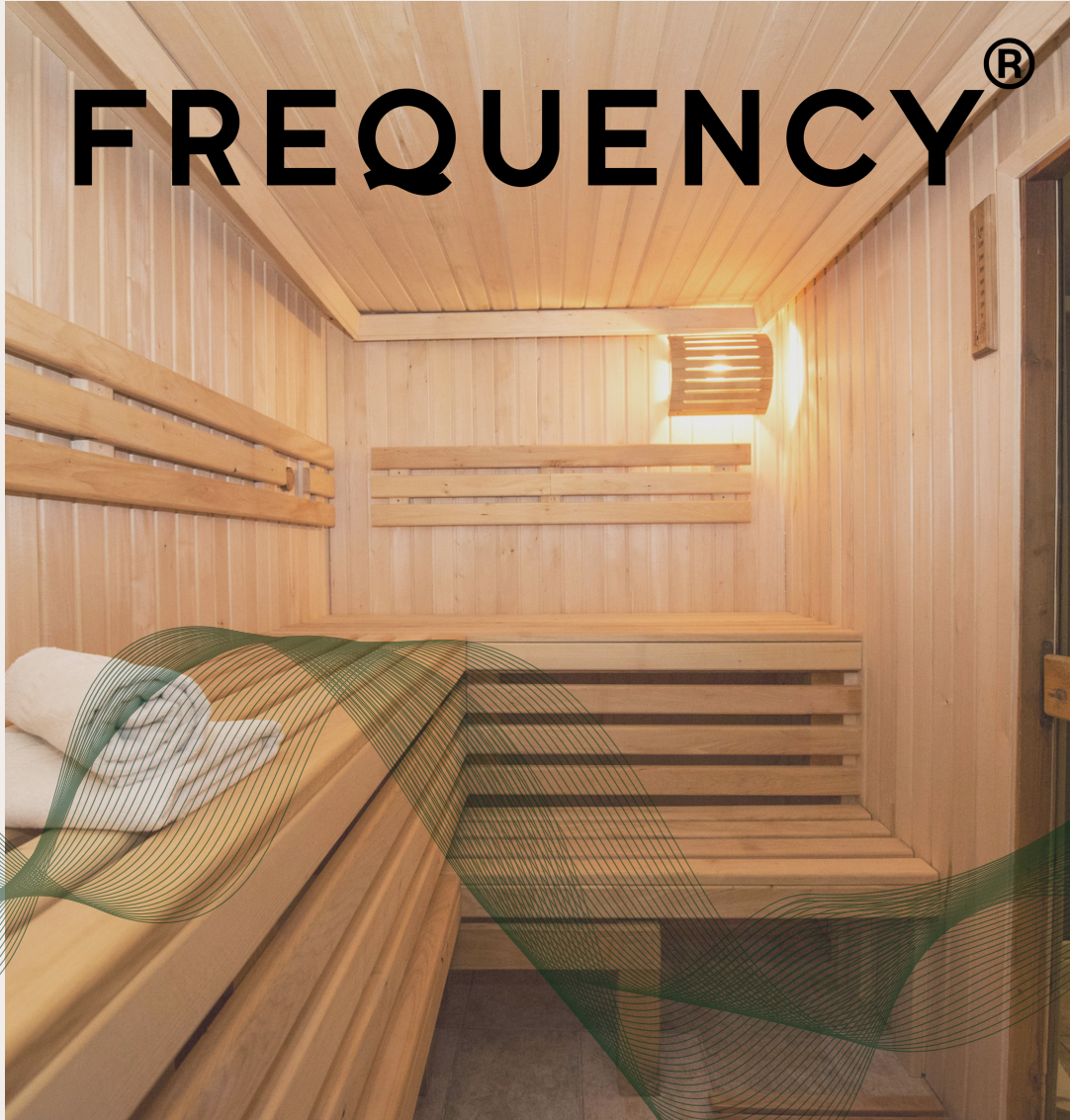

FREQUENCY[®]



