



Developing a Better Understanding

MEDICATIONS & HEAT INTOLERANCE

Extreme heat often results in the highest annual number of deaths among all weather-related disasters. According to the U.S. Department of Health and Human Services, heat-related deaths have been increasing in the United States in recent years with 1,602 deaths occurring in 2021; 1,722 in 2022; and 2,302 in 2023. Heat exhaustion, heat cramps, and heat strokes are urgent health risks that can occur during extreme heat. Heat stroke is a medical emergency that can be fatal, so it is important to act immediately if a person is showing signs of heat stroke. Symptoms include high body temperature (103°F or higher); hot, red, dry, or damp skin; fast, strong pulse; headache, dizziness, nausea, confusion, or loss of consciousness. Certain antidepressants can reduce a person's heat tolerance, making them more prone to heat exhaustion and heat stroke. Two classes of antidepressants — selective serotonin reuptake inhibitors (SSRIs) and tricyclic antidepressants (TCAs) — have physiological effects on the body. According to the Centers for Disease Control and Prevention, SSRIs and TCAs struggle with thermoregulation, the body's heat regulation, in high temperatures. This can lead to impaired sweating and cooling. SSRIs can cause increased sweating, while TCAs cause decreased sweating, inhibiting cooling mechanisms. When thermoregulation begins to fail, it can ultimately lead to hyperthermia, meaning the body temperature has risen to dangerous levels. Hyperthermia can lead to heat exhaustion, heat cramps, or heatstroke.

According to the CDC, medications and heat interact in 3 primary ways:

1. Some medications interfere with thermoregulation and/or fluid balance, amplifying the risk of harm from hot weather (e.g., diuretics, antipsychotic medications, antidepressants, and antihypertensive agents).
2. Heat can degrade or damage some medications, and patients can be counseled on how to properly store their medications when temperatures are high (e.g., inhalers, EpiPens, insulin).
3. Some medications can increase skin sensitivity from sun exposure, and counseling on skin protection can help protect patients (e.g., antifungals, and antibiotics).

Some experts do believe the chemical impact antidepressants have on the brain could potentially interfere with the part of the brain that controls temperature regulation, known as the hypothalamus. Other types of psychiatric medication – including antipsychotics and benzodiazepines – have also been linked to decreased heat intolerance, although the reason why this happens differs slightly from antidepressants; for example, antipsychotics can inhibit sweating and therefore make it harder for the body to eliminate heat. Thermoregulation is a neurobiological network of endocrine, central nervous system, autonomic, and somatosensory responses that controls our body temperature, among other things. What's important here is to understand while psychiatric medications offer a reduction in anxiety, depression, and other mental illness symptoms, they can meddle with our thermoregulation. Due to the increased risk, individuals taking antidepressants should familiarize themselves with the symptoms of heat exhaustion and heat stroke. Signs of heat exhaustion can include; elevated body temperature, heavy sweating, headache, nausea, dizziness, weakness, thirst, and irritability.

Antidepressants that can increase the risk of heat stroke:

- Sertaline
- Fluoxetine
- Citalopram
- Escitalopram
- Fluvoxamine
- Paroxetine
- Prozac
- Norpramin
- Amitriptyline

Source: CDC

Medications can contribute to heat sensitivity in the following ways:

- Reduced thirst sensation (e.g., diuretics, ACE inhibitors, ARBS).
- Interference with central thermoregulation (e.g., antipsychotics, anticholinergics, stimulants)
- Impaired sweating and therefore impaired cooling (increased with Selective Serotonin Reuptake Inhibitors (SSRIs), Serotonin and Norepinephrine Reuptake Inhibitors (SNRIs), decreased with Tricyclic Antidepressants (TCAs), typical and atypical antipsychotics, anticholinergic agents).
- Volume depletion, hypotension, and/or reduced cardiac output with increased risk of fainting and falls, and potentially reduced renal blood flow and renal injury from nephrotoxic drugs, as can happen with non-steroidal anti-inflammatory drugs (NSAIDs) (e.g., diuretics, beta-blockers, TCAs, laxatives).
- Reduced blood vessel dilation and impaired ability to dissipate heat (e.g., aspirin, beta-blockers, and clopidogrel).
- Drug toxicity from reduced clearance of medications in dehydrated people, especially for medications with a narrow therapeutic index (e.g., apixaban, carbamazepine, and lithium).
- Electrolyte imbalance (e.g., diuretics, beta-blockers, calcium channel blockers, antacids, laxatives, lithium, and trimethoprim-sulfamethoxazole).
- Sedation or cognitive impairment with increased risk of falls and reduced thirst sensation (e.g., opiates, benzodiazepines, typical and atypical antipsychotic medications, antidepressants,

Source: CDC

Heat-management measures can help prevent heat-related conditions. The National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce advocates preparing for high temperatures ahead of time. During hot weather, the NOAA recommends:

- Staying current on heat advisories from local TV and radio stations.
- Plan for heat through air conditioners, obtaining a window fan, and knowing cool indoor places to go to, such as shopping malls
- Visiting a doctor to see if a health condition may worsen in hot weather
- Drinking plenty of water and nonalcoholic beverages
- Dressing in lightweight, light-colored clothing
- Avoiding being in the sun for long periods
- Reducing strenuous activity and saving activities — such as gardening or lawn mowing — for early morning or late evening
- Misting skin with cool water when outside and using cold compresses when inside

The CDC urges prompt medical attention for symptoms of either heat exhaustion or heat stroke. A person with heat exhaustion should get to an emergency room, but if this is unavailable, someone with them should call 911.

Sources: Centers for Disease Control and Prevention (CDC)
The National Oceanic & Atmospheric Administration (NOAA)

US Department of Health & Human Services

Cleveland Clinic