

# BMJ Open Effects of climate change in the elderly's health: a scoping review protocol

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## ABSTRACT

**Introduction** Climate change is a global problem that affects human health, especially the most vulnerable groups, including the elderly. However, no scope review includes the perspective of institutions specialised in climate change and health and whose reports are the basis for policies orientated on the environmental health. Therefore, this study aims to identify these effects on older people health. The results will allow health professionals to have valuable information enabling them to provide quality care in meeting the demand that this situation is producing.

**Methods and analysis** A scoping review of the relevant literature will be performed from 2008 to 2021. The Joanna Briggs Institute guidelines and the PRISMA-Scoping Review Extension checklist will be used. A peer-reviewed search will be conducted using the electronic databases Medline, Scopus, Cumulative Index to Nursing and Allied Health Literature, Cochrane, PsycINFO and Cuiden Plus between October and December 2021. Original quantitative studies and reports from official agencies on the effects of climate change on the elderly health in any health and geographical context will be included. Literature selection will be made by two reviewers. The table format used for data extraction will be reviewed by the review team and tested by two reviewers.

**Ethics and dissemination** This study does not require approval by an ethics committee to be conducted. This article will result in the mapping of the direct and indirect effects of climate change on the health of the elderly. The results will be published in scientific journals to be accessible to health professionals in the creation of care plans for the elderly at climate risk.

## INTRODUCTION

There is a great global concern about climate change and its effect on human health. In 1979, the First World Climate Conference was held in Geneva, where it became clear that climate change is a serious problem for our planet. The 1994 United Nations Framework Convention on Climate Change defined climate change as 'a change of climate, which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods'.<sup>1</sup> Subsequently, several important facts were highlighted

## Strengths and limitations of this study

- The review will follow the Joanna Briggs Institute guidance and will be subjected to the PRISMA-Scoping Review Extension checklist.
- The review will include publications from 2008 to the present.
- A peer-reviewed search and paper selection will be conducted according to the inclusion criteria.
- The reports made by specialised organisms in climate change and health contributing in the elaboration of environmental policies will be included in the review.
- Quality analysis is not required in the studies included in the review.

at the COP23 UN Conference in Bonn (Germany, 2017); indicators of long-term climate change (increasing carbon dioxide concentration, ocean acidification and rise in sea level) have increased significantly, as has the global average temperature (1.1°C higher than in industrial times).<sup>2</sup> Additionally, the latest Intergovernmental Panel on Climate Change (IPCC) report warns that there is a high risk of intense heat waves, among other impacts, if the 1.5°C increase in the Earth's average temperature is exceeded, with corresponding impacts on human health.<sup>3</sup> Climate change, along with other exceeded planetary boundaries, has increased the risk to human well-being, requiring change and transformation to enable human societies to develop in a just and safe manner.<sup>4</sup>

Broadly speaking, climate change can influence human health by means of the following:<sup>5</sup>

- Direct effects: through changes in the normal temperature range (heat waves or intense cold), extreme weather events (floods, hurricanes, droughts or wildfires) or exposure to ultraviolet radiation.
- Indirect effects: through changes in air quality (air pollution, pollen and allergens), access to unsafe food and water and increased risk of transmission of certain vectorborne diseases.



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Moreover, the ageing of the world's population is an unprecedented phenomenon that has been accelerating in recent decades, especially in developed countries. The proportion of people over 60 years of age is expected to double in just 50 years, reaching 2 billion in 2050 (22% of the world's population). Recently, people in this age group have outnumbered children under 5 years of age.<sup>6</sup>

Climate change is a problem that affects all human beings, but it will affect the most vulnerable population groups to a greater extent, including the elderly, defined as individuals over 65 years of age. The response of this population group to the effects of climate change is conditioned by the changes that occur in the body because of the physiological ageing process. Because their thermoregulatory system does not function properly, their response to heat waves and intense cold leads to increased mortality. Additionally, their reduced ability to eliminate pollutants from the body and decreased lung capacity lead to increased respiratory and heart disease due to air pollution, as well as decreased cognitive function. Despite extreme weather events, apart from the direct effects of disasters, there is also the interruption or difficulty of access to healthcare, as well as depression or post-traumatic shock.<sup>7</sup> In addition to physiological characteristics, repeated exposure to these effects also plays a key role, leading to a cumulative effect.<sup>8</sup> Socioeconomic factors such as poverty, low educational level, scarcity or absence of family and social networks may also increase the vulnerability of this population group to climate change.<sup>9</sup>

## Background

Nursing is witnessing this climate change and its consequences on the health of individuals over the age of 65. Healthcare professionals are unprepared and only half-task on environmental measures as few understand why extreme weather events are related to climate change and how they affect the health of older adults.<sup>10</sup> Because of this, they are unaware of strategies or interventions to lessen the impact on this population.<sup>11</sup> Organisations such as International Council of Nurses, American Nurse Association and Canadian Nurses Association have called on nursing professionals to contribute to preventing the effects of climate change on the most vulnerable groups, including the elderly.<sup>12</sup>

