



E F F E C T O F W E A T H E R O N H E A R T

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○ Prevention of Heart Disease

- Lifestyle patterns: guide individuals to establish
 - Healthy living
 - Healthy eating
 - Regular exercise
 - Proper sleep guidance
 - Avoidance of tobacco smoking
 - Management of hypertension and diabetes mellites,
 - and use of aspirin and statin therapy¹.





- Daily habits are greatly influenced by daily variations in the weather. For example, people stay indoors and refrain from walking during extremely hot or cold days.
- Lower weather temperatures were associated with increased hospitalizations for CVD. Other studies have found that cold-induced systemic hypertension⁹ and pulmonary hypertension¹⁰ are risk factors associated with the renin-angiotensin system, that could modulate the incidence of CVD hospitalizations.







- Hypothermia means the body temperature has fallen below 35 degrees Celsius or about 95 degrees Fahrenheit.
- It occurs when your body can't produce enough energy to keep the internal body temperature warm enough.
- It can kill you. Symptoms include lack of coordination, mental confusion, slowed reactions, shivering and sleepiness.





- Children and the elderly are at special risk because they may have limited ability to communicate or impaired mobility. Elderly people may also have lower subcutaneous fat and a diminished ability to sense temperature so they can suffer hypothermia without knowing they're in danger.
- Besides cold temperatures, high winds, snow and rain also can steal body heat. Wind is especially dangerous, because it removes the layer of heated air from around your body. At 30 degrees Fahrenheit in a 30-mile per hour wind, the cooling effect is equal to 15 degrees Fahrenheit. Similarly, dampness causes the body to lose heat faster than it would at the same temperature in drier conditions.





- The potential pathogenic mechanism underlying these effects may be attributed to the effects of seasonal and weather temperature changes on CVD risk factors, such as increased blood pressure, serum cholesterol, platelets and fibrinogen activity, endothelial dysfunction, and respiratory infection in winter



○ Heart Attacks and Cold Weather

Rates of coronary events increased during comparatively cold periods, especially in warm climates. The smaller increases in colder climates suggest that some events in warmer climates are preventable. It is suggested that people living in warm climates, particularly women, should keep warm on cold days.

Winter also raises your chances of getting the flu due to low humidity brought on by cold weather and indoor heating. The flu is potentially dangerous in anyone with heart disease.



○ Atrial Fibrillation and Cold Weather

- They observed a stronger association between lower absolute humidity and atrial fibrillation among older patients and patients without a clinical history of atrial fibrillation.
- The elderly are especially sensitive to cold, dry air. They have lower metabolic heat production and are more prone to develop disorders of thermoregulatory function.
- In general, about 90% of paroxysmal atrial fibrillations are thought to be triggered by muscular sleeves in the pulmonary veins. As atrial fibrillation progresses, atrial substrates formed through electrical, contractile, and structural remodeling play a more important role in onset.





