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# Effects of sauna bath on heart failure: A systematic review and meta-analysis

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# Background

Laukkanen et al. 2015: Higher frequency of sauna bath – lower cardiovascular and all-cause mortality

What is the mechanism behind this?

A systematic review of the literature – possible answers?

Effects on individuals with heart disease – can it explain the results?



# Heart failure

- “Heart failure is a chronic, progressive condition in which the heart muscle is unable to pump enough blood through to meet the body's needs for blood and oxygen. Basically, the heart can't keep up with its workload. ” *American Heart Association*
- End-point of several heart diseases
- The prevalence is increasing

# Sauna bath - physiology

- Heart rate increases
- Dilation of peripheral blood vessels
- Hyperthermia – body temperature rises
- Sweating – loss of fluid and heat

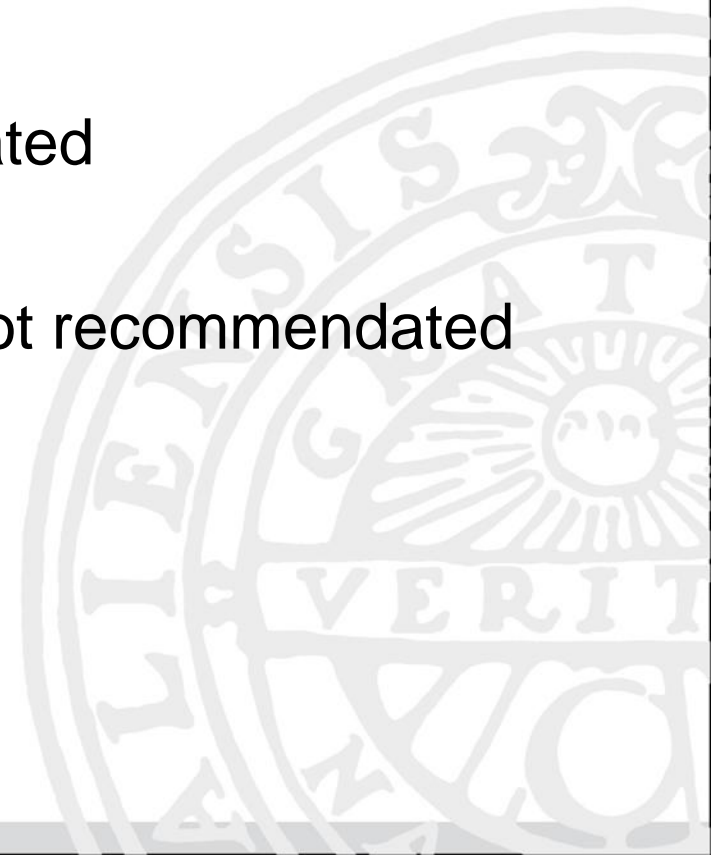
Effects similar to exercise



Picture: <https://www.polar.com/>

# Can or should individuals with heart failure bath sauna?

- Radtke et al 2015: Sauna bath is safe for heart failure patients
- Earlier literature: Not recommended
- Clinical practice: Varies, usually not recommended





