PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Rationale and Design of the Improving Care for Cardiovascular Disease in China (CCC) Project: A National Registry to Improve Management of Atrial Fibrillation
AUTHORS	Hao, Yongchen; Liu, Jing; Smith, Sidney; Huo, Yong; Fonarow, Gregg; Ge, Junbo; Liu, Jun; Taubert, Kathryn; Morgan, Louise; Guo, Yang; Zhou, Mengge; Zhao, Dong; Ma, Chang-Sheng

VERSION 1 – REVIEW

REVIEWER	Dominique Cadilhac Monash University, Australia
REVIEW RETURNED	21-Jan-2018

GENERAL COMMENTS	This is a well written paper which outlines the protocol and progress of a new national clinical quality registry and quality improvement program for atrial fibrillation in China. There are several queries to potentially add clarity and also some grammatical changes needed. As a protocol paper it is assumed data collection is ongoing and the methods still current. Therefore, please use present tense throughout including in the abstract. Abstract Strengths and limitations section does not clearly articulate these constructs, please amend. Table 3 add the date range for these data Introduction – 'However studies have shown…'. Authors and researchers identify the issues so please change this to sentence. E.g However, poor compliance with evidence-based therapies have been reported in China, including…' Second paragraph: '…modelled in part of the AHA' change to 'on the AHA…' Reference to 'unique tools' – be specific do you mean in China or internationally? Study objectives- last sentence : is there no other comprehensive program like this used in China currently? E.g in other diseases or

	risk factors Methods Remove ‘and analysis’ as this is in fact part of the method. What is the potential for linking this dataset to other health records e.g death data, primary care, hospital data e.g for stroke outcome rates in the future . The CRF has identifiers so this should be explained in the main text. Does the central office have the ability to see the personal information? Who analyses the data and is this done in a de-identified way – hospital level and patient level ? Organisational framework – add and ‘Governance’ to the title Is there an outlier policy (what action might be taken if a hospital continues to performed below its peers)? What other policies exist e.g. for access to the data by third parties, etc contribution to publications etc AHA is referred to as securing funding if this is no longer the case then make this past tense e.g secured the initial project funding Continuous is spelt incorrectly- ‘As a continues quality…’ After ‘December 2018’ remove ‘currently’ Face to face meeting should be plural The implementation of the CCF-AF (missing the) Hospital recruitment- if this is completed then reference to stratification should be in past tense. Discussion point- if tertiary hospitals with cardiac wards enrolled does this mean care quality is likely to be overestimated for the country overall? Quality control of data – if this is still being undertaken then should be explained in present tense What is meant by ‘care opportunities ‘ wasn’t clear. Reference to clinical guidelines and updates – need a reference or state which ones AHA or specific for China Monthly monitoring- if still ongoing change to present tense and the same for the Regional workshops, hospital recognition etc Educational materials- who designed these ? Source . Are these new resources or existing ones but made available through the program? Are data collected in a de-identified format? Please specify if there are identifiers (or person IDs) used so data may be re-identified or not, or linked to other sources of health data.

	Statistical consideration- where did the 45% baseline measure come from? Is a 6% change in guideline adherence meaningful? How would that compare to other similar programs? Change here to present tense or provide analysis section separately with its own subheading Analysis of preliminary data from the program (give date range as well). Discussion Is there any evidence that clinicians are using the monthly reports? Have you got any signals yet or practice improvement from baseline ? Reference to data linkage is made here which is good but the ability to do this not explained. See earlier comments. Reference to unique tools made but unique in what context? AF? China ? I note a similar cardiac program (reference 18) so how do the tools differ? Please make sure the Tables have the acronyms spelt out in the footnotes. BMJOpen is a general journal and some of these terms are specific to cardiovascular disease. Please also indicate missing data as a measure of data quality.

REVIEWER	Dr K Poppe University of Auckland, New Zealand
REVIEW RETURNED	22-Jan-2018

GENERAL COMMENTS	Congratulations to everyone involved in this project. We can recognise the need to improve the quality of care of patients with AF but turning that into action is a major undertaking and not for the faint-hearted. The investigators have designed a system of comprehensive data collection, monitoring, and rapid reporting for quality improvement (QI), and although it is just one of many points, I particularly liked that the frequency of website visits and downloads were tracked to evaluate the engagement of each participating hospital. One of the objectives of the study is to evaluate the effectiveness of the continuous QI efforts on the quality of care and outcomes of AF. In addition to the markers of quality, which are well described, I'd expect "outcomes of AF" to include death or hospitalisation for TIA, stroke, all other CVD. If that is intended, how will the data be linked to patient outcomes, and how often or within what timeframe will these linkages and analyses be done? Tracking patients over time is mentioned in the limitations section however it is not clear whether you're doing that, or acknowledging that it would be nice but can't be done. Could you clarify please? The statistical considerations section is written in the past tense, which I found difficult to read as I expected it to be a description of

	what will be done.