Deep Dive:
Sauna



Academic Insights

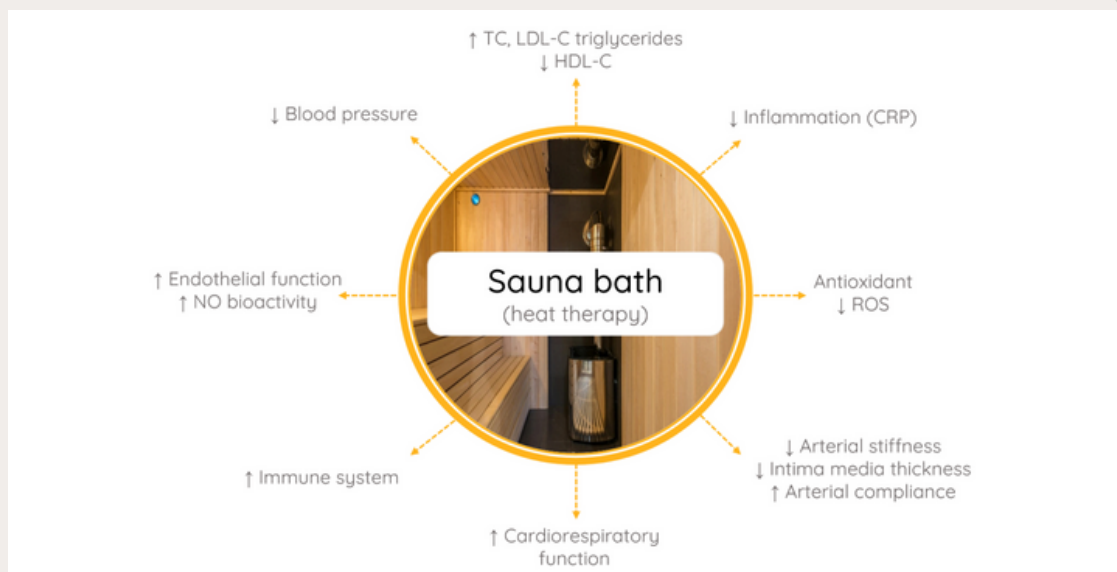
Sauna bathing, prevalent for millenia in Scandinavian culture and around the world in the form of various hyperthermic (high heat) analogues, is considered by many to be one of the best single interventions available for health and wellbeing. The benefits of sauna bathing are wide ranging, from improved cardiovascular health and cognitive longevity to reduced respiratory diseases and inflammation.

These health impacts are believed to be a product of hormesis, an adaptive response of the cells to intermittent and moderate bouts of stress. By temporarily raising body temperature to a stressful point, the body enters a state of [hormesis](#) and begins a series of protocols to ensure that the body will be better prepared to respond to similar stressors in the future. Since modern luxuries remove many of the natural triggers of hormesis that people saw in the past (hunger, physical fatigue, threat of predators), it's thought that people have lower stress thresholds than ever before. For this reason, integrating healthy stressors into one's daily routine is more important than ever, as these stressors trigger the hormetic response that keeps stress levels balanced and various aspects of the body in peak condition.

Studies have shown significant benefits of sauna bathing 4+ times per week, even compared to populations that consistently sauna once a week. 2 It is for this reason that Frequency considers sauna to be a high-priority amenity in the spaces people frequent: ease of access is a key factor to ensure regularity of use, unlocking a host of benefits across the spectrum of wellbeing.



Findings and Impact by Badge



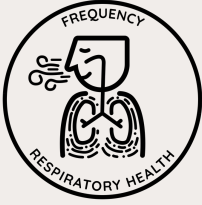
Cardiovascular

- Sauna therapy is effective for people with hypertension, congestive heart failure, and post-myocardial infarction care. It may also reduce blood pressure and enhance blood flow and cardiac functioning ¹
- Sauna bathing linked to reduced risk of vascular diseases like high blood pressure, cardiovascular disease, and neurocognitive diseases ²
- 4-7 saunas per week compared to 1/wk associated with 62% reduced risk of incident stroke ²



Cognitive

- 66% and 65% reduced risk of dementia and Alzheimer disease, respectively, for cohorts sauna bathing 4-7 times per week compared to those sauna bathing once per week. ²
- 78% reduced risk of developing psychosis for men who sauna 4-7/wk compared to those who sauna once per week. ²



