

“SEÑOR CALAVERA”: EFFECTS OF CLIMATE CHANGE ON PUBLIC HEALTH IN MEXICO

"SEÑOR CALAVERA": EFECTOS DEL CAMBIO CLIMÁTICO EN LA SALUD PÚBLICA EN MÉXICO

“SEÑOR CALAVERA”: EFEITOS DAS MUDANÇAS CLIMÁTICAS NA SAÚDE PÚBLICA NO MÉXICO

PATIÑO, Donovan Casas

Universidad Autónoma del Estado de México. RED BIOUCULTURA. RED Internacional en Salud Colectiva y Salud Intercultural (REDSACSIC)

E-mail:

ORCID: <https://orcid.org/0000-0002-3129-9418>

The earth dies slowly,
the tree I watched from my window has withered,
the birds are gone,
the clouds have fled from the vast sky,
and with them, the raindrops vanished,
we suffocate little by little,
in this heat that consumes us,
"Save the world" Likes,
drowned in the vast abysses of the web.

The earth dies slowly,
my pupils in a constant state of contraction,
the sun's radiation blurs the horizon,
lights are cast everywhere,
my thoughts confused,
in mazes without reason,
how did we lose the battle,
at what point did we drown in arrogance?

The earth dies slowly,
we suffocate in a perpetual state,
before this intense heat,
its death is slow,
and with it,
it suffocates us with pleasure,
this earth has been murdered,
a thousand apologies are worthless,
nor Likes overflowing on the web,
lamentations and sorrows choke us in the air,
in the infinity of our being,
we are remorseful,
begging for forgiveness,
from this earth that has tragically died.
Ecocides and Laments.

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Abstract - This article emerges as a critical reflection on climate change and public health in Mexico. Through six analytical categories, we examine the effects of Señor Calavera (Climate Change) on Mexican territory: Coca-domination: The Water Crisis in the Highlands of Chiapas, Heat to the Death: Heatwave-related Deaths, Stings of Death: Vectors and Diseases, Winds and More Winds: The Origin of “Zombie” Storms, Let’s Leave Before We Die Here: Human Migrations Due to Climate Change, and Fake News: Climate Change is a Lie. In this way, we construct an analytical framework to address this devastating present, where climate change is signaling forthcoming global catastrophes.

Keywords: Climate change, health, disease, mortality, heatwaves, hurricane, Fake news.

Resumen - Este artículo surge como una reflexión crítica sobre el cambio climático y la salud pública en México. A través de seis categorías analíticas, examinamos los efectos del Señor Calavera (Cambio Climático) en el territorio mexicano. Dominación de la coca-cola: La crisis del agua en las tierras altas de Chiapas, Calor a muerte: muertes relacionadas con olas de calor, Mordeduras de muerte: vectores y enfermedades, Vientos y más vientos: el origen de las tormentas “zombies”, Vámonos antes de morir aquí: migraciones humanas por el cambio climático y Noticias falsas: el cambio climático es una mentira. De esta manera, construimos un marco analítico para enfrentar este presente devastador, donde el cambio climático señala futuras catástrofes globales.

Palabras clave: Cambio climático, salud, enfermedades, mortalidad, olas de calor, huracanes, noticias falsas

Resumo - Este artigo surge como uma reflexão crítica sobre as mudanças climáticas e a saúde pública no México. Através de seis categorias analíticas, examinamos os efeitos do Señor Calavera (Mudanças Climáticas) no território mexicano: Dominação da coca: A crise hídrica nas terras altas de Chiapas, Calor até a morte: mortes relacionadas às ondas de calor, Picadas de morte: vetores e doenças, Ventos e mais ventos: a origem das tempestades “zumbis”, Vamos partir antes de morrermos aqui: migrações humanas devido às mudanças climáticas e notícias falsas: as mudanças climáticas são uma mentira. Desta forma, construímos um quadro analítico para enfrentar este presente devastador, onde as alterações climáticas sinalizam futuras catástrofes globais.

Palavras-chave: Mudanças climáticas, saúde, doenças, mortalidade, ondas de calor, furacão, Fake news.

INTRODUCTION

The new normality standards emerging from global climate change are giving rise to new ways of living and are directly affecting human health, ranging from eco-anxiety to heat stroke-related deaths, as well as impacts from pollution (undesired human-origin waste released into the air, soil, water, and oceans) and meteorological phenomena (Fuller, 2022). In this scenario, climate change has become the central axis of scientific debate in recent

years, as it is a consequence of human activity, which has resulted in changes to the world's natural climate, directly and indirectly causing harmful effects on natural ecosystems (UN, 1992).