Following the IPCC recommendations, nursing professionals should use both mitigation and adaptation strategies: educate themselves on the health effects of climate change and be able to address the deterioration of health in this population group;<sup>13</sup> promote healthy lifestyles<sup>14</sup> and work with communities to build resilience to the consequences of climate change according to the context and resulting needs.<sup>15</sup> Ultimately, it is up to nursing to make significant changes in order to improve society's response to climate change and drive the transformation needed to achieve a healthy future.<sup>13</sup> Significant advances in mitigation and adaptation are achieved when health professionals are engaged in climate change, by

demonstrating their central role in understanding and maximising the health benefits of any intervention and communicating the need for rapid response.<sup>16</sup>

Thus, nursing professionals must have the competencies (knowledge, skills and attitudes) necessary to do the following, for instance:<sup>17</sup>

- ▶ Be able to identify health problems related to climate change.
- ▶ Adjust the care and monitoring plan according to the increased climatic risk of the exposed elderly (increased hydration, modification of their diet, etc).
- ▶ Be informed of early warnings of weather events and the prediction of weather-related disease outbreaks (epidemiological surveillance).
- ▶ Identify individuals with the greatest exposure or sensitivity to the effects of climate change.
- ▶ Conduct educational interventions with the elderly on measures to prevent the effects of climate change on health.

For all of the above reasons, it was decided to carry out a scoping review as it is the most suitable design to address this topic, considering the breadth of the subject to be studied.<sup>18</sup> The authors' intention is to provide an overview and to synthesise the existing evidence on the effects of climate change and its consequences on the health of the over-65 population. Additionally, in order to get a complete picture of the subject, the aim is to take into account not only the results of primary research but also the perspective of bodies and organisations specialising in climate change and health that produce their own reports, some of which are used by governments for decision making on health policy issues.

Before starting this review protocol, a preliminary search was conducted in March 2021 in the databases Joanna Briggs Institute (JBI) Evidence Synthesis, Cochrane Library, Cumulative Index to Nursing and Allied Health Literature (CINAHL) and Medline to locate the possible existence of systematic or scoping reviews previously published or in process that dealt with the same topic. No scoping review was found with the terms sought, although it is worth noting the integrative review carried out by Leyva *et al* that includes both quantitative and qualitative studies to further explore the resilience of this population group when faced with climate change.<sup>19</sup> This future review will provide an updated and in-depth analysis of the available evidence on the influence of environmental factors related to climate change on the health of the older population, including reports from agencies and institutions specialising in climate change and health. A recent scoping review of the effects of climate change focusing on children<sup>20</sup> highlights the need to also review the effects of climate change on older people, as another group vulnerable to such effects.

The authors of this future scoping review believe that it is essential to have the results of research and reports available on the websites of relevant institutions and organisations in the field such as WHO, the IPCC, the European Environment Agency (EEA) and the Lancet, as they have

been used as a basis or guide for political decision-making on health issues and highlight the particularities of the most vulnerable population groups, including the elderly. It is, therefore, advisable to carry out a review that incorporates the point of view of these organisations.

### Objective and scoping review guiding questions

The aim of this scoping review is to map the existing literature in order to identify and conduct a description of the effects of climate change on the health of people over 65 years of age. The purpose is to provide nursing professionals with an overview of the issues to enable them to plan and implement appropriate care plans for the older population at risk from the effects of climate change.

Therefore, this review will be guided by the following research questions:

- ▶ What effects does climate change have on the health of older people?
- ▶ Which climate change factors pose the greatest threat to older people?

## METHODS AND ANALYSIS

### Design

This study will use the scoping review methodology. It will follow the JBI guidance<sup>21</sup> developed by a working group of experts in scoping review methodology.<sup>22</sup>

The review will be subjected to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)-Scoping Review Extension checklist<sup>23</sup> to confirm that it has the necessary reporting elements for this type of review and thus complies with reporting standards.<sup>22</sup>

### Inclusion criteria

#### Population

The participants of interest for this review are older people, defined as individuals over 65 years of age.<sup>24</sup>

#### Concept

The direct and indirect effects of climate change (such as temperature, extreme weather events and air pollution) and their consequences on the health of older people will be identified, both physically, in terms of mortality and morbidity, and in terms of their impact on mental health. Its impact on cognitive decline and its influence on the possible acceleration of cognitive decline will also be explored.

#### Context

All studies conducted in any geographical area will be taken into account, since climate change is a problem that affects the entire planet and all countries are affected to a greater or lesser extent by its consequences.

In addition, we will consider studies that are carried out at any level of healthcare, from primary care to hospitalisations and care in emergency departments.

