

## Hot Air Sauna Burns

by Ann Gerhardt MD and Glennah Trochet MD  
(former Sacramento County Public Health  
Chief)

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A friend recently suffered 3<sup>rd</sup> degree leg burns after falling asleep in a sauna, so we decided to see if this is a public health problem.

There are no good data about how many people are injured or burned in saunas in the U.S. In Sacramento County, the burn unit at UC Davis has not seen a hot air sauna burn in recent memory and not in the past three years. The few reported deaths due to sauna consist of an inebriated 61-year-old woman expiring in a sauna with no timer, three who died in an Arizona cult sweat lodge and a 68-year-old man, alone in a malfunctioning sauna.

Finland, site of the now defunct World Sauna Championship, tops the world for most reported sauna burns and deaths. There, one sauna burn a day requires hospitalization, usually related to touching the heater or a hot surface, and one out of four burns in the country is sauna-related. In the Championship, the temperature starts at 110 degrees then is increased, with water thrown on the heater every 30 seconds. In 2010, two people fainted at 6 minutes, one of whom died. Some mutant holds the record for lasting more than 16 minutes.

According to a 2008 study, Finland has about 2 million saunas for a population of 5.2 million people. The annual sauna-related death rate is less than 2 per 100,000 inhabitants. Half were inebriated. Twenty-five percent of deaths were due to heat exposure and fifty-one percent died of 'natural causes.' The cause of the remaining deaths is unclear, but it could be trauma – for example, a man in Germany died after falling face first onto a sauna stove.

Other than the trauma of falling onto a stove or head trauma when a skull hits the floor, what kills people is dehydration and high body temperature. We normally dissipate body heat in two ways, by sweating and by dilating blood vessels in the extremities. Sweating in turn induces water weight loss and dehydration. Dehydration and extreme sauna humidity both reduce sweating. This severely handicaps the body's ability to disseminate heat.

Dehydration causes constriction of extremity blood vessels, further reducing the body's ability to adjust its temperature. Constricted blood vessels deprive the limbs of their blood supply, making them particularly prone to hot air damage. People incur full thickness skin burns and severe deep muscle damage.

The brain is particularly sensitive to heat. This may prevent an appropriate response to discomfort, especially in a person whose judgement is already impaired by alcohol. The combination of alcohol and heat can also cause a person to faint.

There may not be many reported sauna problems in the U.S., and California does not have any regulations for saunas (unlike those for hot tubs). However, most sauna manufacturers provide timers with their saunas, cutting off the heat after a predetermined time.

Taking a few precautions will ensure enjoyment of the sauna without danger: Keep the temperature  $\leq$  180 degrees. Set the timer, if available. Take breaks and drink water. Don't have metal items in the sauna or wear jewelry or clothing with metal in them. Don't drink alcohol and sauna. Don't sauna alone. Make sure someone checks on you if you don't leave the sauna after 15 to 20 minutes. Don't leave a drunk alone in a sauna.

And last, but not least, sauna isn't a macho competition: When it feels uncomfortable or the brain is sleepy, leave.

Koljonen V. Hot air sauna burns- review of their etiology and treatment. *J Burn Care Res* 2009 30(4);705-10

Abstract: [Kenttämies A<sup>1</sup>](#), [Karkola K](#). Death in Sauna. *J Forensic Sci*. 2008 May;53(3):724-9.