VERSION 1 – AUTHOR RESPONSE

Reviewer #1:
Reviewer Name: Dominique Cadilhac
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 is a well written paper which outlines the protocol and progress of a new national clinical quality registry and quality improvement program for atrial fibrillation in China.
There are several queries to potentially add clarity and also some grammatical changes needed.

Response
Thank you very much for your thoughtful comments and suggestions, which have been valuable and very helpful for revising and improving our manuscript. We have revised our manuscript point by point according to your comments and suggestions.

1. As a protocol paper it is assumed data collection is ongoing and the methods still current. Therefore, please use present tense throughout including in the abstract.
Response: We have revised the manuscript carefully and use present tense in sentences regarding methods in the revised paper.

Abstract
2. Strengths and limitations section does not clearly articulate these constructs, please amend.
Response: We have revised the strengths and limitations section to articulate their constructs.

3. Table 3 add the date range for these data
Response: We have added the date range for the date for Table 3 in the revised manuscript (page 30, line 1-2).

4. Introduction – 'However studies have shown…'. Authors and researchers identify the issues so please change this to sentence. E.g However, poor compliance with evidence-based therapies have been reported in China, including…'
Response: We have revised this sentence accordingly (page 5, first paragraph).

5. Second paragraph: '…modelled in part of the AHA' change to 'on the AHA…'
Response: We have revised this sentence as your suggestion (page 5, secondary paragraph).

6. Reference to 'unique tools' – be specific do you mean in China or internationally?
Response: "Unique tools" refer to tools that specially designed to improve the quality of care for AF in the CCC-AF program. We have revised this sentence to make it more clear. (page 5, secondary paragraph).

7. Study objectives- last sentence : is there no other comprehensive program like this used in China currently? E.g in other diseases or risk factors
Response: Yes, there are other programs in China including the one we cited in reference 18, which focus on acute coronary syndrome.

Methods

8. Remove ‘and analysis’ as this is in fact part of the method.
Response: We have removed ‘and analysis’ in the revised manuscript.

9. What is the potential for linking this dataset to other health records e.g death data, primary care, hospital data e.g for stroke outcome rates in the future . The CRF has identifiers so this should be explained in the main text. Does the central office have the ability to see the personal information?
Response: In the revised manuscript, we have discussed the potential for linking our dataset to other health records including death and hospitalization data in the future (page 18, first paragraph). Also, we have pointed out the identifiers in the CRF which contribute the potential for linking (page 8, third paragraph). The central office have the ability to see the personal information, while researchers analysis the data in a de-identified way.

10. Who analyses the data and is this done in a de-identified way – hospital level and patient level ?
Response: Researchers from Senior Management Group, Project Management Group and participating hospitals have the access to analysis the data in a de-identified way, in both hospital level and patient level. We have added this point in Statistical considerations section of the revised manuscript (page 13, second paragraph).

11. Organisational framework – add and ‘Governance’ to the title
Response: We have rephrased it into “organizational framework and governance” as you suggested. In addition, we have revised the S1 figure title in the supplement (Organizational Framework and Governance of the CCC-AF Program) to match the request to add governance.

12. Is there an outlier policy (what action might be taken if a hospital continues to performed below its peers)? What other policies exist e.g. for access to the data by third parties, etc contribution to publications etc
Response: Currently, there is no outlier policy for hospitals that continue to perform below its peers. Instead, we provide benchmarked feedback on data quality and performance to each site and share best practices and guidance for improvement for those hospitals underperforming. We also provide recognition for the hospitals demonstrating best practices in data quality each year. For other policies like access to the data by third parties and contribution to publications, researchers from SMG, day-to-day management group and participating hospitals have the access to analysis the data for publications. We have added these policies in the revised manuscript (Page 7, first paragraph).

13. AHA is referred to as securing funding if this is no longer the case then make this past tense e.g secured the initial project funding
Response: Thank you for pointing this out. We have made this revision.

14. Continuous is spelt incorrectly- ‘As a continues quality…’
Response: We have corrected this spelling error in the revised manuscript.