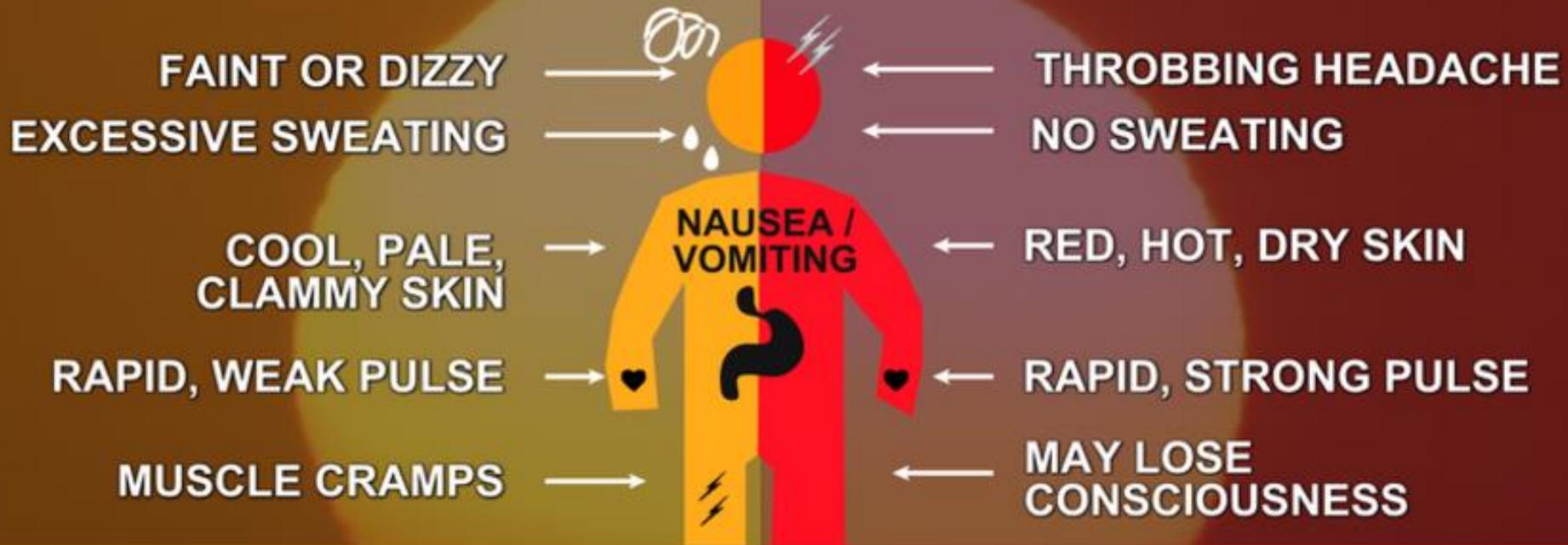
- Both cold and hot weather temperatures increased the risk of cardiovascular mortality. The mechanisms underlying higher weather temperature-related health effects potentially include impaired vascular endothelium, microthrombosis, elevated blood viscosity, disruptions in cholesterol levels, and dehydration.



> HEAT DANGER

» KNOW THE DIFFERENCE BETWEEN EXHAUSTION AND STROKE

FIRST WARNING



HEAT EXHAUSTION

- GET TO A COOL, AIR CONDITIONED PLACE
- DRINK WATER, IF CONSCIOUS
- TAKE A COOL SHOWER OR USE COLD COMPRESS

HEAT STROKE

CALL 9-1-1



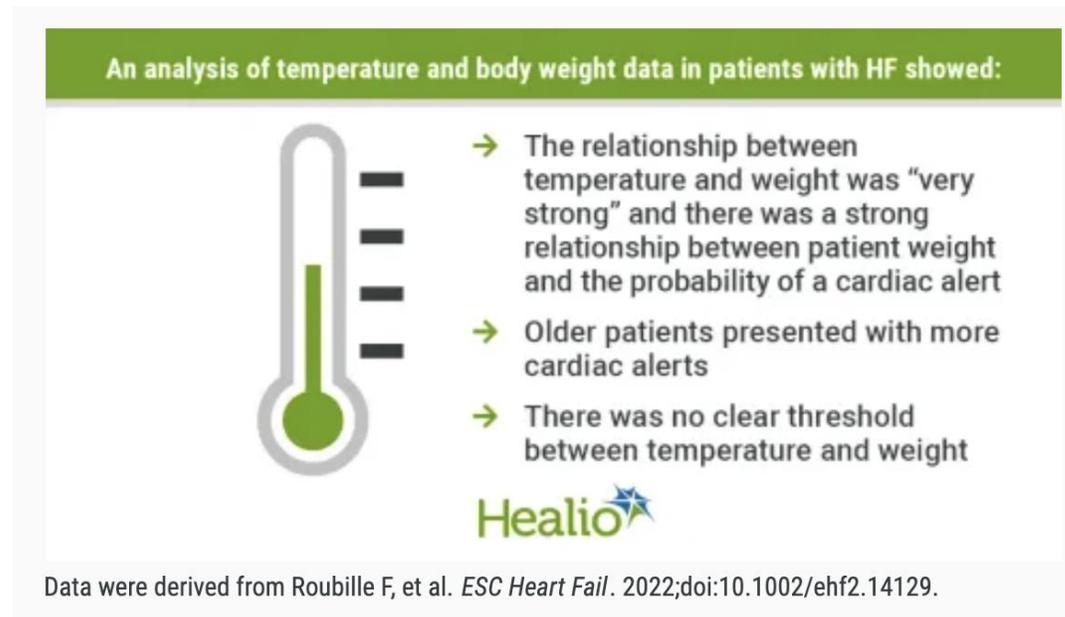
○ Extreme, high temperatures may double or triple heart-related deaths: Circulation Journal Report; 2020

