Author's response to reviews

Title: Costs of the 'Hartslag Limburg' Community Heart Health Intervention

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Author's response to reviews: see over
Comments: 
This document contains our answers to the comments of the reviewers. First the comment is repeated, a reaction is given and the changes made related to the comments are detailed outlined (including text phrases that are eliminated and text phrases that are added). In the original article, line numbers are added which are referred to in the reactions.

Comments reviewer Douglas Curran-Everett

Minor essential revisions

Comment 1
Background, p4, paragraph 1 to p 5. It would help to identify the second and the third reasons with the word second and third.

Reaction to comment 1
We agree that identifying the reasons with the words ‘second’ and ‘third’ will be clearer to the reader.

Changes related to comment 1
Following the suggestions, we identified the second and third reasons with the words ‘second and third’. (line 94, line 106)

In relation to this and following another reviewers’ suggestions, the 3 justifications are listed up front, and are then explained in a paragraph on each to increase readability even more. See for added text comment 1 of the minor essential revisions of Jonathan Mant (lines 71-75).

Comment 2
Results, p 12, paragraph 2. The authors report that 3 interventions (Exercise tv, Tasty and healthy, and Focus on Heart and Sports) account for 45% of the total costs. Is there any way to examine the benefit of the 3 interventions in an effort to identify interventions that are most cost-effective? I understand that this may be difficult or impossible to do, but it would help if the authors would discuss this issue.

Reaction to comment 2
In spite of the fact that we ourselves are interested in this information, it is not possible to examine the cost-effectiveness of the individual interventions because of the large amount of interventions running simultaneously. Efforts were done however to examine the potential effectiveness of two of these large scale programs.

Changes related to comment 2
We added a section explaining why it is impossible to calculate cost-effectiveness data of individual studies and we briefly discussed the results of the additional studies on the effectiveness of the large scale interventions.

Added text (Lines 281-292)

Although insight into the CE of these individual programs would be of great interest because of the high costs incurred, it was not possible to calculate the CE of these individual programs. The reason for this is that Hartslag Limburg is very complex (i.e. the large amount of interventions performed simultaneously),
which makes it impossible to assign effects of the program to individual interventions. In order to gain some insight into the effectiveness of these expensive programs however, two of them were evaluated separately. Effects in terms of behavioural change or intended behavioural change were examined concerning the interventions ‘Exercise TV’ and ‘Tasty and Healthy’ using questionnaires. These evaluations indicated that the ‘exercise TV’ seemed to be able to change behaviour, while the intervention ‘Tasty and Healthy’ in its current form was not.

Comment 3
Discussion, p 13, paragraph 1, last sentence. How can cost-sharing be applied by other programs? It would help if the authors briefly address this issue.

Reaction to comment 3
It is indeed important for the readers to understand how cost-sharing can be applied to other programs.

Changes related to comment 3
Although the article discusses preconditions for a program like Hartslag Limburg, we briefly addressed the issue how cost-sharing can be achieved and facilitated in future programs. Added text (344-354):

To apply cost-sharing to future programs it is thus important to form a network of participants. The participants should be well informed about the goals of the project and the advantages for their own sector. This will increase cooperation. To assure effective collaboration, the formulation of written agreements is advisable, especially when private organisations are included. To increase involvement of the partners they can be informed about the progress of the program. Furthermore, the program should be visible to society. It increases the likelihood of external funding and can for example be reached by media messages. Within Hartslag Limburg, creating, maintaining and expanding the network was done by the project leader. It is highly advised for future programs to appoint a person who can execute this task on a full time basis.
**Comments reviewer Jonathan Mant**

**Major essential revisions**

**Comment 1**

It would be very helpful to have an overview of what the Hartslag Limburg prevention programme entailed in the introduction. A reference is given but no details are provided. It is essential to have a description of the programme. As the authors state in their justification, community programmes comprise large and complex interventions, and without some description of what types of programme this is, it is not clear to the reader whether or not this is relevant to their own programmes. For example, table one lists the 21 types of major interventions, but is not clear to me how they were derived at and who decided to use them.

*Reaction to comment 1:*

We agree that the program should be described more clearly in order for the readers to judge whether it is relevant to their own situation. For this reason, we explained the programme more clearly.

