Technical report:

HENVINET

Evaluation questionnaire - Climate Change and respiratory diseases

Aileen Yang[1] and Alena Bartonova[1], Editors

Authors:
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Norsk institutt for luftforskning
Norwegian Institute for Air Research

NILU

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HENVINET
HEALTH AND ENVIRONMENT NETWORK

EVALUATION QUESTIONNAIRE – CLIMATE CHANGE AND RESPIRATORY DISEASES

PRELUDE

Thank you very much for participating in this study of the HENVINET project. Before beginning, we would ask that you provide some basic information about yourself.

- Name:_____

- Email address: _____

- Institutional affiliation: _____

- Disciplinary Background:_____

- 5 keywords describing your area of expertise:

1._____ 2._____ 3._____ 4._____ 5._____

INTRODUCTION

With your help we will evaluate the quality of the scientific knowledge of various aspects of the cause-effect relationship between climate change and asthma/allergy and other respiratory endpoints.

The goal is to identify knowledge gaps and potential disagreement on the evidence between colleagues in the field. Ultimately, the aim is to discuss the implications for policy and research.

The evaluation consists of two separate parts. In part A you will be asked to comment on the completeness and structure of a diagram illustrating our current understanding of the different cause effect relationship. In part B you will be asked to express your level of confidence in the claims that specific effects are expected to occur, at least in some regions, as a result of climate change.

We ask for your considered opinion based on the quality of your scientific work and trust your broad experience in the field will help achieve an understanding of the issues.

If you have any concerns or questions, please contact Bertil Forsberg (bertil.forsberg@envmed.emu.se), Martin Krayer von Krauss (MAK@euro.who.int) or Aileen Yang (ay@nilu.no)

We appreciate your participation and, on behalf of the Henvinet consortium, thank you for your time.

PART A. EVALUATION OF THE STRUCTURE AND COMPLETENESS OF THE CAUSAL DIAGRAM
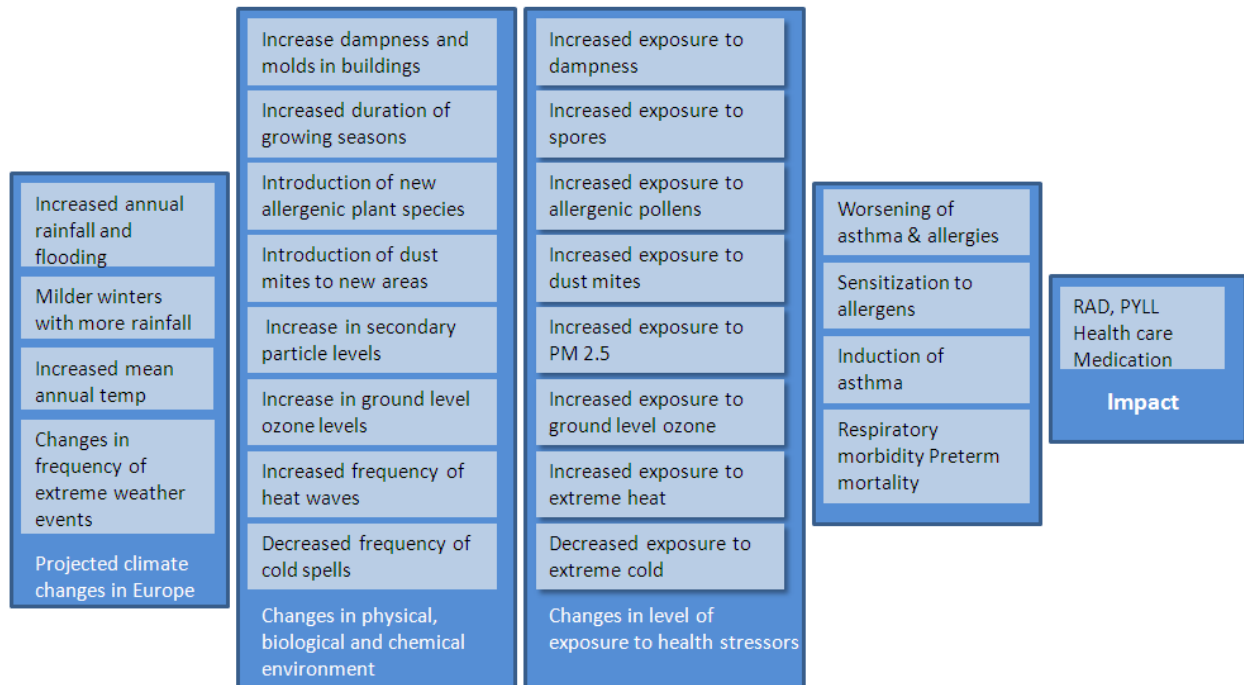
Figure 1. The diagram illustrates 8 different causal pathways through which climate change could lead to a change in cardio-respiratory mortality and morbidity rates:

1. Changed exposure to PM2.5

2. Changed exposure to ground level ozone

3. Changed exposure to dust mites

4. Changed exposure to allergenic pollens

5. Changed exposure to extreme heat

6. Decreased exposure to extreme cold

7. Changed exposure to mould spores

8. Changed exposure to damp buildings and wet building materials.

Evaluate the completeness of the diagram by answering the following questions:

1.   Does the diagram take into account all of the important parameters when evaluating the asthma and allergy risks related to climate change? If no, please explain.

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2.   Are the different causal relationships adequately structured? If no, please explain.

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3. Are there any unnecessary parameters shown in the diagram that could be deleted? If yes, please explain.

