

Cancer Association of South Africa (CANSA)



CANSA Fact Sheet on Climate Change, Heatwaves, and the Incidence of Skin Cancer

Introduction

The World Meteorological Organisation (WMO) describes the build-up of greenhouse gases in the atmosphere as a major cause of climate change. It states that "... the growing use of energy and expansion of the global economy are factors resulting in the build-up of greenhouse gases in the atmosphere which alters the radiative balance of the atmosphere. The net effect of this is warming of the Earth's surface as well as the lower atmosphere because greenhouse gases absorb some of the earth's outgoing heat radiation and reradiate it back towards the surface." (United Nations Framework Convention on Climate Change).



United Nations
Framework Convention on
Climate Change

[Picture Credit: UNFCCC]

Climate Change

The United Nations Framework Convention on Climate change (UNFCCC) defines climate change as follows: "Climate change' means 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." (United Nations Framework Convention on Climate Change).

According to the South African Weather Service, "Climate change is the natural cycle through which the earth and its atmosphere are going to accommodate the change in the amount of energy received from the sun. The climate goes through warm and cold periods, taking hundreds of years to complete one cycle. Changes in temperature also influence the rainfall, but the biosphere is able to adapt to a changing climate if these changes take place over centuries. Unfortunately, human intervention is currently causing the climate to change too fast. (Climate models predict that the mean air temperature over South Africa will increase by an estimated 2°C over the next century.)" (South African Weather Service).

Isler, M.F., Coates, S.J. & Boos, M.D. 2023.

"The skin plays an important role in human health by providing barrier protection against environmental stressors. In addition to human skin cells, the cutaneous barrier is also home to a network of organisms that have co-evolved with humans, referred to as the cutaneous microbiome. This network has been demonstrated to play an active role in skin health and the manifestation of cutaneous disease. Here, we review how a warming world and its attendant changes in climatic variables, including temperature,

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humidity, ultraviolet radiation, and air pollution, influence the cutaneous microbiome and, in turn, skin health. Studies indicate that the cutaneous microbiome is affected by these factors, and these changes may influence the epidemiology and severity of cutaneous disorders including atopic dermatitis, acne vulgaris, psoriasis, and skin cancer. Further investigation into how the cutaneous microbiome changes in response to climate change and subsequently influences skin disease is needed to better anticipate future dermatologic needs and potentially generate novel therapeutic solutions in response.”

Heatwaves

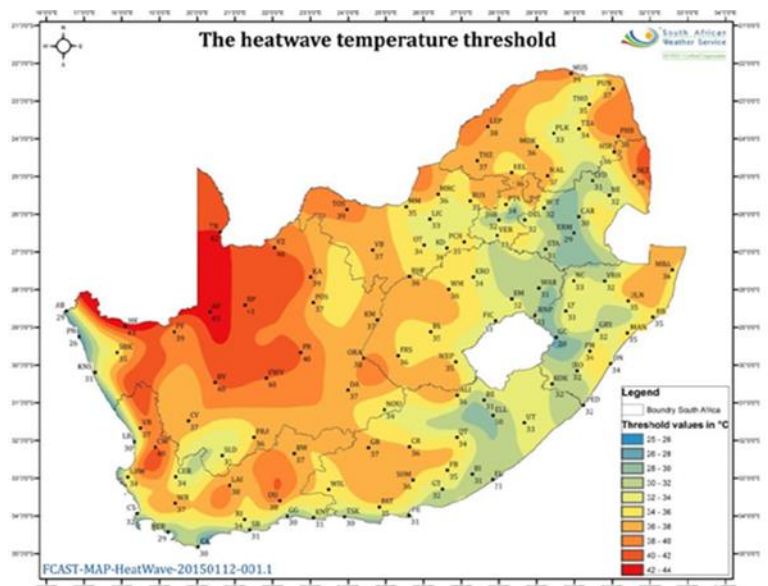
A heatwave normally refers to a period of prolonged abnormally high surface temperatures relative to those normally expected. Heat waves may span several days to several weeks and are significant causes of weather-related mortality, affecting developed and developing countries alike.

Although there is no formal, standardised definition of a heatwave, the World Meteorological Organization, defines it as “five or more consecutive days during which the daily maximum temperature surpasses the average maximum temperature by 5 °C or more.” (Encyclopaedia Britannica).

There is a specific criterion that the South African Weather Service applies to each town or city, in order to determine whether heat wave conditions are met or not.

[Picture Credit: SA Heatwave Threshold Map]

The criterion reads as follows: “If the maximum temperature at a particular town is expected to meet or exceed 5 degrees C above the average maximum temperature of “the hottest month” for that particular place, as well as persisting in that mode for 3 days or more, then a heat wave may be declared. For ease of use by SAWS meteorologists, a detailed map of the ‘heat wave threshold’ has been compiled (see figure on right), using the latest climatological data to hand. This threshold is thus the maximum temperature which needs to be met or exceeded, for a heat wave to occur.” (South African Weather Service).



Changing Climatic Patterns

According to the World Health Organization, 2018 (WHO), the world has warmed by approximately 0.85°C over the last 130 years and each of the last 3 decades has been successively warmer than any preceding decade since 1850.

WHO further mentions that:

- Sea levels are rising
- Glaciers are melting
- Precipitation patterns are changing
- Extreme weather events are becoming more intense and frequent

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- Climate change is affecting social and environmental determinants of
 - health
 - clean air
 - safe drinking water
 - sufficient food
 - secure shelter

Key Facts

- Climate change affects the social and environmental determinants of health – clean air, safe drinking water, sufficient food and secure shelter.
- Between 2030 and 2050, climate change is expected to cause approximately 250 000 additional deaths per year, from malnutrition, malaria, diarrhoea and heat stress.
- The direct damage costs to health (i.e. excluding costs in health-determining sectors such as agriculture and water and sanitation), is estimated to be between USD 2-4 billion/year by 2030.
- Areas with weak health infrastructure – mostly in developing countries – will be the least able to cope without assistance to prepare and respond.
- Reducing emissions of greenhouse gases through better transport, food and energy-use choices can result in improved health, particularly through reduced air pollution.

Key Findings of Research:

Ambient temperature of above 27°C and particularly 29°C and above contributes to DNA damage in skin cells increasing the risk for various skin cancers:

- Ambient temperature significantly correlates with the ambient UV dose received
- Ozone depletion has led to an increase in skin cancers
- Behavioural changes contributes to an increase in skin cancer
- A rise in environmental temperature coming with climate change can amplify the induction of non-melanoma skin cancers by UV radiation in human populations
- Warmer temperatures may result in individuals increasing their sun exposure and wearing less covering clothing resulting in an increase in skin cancer
- Increased environmental temperatures above 27°C results in DNA damage of skin cells
- Incidence of skin cancer is expected to continually rise in correlation with rising ambient temperatures
- Industries like mining, construction and agriculture operating in areas that regularly see high temperatures, should actively protect their workers from increased environmental temperature so as to reduce the risk of DNA damage in skin cells

Medical Disclaimer

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