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

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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.

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.

Results

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

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.
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)."

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.

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."

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.

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?

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.

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.