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PART B. EVALUATION OF INDIVIDUAL PARAMETERS

In the following section, we ask you to express your level of confidence in the claims that specific effects are expected to occur as a result of a change in the factor(s) representing the previous model module.

Please consider each question independently of the others. For example, when you answer a question on confidence in health effects, do not let your answer be influenced by your answer on your confidence in changes in exposure levels

1. CHANGED EXPOSURE TO DAMPNESS
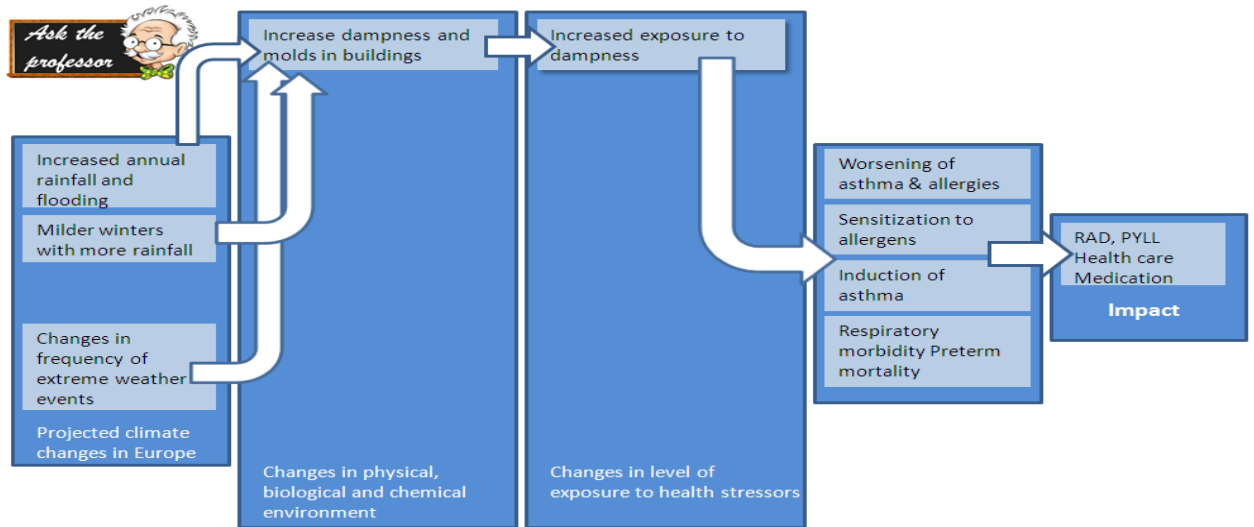
1.1 What is your level of confidence in the claim that increased rainfall and flooding from climate change will increase the numbers of damp buildings and wet building material?

(Insert a checkmark in the appropriate box)

Very high confidence. At least a 9 out of 10 chance of being correct.	High confidence. At least an 8 out of 10 chance of being correct.	Medium confidence. At least a 5 out of 10 chance of being correct.	Low confidence. At least a 2 out of 10 chance of being correct.	Very low confidence. Less than a 1 out of 10 chance of being correct.

1.2 What is your level of confidence in the claim that population exposure to damp buildings and wet building material also will increase as a result of climate change?

(Insert a checkmark in the appropriate box)

Very high confidence. At least a 9 out of 10 chance of being correct.	High confidence. At least an 8 out of 10 chance of being correct.	Medium confidence. At least a 5 out of 10 chance of being correct.	Low confidence. At least a 2 out of 10 chance of being correct.	Very low confidence. Less than a 1 out of 10 chance of being correct.

1.3 What is your level of confidence in the claim that increased exposure to damp buildings and wet building material will increase the frequency of acute asthma and respiratory morbidity?

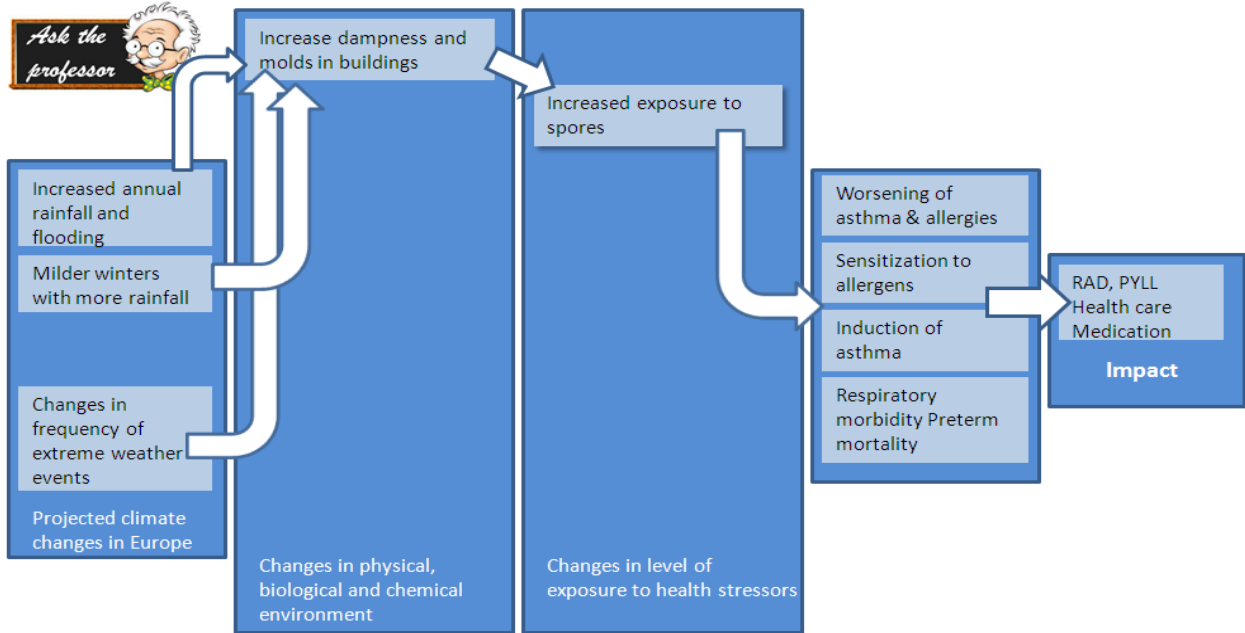 (Insert a checkmark in the appropriate box)

