TeRRIFICA Summer School

Report from Public Health Agency of Barcelona team for Climate Change

Climate change and health

Reports issued by the Intergovernmental Panel on Climate Change (IPPC) show unequivocal evidence of a median increase in air and ocean temperatures, changes in precipitation patterns, widespread melting of ice and rising sea levels on a global scale. Global greenhouse gas (GHG) emissions come from a variety of sources, mainly power generation, industry, transport and agriculture. In the case of Barcelona, transport is the largest emitter, contributing 30% of CO_2 emissions (Barcelona Climate Plan, 2018).

Climate change affects the health of the population in several ways and is considered the greatest health threat of this century. The health effects of climate change fall into two categories (WHO, 2018):

- **Direct effects:** These include effects that result from exposure to extreme weather events such as droughts, floods, heat waves, storms and fires. Health impacts are expressed as an increase in respiratory and cardiovascular diseases, as well as in the overall number of injuries and deaths.
- **Indirect effects**: These are due to ecological and environmental changes that have an impact on health such as air quality, drinking water quality, as well as vector-borne diseases. Indirect effects also include those that are mediated by human systems, such as population migration, malnutrition or lack of access to universal health systems.

Climate change has the potential to influence the main social and environmental determinants of health, i.e. the ability to breathe clean air, the availability of clean water and safe food, and safe and sufficiently comfortable housing.

Climate change and health in Barcelona

According to studies (Villalbí and Ventayol, 2016; Barcelona City Council, 2017, Climate Plan 2018), the main health effects of climate change in the city of Barcelona are the following: heat waves, impacts on water availability and quality, air quality, vector-borne diseases and energy poverty.

The following sections will review these impacts and other relevant aspects such as mobility or food, which are also relevant, and will provide recent health data available.

A. Heat vulnerability

- Excessive heat can be a health hazard both directly and through the aggravation of chronic diseases. It is estimated that during the period 1992-2015 natural deaths (age >=25 years) attributable to extreme heat were 980 deaths in men and 2.729 deaths in women. In relation to direct deaths from heat stress, during 2018, 13 deaths were identified in the city of Barcelona.
- The association between temperature and mortality in Barcelona differs between men and women, with women presenting higher risks of dying compared to men. The elderly and children are also the most vulnerable to the effects of heat.
- Geographical vulnerability to heat within Barcelona is defined by variables such as the percentage of the population over 75 years of age, the energy performance of buildings, the lack of vegetation and various socio-economic indicators.

B. Vector-borne diseases

- Climate change may affect the abundance, geographical and temporal distribution of vectors and reservoirs of diseases and the diseases they transmit, and this implies the need for a rapid response to identify and deal with this risk. Thus, since 2014, Barcelona has been carrying out joint human and vector surveillance of mosquito-borne diseases.

C. Energy poverty

- Climate change has a direct relationship with energy poverty. On the one hand, the current energy model responsible for the environmental consequences of climate change also has social consequences, such as energy poverty. On the other hand, the effects of climate change, such as the increase in temperature, the possible increase in the price of energy and the exacerbation of social inequalities, are likely to push more households into energy poverty.
- In Barcelona, 12.4% of the population lives in energy poverty. There are strong social and territorial inequalities in the distribution of energy poverty. Some of the most affected groups are people from the most disadvantaged social classes, people born in low- and middle-income countries and women over 65. Neighbourhoods in the north, north-west, historic centre and south-east of the city also have more energy poverty.

D. Air pollution

- Air pollution and meteorology are closely related. Projections in Barcelona indicate that climate change could lead to an increase in the annual concentration of three air pollutants: particulate matter, NO2 and O3. The main impact of air pollution on health in Barcelona is caused by chronic exposure to the usual levels of pollution, which contributes to an increase in cardiovascular diseases, respiratory diseases, lung cancer

and total mortality. Between 2010 and 2018, the median mortality attributable to excess PM2.5 particulate matter was 3%, 424 deaths (residents aged 30 and over).

E. Water supply and quality

- Existing surveillance systems will need to be improved to adapt to new needs, for example to include surveillance of emerging contaminants in water, surveillance of emerging diseases that may occur due to an increase in reservoirs (e.g. Leptospirosis) or the creation of new health impact indicators.
- We note that technological improvements in the supply network are essential to ensure good water quality both in drought scenarios and in extreme flooding episodes, as well as the capacity of management bodies to foresee the consequences of climate change on supply infrastructures.
- Policies with an equity perspective are needed to mitigate the impact that climate change may have on access to water for the most disadvantaged social classes.

F. Food system

- There are common factors between climate change, the agrifood model and human health that allow us to establish causal relationships and interactions. The agri-food model is responsible for 21-37% of greenhouse gas (GHG) emissions.
- Key actions to transform the food system include: changing and promoting a healthy diet; reorienting agricultural priorities; increasing sustainable food production; international coordination of land and sea management; and reducing food losses and waste.

G. Mobility

- Among others, motorised transport has direct impacts on greenhouse gas emissions as well as on the health of the population through the emission of air pollutants, vehicle noise, injuries caused by traffic collisions and lack of physical activity due to the presence of unsafe and hostile environments. Transport policies provide an opportunity to reduce air and noise pollution, improve the health of the population and can have a significant impact on reversing the effects of climate change. In cities, this necessarily involves a change in the mobility model, where the use of private vehicles, particularly cars, is anecdotal, and preference is given to walking, cycling and public transport.

H. Mental health

- Mental health is a cross-cutting health impact of climate change. Mental health can be affected both directly, through exposure to extreme events, rising temperatures, droughts or sea level rise, and indirectly, through the environmental and social consequences of climate change.
- The effects of climate change on mental health are less well known and often ignored. This lack of knowledge is mainly due to the difficulty of monitoring, assessing and predicting the mental health implications of climate change, but also to the general lack of attention and stigmatisation of mental health as a fundamental part of health.

I. Social health inequalities:

- Climate Change can increase social health inequalities, worsening living and working conditions, which will also have a direct impact on people's health.

Climate Change and Community Health

Community health can reduce inequalities in health and improve the health of the most disadvantaged populations. In 2007, Barcelona Health in the Neighbourhoods (BHiN) was launched, a community health programme to reduce social inequalities in health. In 2020, this programme reached the 25 most disadvantaged neighbourhoods of the city. Nowadays BHiN worked with more than 460 agents that co-produced 183 interventions involving more than 13,600 people.

The Community Health Department recommends working in two main strategies:

a) Incorporate different sustainability components in the existing interventions in BHiN programme, mainly focused on communication and awareness-raising workshops in the most disadvantaged populations.
b) Implement new community health interventions aimed to promote a sustainability culture, focusing on the food system, mobility, mental health and energy poverty.

To work along these two lines it will be necessary to generate enabling environments in neighbourhoods for facilitating change:

a) Environmental awareness meeting points: Meeting points for organizations, neighbours and the administration, where the sustainability culture and the dynamisation of community networks are promoted.
b) School programmes that promote a sustainability culture.

c) Promote intersectoral work that generates collective intelligence to address local and supra-local challenges.

Examples of possible community interventions:

1) Promoting local and sustainable food consumption
2) Community composting sites
3) Food self-production: urban gardens
4) Reducing food loss and waste: Establishing food recovery networks
5) Generating neighbourhood good practices networks
6) Collection and recycling of textiles
7) School workshops: sustainable consumption and responsible energy consumption
8) Healthy and sustainable cooking workshops
9) Permaculture and pollination workshops
10) Promoting sustainable mobility
11) Renaturalising the city: urban greening

We should work together helping to promote a new city model and way of life.