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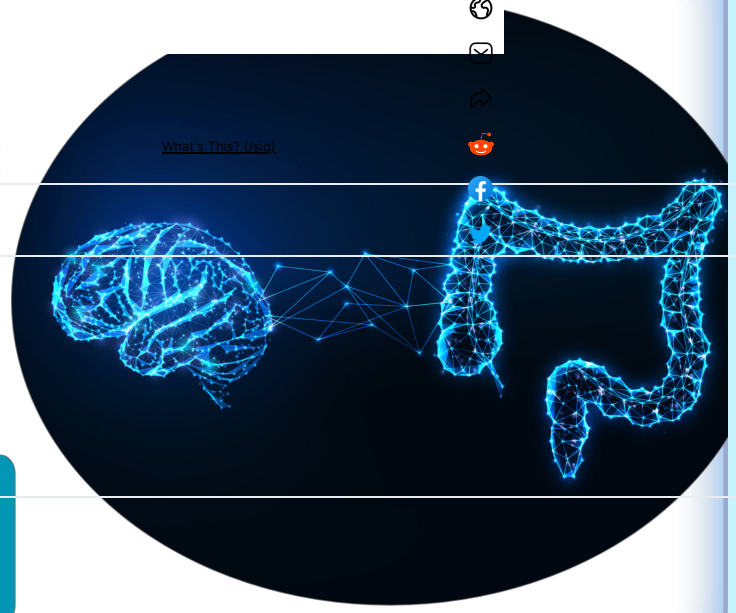
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Global warming is a phenomenon published May 28, 2019. DOI: 10.7759/cureus.4771

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temperature increased 0.9°C compared to the average temperature in the mid-1900s. Beyond this change in

temperature lies significant threats to human health in the form of natural disasters and extreme temperatures. One

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natural disaster that has been receiving much more attention as of 2010 is the ignition and spread of

Cite this article as: Rossiello M R, Szema A (May 28, 2019) Health Effects of Climate Change-induced Wildfires and

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infernos. The dangers that these intense fires pose are twofold: first, the fire causes mass property damage, physical

harm, or death to the people unfortunate enough to be caught in the blaze; second, the health hazards of smoke

inhalation and the emotional strain of losing one's possessions cause immense physical and emotional harm to the

fire's victims. Another health hazard that is becoming more common due to global warming is heatwave

exposure. The heat provides an ideal environment for certain pathogens to thrive, increases people's risk of

developing temperature-related health conditions, and could exacerbate many preexisting diseases. The increase in

frequency and intensity of these extreme weather conditions calls for devotion of resources to fire prevention and

public health measures related to smoke inhalation and heat exposure.



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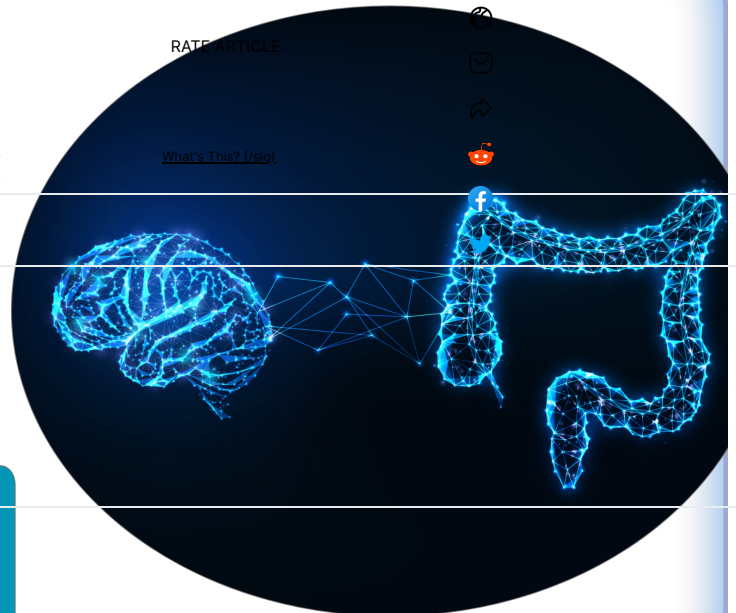
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which is sensitive to temperature change. Within the period of study, 56% of wildfires and 72% of area burned in wildfires occurred in early snowmelt years, while 11% of wildfires and 4% of area burned occurred in late snowmelt years. As temperatures rise earlier in the year, the soil dries out sooner and the flora become more flammable as water from winter precipitation is extracted from them. An increase in global temperatures and a drier atmosphere in the West increases the likelihood of sparking more devastating fires with far greater destructive potential.
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Review

- [The increase in frequency and duration of wildfires places a large financial burden on federal and state governments.](#) According to the National Interagency Fire Center, the U.S. Forest Service's annual suppression costs have exceeded one billion dollars for 13 of the 18 years between 2000 and 2017 [3]. This is a significant increase in average annual costs from those between the years of 1985 and 1999, during which the total annual suppression costs never once exceeded one billion dollars.