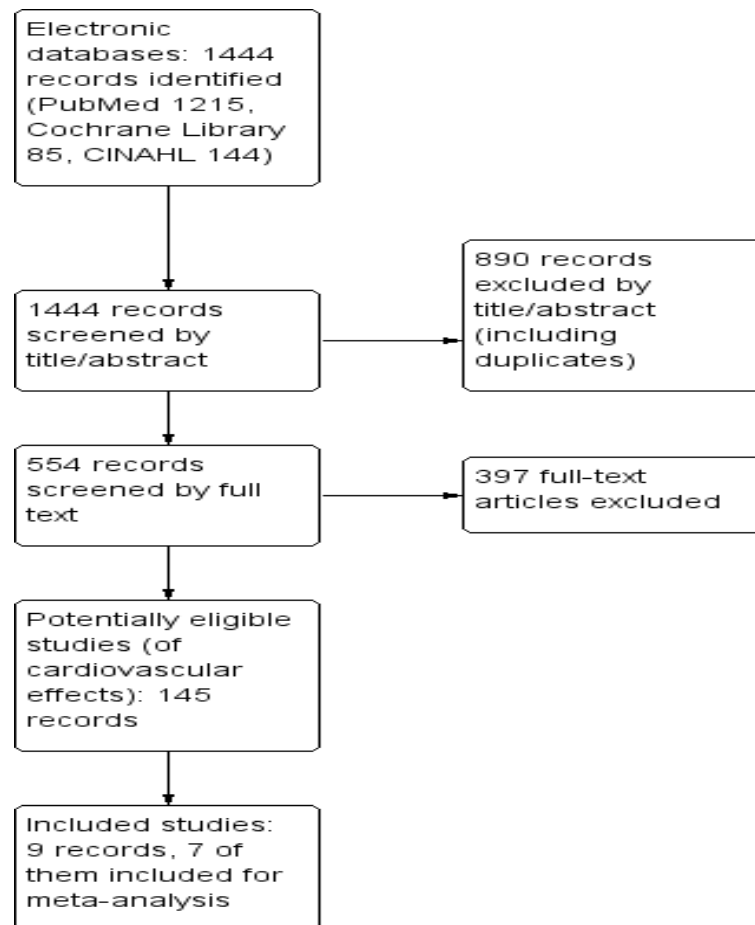
# Inclusion criteria

- Population: Men and women, over 16 years of age
- Intervention: Sauna bath: humid, infrared and dry
- Control: Control group without sauna bath
- Outcomes: Blood pressure, cardiac size and function, biomarkers, endothelial function, tolerance/safety, mortality



# Search

- Search in 3 databases: PubMed, Cochrane library, CINAHL
- 1444 studies identified
- 554 of those about health effects of sauna bath
- 144 cardiovascular effects
- 9 met the inclusion criteria, 7 in the meta analysis





# What we found

- 491 patients in the meta-analysis
- Japanese patients with heart failure
- Infrared sauna bath in 60 degrees Celsius
- Sauna schedule: 15 minutes of sauna, with a rest of 30 minutes in a warm room, at least 5 times a week for 2-4 weeks
- 3 outcomes showed statistically significant results

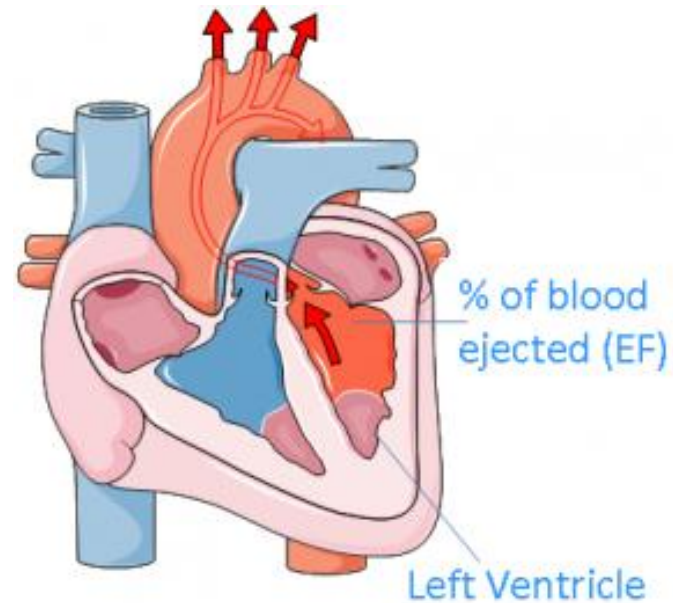


# Left ventricle ejection fraction (EF)

CI95%: 0.55 to 2.35  
increase

What does it mean?