Respiratory

- Evidence suggests that sauna bathing improves lung function by improving vital capacity and volume, ventilation, and forced expiratory volume.²
- Moderate to high frequency sauna associated with reduced risk of respiratory diseases (defined as chronic obstructive pulmonary disease, asthma, or pneumonia).²



Resilience

- Studies have demonstrated that during the cooling down period after a sauna session, heart rate variability (HRV) increased. This shows that sauna bathing improves the body's ability to switch from the activation of the sympathetic system (fight or flight) to the parasympathetic system (rest and digest), improving overall resilience after periods of physical stress.²
- Halved incidents of common cold for sauna users vs non-sauna users.²
- There is stimulation of the sympathetic nervous system due to the high temperature, which increases the production of norepinephrine. This response is reported to mimic that of high-intensity exercise.²



Emotional Sustainability

- Regular Finnish sauna baths are associated with a decrease in circulating levels of inflammatory markers such as high-sensitivity C-reactive protein, fibrinogen, and leukocytes at baseline and long-term follow-up.²



Circadian

- 83% of respondents to the "Global Sauna Survey" reported sleep benefits after sauna use.³

Testimonies of Trusted Voices

Many of the most popular and credible wellness personalities have recommended using sauna as a holistic health tool. Andrew Huberman, Stanford neuroscientist and host of the Huberman Lab podcast, published an article where he discusses the effects of sauna on mood, stress response and growth hormones:

"The body responds to heat with a release of dynorphins and endorphins in the brain; dynorphins at first cause discomfort and agitation but biochemically set the stage for endorphins to have enhanced effects on our mood and body. [...] Studies have found that the regular use of sauna can decrease cortisol levels; enhance the activation of DNA repair/longevity pathways; and increase the activation of unique heat-dependent molecular mechanisms."



Dr. Rhonda Patrick, PhD in biomedical science, wrote an analysis on sauna bathing and its efficacy at improving cognition, cardiovascular and mental health, metabolic function and fitness performance:

"Frequent sauna users were found to be 37 percent less likely to die from all causes of premature death, regardless of age, activity levels, and lifestyle factors. [...] Findings from a large observational study of middle-aged men living in Finland demonstrated that men who used the sauna four to seven times per week had a 65 percent reduced risk of developing Alzheimer's disease. [...] One 30-minute sauna session twice a week for three weeks post-workout increased the time that it took for the study participants to run until exhaustion by 32 percent compared to their baseline."



Peter Attia, MD, interviewed on The Tim Ferriss Show, discussed the advancement of studies around saunas, and how the evidence supports the claims of longevity benefits:

"The burden of evidence in the non-randomized data is so strong it's becoming hard to ignore. [The data shows] a benefit in all-cause mortality, a relative risk reduction of 40 percent, and an absolute risk reduction of 18 percent."



Standing Questions

Standard vs. Infrared Saunas

Traditional dry saunas are wood paneled rooms equipped with benches above the floor level and rocks atop a heater (electric or wood fire). The room temperature fluctuates from 158°F to 212°F, and the humidity, controlled by throwing water at the heated rocks, starts at 15% and can reach up to 30% relative humidity at these temperatures.⁴

Far infrared saunas (FIRS) heat at ~140°F, utilizing 120-V infrared elements that radiate with a wavelength between 3-100 μm (micrometers), often falling around 10 μm. These wavelengths are optimal to penetrate deep into the body's tissues, producing heat inside of the body without needing to furiously heat the air within the sauna.⁵

Some users prefer FIRS, as it radiates heat directly into the body instead of through convection like traditional saunas. This results in a surrounding environment that some find more comfortable and less overwhelming.⁵ However, many traditionalists don't consider FIRS to be a sauna, opting to call it "infrared therapy".⁶

Frequency believes this distinction between "infrared therapy" and "sauna", as far as health and wellbeing is concerned, comes down to the wavelength of infrared waves being used. If the infrared sauna is using far infrared rays, or a combination of both near and far infrared rays, the heaters are perfectly capable of elevating body heat enough to cause the temporary stress that triggers many of the positive responses sought in sauna. However, if the infrared sauna is using purely near infrared rays, these heaters will not produce a significant increase in body temperature. Instead, these near infrared saunas ought to be separated from the traditional sauna tradition, as the technology and impact is much more similar to that used in [red light therapy](#).