Very high confidence. At least a 9 out of 10 chance of being correct.	High confidence. At least an 8 out of 10 chance of being correct.	Medium confidence. At least a 5 out of 10 chance of being correct.	Low confidence. At least a 2 out of 10 chance of being correct.	Very low confidence. Less than a 1 out of 10 chance of being correct.

1.4 What is your level of confidence in the claim that increased exposure to damp buildings and wet building material will result in an increased incidence/prevalence of asthma and/or allergies?

 (Insert a checkmark in the appropriate box)

Very high confidence. At least a 9 out of 10 chance of being correct.	High confidence. At least an 8 out of 10 chance of being correct.	Medium confidence. At least a 5 out of 10 chance of being correct.	Low confidence. At least a 2 out of 10 chance of being correct.	Very low confidence. Less than a 1 out of 10 chance of being correct.

2. CHANGED EXPOSURE TO MOULDS AND SPORES

2.1 What is your level of confidence in the claim that increased rainfall and flooding from climate change will result in increases in moulds and spores in buildings?

(Insert a checkmark in the appropriate box)

Very high confidence. At least a 9 out of 10 chance of being correct.	High confidence. At least an 8 out of 10 chance of being correct.	Medium confidence. At least a 5 out of 10 chance of being correct.	Low confidence. At least a 2 out of 10 chance of being correct.	Very low confidence. Less than a 1 out of 10 chance of being correct.

2.2 What is your level of confidence in the claim that the exposure of the population to moulds and spores in the buildings also will increase as a result of climate change?

(Insert a checkmark in the appropriate box)

Very high confidence. At least a 9 out of 10 chance of being correct.	High confidence. At least an 8 out of 10 chance of being correct.	Medium confidence. At least a 5 out of 10 chance of being correct.	Low confidence. At least a 2 out of 10 chance of being correct.	Very low confidence. Less than a 1 out of 10 chance of being correct.

2.3 What is your level of confidence in the claim that increased exposure to moulds and spores in buildings will increase the frequency of acute asthma and respiratory morbidity
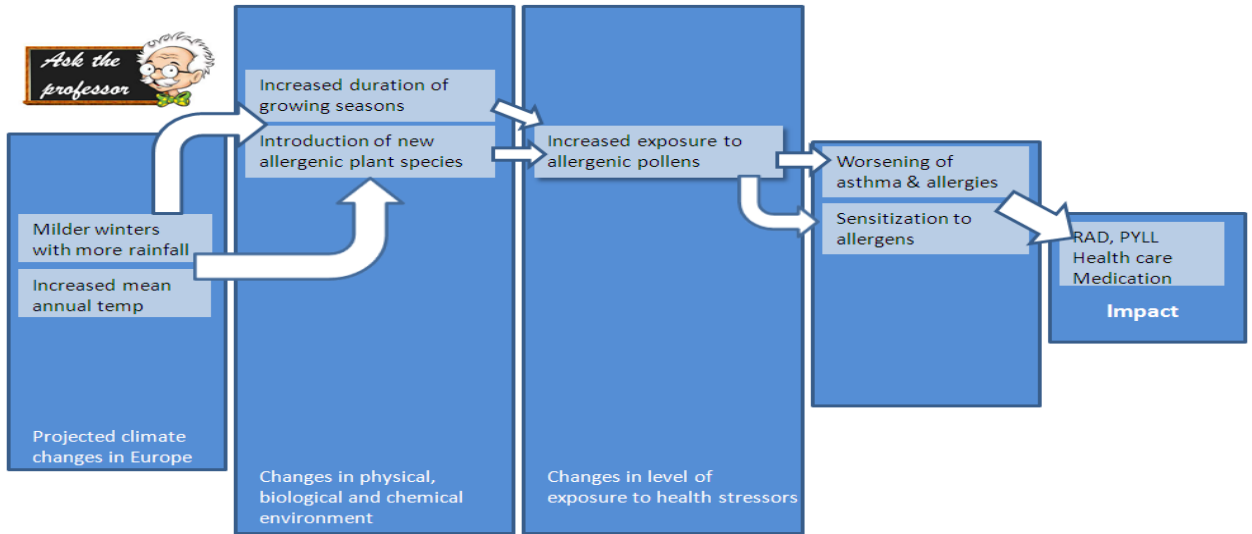
(Insert a checkmark in the appropriate box)

Very high confidence. At least a 9 out of 10 chance of being correct.	High confidence. At least an 8 out of 10 chance of being correct.	Medium confidence. At least a 5 out of 10 chance of being correct.	Low confidence. At least a 2 out of 10 chance of being correct.	Very low confidence. Less than a 1 out of 10 chance of being correct.

2.4 What is your level of confidence in the claim that increased exposure to moulds and spores will result in an increased incidence/prevalence of asthma and/or allergies?