Climate change presents unprecedented challenges for global public health, where healthcare professionals will play a crucial role in recognizing the magnitude of this climate crisis. It is worth noting that there are positive indications regarding the attitude of healthcare professionals, acknowledging the need for training on the consequences of climate change on human health (Atwoli, 2021; Armand, 2024). Similarly, the World Health Organization has listed climate change as one of its top ten global health issues, estimating that there will be 250,000 additional deaths each year between 2030 and 2050 (WHOa, 2024). In this context, climate change is considered the greatest health threat of the 21st century.

In addition, climate change immediately and locally, regionally, or globally affects communities, triggering health crises through storms, hurricanes, floods, landslides, and mudslides; environmental pollution; extreme heatwaves; droughts—areas experiencing water crises; wildfires; increased vector-borne diseases (dengue, chikungunya, malaria, Chagas disease, etc.); human displacement—migrations, among others (Hartering, 2023). These factors intervene in the health/illness/care/death process, representing a global issue where all sectors and continents must commit to addressing the situation. If immediate action is not taken, the problem will worsen drastically.

Although some countries report a high capacity to respond to health emergencies caused by climate change (Hurtado, 2024), the reality is different. Health systems are shown to be highly fragmented, underfunded, and marked by health inequities due to insufficient preparedness and surveillance capabilities. Combined with a lack of skilled workforce and leadership, along with misinformation and fake news, climate change will pose an unprecedented threat to public health (Pörtner, 2022; Sorensen, 2024). In the Gulf of Mexico, climate change, referred to as "Señor Calavera," will move through the region amidst widespread misfortune.

From this perspective, analyzing the health consequences related to climate change equips us with the technical and scientific tools necessary to establish public policy decisions and raise awareness among communities about this threat. This approach fosters open

dialogue and helps build organized social responses. If we continue to remain confined to academia or politicized forums where pseudo-scientific groups dictate doctrines, there will be no awareness until total extinction occurs.

Coca-domination: the water crisis in the highlands of Chiapas.

The water crisis has led to alternative survival models in the face of the lack of this vital resource. Chiapas, in Mexico, exemplifies how extractive water models—water privatization—combined with uncontrolled population growth—contamination of aquifers—and climate change, have resulted in hydration based on Coca-Cola, a beverage more accessible than potable water (López, O. et al., 2018). This dark liquid has also embedded itself into the traditions, rituals, and customs of the indigenous population of Chiapas, where consumption practices, shaped by marketing strategies, have reinforced cultural patterns of worship, status, and power associated with this drink (Nájera, A. et al., 2010).

This conquest, driven by marketing and advertising (Image 1), has built a solid brand amid water crises, where the construct around this beverage has displaced water, endowing it with prestige and social standing. The population consumes 821 liters of soda per person annually, making Chiapas the leading state in the country in carbonated beverage consumption (González, 2020). Despite the health risks to the people of Chiapas, awareness campaigns have been ineffective, and consumption continues to rise.

Image 1. Promotional poster at the entrance of the town encouraging Coca-Cola consumption



Source: Poder del Consumidor, 2014.

In this era of **Coca-domination**, the political factor in the distribution of this dark liquid is regarded as “an exchange commodity used to settle conflicts, negotiate, and in some cases, for reconciliation” (Alonso, M. et al., 2020). Additionally, as it contains sugar and elements like caffeine, it is a beverage that provides energy for daily life. Alongside the previously mentioned factors, other elements must also be considered: the negative perception of water quality due to bad odor and the presence of fecal coliforms (Faviel, E. et al., 2019), the extraction of 1,150,065.75 liters of water per day for over a decade by the soft drink company (López, O. et al., 2018), the reduced rainfall in the area, rapid deforestation, and subsequent droughts (Mora, C. et al., 2016). These factors create the perfect combination for a direct relationship between Coca-Cola consumption due to the water crisis and chronic illness. In this case, Chiapas has the highest incidence of diabetes mellitus (Rodríguez, J. et al., 2024; López, O. et al., 2018), which leads to a fiscal burden on the state's healthcare system and out-of-pocket expenses for the population, further straining **an already vulnerable and fragmented healthcare system**, resulting in communities sickened by the water crisis.

Heat to the Death: Heatwave-related Deaths.

It is common to hear comments about how every year feels hotter, without asking ourselves: what is causing this, and who contributes to it? There is no doubt that global warming is the increase in Earth's temperature, secondary to the use of fossil fuels, deforestation, and extensive livestock farming, among other factors, which drives climate change, leading to heatwaves, “defined as a period longer than three days during which maximum and minimum temperatures exceed climatologically normal values” (Chiabai, 2022).

