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## The Role of Physicians in Fighting Climate Change



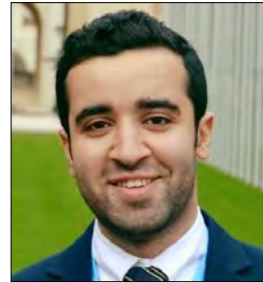
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In 1958, a team of researchers installed their equipment on the top of the Mauna Loa, one of the five volcanoes on the island of Hawaii. Led by Charles David Keeling, they started monitoring the level of atmospheric CO<sub>2</sub> concentration. Since then, the verdict is unequivocal: the CO<sub>2</sub> concentration in the atmosphere is consistently increasing from year to year. This is now known as the *Keeling curve*.

At that time, only a handful of individuals were starting to worry about climate change. However, greenhouse gases (GHGs) have increased in such a way that effects of climate change have already started being felt by people around the globe, increasing as consistently as the *Keeling curve*. What was once a scientific matter is now a public health matter.

Climate change has been called the greatest threat to global health in the 21st century [1]. We could lose decades of global health advancement [2] and face about 250 000 additional deaths each year between 2030 and 2050 [3]. This article aims to explain key impacts of climate change on health and what physicians can do about it, specifically focusing on the global protest movements that have started occurring globally.

### Health Impacts of Climate Change

#### Heat waves

“July has re-written climate history, with dozens of new temperature records at local, national and global level,” recently commented Petteri Taalas, Secretary-General of the World Meteorological Organization [4]. Indeed, many cities in Europe saw their thermometers reach temperatures as high as 45 °C in July.

Each decade since the 1980s has been hotter than the previous [5]. We expect that hot days and nights will be warmer and more frequent and that periods of intense heat will occur more frequently and will be longer in parts of Europe, Asia, the Americas and Australia [6]. This will affect the health of our communities, particularly the most vulnerable (older populations, people living with chronic diseases, such as cardiovascular, respiratory or renal diseases, people dealing with psychiatric issues and people living in urban areas, particularly those in neighborhoods with lower socioeconomic status). According to the 2018 report of *The Lancet* countdown on health and climate change, there were 18 million more heat wave exposure affecting vulnerable people in 2017 than in 2016, and over 157 million more than the 2000s baseline [7]. The

healthcare system and its workers must be ready to address the challenges related to this important exposure.

#### Air pollution

Climate change and air pollution are closely related, both driven by fossil fuel burning, and because of the impact of the former on the latter. Indeed, climate change could worsen air quality with increased levels of tropospheric ozone, a lengthened pollen season and an increased number of forest wildfires [8].

For example, in urban areas, tropospheric ozone can increase in response to high temperatures. It is hence predicted that there would be more ozone-related mortality with a global warming of 2 °C than with warming of 1.5 °C [9].

Currently, over 90% of the urban population of the world breathes air containing levels of outdoor air pollutants that exceed WHO’s guidelines [10]. This can contribute to strokes, ischaemic heart disease, chronic obstructive pulmonary disease and lung cancer. Estimates say that 7 million people die each year from outdoor and indoor air pollution; one in eight deaths annually [11]. Reducing fossil fuel burning would have an impact on both climate change and air pollution-related diseases.

## Extreme weather events

In November last year, the state of California had to deal with the Camp Fire, the largest and the deadliest wildfire in its history as 153,336 acres were progressively burned [12]. 85 people died, many were injured, and the smoke from the fire caused widespread air pollution. A few weeks later, a United States report underlined that climate change would increase the quantity of wildfires and their size in the country [13]. Globally, from 1979 to 2013, fire seasons have lengthened in time by almost 19% and across 25.3% of the vegetated surface of the Earth [14]. Forest fires are expected to continue to increase in many parts of the world because of climate change [15].