(Insert a checkmark in the appropriate box)

Very high confidence. At least a 9 out of 10 chance of being correct.	High confidence. At least an 8 out of 10 chance of being correct.	Medium confidence. At least a 5 out of 10 chance of being correct.	Low confidence. At least a 2 out of 10 chance of being correct.	Very low confidence. Less than a 1 out of 10 chance of being correct.

3. CHANGED EXPOSURE TO ALLERGENIC POLLEN

3.1 What is your level of confidence in the claim that climate change will result in increased levels of allergenic pollen?

(Insert a checkmark in the appropriate box)

Very high confidence. At least a 9 out of 10 chance of being correct.	High confidence. At least an 8 out of 10 chance of being correct.	Medium confidence. At least a 5 out of 10 chance of being correct.	Low confidence. At least a 2 out of 10 chance of being correct.	Very low confidence. Less than a 1 out of 10 chance of being correct.

3.2 What is your level of confidence in the claim that increased levels of allergenic pollen from climate change also will result in an increased population exposure?

(Insert a checkmark in the appropriate box)

Very high confidence. At least a 9 out of 10 chance of being correct.	High confidence. At least an 8 out of 10 chance of being correct.	Medium confidence. At least a 5 out of 10 chance of being correct.	Low confidence. At least a 2 out of 10 chance of being correct.	Very low confidence. Less than a 1 out of 10 chance of being correct.

3.3 What is your level of confidence in the claim that increased exposure to allergenic pollen will increase the frequency of acute asthma and respiratory morbidity?

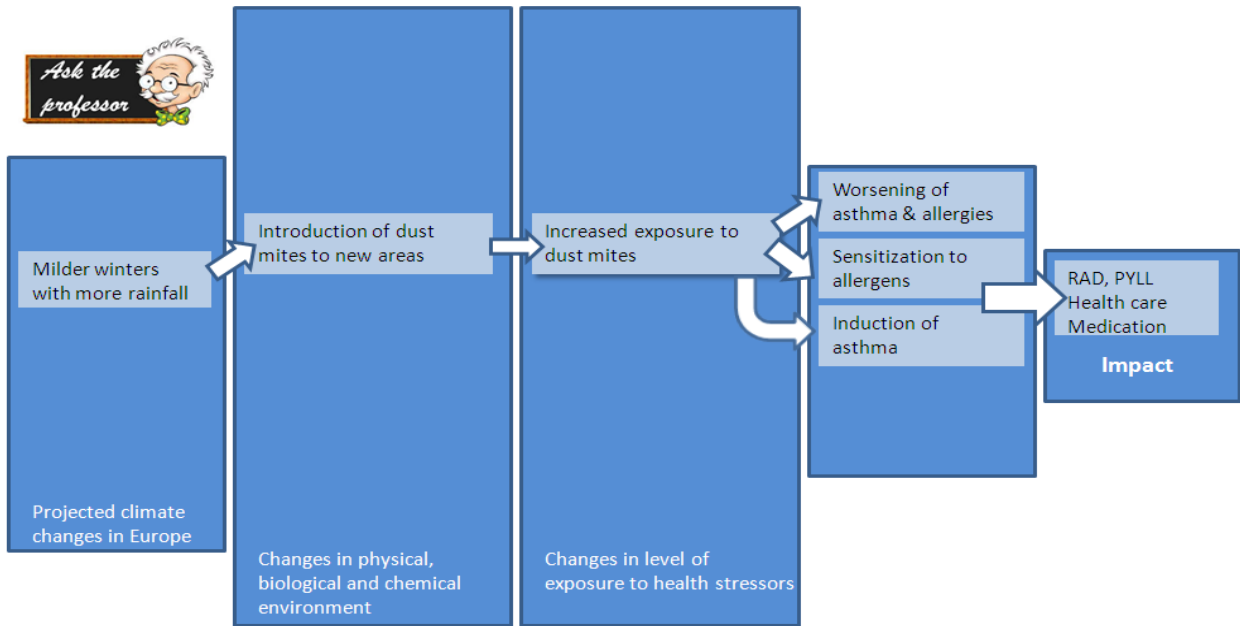(Insert a checkmark in the appropriate box)

Very high confidence.	High confidence.	Medium confidence.	Low confidence.	Very low confidence.
At least a 9 out of 10 chance of being correct.	At least an 8 out of 10 chance of being correct.	At least a 5 out of 10 chance of being correct.	At least a 2 out of 10 chance of being correct.	Less than a 1 out of 10 chance of being correct.

3.4 What is your level of confidence in the claim that increased exposure to allergenic pollen will result in an increased incidence/prevalence of asthma and/or allergies?

(Insert a checkmark in the appropriate box)

Very high confidence.	High confidence.	Medium confidence.	Low confidence.	Very low confidence.
At least a 9 out of 10 chance of being correct.	At least an 8 out of 10 chance of being correct.	At least a 5 out of 10 chance of being correct.	At least a 2 out of 10 chance of being correct.	Less than a 1 out of 10 chance of being correct.

4. CHANGED EXPOSURE TO DUST MITES

4.1 What is your level of confidence in the claim that climate change will result in increased levels of dust mites?

(Insert a checkmark in the appropriate box)

| Very high confidence.

At least a 9 out of 10 chance of being correct. | High confidence.

At least an 8 out of 10 chance of being correct. | Medium confidence.

At least a 5 out of 10 chance of being correct. | Low confidence.

At least a 2 out of 10 chance of being correct. | Very low confidence.

Less than a 1 out of 10 chance of being correct. |
|---|---|---|---|---|
| | | | | |

4.2 What is your level of confidence in the claim that increased levels of dust mites from climate change also will result in an increased population exposure?