These heatwaves have harmful effects on human health, causing signs and symptoms including intense thirst, heavy sweating, weakness, pallor, discomfort, anxiety, dizziness, fatigue, fainting, nausea, vomiting, headaches, electrolyte imbalances, cramps, and in some cases, heat-related death (Luber, G. et al., 2008). The most vulnerable groups include the elderly, newborns, pregnant women, individuals with chronic illnesses—kidney damage, cancer, diabetes, hypertension—and outdoor workers (PAHO, 2021).

It is worth noting that 2021 was the sixth hottest year globally, with a temperature increase of 1.2°C (Hartinger, S. et al., 2024). In Latin America, the summer temperature rose by an average of 0.38°C (López, 2022), while in Mexico, a 1.7°C increase was recorded, triggering heatwaves and droughts (Enciso, 2023). There are data showing that **heat-related mortality** increased by 140% globally over 20 years. In Europe, the 2023 heatwave caused 47,000 deaths (Linde, 2024), while Mexico recorded 372 deaths in 2023 (Redacción, 2023), and in 2024, 2,813 heatstroke cases have been reported, with 183 heat-related deaths as of July (Rojas, 2024). Prevention campaigns have been conducted through the National Center for Disaster Prevention (Image 2), which have had a positive impact. However, the root cause has not been addressed, meaning that temperatures will continue to rise. It is also important to note the correlation between heatwaves, environmental humidity, and suicide rates, a line of investigation that has been little explored but requires epidemiological monitoring (Florida, F. et al., 2021). Thus, how much heat are we willing to endure in the coming years?

Image 2. "What's up with the heat!" prevention poster for high temperatures in Mexico.

¡Qué onda con el calor! Todos a hidratarse

¿Qué es?
La onda u ola de calor es un periodo de temperatura excesiva, casi siempre combinada con humedad, que se mantiene durante varios días consecutivos

Es más frecuente en las ciudades por la deforestación y la contaminación

Características
Su duración es mayor de **3 días**
Genera pérdida de agua por evaporación
Ocurre principalmente durante la tarde
En algunos sitios ha llegado a los 57 °C

Protégete
Evita asolearte entre 11 am y 4 pm
Viste ropa suelta de colores claros y manga larga
No realices actividades físicas intensas bajo el sol
Toma agua simple aunque no tengas sed
Come alimentos frescos, frutas y verduras
Permanece en la sombra y en lugares frescos
Usa protector solar (mínimo F15)
Utiliza lentes de sol, gorra o sombrero
Evita consumir bebidas alcohólicas

Efectos en la población
Insolación
Desmayos
Golpe de calor
Deshidratación
Enfermedades diarreicas agudas
Enfermedad es en la piel

Las señales de golpe de calor son:
Dolor de cabeza y convulsiones
Confusión
Náuseas
Sudoración excesiva
Pérdida del conocimiento
Mareos
Pulso rápido
Piel seca y caliente

Grupos en mayor riesgo
• Niñas y niños menores de cinco años
• Personas con enfermedades crónicas
• Trabajadoras y trabajadores agrícolas
• Adultos mayores
• Mascotas

No permanezcas en un vehículo con las ventanillas cerradas
La temperatura puede superar los 50 °C

¡Recuerda! Toma agua durante el día

Centro Nacional de Prevención de Desastres / Comisión Nacional del Agua / Secretaría de Salud

GOBIERNO DE MÉXICO | SEGURIDAD | CNPC | CENAPRED

gov.mx/cenapred | www.gob.mx/conagua | www.gob.mx/salud

Source: Government of Mexico. Available at:
<https://www.gob.mx/cenapred/articulos/onda-de-calor-en-mexico>

Stings of death: vectors and diseases.

The ecological transition caused by human invasion into all corners of the planet, along with the adaptation of vectors—expanding their range of latitudes and altitudes—and climate change—increasing temperature, precipitation, and humidity—has resulted in vector-borne diseases representing over 17% of infectious diseases and causing more than 700,000 deaths globally each year (WHO-b, 2024). Diseases such as malaria, dengue, chikungunya fever, yellow fever, Zika, schistosomiasis, rickettsial infections, leishmaniasis, Chagas disease, Japanese encephalitis, and onchocerciasis (WHO-b, 2024) are spreading among populations due to various social determinants of health, where climate change now plays a pivotal role in enabling transmission between host and carrier.

