An Algorithm to Estimate Body Temperature
→ **Cardiovascular** (Increased HR and BP, Decreased SV, Increased Arterial Stiffness)
→ **Hematological** (Decreased Plasma Volume, Hemoconcentration, Procoagulatory)
→ **Thermoregulatory** (Elevated Core Temperature, Dehydration)
→ **Respiratory** (Increased Breathing Rate and Oxygen Consumption)
→ **Metabolic** (High Oxygen Cost, Increased Lactate, Fatigue)
→ **Immune/Endocrine** (Increased Leukocytes and Hormones)
→ **Nervous** (Sympathetic Surge and Increased Adrenaline)
→ **Muscular** (Increased Oxygen Use and Heat Production)

Firefighting Affects all Systems of the Body
“Probably the greatest stress ever imposed on the human cardiovascular system is the combination of exercise and hyperthermia. Together these stresses can present life-threatening challenges, especially in highly motivated athletes who drive themselves to extremes in hot environments.”

Common Aspects of Firefighting Work

A. Ambient Temperature

B. Heat Stress

1. Heat Illnesses
2. Increase CV Strain
3. Impaired Cognitive Function
4. Early Onset of Fatigue

C. Physiological Consequences

- Heat Stroke
- Multisystem Failure
- Rhabdomyolysis

D. Life-Threatening Consequences

- Risk of SCE
- ↓ Situational Awareness
- ↑ Risk of Injury
- Slower Work;
- Rapid Fire Growth;
- ↑ Risk of Slips, Trips, & Falls
Heart Rate and Core Temperature Recovery

Horn et al., Prehospital Emergency Care, 2011
Common Core Temperatures

House Burn Core Temps – Subj #1

House Burn Core Temp – Subj#14