PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form ([see an example](#)) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below. Some articles will have been accepted based in part or entirely on reviews undertaken for other BMJ Group journals. These will be reproduced where possible.

ARTICLE DETAILS

TITLE (PROVISIONAL)	What components of chronic care organization relate to better primary care for coronary heart disease patients? An observational study.
AUTHORS	van Lieshout, Jan ; Frigola, Eva; Ludt, Sabine; Grol, Richard; Wensing, Michel

VERSION 1 - REVIEW

REVIEWER	JoAnn Sperl-Hillen, MD Senior Investigator HealthPartners Research Foundation Minneapolis, MN, USA
REVIEW RETURNED	06-Jun-2012

THE STUDY	1. The overall study design cannot infer causality between chronic care model components and patient outcomes, but the conclusions suggest that. 2. It was not clear to me how the patient data was obtained. If measures relied on chart documentation, it is possible that practices with better clinical information system scores had better antiplatelet and influenza measures just because of documentation rather than actual patient outcomes. 3. The methods to not account statistically for multiple comparisons. 4. The conclusions seem over-stated. Although process measures may have improved, it does not seem that health care organization nor any components of the chronic care model were associated with significant improvements in important intermediate patient care outcomes (e.g. bp and LDL). 5. No explanation given for the smaller number of women included (though I suspect it is due to the distribution of CV disease in the population sampled).
RESULTS & CONCLUSIONS	I found the text difficult to understand at times. Terms were not explained well and abbreviations in the tables were not always defined. The conclusions seem over-stated due to the following: (a) the methods do not support causality and do not account for multiple comparisons (b) process measures improve, but not much effect on important intermediate patient care outcomes.

REVIEWER	Thomas E. Kottke, MD, MSPH Senior Clinical Investigator HealthPartners Research Foundation Minneapolls, Minnesota USA I have no competing interests.

REVIEW RETURNED	06-Jun-2012

GENERAL COMMENTS	This manuscript is part of a larger much-needed project that is seeking to improve the management of patients with chronic diseases across Europe. The methodology is sound. The results are rather spotty and I think are somewhat overstated as positive in the Discussion. For example, in Table 3b, only 7 of the 25 indicators are significantly associated with components of the chronic care model, and 5 of these 7 are for influenza immunization. The variables selected for inclusion in Table 4 appear cherry-picked to me. I can't identify a theoretical reason why the variables that were associated with the CCM were associated and the other variables were not.
	I think that the topic of research that this paper represents is very important in general and that this paper, while not showing particularly strong associations, is also important. I think that it would make a stronger contribution to the science if the authors would include some candid discussion about why the associations were so spotty

VERSION 1 – AUTHOR RESPONSE

Reviewer: JoAnn Sperl-Hillen, MD
Senior Investigator
HealthPartners Research Foundation
Minneapolis, MN, USA

1. The overall study design cannot infer causality between chronic care model components and patient outcomes, but the conclusions suggest that.

Throughout the text we used the term associations, but we agree that in the conclusion causality is suggested. We have changed the sentence: 'Its effects [self-management support and use of computerization] proved to be significant…' We now write '…significant associations to quality of care…'.

2. It was not clear to me how the patient data was obtained. If measures relied on chart documentation, it is possible that practices with better clinical information system scores had better antiplatelet and influenza measures just because of documentation rather than actual patient outcomes.

Data indeed was obtained from patient medical records. We added this more clearly in the methods section.
We agree that documentation in itself may be a factor explaining better scores in practices with better use of computerization. The formulation of the quality indicators in its full text takes into account this nuance and is formulated: For patients with CHD […] there is a record that anti-platelet therapy […] has been offered unless contraindicated. We added this in the methods section and in the Discussion section we discussed this problem.

3. The methods to not account statistically for multiple comparisons.

We agree that the presentation of data in table 3 suggests the results of multiple testing. However, what we did was in fact hypothesis driven testing of the association between the complete chronic care model with all domains, using the composite score for five domains based on the highly positive correlations, prohibiting directly entering all domains apart in one regression analysis. This analysis gave the result as displayed in table 3a.
In a next step we wanted to break down the composite to assess the contribution of the various domains within the composite score. Therefore, we analyzed how these five specific domains within

the composite score apart attributed to the quality indictor scores. These analyses resulted in table 3b.
Whether or not multiple testing is a reason for corrections (such as Bonferroni) is a topic for methodological debate. We chose to use the conventional $p < 0.05$ as cut off level for significance.

4. The conclusions seem over-stated. Although process measures may have improved, it does not seem that health care organization nor any components of the chronic care model were associated with significant improvements in important intermediate patient care outcomes (e.g. bp and LDL).

We have now explicitly added in the abstract's conclusions and in the conclusion section of the manuscript that practice organization was associated with scores on process indicators, not on intermediate outcome measures.

5. No explanation given for the smaller number of women included (though I suspect it is due to the distribution of CV disease in the population sampled).

We cannot account for the low number of female CHD patients included in especially Belgium and Switzerland. We added this in the paragraph on Strengths and limitations. Data on sex were used as variables, so this did not interfere with our analyses.

I found the text difficult to understand at times. Terms were not explained well and abbreviations in the tables were not always defined. The conclusions seem over-stated due to the following: (a) the methods do not support causality and do not account for multiple comparisons (b) process measures improve, but not much effect on important intermediate patient care outcomes.

We went through the text and explained terms and abbreviations.
The comment on the conclusions were dealt with in response to comment 4.

Reviewer: Thomas E. Kottke, MD, MSPH
Senior Clinical Investigator
HealthPartners Research Foundation
Minneapolls, Minnesota USA

I have no competing interests.

This manuscript is part of a larger much-needed project that is seeking to improve the management of patients with chronic diseases across Europe. The methodology is sound. The results are rather spotty and I think are somewhat overstated as positive in the Discussion. For example, in Table 3b, only 7 of the 25 indicators are significantly associated with components of the chronic care model, and 5 of these 7 are for influenza immunization. The variables selected for inclusion in Table 4 appear cherry-picked to me. I can't identify a theoretical reason why the variables that were associated with the CCM were associated and the other variables were not.

We have now more clearly stated that results relate to associations, not inferring causality (see also comment 1). And the positive results relate to process indicators and hardly if any to the (intermediate) outcome indicators.
The primary analysis (with results presented in table 3) is not cherry picked, but focused on broad domains of healthcare organization and key indicators for cardiovascular risk management. Table 4 is an example that is used for illustrative purposes only. Thus it is cherry picking indeed, but is meant as such. We clarified this in the Discussion section.

I think that the topic of research that this paper represents is very important in general and that this paper, while not showing particularly strong associations, is also important. I think that it would make a stronger contribution to the science if the authors would include some candid discussion about why the associations were so spotty.'

In the Discussion section we elaborated on the issue of associations with just a part of the quality indicators.

VERSION 2 – REVIEW

REVIEWER	Thomas E. Kottke, MD, MSPH
	Senior Clinical Investigator
	HealthPartners Institute for Education and Research
	Minneapolis, Minnesota USA
REVIEW RETURNED	20-Jul-2012

- The reviewer completed the checklist but made no further comments.