(Insert a checkmark in the appropriate box)

| Very high confidence.

At least a 9 out of 10 chance of being correct. | High confidence.

At least an 8 out of 10 chance of being correct. | Medium confidence.

At least a 5 out of 10 chance of being correct. | Low confidence.

At least a 2 out of 10 chance of being correct. | Very low confidence.

Less than a 1 out of 10 chance of being correct. |
|---|---|---|---|---|
| | | | | |

4.3 What is your level of confidence in the claim that increased exposure to dust mites will increase the frequency of acute asthma and respiratory morbidity?

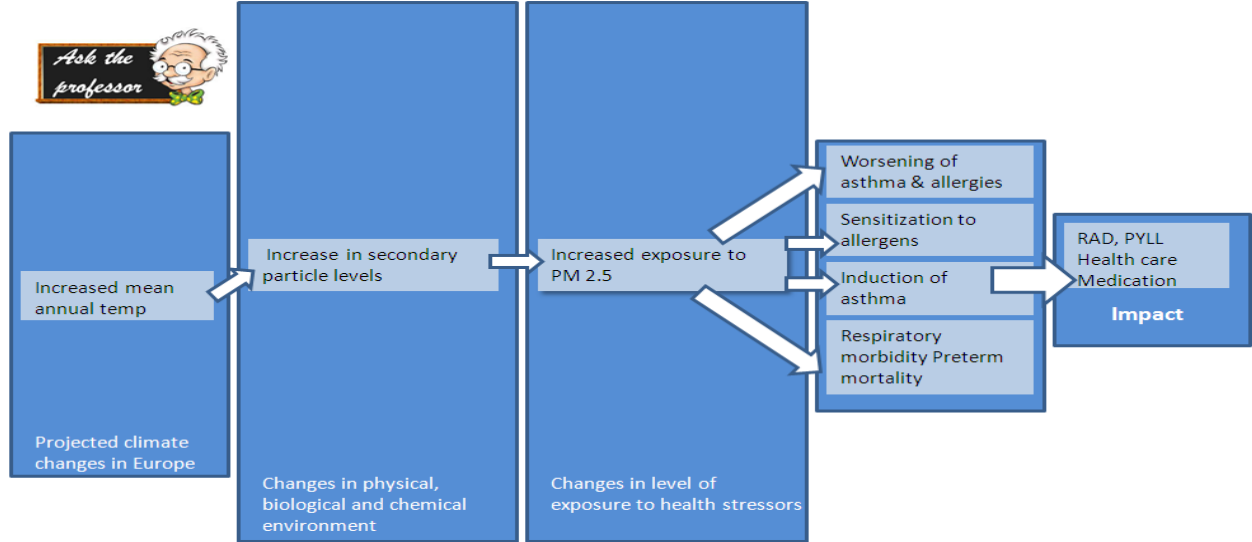(Insert a checkmark in the appropriate box)

Very high confidence. At least a 9 out of 10 chance of being correct.	High confidence. At least an 8 out of 10 chance of being correct.	Medium confidence. At least a 5 out of 10 chance of being correct.	Low confidence. At least a 2 out of 10 chance of being correct.	Very low confidence. Less than a 1 out of 10 chance of being correct.

4.4 What is your level of confidence in the claim that increased exposure to dust mites will result in an increased incidence/prevalence of asthma and/or allergies?

(Insert a checkmark in the appropriate box)

Very high confidence. At least a 9 out of 10 chance of being correct.	High confidence. At least an 8 out of 10 chance of being correct.	Medium confidence. At least a 5 out of 10 chance of being correct.	Low confidence. At least a 2 out of 10 chance of being correct.	Very low confidence. Less than a 1 out of 10 chance of being correct.

5. CHANGED EXPOSURE TO PM2.5

5.1 What is your level of confidence in the claim that climate change will result in increased levels of secondary fine (PM2.5) particles?

(Insert a checkmark in the appropriate box)

Very high confidence.	High confidence.	Medium confidence.	Low confidence.	Very low confidence.
At least a 9 out of 10 chance of being correct.	At least an 8 out of 10 chance of being correct.	At least a 5 out of 10 chance of being correct.	At least a 2 out of 10 chance of being correct.	Less than a 1 out of 10 chance of being correct.

5.2 What is your level of confidence in the claim that increased levels of secondary fine (PM2.5) particles also will result in an increased population exposure?

(Insert a checkmark in the appropriate box)

Very high confidence.	High confidence.	Medium confidence.	Low confidence.	Very low confidence.
At least a 9 out of 10 chance of being correct.	At least an 8 out of 10 chance of being correct.	At least a 5 out of 10 chance of being correct.	At least a 2 out of 10 chance of being correct.	Less than a 1 out of 10 chance of being correct.

5.3 What is your level of confidence in the claim that increased exposure to secondary fine (PM2.5) particles will increase the frequency of acute asthma and respiratory morbidity?

(Insert a checkmark in the appropriate box)

Very high confidence. At least a 9 out of 10 chance of being correct.	High confidence. At least an 8 out of 10 chance of being correct.	Medium confidence. At least a 5 out of 10 chance of being correct.	Low confidence. At least a 2 out of 10 chance of being correct.	Very low confidence. Less than a 1 out of 10 chance of being correct.