*Changes related to comment 1:*

Because of the length of the introduction section, we decided to add a section about the programme and the intervention population in the method section (lines 124-168).

*Added text:*

In this section the Hartslag Limburg program is first described in more detail. Then, the methods of cost-calculation are presented.

2.1 Intervention and target population

*Intervention*

The community programme of Hartslag Limburg aims at health promotion among all inhabitants of the intervention region Maastricht, including four adjacent municipalities (n=180,000).

The programme is based on a unique design, in that a network of participating organisations implemented it. While the Regional Public Health Institute of Maastricht coordinated the programme, a large number of other agencies joined the project, including health promotion agencies, the local hospital, general practitioners, welfare services and local authorities. The large number of participating organisations made it possible to implement a multiple intervention strategy and to reach inhabitants of the region in a variety of ways.

Special attention was paid to inhabitants of four low socio-economic status (LSES) neighbourhoods (n=20,000), in which 50% of the interventions took place.

The community-based health promotion within Hartslag Limburg was realized through nine local health committees: one in each of the 5 municipalities and one in each of the 4 LSES areas. Each committee consists of employees of the Regional Public Health Institute and of welfare services, civil servants and individuals from the target population themselves. The committees approach individuals and groups within the target populations by means of health promotion projects and activities.
The participation of community members in the local health Committees is essential in order to facilitate the recruitment and participation of inhabitants. This is especially true for the LSES regions, because persons with a LSES are difficult to reach with general health promoting activities.

The participation of civil servants is important for policy changes to occur, and because health promotion activities are partially financed by city councils.

Target population

The intervention region consisted of the city of Maastricht (120,000 inhabitants) and 4 adjacent municipalities (60,000 inhabitants). The majority of the people thus lived in urban areas. The labour force accounted for 62 percent of the inhabitants of the intervention region, while 17 percent of the inhabitants had passed the age of 65 years.

In the intervention region, cardiovascular diseases account for 32 percent of all the deaths. The prevalence of the acute heart infarction in the intervention region is 3.7 percent. This is almost two percent higher than the average prevalence rate in the Netherlands.

Concerning lifestyle, 32 percent of the inhabitants smoke and almost 50 percent of the inhabitants in the intervention region does not reach the recommended exercise norms (30 minutes a day for at least 5 days a week).

Comment 2

the methods gives a description of their philosophy of collecting cost data, but it does not actually explain how they collected costs. This detail must be provided. For example, the costs of a nutrition party is given as 399 euros. Table 3 provides the detail that presumably allowed this cost to be estimated, but it is not stated in the methods how this was done

Reaction to comment 2

It is true that the actual application of the methods to hartslag limburg did not get enough attention.

Changes related to comment 2

In the method section, we added some paragraphs about the actual application of the method to the cost-calculation of Hartslag Limburg (lines 214-228)

Added text:

The costs were based on the expenditures within Hartslag limburg and gathered via regular interviews with a health education specialist who was involved in implementing the interventions. First, an overview was provided on the necessary material and personnel input for each intervention (both in kind and in quantity). This means that not the actual input within Hartslag Limburg was used, but an estimation was made on the resources necessary to implement the intervention in the future. In cases where the health education specialist could not provide an accurate estimation, persons who actually carried out the intervention were interviewed.

Separate estimations were made for resource use in the development phase and the implementation phase, because it are only the costs made in the implementation phase that have to be made again when performing the
intervention again. Because necessary material and personnel resource use was the starting point in the calculation of the costs, the cost-calculation was accurate in that large amounts of subsidies and sponsor costs – that were not incorporated in the organising agency’s financial records – were incorporated into the cost-calculation.

This was introduced by the following lines at the start of the method section. (lines171-172)

Added text:

First a general description about the cost-calculation is provided. Then, the actual application of the method to the cost-calculation of Hartslag Limburg will be explained.

Furthermore, table 4a and 4b are expanded with a column, providing details about the source of the data used.

**Minor essential revisions**

**Comment 1**

P4: the autors refer to three justifications for publishing detailed costing studies. Better sign-posting would make it clearer what the three justifications are – perhaps list them all up front, and then a para on each?

*Reaction to comment 1*

We agree that sign-posting makes this part of the introduction easier to read.