Optimal methodology

Traditional Finnish sauna users typically take one to three sauna sessions per day of sauna, each lasting 10-20 minutes, with cooling sessions in between (swimming, showering or refreshing at room temperature). It is recommended to sauna bathe a minimum of 1 to 3 times a week, with peak health benefits found when bathing between 4-7 times per week.²

Far-infrared saunas are safe to use daily, with optimal results stemming from use at least 3 times a week. Optimal infrared sessions last a bit longer, with 25 - 45 minute sessions recommended to achieve the same rise in body temperature as a 20 minute session in a traditional Finnish sauna. While there is not as much tradition around infrared saunas, it's reasonable to believe that the use of cooling sessions between/after infrared sauna sessions is similarly beneficial as those practiced in the Finnish tradition. Besides the difference in session length (25-45 minutes in a FIRS), the two approaches produce similar changes in body temperature and ought to be thought of as different sects of the same practice and tradition.

Sauna Buyers Guide

Key Points

Far Infrared Sauna	Traditional Sauna
<ul style="list-style-type: none">• 120° – 165° (Fahrenheit)• No preheat required• Heats the body directly• Temperature control only• Ventilation not required• Typically uses a standard electrical outlet• Longer sessions (30-45 mins) are recommended	<ul style="list-style-type: none">• 150° – 195° (Fahrenheit)• 30 – 40-minute preheat time• Heats the air to heat the body• Temperature and humidity control• Ventilation required• Typically requires a dedicated 220V circuit• 15-20-minute sessions

Differentiators

A number of factors ought to be considered depending on the context of your situation, including size, type of heater, aesthetic preference, and upkeep/maintenance. Besides obvious questions of getting a sauna that fits in your space, uses safe materials, and holds the proper number of people, there are some less rigid considerations at play: aesthetic quality, premium technology, and balancing user experience with asset management.

For example, a sauna being installed at a development marketing to a wellness-driven audience would be more likely to consider a traditional finnish sauna, as the natural and traditional elements of the practice are likely to be appreciated.

In another scenario, an infrared sauna may be preferred, as its approachability may be more appreciated than the Finnish sauna's authenticity to an audience that isn't predominantly wellness-focused.

Here are a few heuristic questions that may help with this process:

- Are users more concerned with authenticity (Finnish) or pragmatism (infrared)?
- Are users seeking intensity and catharsis (Finnish) or slow and subtle (infrared)?
- Are users expecting or escaping from gadgets and technology?
- Are users better suited for modern or natural aesthetics?
- Is this space better suited for modern or natural aesthetics?

Overall, tailoring the type of sauna, aesthetic, and amenity profile to the characteristics of the sauna's occupants will produce the best experience for all. Once those variables are decided, the option pool is narrowed greatly and comes down to simpler questions: size and price.

Size

Population	Dimensions	Square footage
1 person	3' x 4' 3' x 5'	12 - 15
2 - 4 people	4' x 4' 4' x 6' 5' x 6' 5' x 7' 6' x 6'	16 - 36
5 - 7 people	6' x 8' 8' x 8'	48 - 64
8 - 10 people	8' x 10' 8' x 12' 10' x 10' 10' x 12'	80 - 96

Intelligence

Sauna automation is one area where companies seek to innovate. Custom lightning, remote scheduling, humidity and temperature control, CO2 and movement sensors, and multimedia players are some of the high-tech options that can make the sauna more comfortable and accessible.

Aesthetic

As the sauna market grows, different aesthetic choices from the traditional Finnish sauna continue to surface. Modern installations that rely heavily on materials like metal, glass, and concrete are becoming popular choices for owners that prefer a more sleek and streamlined style. However, Scandinavian style saunas and their nature-inspired designs, are more biophilic and [can have a greater impact on our well being and overall health](#) as a result Wood is an excellent material for saunas as it contains antimicrobial properties, is heat-resistant, and positively impacts cognitive and emotional wellbeing 11 , making wood more comfortable and safe in a warm, wet, and likely artificial environment.