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Governing bodies are not the only ones who suffer immense costs as a result of a wildfire. These catastrophes take a far greater toll on their victims, who often lose their entire livelihood, and sometimes their lives, in the blaze. In the course of just a few hours, people can lose their homes, businesses, pets, family heirlooms, and sentimental items that hold far more value to them than to insurance companies. Victims only recover approximately ten percent of their financial losses and are allotted a maximum of 2-2.5 years to complete their projects and close out their claims. This places an extra burden on them as they navigate a rebuilding process riddled with hurdles to overcome and permissions to obtain and ensure that their new home complies with updated building codes and regulations [4]. Although victimized communities make efforts to update infrastructure and safety regulations and use more flame-retardant materials, the fact remains that another wildfire could be ravaging through their region in the not-so-distant future. Many of these victims must decide whether they want to cut their losses and leave or undergo the rebuilding process and the risks that come with it. Many of these victims are displaced from their homes during the rebuilding period, leading to congestion in neighboring communities, placing a large strain on their resources. According to CAL FIRE, the Department of Forestry and Fire Protection in the state of California, 15 of the



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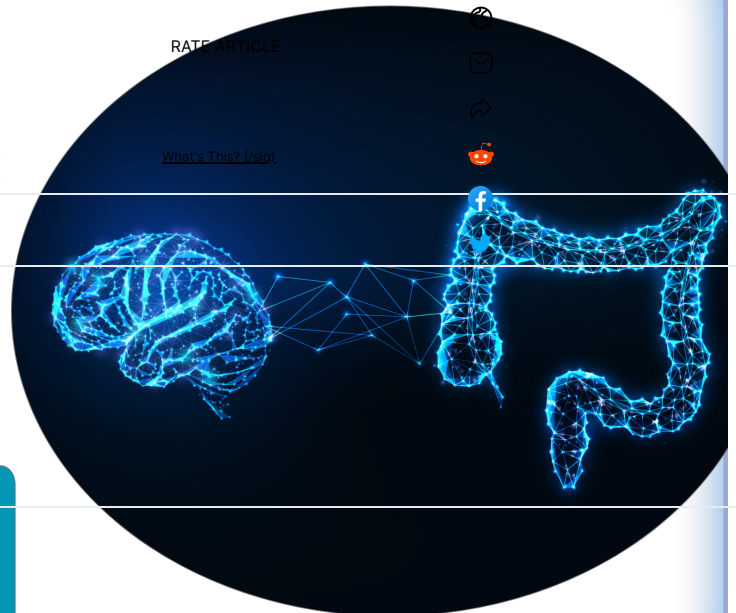
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medications by asthmatics and the lack of medication use by non-asthmatics. Other studies highlighted an

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increase in both the usage of reliever medications and initiation of oral steroid use associated with wildfire smoke

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in Southern California [8].

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Butte County for 17 days, before being one hundred percent contained by firefighters [9]. It was the most destructive

fire in California's history, burning over 153,000 acres of land and incinerating nearly 19,000 structures. Eighty-six

deaths were reported as a result of the blaze, making the Camp Fire the deadliest wildfire in the state of

California. The death toll is nearly four times that of the Tubbs Fire, which is now the second most destructive fire in

California history [5]. One of the most affected communities was the town of Paradise, which was totally annihilated

in the fire (Figure 1). Few structures managed to survive the inferno; what remained was uninhabitable. Furthermore, the temporary accommodations for victims of the Camp Fire were inundated by overcrowding. More than 120 people were sickened by an infection with norovirus [9].

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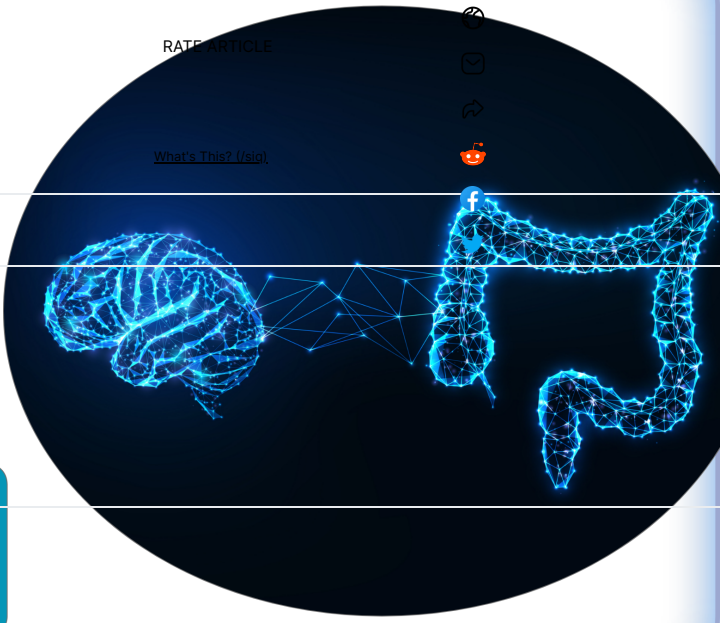