*Changes related to comment 1*

The 3 justifications for publishing detailed costing studies are listed up front, and are then explained in a paragraph on each. P4 lines (71-75)

Added text:

(1) a clear description of the methodology is necessary for the interpretation of the results, (2) community programs are complex, and (3) local factors are likely to affect the costs of a program. In the following three paragraphs, these reasons will be discussed in more detail.
**Comments reviewer Silvie Perrault**

**Major essential revisions**

The objective of the study is clear but the methods used are not sufficiently developed to judge of the validity. Major revisions need to be done

**Comment 1**

Introduction needs to be shortened (max 2 pages)

*Reaction to comment 1*

We agree that the introduction is quite long

*Changes related to comment 1*

The introduction was shortened from four to two and a half pages. Our opinion is that shortening the introduction even more would decrease the informative value of the introduction.

Actual changes made to the introduction:
- The description of the intervention is shortened in the introduction. More detailed information about the programme is given in the method section

  Removed text:

  The programme is based on a unique design, in that a network of participants implemented it. While the Regional Public Health Institute of Maastricht coordinated the programme, a large number of other agencies joined the project, including health promotion agencies, the local hospital, general practitioners, welfare services and local politicians.

  Another unusual aspect of the Hartslag Limburg programme is the special attention that was paid to disadvantaged population groups, by using small-scale activities and a multiple intervention strategy. This could easily be implemented thanks to the large network of participants. In addition, inhabitants of the disadvantaged areas themselves were involved in recruiting participants and organising the activities. For a more detailed description of the Hartslag Limburg programme, see Ruland et al. (1999).[^3]

Alternative text (lines 63-66)

Furthermore, special attention was paid to disadvantaged population groups by using small scale activities and a multiple intervention strategy. The next chapter contains a more detailed description of the program.

- the first reason for doing this study is worded more briefly.

  Removed text:

  In the field of health promotion, there have been some studies providing information on the costs of community programmes.[8 9 10 11 12 13 14 15 16 17] For one of these studies, the method used to calculate costs was completely unclear from the article.[17] The majority of the articles, however, explained the cost-calculation method to some extent, and in most cases the costs were based on the actual expenditures, using financial records.[8 9 12 14 15] However, actual expenditures usually do not reflect economic costs, but the costs that were paid by
the agency organising the programme. In some community programmes, large amounts of money are contributed by sponsors.\textsuperscript{[14 15]} Although these costs are not visible in the organising agency's financial records, they should be included in the cost analysis. Furthermore, two of the studies on cost-effectiveness included development costs and research costs, which are irrelevant for economic evaluations.\textsuperscript{[8 9]}

The studies by Ratcliffe et al. (1997) and Baxter et al. (1997) estimated costs using a combined method of actual expenditures and retrospective time input to estimate intervention costs.\textsuperscript{[10 11]} Their methods, however, are not transparent and the costs again are not likely to reflect economic costs. For example, the study by Ratcliffe et al. (1997) includes irrelevant costs.

Two studies calculated costs in accordance with the guidelines, one study using the perspective of the organising agency, the other using the societal perspective.\textsuperscript{[13 16]} These studies, however, only focused on one or two specific interventions. Thus, information about the economic costs of a large-scale multi-factor community intervention like Hartslag Limburg is as yet not available.

Alternative text (lines 82-93)

In the field of health promotion, there have been some studies providing information on the costs of community programmes, but guidelines for economic evaluation are seldom correctly applied.\textsuperscript{[8 9 10 11 12 13 14 15 16 17]} In some cases, the methods used for cost-calculation was not clear.\textsuperscript{[10 11] 17} In the majority of the articles costs were based on the actual expenditures, using financial records.\textsuperscript{[8 9 12 14 15]} Irrelevant costs, like research costs and development costs, were often incorrectly included into the cost calculation,\textsuperscript{[8 9 10]} whereas relevant costs, like financial support in the form of sponsorships, were often not included into the cost-analysis.\textsuperscript{[14 15]}

The two studies that calculated costs in accordance with the guidelines only focused on one or two specific interventions.\textsuperscript{[13 16]} Thus, information about the economic costs of a large-scale multi-factor community intervention like Hartslag Limburg is as yet not available.