- When temperatures reach extremes of an average daily temperature of 109 degrees Fahrenheit, the number of deaths from cardiovascular disease may double or triple.
- When core body temperature increases, the human body tries to cool itself by shifting blood from the organs to underneath the skin. This shift causes the heart to pump more blood, putting it under significantly more stress
- Some medications like angiotensin receptor blockers (ARBs), angiotensin-converting enzyme (ACE) inhibitors, beta blockers, calcium channel blockers and diuretics, which affect blood pressure responses or deplete the body of sodium, can exaggerate the body's response to heat and cause you to feel ill in extreme heat



○ Risk of Dehydration in CHF with excessive Heat

- Excessively high temperatures observed during a 2019 heat wave in France were closely associated with weight loss measured in adults with chronic HF, indicating worsening of HF, according to an analysis of telemonitoring and weather data.





- “Given the expectation of more heat waves, telemonitoring systems also need to alert clinicians of weight loss in heart failure patients,” Roubille said in the release. “In addition, systems could notify patients losing weight that it may be due to the heat, and they should contact their health care provider about reducing the dose of diuretics. For heart failure patients not monitored remotely, a good rule of thumb would be to contact a health care professional if weight drops by 2 kg during a heat wave for advice on adjusting diuretic medication. Reacting early should help us to prevent complications.”

