PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (**http://bmjopen.bmj.com/site/about/resources/checklist.pdf**) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

ARTICLE DETAILS

TITLE (PROVISIONAL)	Evaluating quality and its determinants in lipid control for secondary prevention of heart disease and stroke in primary care – a study in an inner London Borough.
AUTHORS	Dodhia, Hiten; Liu, Kun; Logan-Ellis, Hugh; Crompton, James; Wierzbicki, Anthony; Williams, Helen; Hodgkinson, Anna; Balazs, John

VERSION 1 – REVIEW

REVIEWER	Julian Perelman Escola Nacional de Saúde Pública, Universidade Nova de Lisboa
REVIEW RETURNED	02-Jul-2015

GENERAL COMMENTS	The paper measures inequalities in the management of cholesterol. The paper is potentially relevant but must be completely reformulated and developed. The objectives of the paper should be clarified (they are much broader than indicated), and supported by a theoretical background and literature review. The discussion should be related to these objectives and to the literature. Title/Introduction 1. The aim of the paper should be clarified: - The title refers in the same sentence “inequality” and “inequity”: what are you measuring exactly? - The title refers to gender, but (i) the Introduction does not explicitly refer to gender issues (no theoretical background on this issue, no rationale for studying it, no literature review justifying the topic); (ii) the text mentions indifferently sex and gender, while these refer to different concepts; (ii) the study measures inequalities related to other socioeconomic factors (ethnicity, deprivation), so that the topic is broader than gender inequality. - The title refers to management of lipid control. First, I think that the issue is about the quality in the management of cholesterol. Second, the introduction essentially discusses the use of statins, so that the reader believes that the paper is about the health care use, while this is not the case. - I recommend to state in the Title that the paper is about inequality, and about the quality in the management of cholesterol. Then, the Introduction should primarily focus the inequalities in the disease management.

	2. Following the previous comment, the Introduction lacks a theoretical background and literature review. This background should focus the inequalities in the management of disease, and in particular cholesterol. Also, it should discuss the literature on inequalities related to the QOF/P4P. See e.g. the studies by Christopher Millett and others. Methods The section “Analysis” should be much more detailed. 1. The dependent variables should be clearly defined (e.g., give them names along the paper, measurement of cholesterol level =PS1, cholesterol control=PS2). 2. The independent variables should be justified (e.g., why do you expect that smoking affects the management of cholesterol?). 3. The factors related to inequalities (in my view, gender, ethnicity, and deprivation) should be emphasized, indicating why they are markers of inequality. Results 1. The Table 2 should be discussed in the text. 2. In the hypotheses, the dependent variable should be repeated clearly (e.g., refer PS1 and PS2). 3. The Table 4 does not include the “sex” variable. Was this variable omitted in the analysis? 4. The regressions included the variable “Statin prescription”. Including this variable is a tautology, because the control of disease mostly includes the prescription of statins. In other terms, the authors explain the control of cholesterol by the drug to control the cholesterol. 5. A separate analysis for CHD and stroke patients should be considered. 6. The results are often presented inversely, suggesting an inverse causal pathway. For example “patients with no current records were significantly more likely to be between 16-64 years”: it is the contrary, it is the age that influences the recording. Discussion 1. A major limitation of the paper is that the study was carried out in a single setting. This is a serious problem because the management of diseases varies according to clinical practices, so this is a major missing variable. This question needs to be discussed. 2. Another major question to be discussed is the QOF. The guidelines under evaluation have been incentivized. The authors should discuss how the incentives (the P4P) have been effective (the results from Table 3 contradict this), and how they may have increased (or unable to reduce) the inequalities. 3. There are interesting and significant results related to ethnicity and age that deserve discussion, including comparisons with the literature. 4. The Discussion introduces questions and references that were not mentioned before, namely the gender inequality and the policy issue of the Health and Social Care Act. This should be included in the Introduction. 5. The limitations refer a “small proportion of missing data”. A numeric value (% of missing) would convince the reader that this problem is indeed negligible.