### Sources

Quantitative and epidemiological primary study designs will be considered. As grey literature, conference reports

**Table 1** Search chains for different databases

Database	Search chain
PubMed	(climate change) AND (health AND (effect* OR problem* OR impact* OR issue OR hazard*)) AND (elder* OR aged OR (older AND (people OR adult*)))
Scopus	(climate change) AND (health AND (effect* OR problem* OR impact* OR issue OR hazard*)) AND (elder* OR aged OR (older AND (people OR adult*)))
CINAHL	(Climate change OR global warming) AND (health AND (effect* OR impact* OR problem* OR issue OR hazard*)) AND (elderly or aged or older or elder or geriatric or elderly people or old people or old people or senior)
Cochrane	(Climate change) AND health AND (elderly OR (older people))
PsycINFO	(climate change) AND (health AND (effect* OR problem* OR impact* OR issue OR hazard*)) AND (elder* OR aged OR (older AND (people OR adult*)))
Cuiden plus	Cambio climático AND ancianos

and abstracts published on climate change and ageing on websites of specialised organisations, such as the IPCC, the US Environmental Protection Agency, the EEA and the Stockholm Environment Institute, will be considered. Qualitative studies, integrative reviews, narrative reviews, systematic reviews, commentaries, editorials, letters, case series and opinion pieces will not be included as they do not provide original data on the effects of climate change on the health of older people.

### Search strategy

The principal investigator will perform three steps:<sup>18 22</sup>

1. Initial search of Medline and CINAHL databases to identify key terms and words in the title and abstract of potential articles to be included in the review. Because of this initial search, the following keywords were identified: climate change, global warming, aged and health as MeSH terms; effect, problem, impact, issue, hazard, elder, elderly, older people and older adult as free terms.

2. Second search using the terms identified above to form the appropriate search chains used in the databases as outlined in table 1. The search will be conducted between October and December 2021. After eliminating duplicates, a peer-reviewed search will be conducted according to the inclusion criteria, reviewing title and abstract. Grey literature will be obtained through the official websites of the most relevant specialised bodies identified during the reading of documents for the pre-documentation phase. Papers published in English and Spanish from 2008 to the present will be reviewed.

The number of references returned by the search in the different databases will be detailed in a table containing the following information:

Databases.

Search chains.

Filters.

Number of references/articles retrieved.

3. Search for additional studies in the reference list of articles and reports selected for inclusion in this review.

### Analysis

The software used for managing the results will be Refworks ProQuest, where the references returned by the databases will be exported and duplicates will be eliminated.

The selection of articles and papers to be finally included in the review will be guided by the inclusion criteria. The degree of agreement between the two reviewers must be equal to or greater than 75% for the selection to continue. If the two reviewers have major disagreements about the inclusion of an article and cannot agree, a third reviewer will analyse the source and determine its eligibility.<sup>22</sup>

The PRISMA flow chart will be used along with a narrative description to report the number of studies and reports initially identified in the search, as well as the review decision process, the number of duplicate citations removed, study selection, full-text article retrieval and additional reference list searching.<sup>18</sup>

Separate appendices will be prepared to detail the articles included and a brief mention of those excluded with reasons for their deletion.

As this is a scoping review, the JBI guidance indicates that it is not necessary to analyse the quality of the included studies, as such reviews provide an overview of the existing evidence regardless of the methodological quality,<sup>21</sup> unless there is a specific requirement in relation to the objective of the review.<sup>25</sup>

### Extraction and presentation of data

The results will be categorised according to the effects of climate change that have negative consequences on health, for example, extreme temperatures (category), heat waves (subcategory). This will result in as many categories and subcategories as effects identified during the review of the selected studies. In addition, the results will be presented by geographical area depending on the country conducting the research to be able to assess which climate change effect might affect that region the most, determined by the number of studies addressed on each effect. In any case, these and other results that should be taken into account, for the information they yield will be presented in the form of a table or diagram for better understanding.

The format of the table will be reviewed and pretested by another researcher to corroborate the adequacy of the data collection in relation to the guiding research question. One author will analyse the full text of the selected articles and perform the relevant data extraction; in addition, another author will review the adequacy of the data extraction and analysis.

The most relevant information contained in the selected articles and reports will be extracted in the form of a table created by the research team and which will contain the items detailed below:

- ▶ Author and date
- ▶ Title of the study.
- ▶ Study location.
- ▶ Target population.
- ▶ Aim of the study.
- ▶ Type of design.
- ▶ Results.
- ▶ Conclusions/key findings.

Additionally, a narrative description of the results will be provided in relation to the research objective and research questions.

The researchers will contact the authors of the original articles if additional data of particular relevance to the research are required.

### Patient and public involvement

No patient involved.

### ETHICS AND DISSEMINATION

This study is a secondary research using findings from primary researches. Therefore, it does not involve any person as a patient and does not require approval by an ethics committee for its conduct.

The results of this study will provide nursing professionals with relevant and updated information that will help them to evaluate the environmental health of the elderly. Simultaneously, they will be able to conduct health promotion activities and education on environmental health, as well as care plans adapted to the climatic risk to which this population is exposed. To this end, it is intended to disseminate the results of this research through publication in peer-reviewed scientific journals and communications in congresses whose subject matter is climate change, health and the elderly.

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