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Woolsey Fire ([Ocurring](#)) simultaneously with the Camp Fire was the Woolsey Fire. This wildfire ignited on the site of the old Santa Susana test lab near Simi Valley in Ventura County on November 8, 2018 [10]. The fire grew to be one of California's most destructive wildfires, incinerating nearly 97,000 acres of land and over 1,600 structures. The inferno also claimed three lives [5]. The rapid growth of the fire was attributed to strong winds, which accelerated the spread of the flames - and a lack of containment resources. Rescue workers in Southern California had their hands full battling the nearby Hill Fire in Santa Rosa Valley, placing a strain on firefighting personnel and resources. The Los Angeles Times reported that by 7:30 p.m. on November 8, 400 personnel were battling the Hill Fire while only 150 firefighters from three agencies were attempting to control the Woolsey Fire [10]. The fire rapidly made its way south into Los Angeles County, ravaging parts of Thousand Oaks and Malibu (Figure 2).

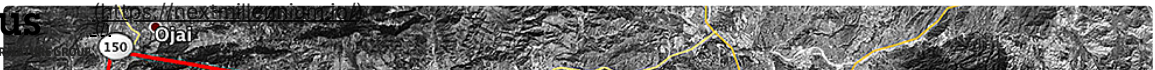
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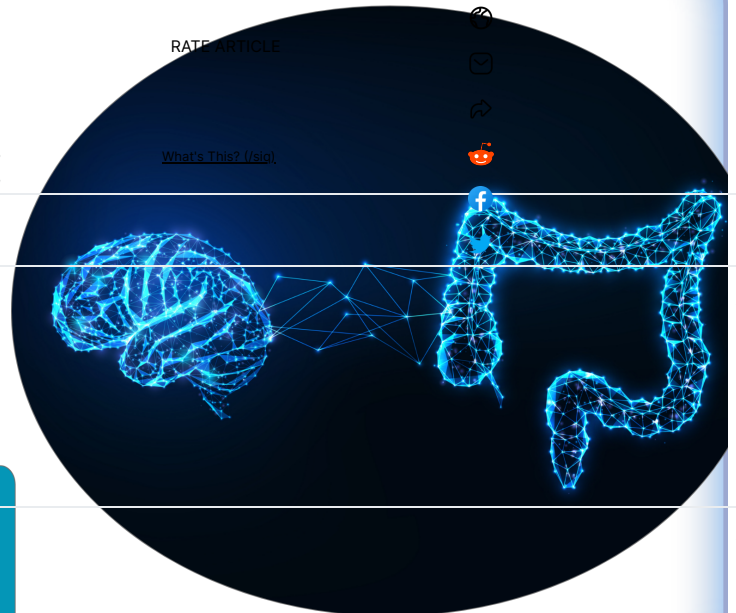
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Another consequence of global warming is the increase in frequency of heatwaves. Heatwaves not only contribute to the drying of the land and subsequent creation of fuel for the rapid spread of wildfires, but also increase the mortality rate and the frequency of hospitalizations in the areas they affect. This is especially problematic when a heatwave hits an area with a normally cool climate because the residents are not accustomed to the intense heat. A review by Rossati on the health impacts of global warming states that mortality generally increases at temperatures above and below optimum value. For example, a heatwave in Europe during August of 2003 resulted in an excess mortality of 14,800 deaths. Additionally, people with preexisting, chronic conditions such as hypertension, heart disease, diabetes, and obesity are more vulnerable to the heat and at risk of complications. Asthma patients were hospitalized more frequently during the extreme weather period, and the risk of out-of-hospital cardiac arrest was reported to rise by 14%. Extreme heat is also known to increase the incidence of arthritis [1].
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A study examining heatwaves in California from 1999 to 2009 found that hospital admissions increased by seven percent on the peak heat-wave day. These investigators observed a significant impact on cardiovascular disease, respiratory disease, dehydration, acute renal failure, heat illness, and mental health. Over the period of study, 11,000 excess hospitalizations due to extreme heat were observed [12].

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Conclusions

In conclusion, wildfires are increasing in prevalence, largely as a result of climate change. Higher temperatures have dried vegetation to produce fuel and concurrent drying of groundwater accelerates combustion. Physicians should note the impact of global warming on human health with regard to fires and heatwaves so they can be attuned to relevant medical conditions and can proactively help their patients.