15. After ‘December 2018’ remove ‘currently’
Response: We have removed the ‘currently’ after ‘December 2018’.

16. Face to face meeting should be plural
Response: We have changed it into “face to face meeting”.

17. The implementation of the CCF-AF (missing the)
Response: We have added “the” before “CCC-AF” in the revised manuscript.

18. Hospital recruitment- if this is completed then reference to stratification should be in past tense.

Response: We have changed the sentences regarding hospital recruitment into past tense in the revised manuscript as it is completed.

19. Discussion point- if tertiary hospitals with cardiac wards enrolled does this mean care quality is likely to be overestimated for the country overall?
Response: Yes, enrollment of only tertiary hospitals may overestimate the care quality. We have added this point in the revised strengths and limitations section (Page 18, first paragraph).

20. Quality control of data – if this is still being undertaken then should be explained in present tense
Response: We have changed the sentences regarding quality control of data into present tense in the revised manuscript as it is still ongoing.

21. What is meant by 'care opportunities ' wasn't clear.
Response: To make it easy to be understood, we have revised it as follows "eligible opportunities for care" (Page 10, second paragraph).

22. Reference to clinical guidelines and updates – need a reference or state which ones AHA or specific for China
Response: Thank you for your comments. In the revised manuscript, we have added columns in Table 1 and 2 named "References" to indicate which guidelines each performance come from (page 27 and 29).

23. Monthly monitoring- if still ongoing change to present tense and the same for the Regional workshops, hospital recognition etc
Response: We have changed the sentences regarding monitoring, regional workshops and hospital recognition into present tense in the revised manuscript as they are still ongoing.

24. Educational materials- who designed these ? Source . Are these new resources or existing ones but made available through the program?
Response: Educational materials include updated clinical guidelines and scientific statements for AF and webinars. Clinical guidelines and scientific statements are publicly available documents. Webinars are new educational materials that specially designed by clinical experts, focusing on the areas with gaps between clinical practice and guideline recommendations identified in the program. We have added detailed information for educational materials in the revised manuscript (Page 12, third paragraph).

25. Are data collected in a de-identified format? Please specify if there are identifiers (or person IDs) used so data may be re-identified or not, or linked to other sources of health data.
Response: No, the data are collected in an identified format with personal IDs collected. This data can be linked to other sources of health data with person IDs. The central office have the ability to see the personal information, while researchers analysis the data in a de-identified way.

26. Statistical consideration- where did the 45% baseline measure come from?
Response: The 45% baseline for primary composite score was estimated based on previous reports on the six primary performance measures, including assessment of thromboembolic risk (with no information from previous reports), anticoagulant drug at discharge (36.5%), PT/ INR planned follow-up (70.4%), ACEI/ ARB at discharge (44.9%), beta-blockers at discharge (50.4%), and statins at discharge (26.1%) in AF inpatients with indications [1-2]. The current estimated baseline measure came from the average of these primary performance measures.

1. Chang SS, Dong JZ, Ma CS, et al. Current Status and Time Trends of Oral Anticoagulation Use Among Chinese Patients With Nonvalvular Atrial Fibrillation: The Chinese Atrial Fibrillation Registry Study. Stroke. 2016; 47:1803-1810
2. Zhang H, Yang Y, Zhu J, et al. Baseline characteristics and management of patients with atrial fibrillation/flutter in the emergency department: results of a prospective, multicentre registry in China. Intern Med J. 2014;44:742-748.

27. Is a 6% change in guideline adherence meaningful? How would that compare to other similar programs?
Response: Yes, we believe that 6% change in guideline adherence is meaningful and have the potential to improve outcomes of patients with AF. As shown in the improve treatment with oral anticoagulants in atrial fibrillation (IMPACT-AF) study, multifaceted educational intervention significantly increased the proportion of patients treated with oral anticoagulants by 9% and reduced the risk of stroke by 52% in patients with AF [1]. Although the projected guideline adherence improvement in our study is lower than that in IMPACT-AF study (6% VS. 9%), the improvement of guideline adherence in hospital level can benefit more patients with AF.

[1] Vinereanu D, Lopes RD, Bahit MC, et al. A multifaceted intervention to improve treatment with oral anticoagulants in atrial fibrillation (IMPACT-AF): an international, cluster-randomised trial. Lancet. 2017 https://doi.org/10.1016/S0140-6736(17)32165-7

28. Change here to present tense or provide analysis section separately with its own subheading Analysis of preliminary data from the program (give date range as well).
Response: Thank you for your suggestion. We have changed these sentences to present tense (Page 13, secondary paragraph).