This increase is also observed in other extreme weather events (EWE): droughts, heavy rains, violent tropical cyclones and floods [16]. While EWE cause direct impacts such as trauma and increases in diarrheal diseases, many people also experience stress and serious mental health consequences. For example, among a population sample affected by Hurricane Katrina, suicide and suicidal ideation more than doubled, one in six people met the diagnostic criteria for post-traumatic stress disorder (PTSD), and 49% of people living in an affected area developed an anxiety or mood disorder such as depression [17]. With a changing climate, we will have to face the added stress from increased EWE on the healthcare system.

## Infectious diseases

The National Institute of Public Health of Quebec in Canada is currently working on a public education campaign on Lyme's disease. This disease, transmitted by a tick, has been in Quebec for only a few years, but it is now constantly gaining ground with the climate becoming more favorable [18]. This is the case for many vector-borne diseases around the world that will cover new areas as the climate change. *Aedes aegypti* and *Aedes albopictus* are two kinds of mosquitoes

that can transmit viruses like dengue, yellow fever, chikungunya and zika. It is expected that the geographical distribution of these mosquitoes will grow with climate change, but also that their ability to act as a vector and transmit diseases will increase [19].

The case of malaria is particularly worrisome. The WHO predicts that climate change could result in 60,000 additional malaria deaths by 2030, even with improvements in our control methods [20]. During the next century, the geographical reach of malaria and the period of transmission could both increase, exposing ever-growing numbers of people to this deadly disease [21].

It is also predicted that climate change will increase morbidity and mortality from various diarrheal illnesses such as *vibrio cholera* cases which have been linked to high temperatures and heavy rainfalls [22, 23].

These changes in the pattern of infectious diseases related to climate change will need to be dealt with globally and are in certain cases linked to global health security.

## Food security

A recent analysis from the World Resources Institute, identified that nearly a quarter of the world's population, in just 17 countries, are in severe water shortage [24]. At this moment, drinking water levels are decreasing; food yields from ocean are waning; and crops yields are declining as they are impacted by rising temperatures and extreme weather events. Climate stress represents 62.5% of all stressors accelerating soil degradation in Africa [25]. All aspects of food security could be affected by climate change according to the IPCC [26]. The progress of recent decades in the fight to end hunger in developing countries and the access to food globally are at stake.

Climate change could push 3 to 16 million people into extreme poverty [27] and it could force people to flee their homes in or-

der to survive. The Red Cross believes that environmental crises are already generating more refugee flows than armed conflict [28]. In 2010, more than 42 million people worldwide were displaced due to sudden natural disasters, and it is that 90% of those were due to climate change [29].

## The Role of Physicians

Climate change is already affecting the health of people around the world and its impacts are expected to grow. Even if all emissions of greenhouse gas (GHG) were reduced to zero tomorrow, we would still feel the impact, due to the effects of the cumulative GHG emissions [30]. As physicians caring for the health of our communities, we have a role to play in fighting climate change. The Canadian Association of Physicians for the Environment dedicated an entire chapter of its *Climate Change Toolkit for Health Professionals* as to what we can do [31].

Physicians hold a privileged position in society as trusted health authorities. We can be powerful messengers, informing our patients and the public about the health impacts of climate change and give ideas for action. We also have a responsibility to ensure that the health co-benefits of environmental policies are well understood by the public and by policymakers.

Engaged doctors can, for example, carry messages on a wide range of health benefits that result from "healthy transport" measures such as active transport (walking and cycling) and better urban planning based upon low-emissions public transport systems. Physical activity from walking and cycling can help prevent heart disease, type 2 diabetes, and some obesity-related risks. Increased use of non-vehicular transport also leads to lower rates of traffic injuries and less noise pollution. Active transport systems along with better urban land use can help improve healthcare access for vulnerable groups, enhancing health equity [32].

We can also help our hospitals and clinics to adapt to climate change, making sure we are prepared, and contribute to making the healthcare system greener. Indeed, GHG emissions from the health sector are growing and currently represent 5 to 8% of the total emissions in high-income countries [33]. Many solutions exist, and physicians can help implement them. According to a new report published by Healthcare Without Harm, if the global healthcare system was a country, it would be the fifth largest emitter on the planet [32]. Physicians are well placed to initiate changes in their institution and to reduce greenhouse gas emissions from the healthcare sector.