In Mexico, the most prevalent vector-borne infectious disease is dengue, which has tripled in numbers compared to 2023, with 59,581 cases, including 146 deaths (Gómez, 2024). In Latin America, 9 million cases of dengue have been reported, a figure twice as high as in 2023 (Cansler, 2024). Experts attribute this increase to climate change and the fragility of healthcare systems, as well as the political and financial instability of countries, leading to humanitarian crises and population displacements, resulting in **health inequities** and a disease burden among impoverished communities (WHO-c, 2024; Vanlerberghe, V. et al., 2013).

In this context, prevention and control of *Aedes*, *Anopheles*, and *Culex* mosquitoes in Mexico is carried out by eliminating stagnant water sources inside and outside homes, using mosquito nets, and applying natural repellents like citronella. Public awareness campaigns with slogans such as “Wash, cover, flip, and toss,” and “Without breeding sites, there are no mosquitoes, and without mosquitoes, there’s no dengue,” aim to raise public awareness. Another strategy involves infecting mosquitoes with *Wolbachia* bacteria, which reduces the virus's ability to reproduce within the mosquito (Government of Mexico-a, 2022). Currently, two vaccines, Takeda and TAK-003 (Tricou, V. et al., 2024), have been approved by the WHO. However, the commercialization of healthcare raises the question: are we truly addressing climate change, or are we continuing with this malicious plan that creates more health demands, leading to greater profits for pharmaceutical companies through the production of vaccines and medications?

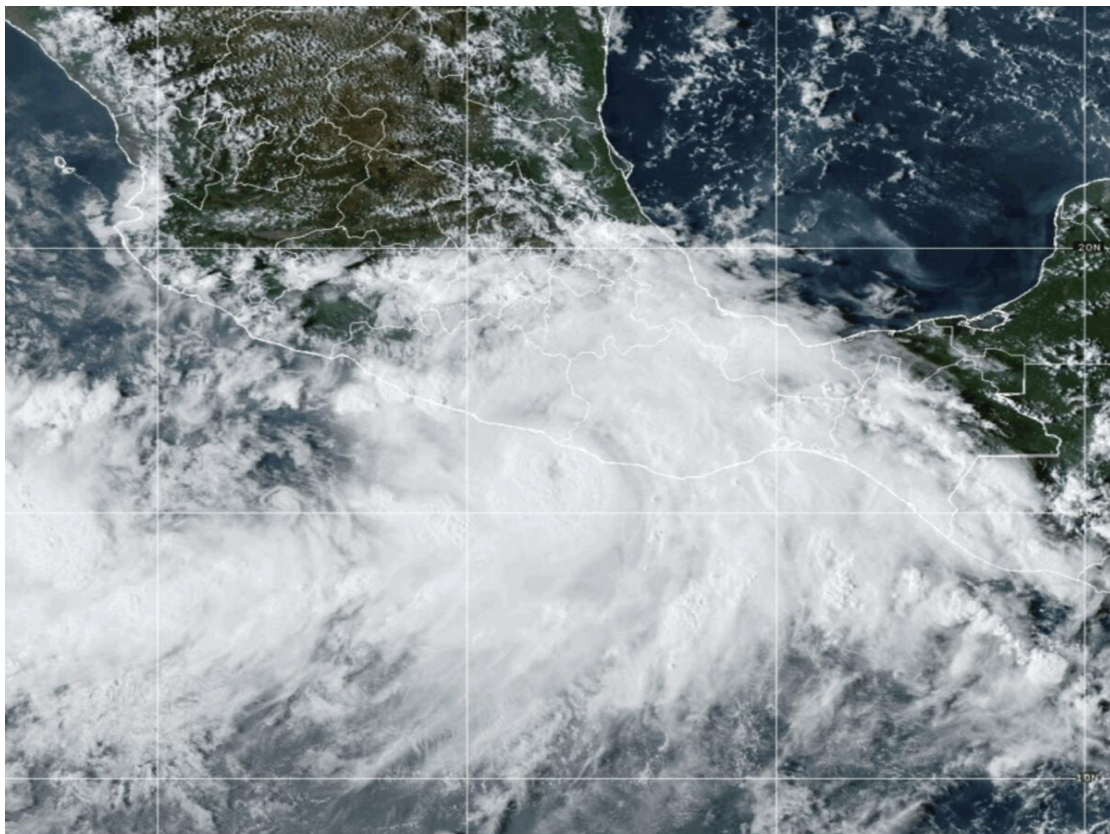
Winds and More Winds: The Origin of “Zombie” Storms.