- the final sections of the introduction are removed as these issues described here, will be explained in the method section also

Removed text:

The cost calculations presented here are based on the interventions performed within the Hartslag Limburg programme and the experiences of the programme’s developers. It should be stressed that the main goal was not to provide an exact cost calculation of the programme itself, since the costs incurred for the actual programme are not necessarily good estimates of the costs that will have to be paid if the intervention is to be implemented elsewhere. In order to present costs that can easily be generalised, some aspects of the actual costs incurred for the programme had to be adjusted.

Another important aspect is that the current study only focused on the intervention costs. Non-health care costs and saved health care costs due to better health are beyond the scope of this article, but will be addressed in the forthcoming article on the cost-effectiveness of the Hartslag Limburg programme.

We have also attempted to provide some insight into the differences that might arise between the costs incurred by the agency coordinating the programme...
Comment 2
Study population needs more details. We need to have more details on the population eligible to these programmes.

Reaction to comment 2
It is indeed important to have detailed information about the intervention population. For this reason, a section is added to the method section that contains a description on demographic characteristics, the prevalence of CVD and its risk factors.

Changes related to comment 2
For added text, see comment 1 of Jonathan Mant (lines 154-166)

Comment 3
source of data: A section needs to be added including the source of data: listed variables used, how these variables were defined, quality of the data used, validity of the data.

Reaction to comment 3
The sources of the data used within our analysis are indeed given too little attention. For this reason, we added a section to the method chapter, providing more details about the application of the methodology. Furthermore, we added a column to the tables 4a and 4b providing details about the source of the data. Quality and validity issues are discussed in the discussion section.

Changes related to comment 3
In the method section, we added a section about the actual application of the method to the cost-calculation of Hartslag Limburg. For added text (lines 214-228) see comment 2 of Jonathan Mant.
Added text: (lines 214-228 and lines 171-172)

Furthermore, table 4a and 4b are expanded with a column, providing details about the source of the data used.

Concerning the quality and validity, see changes comment 6.

Comment 4
Study design: a section of study design needs to be included. Why the study design was chosen, advantages and disadvantages of the study design, internal and external validity of the study design.

Reaction to comment 4
Because of the untraditional nature and aim of the present study (calculating costs), the study cannot be captured into a traditional design. In order to make the methodology more clear, it is given more attention in the manuscript by adding a section. (Dis)advantages of the methodology, and validity issues are shown in the conclusion section.
Advantages (which includes the external validity) are discussed in the discussion section (see lines 375-391)

The bottom up calculation used has some major advantages. First, insight is provided into the resources necessary to perform life-style interventions. This means that costs for an intervention program (consisting of one of more life style interventions) can be estimated accurately beforehand. Because financial constraints are common within the field of health promotion and because uncertainty about expenses may lead to the decision to spend the available money not on cardiovascular health promotion but on achieving other public health goals, detailed information about costs of community interventions in the field of the prevention of cardiovascular diseases may improve the likelihood of implementing such programs.

Another advantage of providing detailed information about the necessary input for all implemented interventions separately, is that the costs can easily be generalized to other regions. We attempted to calculate and report the costs in a detailed and systematic way, in the hope of providing useful information, which policymakers in other regions, could easily adapt to their own situation. Estimations about costs within a specific setting can be achieved by simply linking local prices to the necessary material and personnel resources (which are not expected to differ much between regions or even between developed countries).

disadvantages and validity aspects of the chosen methodology and study design are discussed in the discussion section.

Added text: (lines 392-398)

The disadvantage of the present methodology to calculate costs is that the estimation of the necessary resources is to some extent subjective, because an estimation is made about the resources necessary when implementing the intervention elsewhere. However, the estimations are based on experience within Hartslag Limburg and the bias is not likely to be large. Furthermore, the cost-calculation is more accurate that the cost-calculation in previous studies (which mostly use financial records), leading to increased validity and reliability of the results as compared to previous studies.

Comment 5
Section for statistical analysis needs to be presented: how the data were analysed, which methods, what is the variation around the point estimate, sensitivity analysis.