Discussion
29. Is there any evidence that clinicians are using the monthly reports? Have you got any signals yet or practice improvement from baseline ?
Response: Yes, clinicians are using these monthly reports that we upload onto the project website. This can be reflected in track of monthly report downloads on websites, consultations from hospitals for interpreting of these reports and experience sharing from clinicians using the monthly reports to help quality improvement for care of AF patients. By end of year 2017, 11% improvement in primary composite score has been achieved.

30. Reference to data linkage is made here which is good but the ability to do this not explained. See earlier comments.
Response: We have add description the ability for data linkage in the revised manuscript (page 8, third paragraph; page 18, first paragraph).

31. Reference to unique tools made but unique in what context? AF? China ? I note a similar cardiac program (reference 18) so how do the tools differ?
Response: “Unique tools” refers to tools that specially designed to improve the quality of care for AF. The tools of CCC-AF program differ from that of the ACS program (reference 18) in performance measures of monthly quality reports and webinars. To clear up the confusion, we have rephrased “unique tools” into “diversified tools” in the revised manuscript (page 18, second paragraph).

32. Please make sure the Tables have the acronyms spelt out in the footnotes. BMJ Open is a general journal and some of these terms are specific to cardiovascular disease.
Response: We have revised the manuscript carefully and spelt out all the acronyms in the footnotes of the Tables.

33. Please also indicate missing data as a measure of data quality.
Response: We have added this as a discussion point in the revised manuscript (page 17, second paragraph).

Reviewer #2:
Reviewer Name: Dr K Poppe
Institution and Country: University of Auckland, New Zealand
Please state any competing interests or state 'None declared': None declared

Please leave your comments for the authors below
Congratulations to everyone involved in this project. We can recognise the need to improve the quality of care of patients with AF but turning that into action is a major undertaking and not for the faint-hearted.

The investigators have designed a system of comprehensive data collection, monitoring, and rapid reporting for quality improvement (QI), and although it is just one of many points, I particularly liked that the frequency of website visits and downloads were tracked to evaluate the engagement of each participating hospital.

1. One of the objectives of the study is to evaluate the effectiveness of the continuous QI efforts on the quality of care and outcomes of AF. In addition to the markers of quality, which are well described, I'd expect "outcomes of AF" to include death or hospitalization for TIA, stroke, all other CVD. If that is intended, how will the data be linked to patient outcomes, and how often or within what timeframe will these linkages and analyses be done? Tracking patients over time is mentioned in the limitations section however it is not clear whether you're doing that, or acknowledging that it would be nice but can't be done. Could you clarify please?
Response: Thank you for your comments. We do collect the outcomes during hospitalization for ACS patients. Owing to the current study design, this program does not collect information on post-discharge outcomes. In the limitations section, we mention tracking patients over time to acknowledge to this is the potential of the current program which has not been done. We have revised these sentence in the revised manuscript to clear up the confusion (page 18, first paragraph).
.
2. The statistical considerations section is written in the past tense, which I found difficult to read as I expected it to be a description of what will be done.
Response: Thank you for your suggestion. We have changed these sentences to present tense (Page 13, secondary paragraph).

FORMATTING AMENDMENTS (if any)
Required amendments will be listed here; please include these changes in your revised version:
1. The in text citation for 'Figure S1' is missing on your main text of your main document file. Please amend accordingly.
Response: Thank you for pointing this out. We have added text citation for 'Figure S1' in the main text of the revised manuscript (page 7, first paragraph).

2. Please remove all your figures in your main document and upload each of them separately under file designation 'Image' (except tables and please ensure that Figures are of better quality or not pix-elated when zoom in). NOTE: They can be in TIFF or JPG format and make sure that they have a resolution of at least 300 dpi. Figures in PDF, DOCUMENT, EXCEL and POWER POINT format are not acceptable.
Response: We have uploaded the figures in TIFF and removed them in our main document.

3. Please re-upload your supplementary files in PDF format.
Response: We have re-uploaded supplementary files in PDF format.

VERSION 2 – REVIEW

REVIEWER	K Poppe University of Auckland, NZ
REVIEW RETURNED	13-Mar-2018

GENERAL COMMENTS	Thank you - the authors have addressed my questions.

REVIEWER	Dominique Cadilhac Monash University, Australia
REVIEW RETURNED	22-Mar-2018

GENERAL COMMENTS	Thank you for addressing my feedback I noted the following which is missing the word 'by' after the word 'ensured' - please amend "Moreover, data quality of our study is ensured multiple strategies including training, standardized data collection platform, onsite quality control and monitoring of data completeness."