This is also true at an international level. The involvement of the health community during the previous UN Framework Convention on Climate Change Conferences of Parties (COPs) have led to the insertion of “the right to health” in the Paris Agreement. It was specified that “parties should, when taking action to address climate change, respect, promote and consider their respective obligations on the right to health” [34]. At the COP24, a call to action on climate and health was issued by organizations representing over 5 million doctors, nurses and health professionals in over 120 countries [35]. By pushing governments to meet the targets of the Paris Agreement, we could save over one million lives a year from air pollution alone by 2050 [36].

## Climate Health Education

Climate change has various and serious implications for human health and as such are of fundamental relevance to future and current doctors [37]. Since July 2017, the accreditation process of the Association of Faculties of Medicine of Canada (AFMC) requires all medical schools to have a social accountability mandate. Social accountability has been defined by the World Health Organization as “the obligation to direct their education, research and service activities towards addressing the priority health

concerns of the community, region, and/or nation they have a mandate to serve” [38]. Additionally, ASPIRE, an international program that recognises excellence in medical education, has now outlined specific criteria on environmental accountability, including the obligation for medical schools to ensure they actively develop, promote, and protect environmentally sustainable solutions to address the health concerns of the community, region, and the nation they serve [39].

However, there is a worrisome gap in education of medical students and health professionals on this topic, leaving healthcare professionals with insufficient knowledge and skills to address climate change. As an example, presently, there is no climate change curriculum within any Canadian medical school programs [40]. The preliminary results from a survey done by the Canadian Federation of Medical Students (CFMS) suggest that students are concerned about the health impacts of climate change and believe their current teaching is insufficient [41]. A survey done by the Québec National Public Health Institute (INSPQ) in 2016 has also shown that 65% of family physicians in the province believed they lacked the required training on climate change and health issues [42].

The Canadian Medical Association (CMA), the Canadian Association of Physicians for the Environment (CAPE) and *The Lancet* have unanimously recommended that climate change be integrated into all medical and health science curricula [43]. They argue that a well-trained workforce is required to respond to the enormous challenges posed by climate change. The International Federation of Medical Students Associations (IFMSA), the world’s largest and oldest medical students’ group, representing over 1.3 million medical students in 123 countries, is also advocating for the inclusion of climate change in medical curricula around the world [44]. The Federation has collaborated with the World Health Organization (WHO) and the United Nations Framework Convention on

Climate Change (UNFCCC) to create a manual for future health professionals [45]. There is an urgent need to integrate climate change related issues within the medical curricula. Medical teachers can play a crucial role in supporting their respective faculties to develop such curricula.

## Global Protest Movements

School strikes for the climate is a movement started by Greta Thunberg, a student, who, on 20 August 2018, stopped attending school until the Swedish elections three weeks later calling for more action on climate change from Swedish politicians [46]. The strikes then continued every Friday and were given the name *Fridays for Future* as students from all parts of the world joined in the movement [47]. Through 2018 and 2019, the global protest movements have increased in size and diversity of populations reached with more than 4500 climate strikes taking place in over 150 countries during the month of September 2019 [48] and bringing the estimated total number of people to an impressive 6 million [49]. This is estimated to have been the largest global protest movement [50].

Doctors and healthcare professionals have been joining the protest movement, lending their voices and those of their patients suffering from the consequences of climate change to support increase action on this emergency [51, 52]. Organizations such as Doctors for Extinction Rebellion have also formed and are calling for three simple things: telling the truth, acting now; and going beyond politics to create a citizens’ assembly [53, 54].

Climate change poses a threat to people’s health now and in the future. It is one of the most defining issues on which the generations that currently have the power to act will be judged by their successors. Knowing that each degree of warming will have a significant impact on the health of our patients and of people around the world, addressing



climate change might be the most powerful way we can improve health. Doctors around the world have a role to play in the political decisions that will shape our environment. As Rudolf Virchow said: "Medicine is a social science and politics is nothing else but medicine on a large scale."

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