REVIEWER	Alice Owen Monash University, Australia

REVIEW RETURNED	14-Jul-2015

GENERAL COMMENTS	This was a well written paper describing statin prescribing patterns in participants of two CVD clinical registries in a metropolitan area of London, UK. 1. NICE guidelines suggest that both total and high-density lipoprotein (HDL) cholesterol should be measured to guide treatment decisions for lipid lowering therapy. Was there a reason that HDL was not included into these analyses? 2. Very elderly people and some of those at very CVD high risk are likely to have co-morbidities possibly of more immediate concern than future cardiovascular events. In such circumstances, prescribing a statin may drop down the list of clinical priorities, (particularly with increased risk of side effects associated with statins in older age, polypharmacy and compliance issues). In addition there may be contraindications for statins for comorbidities such as renal disease and liver disease. As co-morbidities were collected, are you able to factor this into your analyses? 3. Could the authors please provide information about the representativeness of the registries? And whether they are they opt-in or opt-out? Abstract: Was the OR for women presented in the abstract adjusted for a different set of covariates that that presented in table 5? Methods No indication of ethics review of this research project is listed in the paper. Minor amendments Page 2, Line 32, missing an end bracket Page 6, line 7, current smokers Page 7, line 45: should the ‘of’ be ‘on’ Page 7, line 50, ‘to a record’?

VERSION 1 – AUTHOR RESPONSE

Reviewer: 1
Reviewer Name Julian Perelman
Institution and Country Escola Nacional de Saúde Pública, Universidade Nova de Lisboa
Please state any competing interests or state ‘None declared’: None declared.

Please leave your comments for the authors below
The paper measures inequalities in the management of cholesterol. The paper is potentially relevant but must be completely reformulated and developed. The objectives of the paper should be clarified (they are much broader than indicated), and supported by a theoretical background and literature review. The discussion should be related to these objectives and to the literature.
Thank you – we have modified the paper to reflect these comments – additional references have been added to support the theoretical background and literature. We have modified the discussion as well.

Title/Introduction

1. The aim of the paper should be clarified:
- The title refers in the same sentence “inequality” and “inequity”: what are you measuring exactly?
The differences are defined as: Health inequality is the generic term used to designate differences, variations, and disparities in the health achievements of individuals and groups. Health inequity refers to those inequalities in health that are deemed to be unfair or stemming from some form of injustice. However as a result of these comments we have focused on inequality and modified the paper to reflect this.

- The title refers to gender, but (i) the Introduction does not explicitly refer to gender issues (no theoretical background on this issue, no rationale for studying it, no literature review justifying the topic); (ii) the text mentions indifferently sex and gender, while these refer to different concepts; (ii) the study measures inequalities related to other socioeconomic factors (ethnicity, deprivation), so that the topic is broader than gender inequality.
Thank you – we have removed the word “gender” from the title to reflect the broader focus on quality and inequalities related to management (mentioned below).

- The title refers to management of lipid control. First, I think that the issue is about the quality in the management of cholesterol. Second, the introduction essentially discusses the use of statins, so that the reader believes that the paper is about the health care use, while this is not the case.
- I recommend to state in the Title that the paper is about inequality, and about the quality in the management of cholesterol. Then, the Introduction should primarily focus the inequalities in the disease management.
Thank you we have now modified as suggested.

2. Following the previous comment, the Introduction lacks a theoretical background and literature review. This background should focus the inequalities in the management of disease, and in particular cholesterol. Also, it should discuss the literature on inequalities related to the QOF/P4P. See e.g. the studies by Christopher Millett and others.
Thank you – we have added some of the background literature to this section as suggested and also discussed the QOF/P4P here and in the discussion section.

Methods
The section “Analysis” should be much more detailed.
1.The dependent variables should be clearly defined (e.g., give them names along the paper, measurement of cholesterol level =PS1, cholesterol control=PS2).
Thank you we have modified this section to reflect these comments.

2. The independent variables should be justified (e.g., why do you expect that smoking affects the management of cholesterol?).
We have kept this variable as what we are demonstrating here is a clustering of poor quality – i.e. those who have poor control for their lipid level are also more likely to have poor control of other CVD risk factors such as smoking and blood pressure. We would recommend that primary care practitioners use poor control of any one CVD risk as a marker to explore other CVD risk factors.

3. The factors related to inequalities (in my view, gender, ethnicity, and deprivation) should be emphasized, indicating why they are markers of inequality.
This has been modified to include some more detail.

Results
1. The Table 2 should be discussed in the text. Thank you we have now added this.
2. In the hypotheses, the dependent variable should be repeated clearly (e.g., refer PS1 and PS2).
This has now been modified.

