMID data is used in the model, but also appears to be the outcome measure.

The authors clearly defined increased risk on page 8 (Definitions of increased risk). It is important to note that we used 3 separate definitions of increased risk:

1. Children with caries experience (as measured in basic dental inspection)
2. Children whose postcode put them in the lowest 20% of SIMD datazones (at a local (Health Board) level)
3. Children whose postcode put them in the lowest 20% of SIMD datazones (at a national (Scotland) level)

Each definition of increased risk was then analysed with each of the four methods for targeting.

Therefore, yes the reviewer is correct that in some cases, by definition, the dependent and independent variables are based on the same concept. Different models of targeting have been adopted by different health boards across Scotland, and different ways of defining increased risk children have also been used. To ensure completeness in our approach, we made the decision to evaluate all four possible methods of targeting with all three methods of defining increased risk. Therefore, this meant for example, that we evaluated how well the local SIMD method of targeting performed with respect to reaching all children in local SIMD Q1.

I think the following is confusing:

"Also of interest to the Childsmile programme was to determine the
(i) proportion of children at increased-risk (true positives) who were not targeted (screened out), (1-sensitivity), and
(ii) proportion of children not at increased-risk (true negatives) that were targeted (screened in), (1-specificity)."

Do the authors mean:

"Also of interest to the Childsmile programme was to determine the
(i) proportion of children at increased-risk who were "screened out" and so not targeted (false negatives), (1-sensitivity), and
(ii) proportion of children not at increased-risk but who were "screened in" and so targeted (false positives), (1-specificity)."

We agree that both are saying the same thing. We propose that if we give the numerous possible definitions in the Methods section (as proposed earlier) then we can be more concise throughout the manuscript. We will change the above text to:

"Also of interest to the Childsmile programme was to determine the
(i) (1-sensitivity) as the false negative rate: the proportion of children at increased-risk (true positives) who were not targeted
(ii) (1-specificity) as the false positive rate: the proportion of children not at increased-risk (true negatives) that were targeted. “

I don't understand what the authors are trying to convey in the sentence:

"Instead, PPV was highest when the targeting method complimented the
definition of increased-risk." This refers to my point above re the use of a model that uses SMID data and an output measure that also uses SMID data. I think the authors need to explain what they mean here.

Please see the above explanation.

Minor Essential Revisions
Main body
Introduction
Rather long sentence, which would be better split: "It is has been shown, however, that such approaches can also present challenges, and targeting all (or the majority of) individuals considered at greatest need can be difficult to achieve [9-12], particularly when resources are limited, disease is widely dispersed, and other social, cultural and political factors have to be considered."

Agree. Full stop after [9-12]. "This is particularly challenging when resources…”

The sentence "Thus, while it does not attempt to identify all high-risk children at an individual level, it is relevant to determine if this clinically-based approach, delivered in a school setting, provides additional support to those at greater need." is probably not needed as the focus of the paper is about determining appropriate models to target care, this sentence suggests that the authors are also going to determine whether the clinically-based approach adds support, which is not the subject of the paper.

We feel that this is an important point to make, and central to our research questions. We think our terminology may have been misleading and have reworded the sentence:

"Thus, while it does not attempt to identify all high-risk children at an individual level, it is relevant to determine if this clinically-based approach, delivered in a school setting, reaches those at greater need."

Definition of at increased-risk
Minor point, but I presume (ii) and (iii) relate to a child residing in a post-code within a local/national SIMD quintile?

Yes, we will rephrase.

Discretionary Revisions

The introduction could also include the results of the longitudinal study in the North-West of England that once young children experience disease, further disease is more likely i.e. the imperative of preventing children moving from caries free to caries active.

We agree this would be an important paper to reference in our Introduction and have now done so.

Level of interest: An article whose findings are important to those with closely related research interests
Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.

Dr Andrea Sherriff, one of the authors is a senior lecturer in Statistics at Glasgow University, a Chartered Statistician (RSS) and Chartered Scientist (RSS), and planned the design of the study and conducted the statistical analysis.