Reaction to comment 5
When possible, we agree that the suggested format should be used when presenting research. Unfortunately however, these rules cannot be fully applied to the present study. The aim of the study was to provide an overview of costs of interventions to prevent cardiovascular diseases. This consist of summing up costs. The ‘statistical analysis’ in our case is thus limited to summing up the costs. In the method section, we describe the source of the data and the way costs are calculated.
Changes related to comment 5
For the above mentioned reasons, we did not include an additional section ‘statistical analysis’. We hope you will understand the reasons for our choice.

Comment 6
Discussion section: how these data compared to other data? A section of the limits of this study needs to be added. They need to discuss about the internal and external validity of the results and the transferability of these results.

Reaction to comment 6
The limits of the study and validity issues indeed need more attention in the study. In our opinion, the issue of transferability is described in detail in the study, as our aim was to calculate the costs in such a way that they can easily be transferred to other regions and countries. The methodology was chosen to meet this aim. Concerning the comparing of our data to other data: This is the first study to use this methodology. Furthermore, community programs are complex and differ much from each other. A comparison of costs has thus little comparative value.

Changes related to comment 6
The limits of the study and the internal validity needed more attention and is discussed in lines 392-398. For added text, see comment 4 of Silvie Perrault:

Comment 7
The conclusion is too long

Reaction to comment 7
The conclusion is indeed quite long. The conclusion contains elements that have not been discussed before and for that reason, we replaced large sections from the conclusion to the discussion section. The conclusion is rewritten.

Changes related to comment 7
Original conclusion:

As far as we are aware, this is the first study to present costs of such a large-scale community intervention in such a detailed way, using the necessary material and personnel input for every single intervention as a starting point and considering guidelines for economic evaluation as well.

The bottom up calculation used has some major advantages. First, insight is provided into the resources necessary to perform life-style interventions. This means that costs for an intervention program (consisting of one of more life style interventions) can be estimated accurately beforehand. Because financial constraints are common within the field of health promotion and because uncertainty about expenses may lead to the decision to spend the available money not on cardiovascular health promotion but on achieving other public health goals, detailed information about costs of community interventions in the field of the prevention of cardiovascular diseases may improve the likelihood of implementation of such programs.

Another advantage of providing detailed information about the necessary input for all implemented interventions separately, is that the costs can easily be generalized to other regions. We attempted to calculate and report the costs in a
detailed and systematic way, in the hope of providing useful information, which policymakers in other regions, could easily adapt to their own situation. Estimations about costs within a specific setting can be achieved by simply linking local prices to the necessary material and personnel resources (which are not expected to differ much between regions or even between developed countries).

The disadvantage of the present methodology to calculate costs is that the estimation of the necessary resources is to some extent subjective, because an estimation is made about the resources necessary when implementing the intervention elsewhere. However, the estimations are based on experience within Hartslag Limburg and the bias is not likely to be large. Furthermore, the cost-calculation is more accurate that the cost-calculation in previous studies (which mostly use financial records), leading to increased validity and reliability of the results as compared to previous studies.

As was discussed in the previous section, cost sharing can be achieved. The present study provides insight into the magnitude of cost savings for the organising agency that can be achieved by for example finding subsidies and sponsoring. These can be regarded as a favourable potential way of financing. A network is required, however, in order to successfully implement a large-scale intervention like Hartslag Limburg.

Finally, contrary to previous studies, the present study calculated the costs according to guidelines for economic evaluation. This means that costs can easily be related to the effects of the intervention to calculate a cost-effectiveness ratio, which can be used for decision-making at macro-level.

Alternative text (lines 411-424)

The costs of the interventions of the community program of Hartslag Limburg are calculated to be €900,000. Because the costs of all interventions are calculated separately using a bottom-up procedure, they are very informative for health promotion specialists and policy makers. Furthermore, the methodology used makes it easy to generalise the costs to other settings and countries.

This study further shows that the costs do not have to be paid by one agency, but that cost sharing can be achieved by for example finding subsidies and sponsoring. These can be regarded as a favourable potential way of financing. A network is required, however, in order to successfully implement a large-scale intervention like Hartslag Limburg.

Finally, contrary to previous studies, the present study calculated the costs according to guidelines for economic evaluation. This means that costs can easily be related to the effects of the intervention to calculate a cost-effectiveness ratio, which can be used for decision-making at macro-level.