Natural disasters like tropical cyclones are increasingly violent meteorological phenomena. Based on wind speed, a cyclone can evolve into a tropical depression, tropical storm, or hurricane (Government of Mexico-b, 2017). In Mexico, records of hurricanes date back to early Mesoamerica, through Spanish accounts since 1492, and from 1970 to the present, there have been 268 recorded hurricanes of various categories (SEMARNAT, 2024). These storms have caused more than 10,000 deaths, billions of dollars in economic losses, and numerous human displacements (Estrada, 2017). It is important to note that the long-term health impact on affected communities remains unknown, as only direct deaths

from these events are typically reported. Epidemiological studies primarily focus on direct **hurricane-related fatalities**—such as drowning—while overlooking indirect mortality factors and other health consequences linked to these disasters.

In 2024, a phenomenon named "John" demonstrated that climate change is part of this natural violence (Image 3). It transitioned from a Category 3 hurricane to a weakening tropical storm, only to regain strength as a Category 3 hurricane once again. This phenomenon has been dubbed a “zombie” storm (Sepúlveda, 2024). It struck the coasts of Guerrero and Oaxaca with unrelenting fury, resulting in 29 deaths (Castillo, 2024). For public health in Mexico, it is essential to develop health predictions for disaster-prone environments like cyclones and to move beyond merely reacting to catastrophic events. Preventive responses to climate and meteorological events must improve, and the national priority should be to develop the science of meteorological disasters in public health.

Image 3. Zombie storm and the phenomenon called John



Source: Los Angeles Times. This satellite image from the U.S. National Oceanic and Atmospheric Administration (NOAA) shows Hurricane John at 6:10 PM Eastern Time, Monday, September 23, 2024, near southern Mexico. (NOAA via AP) (Uncredited / Associated)

Let's leave before we die here: Human Migrations Due to Climate Change.

Climate change has reached every corner of the planet, and it is an increasing threat. **Natural disasters, soil degradation, and associated water crises** have led 23.7 million people to migrate internally, and it is estimated that by 2050, there will be 216 million people displaced by climate change (IOM, 2024). In Mexico, projections estimate over 3 million people will be displaced by climate change by 2050 (Government of Mexico-c, 2024). These displacements result in vulnerability and inequity in health, family fragmentation, mental health issues—such as Ulysses syndrome—malnutrition, the spread of infectious diseases, the collapse of healthcare systems, among others (Hernández, 2022; Gascón, 2003). Which health system will be prepared to meet the health needs of many displaced people when all current health systems are precarious, outdated, poorly located, and lack trained healthcare personnel for dealing with human migration? The humanitarian catastrophe is present, and public health is in a state of collapse amidst the many urgent issues that demand attention. We must also promote organized social responses to address the socio-cultural needs of migrant groups.

Fake news: Climate Change is a Lie.

We are in the Anthropocene, in the 4.0 Revolution, where people are globally and interplanetarily interconnected through the internet. Media outlets are numerous and varied, where the absolute truth of reality is always in doubt—not ontological or epistemic but through the emotional life-giver: TikTok, YouTube, Instagram, Youku, Moj, Ru Tube, VK Video, and others. Different types of news circulate here: **misinformation**—false information spread without the intent to deceive—and **disinformation**—deliberately false information intended to mislead and cause harm, where the information has been manipulated. In this landscape, various user profiles compete to gain subscribers or emojis by spreading false claims like "climate change is not real," "current climate changes are natural," "climate change is not our problem," "sea levels are not rising," and "climate change benefits us" (Silva, 2023). This creates a dangerous mix of followers and detractors regarding an event that concerns all humanity. Therefore, one key role of public health is to combat fake news through official statements that clarify these falsehoods. The road is long,

but collectively, we can take actions beneficial to the world.

IN CONCLUSION

In an arid zone covering 54% of Mexico's surface area (Briones, O. et al., 2018), with a population close to 130 million people and 1.959 million square kilometers of land, with 66 people per square kilometer, we face a present with natural resources—consumed by excessive consumption—an environment—polluted in water and air resources, with biodiversity degradation—and a quality of life—characterized by resource scarcity, insecurity, and inequality. This will soon lead to famine and social conflicts, and no public health system or political body will be able to mitigate this present and future without the support of organized social responses.

We should not wait for major international bodies to dictate the rules of the game. It is time for public health to present a critical and oppositional proposal to confront the effects of climate change.