5.4 What is your level of confidence in the claim that increased exposure to secondary fine (PM2.5) particles will result in an increased incidence/prevalence of asthma and/or allergies?
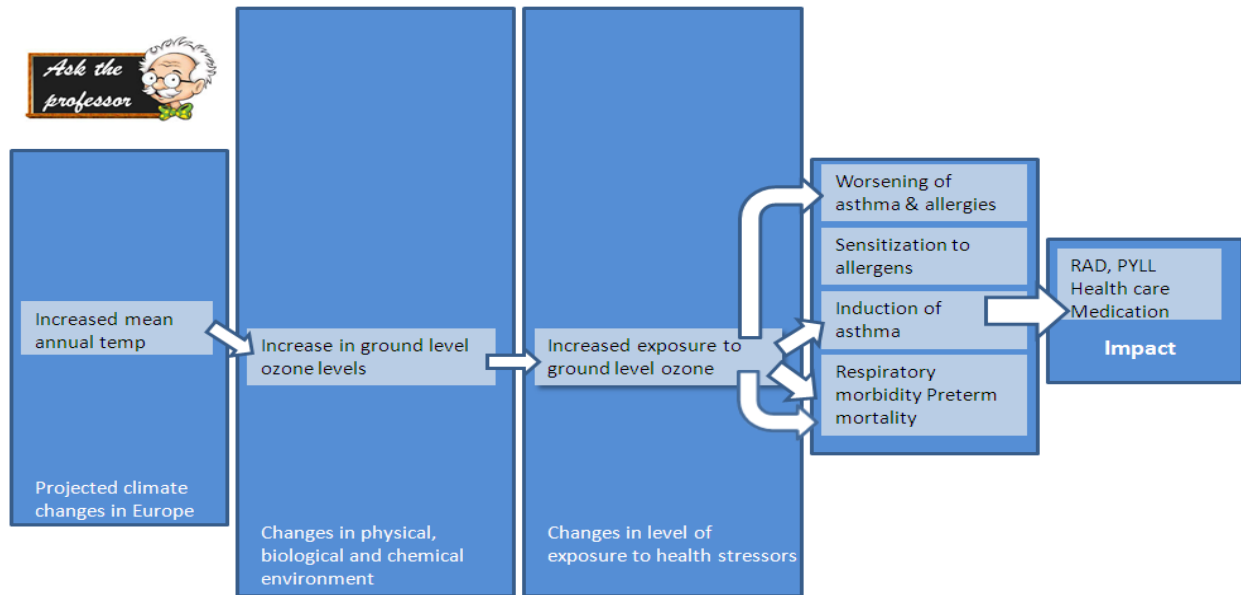
(Insert a checkmark in the appropriate box)

Very high confidence. At least a 9 out of 10 chance of being correct.	High confidence. At least an 8 out of 10 chance of being correct.	Medium confidence. At least a 5 out of 10 chance of being correct.	Low confidence. At least a 2 out of 10 chance of being correct.	Very low confidence. Less than a 1 out of 10 chance of being correct.

5.5 What is your level of confidence in the claim that increased exposure to secondary fine (PM2.5) particles will result in an increase in cardio-respiratory mortality rates?

(Insert a checkmark in the appropriate box)

Very high confidence. At least a 9 out of 10 chance of being correct.	High confidence. At least an 8 out of 10 chance of being correct.	Medium confidence. At least a 5 out of 10 chance of being correct.	Low confidence. At least a 2 out of 10 chance of being correct.	Very low confidence. Less than a 1 out of 10 chance of being correct.

6. CHANGED EXPOSURE TO OZONE

6.1 What is your level of confidence in the claim that climate change will result in increased concentrations of ground level ozone?

(Insert a checkmark in the appropriate box)

Very high confidence. At least a 9 out of 10 chance of being correct.	High confidence. At least an 8 out of 10 chance of being correct.	Medium confidence. At least a 5 out of 10 chance of being correct.	Low confidence. At least a 2 out of 10 chance of being correct.	Very low confidence. Less than a 1 out of 10 chance of being correct.

6.2 What is your level of confidence in the claim that increased ground levels of ozone also will result in an increased population exposure

(Insert a checkmark in the appropriate box)

Very high confidence. At least a 9 out of 10 chance of being correct.	High confidence. At least an 8 out of 10 chance of being correct.	Medium confidence. At least a 5 out of 10 chance of being correct.	Low confidence. At least a 2 out of 10 chance of being correct.	Very low confidence. Less than a 1 out of 10 chance of being correct.

6.3 What is your level of confidence in the claim that exposure to increased ground levels of ozone will increase the frequency of acute asthma and respiratory morbidity?

(Insert a checkmark in the appropriate box)

Very high confidence. At least a 9 out of 10 chance of being correct.	High confidence. At least an 8 out of 10 chance of being correct.	Medium confidence. At least a 5 out of 10 chance of being correct.	Low confidence. At least a 2 out of 10 chance of being correct.	Very low confidence. Less than a 1 out of 10 chance of being correct.