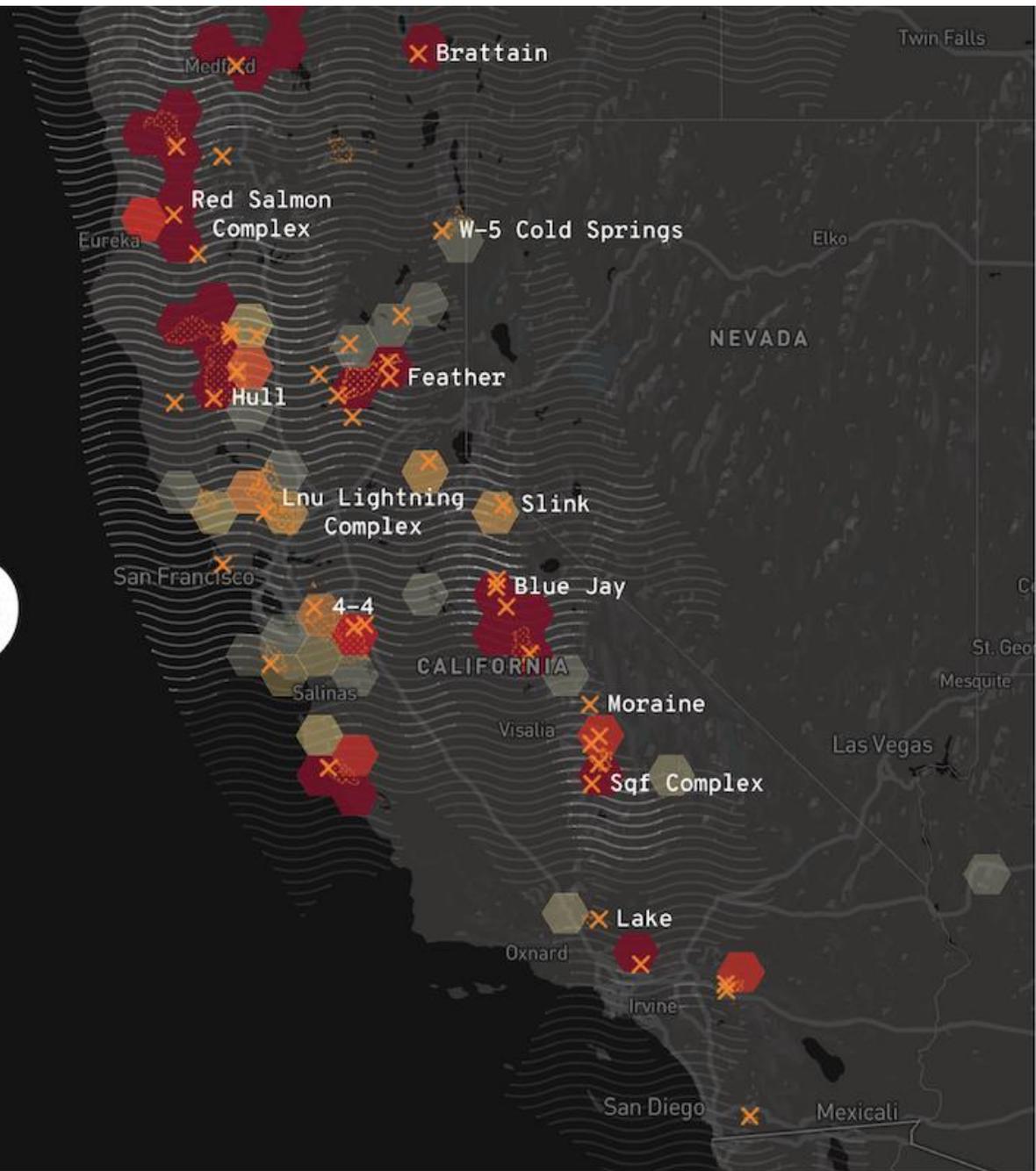


○ Air Pollution: WHO Data

- Air pollution is responsible for about 7 million deaths a year in the world,
- 2.5 million of which are because of heart disease (25%)
- 1.4 million due to stroke (24%).
- The polluting products:
 - Ozone
 - Carbon monoxide (CO)
 - Nitrogen dioxide (NO₂)
 - Sulphur dioxide (SO₂)
 - Volatile organic compounds.
- Road traffic is one of the main culprits in the deterioration of air quality in cities.