Pricing

Commercial/Prefabricated saunas can cost anywhere between \$2,500 and \$15,000 depending on size, model, and preference for indoor or outdoor use. Custom sauna pricing can range from \$4,300 to \$34,000. These options allow for more personalization to a space, often accompanied by a more complex and specific installation process. Personal saunas, more focused on portability and frugality can be found from \$250 to \$600.

Installation

Installing a sauna can look a little different depending on the type of sauna you purchase. Custom saunas often include installation as a part of the purchase, while prefabricated saunas are often installed by the owner or a certified professional for an additional fee.

To install a sauna yourself, the process depends largely on the type of sauna and the space it will occupy. Traditional outdoor saunas are built to resist rain, snow and most other natural elements, usually using electric or traditional wood burning heaters. When constructing outdoor saunas, the greatest priorities are ensuring proper ventilation and a tight seal between parts so the heater can work efficiently and heat the unit as-desired. For indoor traditional saunas, mapping out electrical requirements and the placement of wiring is key. Most vendors have varied options to fit your needs, as long as you look ahead and order with this in mind. Infrared saunas are typically built indoors, with similar considerations of wiring and snug-fitting materials.

Pre-cut saunas include installation manuals to guide the user, and depending on size and amount of people working, installation can take anywhere from a couple hours to a couple days. All types of saunas should be installed on a level, dry surface. If applicable, place the sauna near complimentary amenities like a locker room, communal shower, cold plunge, or other wellness amenities.

Strategies for Upkeep

Showering and cleaning one's feet before use minimizes the presence of stains and grime inside the sauna. If water is used to create steam, it must be free of any chemicals and it cannot be hard water, as this can create mineral buildup that can be difficult to clean. For saunas with moist elements, it's recommended to use purified or distilled water and to clarify the provider's recommended practices for cleaning the heater of condensed water solids to avoid costly repairs. Using a sealant or protectant on the surface of the sauna is not recommended, as toxic chemicals can seep out during the heating process, creating potentially harmful gas. After completing a sauna session, it's best to leave the sauna door open to cool off the sauna and avoid mold growth. See Cleaning below for more tips on sauna upkeep.

Ownership Guide

Cleaning

After a day of use, clean the sauna with a damp towel or cloth and leave the door open so the sauna can cool and dry. The frequency of deep cleaning depends on the sauna's frequency of use, with a general recommendation of at least once per week. A water and vinegar solution can be used to gently disinfect the area. When in community environments, it's best to have cleaning or building staff build these cleaning tasks into their routine, with wipe-downs and deep cleans performed at the frequencies described above. Saunas should never be cleaned with harsh chemicals, since they can damage the wood and give off fumes, especially in the sauna's high heat. If needed, fine-grit sandpaper can rub off stubborn stains. Pressure washing may be necessary to deep clean the inside on occasion, using a low pressure and a wide pattern nozzle.

Rules & Regulations

Signage

A key safety measure on saunas is clear signage with safety rules and recommendations for users. Usually, sauna manufacturers include general rules and guidelines for who should use the sauna and for how long. This information can be posted inside and outside the sauna, but more clear and cut rules can be added. This can be:

- Children are not allowed in the sauna.
- Users with any infectious disease may not use the sauna.
- Always take a shower before entering the sauna.
- Do not use the sauna under the influence of alcohol or drugs.
- It is recommended that all occupants consult their physician before using the sauna.
- Sauna is to be occupied by a certain number of people, maintaining a certain distance.

Liability

In commercial saunas, regulations depend on one's jurisdiction. Most legal codes, at a minimum, require signage stating the rules of sauna use and recommendations for safety. Some combination of staff supervision or signed waivers may be required or recommended as well, depending on the jurisdiction and context around the sauna. Some regulations may mandate record keeping of all users of the sauna.