6.4 What is your level of confidence in the claim that exposure to increased ground levels of ozone will result in an increased incidence/prevalence of asthma and/or allergies?
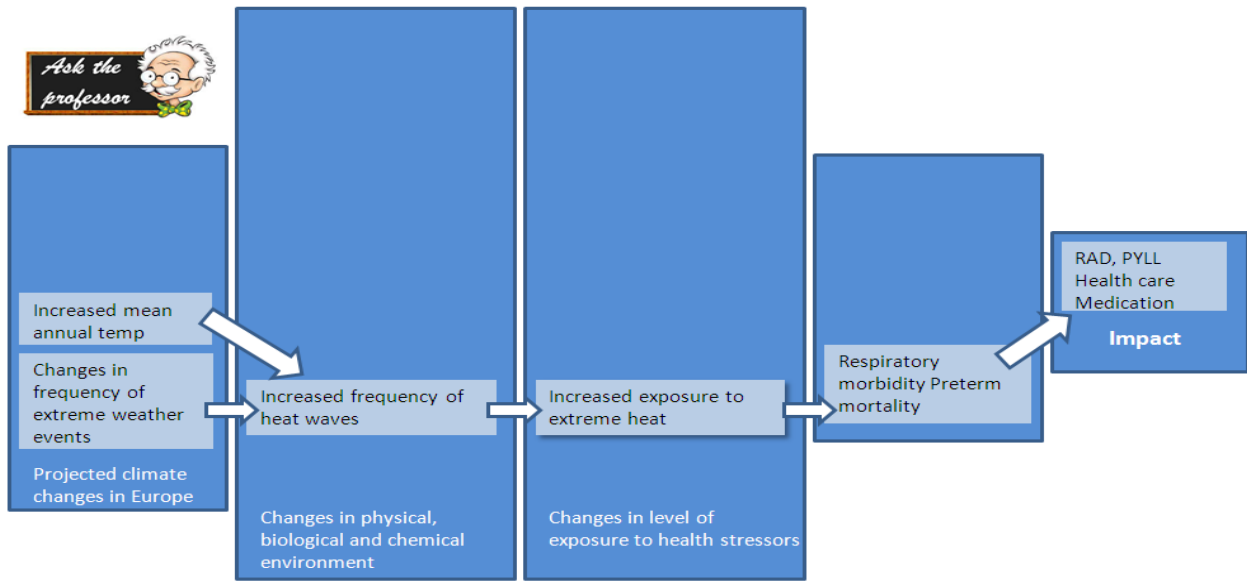
(Insert a checkmark in the appropriate box)

Very high confidence. At least a 9 out of 10 chance of being correct.	High confidence. At least an 8 out of 10 chance of being correct.	Medium confidence. At least a 5 out of 10 chance of being correct.	Low confidence. At least a 2 out of 10 chance of being correct.	Very low confidence. Less than a 1 out of 10 chance of being correct.

6.5 What is your level of confidence in the claim our ability to predict the magnitude of the change in cardio-respiratory mortality rates as a result of changed exposure to ground-level ozone?

(Insert a checkmark in the appropriate box)

Very high confidence. At least a 9 out of 10 chance of being correct.	High confidence. At least an 8 out of 10 chance of being correct.	Medium confidence. At least a 5 out of 10 chance of being correct.	Low confidence. At least a 2 out of 10 chance of being correct.	Very low confidence. Less than a 1 out of 10 chance of being correct.

7. CHANGED EXPOSURE TO EXTREME HEAT

7.1 What is your level of confidence in the claim that climate change will result in increased frequency and duration of heat waves?

(Insert a checkmark in the appropriate box)

Very high confidence. At least a 9 out of 10 chance of being correct.	High confidence. At least an 8 out of 10 chance of being correct.	Medium confidence. At least a 5 out of 10 chance of being correct.	Low confidence. At least a 2 out of 10 chance of being correct.	Very low confidence. Less than a 1 out of 10 chance of being correct.

7.2 What is your level of confidence in the claim that population exposure to extreme heat also will increase as a result of climate change?

(Insert a checkmark in the appropriate box)

Very high confidence. At least a 9 out of 10 chance of being correct.	High confidence. At least an 8 out of 10 chance of being correct.	Medium confidence. At least a 5 out of 10 chance of being correct.	Low confidence. At least a 2 out of 10 chance of being correct.	Very low confidence. Less than a 1 out of 10 chance of being correct.

7.3 What is your level of confidence in the claim that cardio-respiratory mortality and/or morbidity will increase as a result of increased exposures to extreme heat?

(Insert a checkmark in the appropriate box)

Very high confidence. At least a 9 out of 10 chance of being correct.	High confidence. At least an 8 out of 10 chance of being correct.	Medium confidence. At least a 5 out of 10 chance of being correct.	Low confidence. At least a 2 out of 10 chance of being correct.	Very low confidence. Less than a 1 out of 10 chance of being correct.

8. DECREASED EXPOSURE TO EXTREME COLD

8.1 What is your level of confidence in the claim that climate change will result in decreased frequency and duration of cold spells?

(Insert a checkmark in the appropriate box)

Very high confidence. At least a 9 out of 10 chance of being correct.	High confidence. At least an 8 out of 10 chance of being correct.	Medium confidence. At least a 5 out of 10 chance of being correct.	Low confidence. At least a 2 out of 10 chance of being correct.	Very low confidence. Less than a 1 out of 10 chance of being correct.

8.2 What is your level of confidence in the claim that population exposure to extreme cold also will decrease as a result of climate change?

(Insert a checkmark in the appropriate box)