REFERENCES

Alonso, M. Et al., (2020). Etnografía de los procesos alimentarios y el poder en regiones indígenas de Chiapas. Estudios de cultura maya, vol. LVI, pp. 261-291. UNAM, Instituto de Investigaciones Filológicas. Disponible en: <https://www.redalyc.org/journal/2813/281364930010/281364930010.pdf>

Armand W , Padget M , Pinsky E , Wasfy JH , Slutzman JE , Duhaime A. Conocimientos y actitudes de los médicos sobre el cambio climático y la salud después de un programa de incentivos de calidad. JAMA Netw Open. 2024;7(8):e2426790. Disponible en: doi:10.1001/jamanetworkopen.2024.26790

Atwoli, L. et al. Llamado a la acción de emergencia para limitar el aumento de la temperatura global, restaurar la biodiversidad y proteger la salud. N Engl J Med . 2021;385(12):1134-1137. Disponible en: doi: 10.1056/NEJMe2113200.

Briones, Oscar, Búrquez, Alberto, Martínez-Yrizar, Angelina, Pavón, Numa, & Perroni, Yareni. (2018). Biomasa y productividad en las zonas áridas mexicanas. Madera y bosques, 24(spe), e2401898. <https://doi.org/10.21829/myb.2018.2401898>

Castillo, J. (2024). Huracán John: Sube a 29 el número de muertos en México por el meteoro. MVS Noticias. Disponible en: <https://mvsnoticias.com/nacional/2024/9/29/huracan-john-sube-29-el-numero-de-muertos-en-mexico-por-el-meteoro-658741.html>

Cansler, R. (2024). Récord de casos de dengue en América Latina en 2024: cuál es la situación y qué prevén los expertos. Infobase Seccion Salud. Disponible en: <https://www.infobae.com/salud/2024/06/22/record-de-casos-de-dengue-en-america-latina-en-2024-cual-es-la-situacion-y-que-preven-los-expertos/>

Chiabai, A. (2022). Olas de Calor. Masque Centre For Climate Change. Excelencia María de Maeztu. Disponible en: https://info.bc3research.org/wp-content/uploads/2020/12/04_BC3_FACTSHEETS_OLAS-DE-CALOR.pdf

Estrada, R. (2017). Los 7 huracanes más devastadores que han golpeado a México Desde la segunda mitad del siglo XX y hasta nuestros días estos fenómenos naturales han azotado con fuerza a nuestro país, dejando cuantiosas pérdidas humanas y económicas. Aquí un recuento de los más devastadores en México. Disponible en: <https://www.elfinanciero.com.mx/nacional/los-huracanes-mas-devastadores-que-han-golpeado-a-mexico/>

Faviel, E. et al. (2019). PERCEPCIÓN Y CALIDAD DE AGUA EN COMUNIDADES RURALES DEL ÁREA NATURAL PROTEGIDA LA ENCRUCIJADA, CHIAPAS, MÉXICO. Revista internacional de contaminación ambiental, 35(2), 317-334. Disponible en: <https://doi.org/10.20937/rica.2019.35.02.05>

Florido, F. et al. (2021). Correlating heatwaves and relative humidity with suicide (fatal intentional self-harm). Scientific Reports volume 11, Article number: 22175. Disponible en: <https://www.nature.com/articles/s41598-021-01448-3>

Fuller, R. et al. (2022). Pollution and health: a progress update. The Lancet Planetary Health, volumen 6, número 6, e535 - e547. Disponible en: [https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196\(22\)00090-0/fulltext](https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(22)00090-0/fulltext)

Harteringer, S. et al. (2024). Informe América Latina 2023 de The Lancet Countdown sobre salud y cambio climático: el imperativo de un desarrollo resiliente al clima centrado en la salud. The LANCET Regional Health. Vol. 33 May. Disponible en: [https://www.thelancet.com/journals/lanam/article/PIIS2667-193X\(24\)00073-5/fulltext](https://www.thelancet.com/journals/lanam/article/PIIS2667-193X(24)00073-5/fulltext)

Hernández, A. (2022). Qué es el Síndrome de Ulises y cómo afecta a los migrantes. BBC

News Mundo. Disponible en: <https://www.bbc.com/mundo/noticias-62251888>

Gascón, J. (2003). Enfermedades infecciosas e inmigración. *Enfermedades Infecciosas y Microbiología Clínica*. Vol. 21. Núm. 10. Disponible en: <https://www.elsevier.es/es-revista-enfermedades-infecciosas-microbiologia-clinica-28-articulo-enfermedades-infecciosas-e-inmigracion-13054544>