3. The Table 4 does not include the “sex” variable. Was this variable omitted in the analysis? Thank you this is now been added and the table modified.
4. The regressions included the variable “Statin prescription”. Including this variable is a tautology, because the control of disease mostly includes the prescription of statins. In other terms, the authors explain the control of cholesterol by the drug to control the cholesterol.
We feel it is important to include statin prescribing as there is much variation in this variable by age, sex and ethnicity. We thought it was important to include this in the regression models. We wanted to understand if this explained most of the difference in lipid control for e.g. between men and women or different age and ethnic groups (see supplementary data tables). We have modified the results and discussion section to reflect this.

5. A separate analysis for CHD and stroke patients should be considered.
We did not feel this would add anything further to the analysis as the NICE guidelines on lipid control applies to both CHD and stroke. We felt that combining the two data sets increase power for the regression analysis.
6. The results are often presented inversely, suggesting an inverse causal pathway. For example “patients with no current records were significantly more likely to be between 16-64 years”: it is the contrary, it is the age that influences the recording.
Thank you we have changed the wording.

Discussion
1. A major limitation of the paper is that the study was carried out in a single setting. This is a serious problem because the management of diseases varies according to clinical practices, so this is a major missing variable. This question needs to be discussed.
Thank you we have modified the paper to reflect these comments.

2. Another major question to be discussed is the QOF. The guidelines under evaluation have been incentivized. The authors should discuss how the incentives (the P4P) have been effective (the results from Table 3 contradict this), and how they may have increased (or unable to reduce) the inequalities.
Thank you we have now modified the paper to reflect these comments. We have provided supplementary data tables that show improvements overall in recording of total cholesterol, current statin prescription and change in mean total cholesterol by age, sex, ethnicity and deprivation for the cohort of patients that had records in 2013 and 2011. These supplementary data suggest that P4P is continuing to have a positive impact locally but also shows differential changes in total cholesterol control with some worsening in inequalities.

3.There are interesting and significant results related to ethnicity and age that deserve discussion, including comparisons with the literature.
Thank you we have modified the discussion to reflect these comments.

4. The Discussion introduces questions and references that were not mentioned before, namely the gender inequality and the policy issue of the Health and Social Care Act. This should be included in the Introduction.
Thank you we have modified the discussion to reflect these comments.
5. The limitations refer a “small proportion of missing data”. A numeric value (% of missing) would convince the reader that this problem is indeed negligible.
Thank you we have modified the discussion to reflect these comments.

Reviewer: 2
Reviewer Name Alice Owen
Institution and Country Monash University, Australia
Please state any competing interests or state 'None declared': None declared

Please leave your comments for the authors below This was a well written paper describing statin prescribing patterns in participants of two CVD clinical registries in a metropolitan area of London, UK.

1. NICE guidelines suggest that both total and high density lipoprotein (HDL) cholesterol should be measured to guide treatment decisions for lipid lowering therapy. Was there a reason that HDL was not included into these analyses?
We agree that both HDL and total cholesterol should be measured – we only had access to total cholesterol measurement as this is collected routinely as part of the QOF and central returns – therefore we were only able to look at total cholesterol.

2. Very elderly people and some of those at very CVD high risk are likely to have co-morbidities possibly of more immediate concern than future cardiovascular events. In such circumstances, prescribing a statin may drop down the list of clinical priorities, (particularly with increased risk of side effects associated with statins in older age, polypharmacy and compliance issues). In addition there may be contraindications for statins for comorbidities such as renal disease and liver disease. As co-morbidities were collected, are you able to factor this into your analyses?
Thank you, although this may be true – in this study older people with comorbidities appeared to be better controlled. We were not able to look at renal disease or liver disease as comorbidities as these data were not available to us at this time. For this study we were only able to look at diabetes as a comorbidity.

3. Could the authors please provide information about the representativeness of the registries? And whether they are they opt-in or opt-out?
Thank you we have modified the discussion section to reflect this comment. In the UK all diagnosed cases of CHD and stroke are registered in QoF disease registers as part of the GP contract (opt in as QoF returns).

Abstract:
Was the OR for women presented in the abstract adjusted for a different set of covariates that that presented in table 5?
Thank you this is now corrected.