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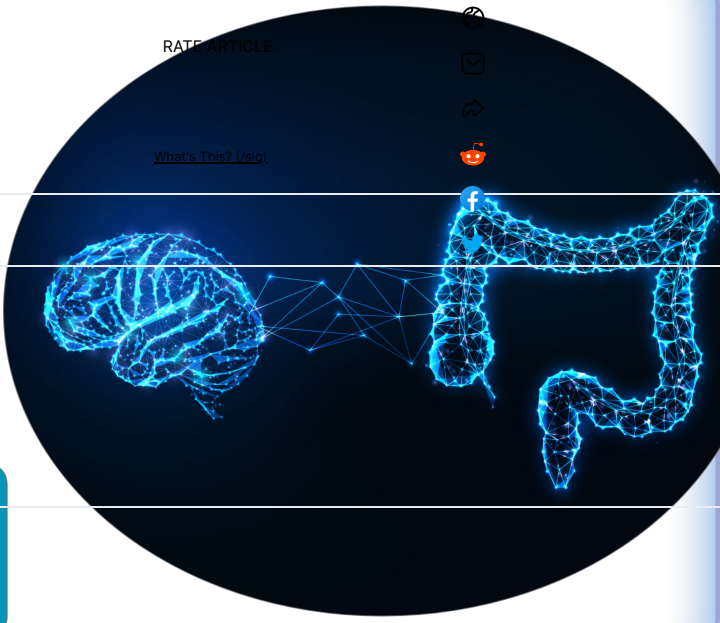


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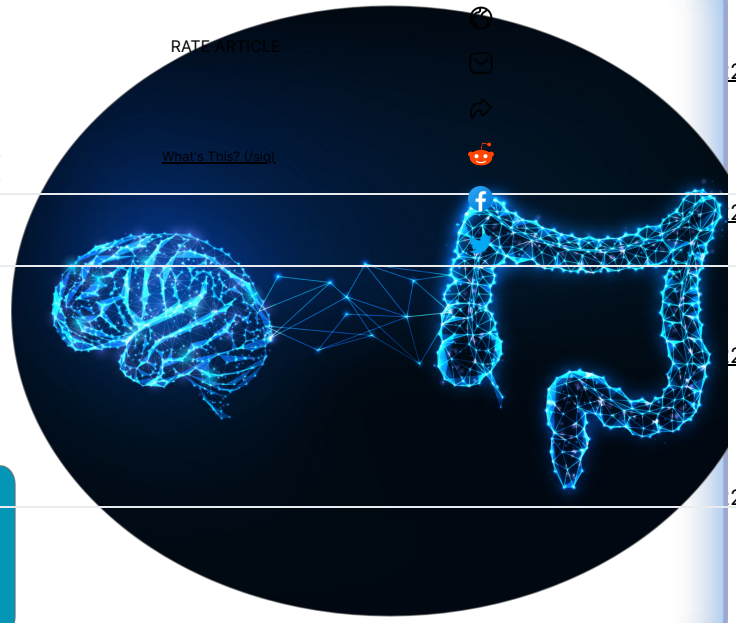
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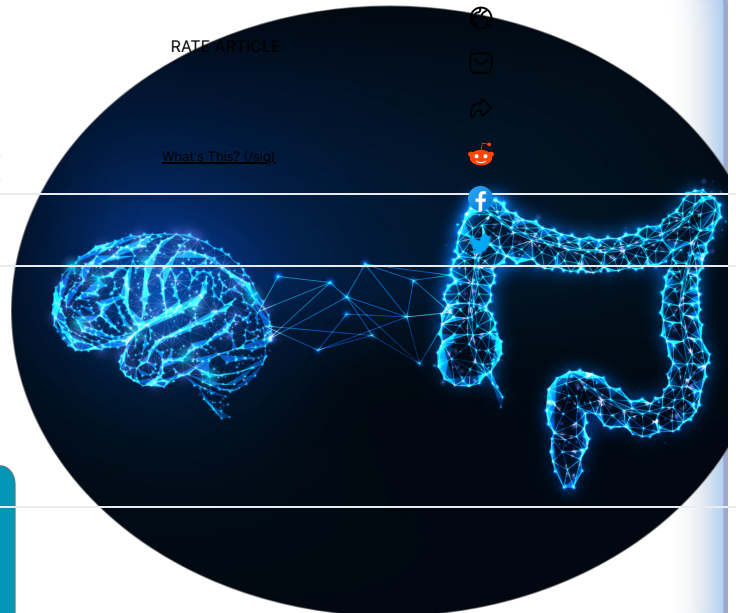
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