Gobierno de México -a-. (2022). México trabaja con mejores estrategias para el control del dengue. Más de 80% de las infecciones son leves y asintomáticas. Disponible en: <https://www.gob.mx/salud/prensa/423-mexico-trabaja-con-mejores-estrategias-para-el-control-del-dengue?idiom=es#:~:text=Ha%20implementado%20campa%C3%B1as%20como%3A%20%E2%80%9CLava,que%20puedan%20acumular%20agua%20estancada.>

Gobierno de México -b- (2017). Diferencia entre un ciclón tropical y un huracán. Un ciclón tropical presenta varias etapas de desarrollo y madurez, la última es cuando evoluciona a huracán. Disponible en: <https://www.gob.mx/cenapred/articulos/diferencia-entre-un-ciclón-tropical-y-un-huracan>.

Gobierno de México -c- (2024). Presentan resultados del estudio Migrantes climáticos internos en México. Disponible en: <https://www.gob.mx/inecc/prensa/presentan-resultados-del-estudio-migrantes-climaticos-internos-en-mexico?idiom=es>.

Gómez, C. (2024). Se triplica el dengue en comparación con 2023: Ssa. *La Jornada Sección Política*. Disponible en: <https://www.jornada.com.mx/2024/09/21/politica/008n2pol>.

González, M. (2020). Refrescos en México: Chiapas, el estado de México donde el consumo de refrescos es 30 veces superior al promedio mundial. *BBC News Salud*. Disponible en: <https://www.bbc.com/mundo/noticias-america-latina-53746039>.

Hartinger, M. et al., (2023). Informe América Latina 2023 de The Lancet Countdown sobre salud y cambio climático: el imperativo de un desarrollo resiliente al clima centrado en la salud. *The Lancet Regional Health – Américas*, Volumen 33, 100746. Disponible en: [https://www.thelancet.com/journals/lanam/article/PIIS2667-193X\(24\)00073-5/fulltext](https://www.thelancet.com/journals/lanam/article/PIIS2667-193X(24)00073-5/fulltext).

Hurtado, M. et al. (2024). Salud y cambio climático en Latinoamérica: el reporte Lancet 2023. Instituto Nacional de Salud Pública. Gobierno de México. Disponible en: <https://www.insp.mx/index.php/index.php/informacion-relevante/salud-y-cambio-climatico-en-latinoamerica-el-reporte-lancet-2023>.

Linde, P. (2024). El calor causó 47.000 muertes en Europa en 2023, según un estudio. *El*

País Sección Clima y Medio Ambiente. Disponible en: <https://elpais.com/clima-y-medio-ambiente/2024-08-12/el-calor-causo-47000-muertes-en-europa-en-2023-segun-un-estudio.html>.

López, O. et al. (2018). En una ciudad con poca agua, la Coca-Cola y la diabetes se multiplican. The New York Times. Disponible en: <https://www.nytimes.com/es/2018/07/16/espanol/america-latina/chiapas-coca-cola-diabetes-agua.html>.

López, P. (2022). México ya rebasó los 1.6 grados de aumento en la temperatura. Es un país que se calienta más rápido que el promedio global; se trata de un fenómeno muy heterogéneo, varía de región a región. Gaceta UNAM. Disponible en: <https://www.gaceta.unam.mx/mexico-ya-rebaso-los-1-6-grados-de-aumento-en-la-temperatura/>.

Luber, G. et al. (2008). Climate Change and Extreme Heat Events. The health impacts of climate change. Vol 35, Issue 5p429-435. Disponible en: [https://www.ajpmonline.org/article/S0749-3797\(08\)00686-7/fulltext](https://www.ajpmonline.org/article/S0749-3797(08)00686-7/fulltext).

Mora, C. et al. (2016) Índices de cambio climático en el estado de Chiapas, México, en el periodo 1960-2009. Revista mexicana de ciencias agrícolas, 7(spe13), 2523-2534. Disponible en: http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S2007-09342016000902523&lng=es&tlng=es.

Nájera, A. et al. (2010). Del posol a la Coca Cola: cambio en las prácticas alimentaria en dos comunidades tojolabales. LiminaR. Estudios sociales y humanísticos, 8(1), pp. 173-190. Disponible en: <https://www.redalyc.org/articulo.oa?id=74516322011>.

OIM (2024). COP27: Abordando la movilidad humana provocada por el cambio climático. Disponible en: <https://www.iom.int/es/cop27-abordando-la-movilidad-humana-provocada-por-el-cambio-climatico>.