Methods
No indication of ethics review of this research project is listed in the paper.
This was given in the foot note

Minor amendments
Thank you – these amendments have been made.
Page 2, Line 32, missing an end bracket
Page 6, line 7, current smokers
Page 7, line 45: should the 'of' be 'on'
Page 7, line 50, 'to a record'? (added "to have a record")

VERSION 2 – REVIEW

REVIEWER	Julian Perelman Escola Nacional de Saúde Pública, Universidade Nova de Lisboa, Portugal
REVIEW RETURNED	03-Sep-2015

GENERAL COMMENTS	The major issue of this paper relates to the use of the "inequality" term (and "inequity" in the Conclusion). These words implicitly refer to a social injustice against some groups. It is unclear why the unequal cholesterol levels of men and women, or between different age groups, is a matter of fairness. This needs to be extensively discussed. Why not considering for example that smoking and type-2 diabetes are also factors of inequality? I feel that the paper is more about the determinants of the management of cholesterol than about inequalities. more should be said about what may cause the differences observed between age groups, men and women, and ethnic groups. Otherwise, it is impossible to draw relevant policy conclusions. Other remarks: - the title is too long and unclear. Also, the paper is also about quality, and this should be referred in the title. I suggest "Quality in the management of lipid control in primary care and its determinants – a study on an inner London Borough". - The second paragraph of the Introduction, on guidelines, in not necessary to for the understanding of the paper. It makes the Introduction too long and unclear. Consider removing. - I suggest mentioning always "cholesterol control" along the text to avoid confusion (sometimes the authors mention CVD control, etc.). - The Analysis section (p.6) should mention how dependent variables are constructed. It should be clarified that these variables are dichotomous and what are the two categories. - The Analysis should also mention how settings are included in regressions (random effects). - The section "What this paper adds" (p.11) repeats the results, and is not informative. This section should be devoted to compare with previous studies on the determinants of cholesterol management, and the new findings in comparison with this previous literature. - We miss some policy conclusions, which would be very relevant in the context of the QOF.

VERSION 2 – AUTHOR RESPONSE

Reviewer: 1
Reviewer Name Julian Perelman
Institution and Country Escola Nacional de Saúde Pública, Universidade Nova de Lisboa, Portugal
Please state any competing interests or state 'None declared':

The major issue of this paper relates to the use of the "inequality" term (and "inequity" in the Conclusion). These words implicitly refer to a social injustice against some groups. It is unclear why the unequal cholesterol levels of men and women, or between different age groups, is a matter of fairness. This needs to be extensively discussed. Why not considering for example that smoking and type-2 diabetes are also factors of inequality? I feel that the paper is more about the determinants of the management of cholesterol than about inequalities.
Thank you – we have modified the paper to reflect these comments and have referred more to the

“determinants of management of cholesterol”. We have modified the discussion to reflect this further and added a new reference that provides a theoretical framework for assessing variation in quality and linking to health equity and inequality. We have also modified the conclusions to say: “This evaluation has identified important quality issues and their determinants. Some of these variations in quality suggest possible health inequities in the secondary prevention of heart disease and stroke.”

more should be said about what may cause the differences observed between age groups, men and women, and ethnic groups. Otherwise, it is impossible to draw relevant policy conclusions.
Thank you we have modified the discussion about what this paper adds to reflect this by adding in possible explanations for the variations in quality identified.

Other remarks:
- the title is too long and unclear. Also, the paper is also about quality, and this should be referred in the title. I suggest “Quality in the management of lipid control in primary care and its determinants – a study on an inner London Borough”.
Thank you we have changed to: “Evaluating quality and its determinants in lipid control for secondary prevention of heart disease and stroke in primary care – a study in an inner London Borough.”

- The second paragraph of the Introduction, on guidelines, in not necessary to for the understanding of the paper. It makes the Introduction too long and unclear. Consider removing.
Thank you we have removed some of this detail for primary prevention.

- I suggest mentioning always “cholesterol control” along the text to avoid confusion (sometimes the authors mention CVD control, etc.).
Thank you we have modified this.

- The Analysis section (p.6) should mention how dependent variables are constructed. It should be clarified that these variables are dichotomous and what are the two categories.
Thank you we have modified and added this.

- The Analysis should also mention how settings are included in regressions (random effects).
Thank you we have modified.

- The section “What this paper adds” (p.11) repeats the results, and is not informative. This section should be devoted to compare with previous studies on the determinants of cholesterol management, and the new findings in comparison with this previous literature.
Thank you we have added further discussion points as outlined above.

- We miss some policy conclusions, which would be very relevant in the context of the QOF.
Thank you we added potential policy implications for QOF in the conclusions.