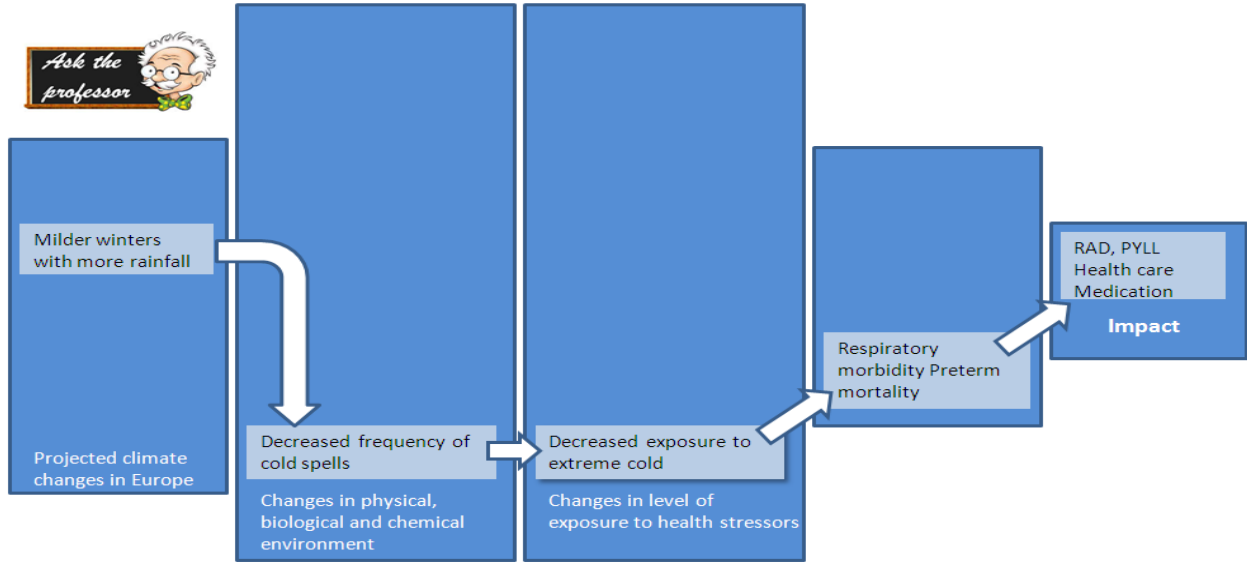| Very high confidence. At least a 9 out of 10 chance of being correct.	High confidence. At least an 8 out of 10 chance of being correct.	Medium confidence. At least a 5 out of 10 chance of being correct.	Low confidence. At least a 2 out of 10 chance of being correct.	Very low confidence. Less than a 1 out of 10 chance of being correct.

8.3 What is your level of confidence in the claim that cardio-respiratory mortality and/or morbidity will decrease as a result of decreased exposures to extreme cold?

(Insert a checkmark in the appropriate box)

Very high confidence. At least a 9 out of 10 chance of being correct.	High confidence. At least an 8 out of 10 chance of being correct.	Medium confidence. At least a 5 out of 10 chance of being correct.	Low confidence. At least a 2 out of 10 chance of being correct.	Very low confidence. Less than a 1 out of 10 chance of being correct.

9. CROSS CUTTING ISSUES

9.1 The diagram in figure 1 illustrates 8 different causal pathways through which climate change could lead to a change in cardio-respiratory mortality and morbidity rates. These pathways are listed below. On a scale of 1 to 8, please rank the relative importance of each pathway, in comparison with the health impact to be expected via other pathways.

<u>Causal Pathway</u>   <u>Relative ranking (1-8)</u>

2. Changed exposure to PM2.5   _____

3. Changed exposure to ground level ozone   _____

4. Changed exposure to dust mites   _____

5. Changed exposure to allergenic pollens   _____

6. Changed exposure to extreme heat   _____

7. Decreased exposure to extreme cold   _____

8. Changed exposure to mould spores   _____

9. Changed exposure to damp buildings and wet building material   _____

9.2 The 8 causal pathways shown in the diagram will interact with one another and lead to a combined impact on health. While the combined health impacts of some of the 8 causal pathways may be additive, others could possibly interact in a synergistic or antagonistic way.

With this in mind, what is your level of confidence in our ability to predict the magnitude of the overall impact of climate change on respiratory morbidity and mortality rates?

(Insert a checkmark in the appropriate box)

Very high confidence.	High confidence	Medium confidence	Low confidence	Very low confidence
At least 9 out of 10 chance of being correct.	At least 8 out of 10 chance of being correct.	At least 5 out of 10 chance of being correct.	At least 2 out of 10 chance of being correct.	Less than a 1 out of 10 chance of being correct.

FINAL COMMENTS

Thank you very much for taking part in this evaluation. Your contribution is much appreciated. These results will now be analysed and discussed by experts within the HENVINET consortium. Are there any comments you would like to make in closing to complete your evaluation? Perhaps you would like to comment on key areas of knowledge which you think are underdeveloped?

Perhaps you would like to provide your impressions of the usefulness of this evaluation, or provide suggestions on how to improve it?

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Thank you very much.

M. Krayer von Krauss, B. Forsberg, A Bartonova

If you do would prefer to fill this out by hand, you can submit to:

Alena.bartonova@nilu.no

NILU

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N-2027 Kjeller, Norway

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ABSTRACT
The HENVINET consortium has developed a questionnaire to identify knowledge gaps in the state of the art in scientific knowledge. Literature reviews covered all elements that compose the causal chain of the different environmental health issues from emissions to exposures, to effects and to health impacts. Ultimately, the aim is to discuss the implications of these for policy and research.

In this evaluation we focus on various aspects of the cause-effect relationship between climate change and asthma/allergy and other respiratory diseases. The questionnaire consists of two separate parts. In Part A, you will be asked to comments on the completeness and structure of a diagram illustrating our current understanding of the cause-effect relationship. In Part B, you will be asked to express your level of confidence in the claims that specific effects are expected to occur, at least in some regions, as a result of climate change.

* Classification   A   Unclassified (can be ordered from NILU)
B   Restricted distribution
C   Classified (not to be distributed)

NILU is an independent, nonprofit institution established in 1969. Through its research NILU increases the understanding of climate change, of the composition of the atmosphere, of air quality and of hazardous substances. Based on its research, NILU markets integrated services and products within analyzing, monitoring and consulting. NILU is concerned with increasing public awareness about climate change and environmental pollution.

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