OPS (2021). Olas de calor: Guía para acciones basadas en la salud. Organización Panamericana de la Salud. Disponible en: https://iris.paho.org/bitstream/handle/10665.2/55244/9789275324080_spa.pdf.

ONU (1992). Convención Marco de las Naciones Unidas sobre el cambio climático. FCCC/INFORMAL/84*, GE.05-62301 (S) 220705 220705. Disponible en: <https://unfccc.int/resource/docs/convkp/convsp.pdf>.

OMSa (Organización Mundial de la Salud) (2024). Diez cuestiones de salud que la OMS

abordará este año. Centro de Prensa. Disponible en: <https://www.who.int/es/news-room/spotlight/ten-threats-to-global-health-in-2019>.

OMSb (Organización Mundial de la Salud) (2024). Enfermedades transmitidas por vectores. Calentamiento Global. Disponible en: <https://www.who.int/es/news-room/fact-sheets/detail/vector-borne-diseases>.

OMSb (Organización Mundial de la Salud) (2024). Dengue y dengue grave. Disponible en: <https://www.who.int/es/news-room/fact-sheets/detail/dengue-and-severe-dengue>.

Poder del Consumidor (2014). Muestra Dulce Agonía incremento de obesidad y diabetes por consumo de refresco en Chiapas. Salud, Salud nutricional. Disponible en: <https://elpoderdelconsumidor.org/2014/09/muestra-documental-dulce-agonia-incremento-de-obesidad-y-diabetes-por-consumo-de-refresco-en-chiapas/>.

Pörtner, O. et al, (2022). Cambio climático 2022: impactos, adaptación y vulnerabilidad : contribución del Grupo de trabajo II al Sexto Informe de Evaluación del Grupo Intergubernamental de Expertos sobre el Cambio Climático . Cambridge University Press; 2022.

Redacción -El Economista- (2023). Crecen más de 1,000% muertes por calor extremo en el país. El Economista Sección Política. Disponible en: <https://www.eleconomista.com.mx/politica/Crecen-mas-de-1000-muertes-por-calor-extremo-en-el-pais-20230908-0011.html>

Rodriguez, J. et al. (2024). Consumo de refrescos y diabetes mellitus en una comunidad Mazahua Otomí. Entreciencias: Diálogos En La Sociedad Del Conocimiento, 12(26), 1–13. <https://doi.org/10.22201/enesl.20078064e.2024.26.86237>.

Roja, A. (2024). Suman 183 muertes por temperaturas altas en México. EL Economista Sección Política. Disponible en: <https://www.eleconomista.com.mx/politica/Suman-183-muertes-por-temperaturas-altas-en-Mexico-20240710-0006.html>.

Silva, M. (2023). 5 afirmaciones falsas sobre el cambio climático desmontadas por la ciencia. BBC News Mundo. Disponible en: <https://www.bbc.com/mundo/articles/cg3p1xy93z7o>.

SEMARNAT (2024). Ciclones que han impactado en México. Disponible en: http://dgeiawf.semarnat.gob.mx:8080/ibi_apps/WFServlet?IBIF_ex=D3_AIRE04_01&IBIC_user=dgeia_mce&IBIC_pass=dgeia_mce.

Sepúlveda, A. (2024). Huracán John: ¿Qué es una “tormenta zombi” y qué tiene que ver con el ciclón en Guerrero? El Universal. Disponible en: <https://www.eluniversal.com.mx/tendencias/huracan-john-que-es-una-tormenta-zombi-y-que-tiene-que-ver-con-el-ciclon-en-guerrero/>.

Sorensen, C. et al. (2024) Definición de funciones y responsabilidades del personal sanitario para responder a la crisis climática. JAMA Netw Open. 7 (3):e241435. doi:10.1001/jamanetworkopen.2024.1435.

Tricou, V. et al. (2024). Long-term efficacy and safety of a tetravalent dengue vaccine (TAK-003): 4-5-year results from a phase 3, randomised, double-blind, placebo-controlled trial. The Lancet Global Health, Volume 12, Issue 2, e257 - e270. Disponible en: [https://www.thelancet.com/journals/langlo/article/PIIS2214-109X\(23\)00522-3/fulltext](https://www.thelancet.com/journals/langlo/article/PIIS2214-109X(23)00522-3/fulltext).

Vanlerberghe, V. et al. (2013). La inequidad en salud: el caso del dengue. Rev. Perú. Med. Exp. Salud Publica vol.30 no.4 Lima oct./dic. Disponible en: http://www.scielo.org.pe/scielo.php?pid=S1726-46342013000400023&script=sci_arttext.