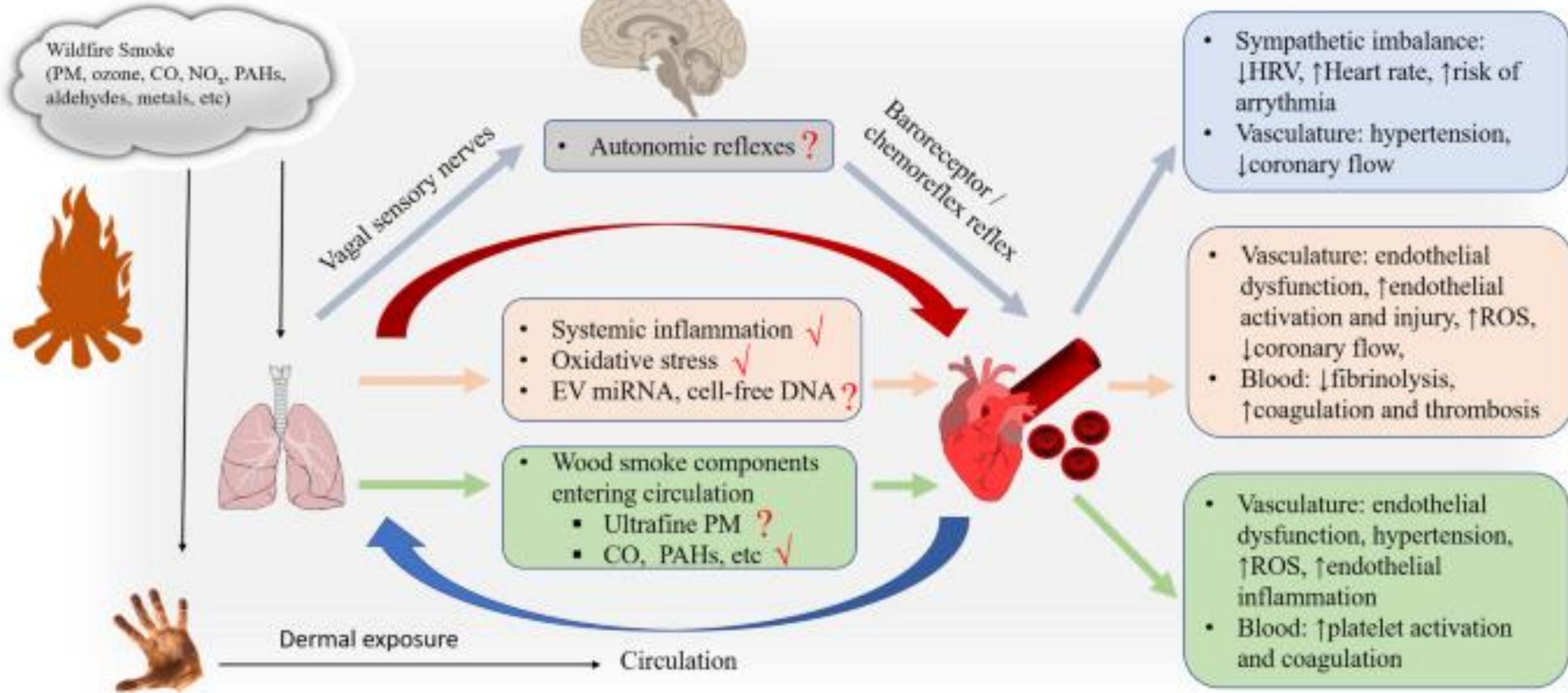
California wildfires map

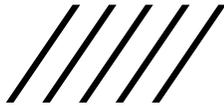




- “Wildfire smoke contains a lot of pollutants including fine, microscopic particles linked to cardiovascular risk,”
- A 2020 study found that exposure to heavy smoke during wildfires raised the risk of out-of-hospital cardiac arrests up to 70%, according to the AHA.
- Meanwhile, a 2018 study found that wildfire smoke exposure was associated with increased rates of emergency room visits for ischemic heart disease, irregular heart rhythm, heart failure, pulmonary embolism and stroke. Emergency department visits increased 42% for heart attacks and 22% for ischemic heart disease within a day of exposure to dense wildfire smoke.









- They found evidence suggesting that, in the high-impact area of NJ, Hurricane Sandy increased the incidence of MIs by 22%, increased the 30-day mortality from MI by 31%, and increased the rate of stroke by 7%.
- The mechanism by which Hurricane Sandy could increase the risk of MI and stroke is not known, but others have attributed higher incidence rates of severe CVEs during natural disasters or extreme weather events to increased stress, increased physical activity, prothrombotic issues, decreased attention or ability to maintain medical needs, and lack of sufficient emergency services.



○ Take Home Messages

- Associated with increased risk of CV disease
- Age, pregnancy, pre-existing health conditions, low socio-economic status
- Due to global warming, population growth and ageing
- Potential pathophysiological mechanisms: cardiac load, BP fluctuations, prothrombotic conditions and inflammatory response
- Health-action plans need to be implemented nationally





- Reducing exposure to wildfire smoke by staying indoors with doors and windows closed, unless you're in an area of immediate danger and need to evacuate.
- Use high-efficiency air filters in air-conditioning systems.
- Avoid exertion, keep well hydrated and consider seeking other shelter if your home does not have an air conditioner and it's too warm to stay inside.
- Always follow local law enforcement orders and prepare early for evacuation. Being prepared may also help protect your heart because it can reduce mental and physical stress.



○ Other Factors

- Power outages
- Drug shortages
- Increased flu or water borne diseases
- Lack of food
- Access to health care
- EXERCISE REGULARLY
- MAKE A PLAN
- BE PREPARED: With food, meds, supplies
- PLEASE DO NOT CHALLENGE THE ELEMENTS





THANK YOU