EF is a prognostic marker  
for heart failure patients  
Increased EF – decreased  
mortality

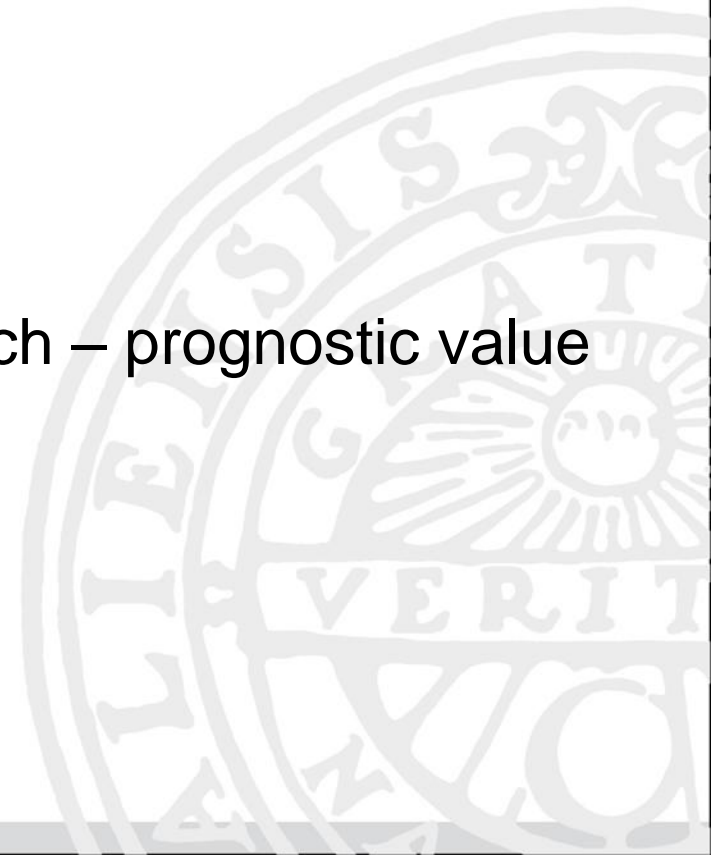


# B-type natriuretic peptide

CI95%: -198.09 to -51.14 decrease

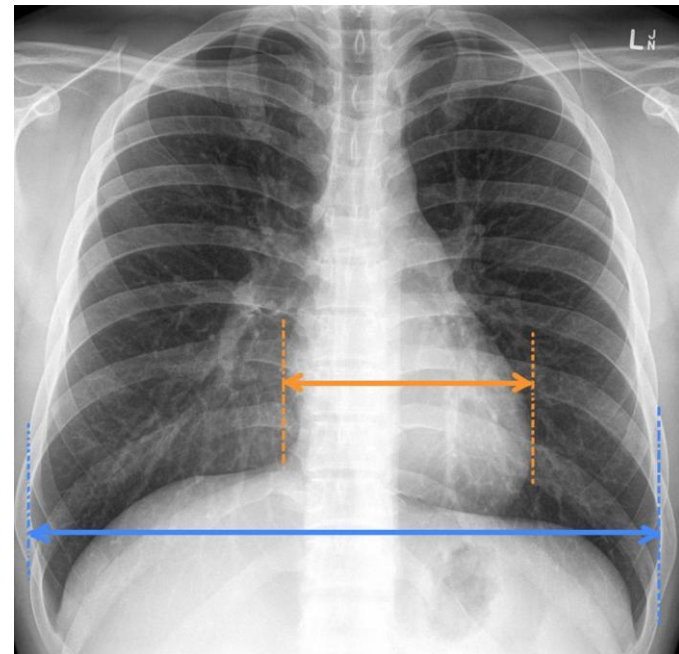
What does it mean?

A marker of cardiac muscle cell stretch – prognostic value



# Cardiothoracic ratio (x-ray)

- CI95% -2.54 to -1.09 decrease
- Heart size decreases
- CTR is a prognostic measure, for healthy and diseased individuals
- Effects of a decreased CTR on patients with heart failure are not well studied





# Conclusions

- A significant result in 3 outcomes in the meta-analysis – promising as the follow up was short
- No major adverse effects were reported
- More studies with a longer follow-up are needed

# Similar effects in a Finnish sauna?

- Infrared sauna:  
Penetrates deeper, has an even temperature and heat distribution
- Finnish sauna: Higher temperature higher up in the room, lower temperature at floor level

More studies are needed with a Finnish sauna setting