Notable Vendors and Products

Product	Heater Type	Materials	Size	Installation	Price
<u>Sun Home Equinox Sauna</u>	Infrared	Eco-certified eucalyptus wood	Fits 2 people. 77.7 x 45.9 x 50.9 in	Easy assembly, no power tools required. Plugs into a 120v / 20 amp dedicated circuit and outlet	Around \$6,399
<u>Almost Heaven Huntington Barrel Sauna</u>	Traditional, Electrical Heater	Cedar wood	Fits 4 - 6 people. 72 x 95 x 75.4 in	Requires 3 to 6 hours, needs 220-volt 40-amp electrical supply	From \$11,246 to \$14,842
<u>Saunaones Barrel Sauna Serenity Nature Air 4</u>	Traditional, Electric Heater or Wood Burning Stove	Hemlock or Red Cedar. Steel rings and asphalt shingles for insulation	Multiple sizes: 2 - 4 people, 4 - 6, 6 - 8, 8 - 10. From 70.8 x 59.0 x 70.8 to 82.6 x 94.4 x 82.6 in	Includes installation manual, but professional assistance service is offered. Plugs into 4.5KW(220V) or 6.0KW(220V) outlets	From \$4,499 to \$7,399
<u>SweatTent Outdoor Sauna</u>	Portable, Wood Burning stove	PVC frame, padded polyester tent	Fits 2 - 3 people	3 minute setup	\$1,499
<u>Dynamic Saunas Avila Ultra Low EMF FAR Infrared Sauna</u>	Infrared	Hemlock	Fits 1 - 2 people. 39" x 36" x 73"	Easy assembly. Plugs into standard 120V/15 amp outlets.	\$1,898.98
<u>Sun Home Luminar™ Outdoor Full-Spectrum Infrared Sauna</u>	Infrared	Carbonized Red Cedar wood, double pane glass	5 people. 82 x 51.5 x 52.5 in	Multiple hours to install, video guide provided. Requires 240V / 30 amp outlets	\$9,099
<u>Sunlighten Amplify III</u>	Infrared	Eucalyptus or Basswood	Up to 3 people. 62.3 x 45.9 x 77.7 in	Easy assembly. Dedicated 120V 20A circuit and outlet required	Contact Sunlighten for pricing
<u>Golden Designs Reserve Full Spectrum with Himalayan Salt Bar</u>	Infrared	Canadian Hemlock	3 people. 62 x 41 x 75 in	Clasp together assembly. Requires 120V/20 amp outlet	\$5,895

Product	Heater Type	Materials	Size	Installation	Price
<u>JNH Lifestyles Joyous 2 Person Far Infrared Sauna</u>	Infrared	Canadian Hemlock, Tempered glass	2 people. 47.3 x 39.5 x 75 in	Easy modular assembly. 110V ~ 120V / 15 Amps	\$1,999
<u>Health Mate Essential Comfort Dome Sauna</u>	Infrared	Memory foam, other fabrics	1 person. Adjustable up to 69 x 28 x 18 in	Portable, pop-up assembly. 110V/120V/220V/230V	Contact Health Mate for pricing.
<u>Clearlight Sanctuary Retreat</u>	Infrared	Mahogany or Basswood	4 people. 71 x 61 x 81 in	Easy installation.	Contact Clearlight for pricing.
<u>Finlandia Precut Sauna Packages (FPC)</u>	Traditional, Wood burning	Red cedar, Glass	Made to order	Up to 9 hours, may require professional assistance	Contact Finlandia Sauna for pricing.
<u>Finnleo Indoor Sauna Rooms</u>	Traditional, Electric Heater	Nordic White Spruce	Custom cut	Depending on size, may require professional assistance	Contact Finnleo for pricing.
<u>Nativa Modern Indoor Sauna by Auroom</u>	Traditional, Electric Heater	Aspen or Alder	Fits up to 5 people. 79 x 99 in	Up to six hours.	From \$2,498 to \$19,522
<u>Kivi 4 Person Traditional Finnish Home Sauna</u>	Traditional, Electric Heater	Canadian hemlock wood, Tempered glass	Fits up to 4 people. 76.7 x 66.9 x 81.9 in	Need 4 people to assemble, requires a certified electrician	\$6,199

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