



WMO  
Commission for Climatology  
OPAG 3 ET 3.7



**ARSO VREME**

Kdaj so vročinski valovi postali  
javnozdravstveni problem?

Tanja Cegnar

# Zgodovina

- Že v antiki so se višji sloji umikali iz mest v letne rezidence in se tako izognili obremenilni vročini in poslabšanim higienskimi razmeram v mestih
- V zadnjem desetletju prejšnjega tisočletja so na področju HHWWS vodile ZDA (EPA in Larry Kalkstein, University of Delaware)
- ICB 1996 v Ljubljani – odločilen premik pri vključevanju WMO v HHWWS
- Sodelovanje WHO in WMO: testni projekti in ekspertna skupina v okviru CCI

# Vročinski val

- Vpliv na vsa živa bitja: ljudi, živali, rastline
- Vpliv na infrastrukturo in materiale
- Vpliv na vodni krog, energetiko, promet, zdravstvo, kmetijstvo, varnost, neživo naravo, kakovost hrane in vode, prenos bolezni....
- Definicija - odvisna od namena in podnebnih razmer
- Razumeti vpliv in posledice
- Izpostavljenost, odpornost in sposobnost prilagajanja
- Ukrepanje, opozarjanje – učinkovitost
- Vpliv na umrljivost, obolevnost, storilnost, napake, odzivnost, tolerantnost in vzdržljivost

# Nedvomna povezava s podnebnimi spremembami

## SCIENCE CONNECTIONS → EXTREME WEATHER & CLIMATE CHANGE

→ Strongest Scientific Evidence Shows Human-Caused Climate Change Is Increasing Heat Waves and Coastal Flooding



# Staranje prebivalstva povečuje ranljivost prebivalstva

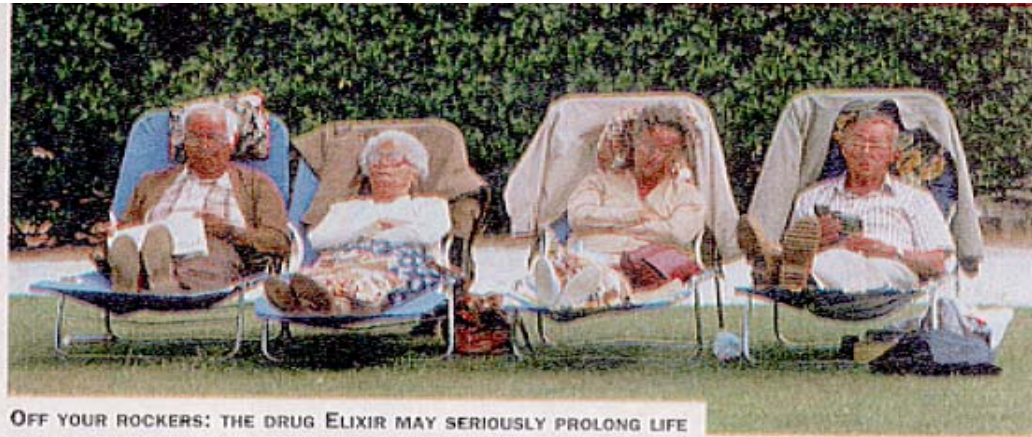
## Forever young

**18.7.15** SCIENCE HAS found a way to turn back the clock with a drug that significantly delays the ageing process. Elixir works by targeting what are known as “advanced glycolisation end-products”, or Age.

Glycolisation has been described by scientists as a slow-motion form of cooking. It is the process that makes the skin lose its elasticity, arteries harden and the lens of the eye form cataracts – in short, all the horrible slowing down and stiffening up that comes with ageing.

“One of the reasons we all begin to freeze up as we get older is what’s called ‘cross-linking’,” says Professor Patrick Wall of the American biotech firm Alteon, which has been researching and developing Elixir for nearly 20 years.

“Proteins begin to bind almost randomly with other proteins. Sugars are involved – hence the ‘glyco’ bit – which is why diabetics, who have trouble with sugar, are especially



OFF YOUR ROCKERS: THE DRUG ELIXIR MAY SERIOUSLY PROLONG LIFE

vulnerable to these debilitating clogging-up processes.”

Elixir is able to break down these links, restoring youthful flexibility.

Just who is going to be eligible for the drug is not yet certain but it seems likely to be those at risk of serious disease.

For those not lucky enough to lay their hands on the new product, advice comes from 80-year-old Dr Michael Perrin of the Optimal Ageing Clinic in Harley Street: “The best way to stay youthful is to eat properly, exercise regularly and have the right combination of hormones and

antioxidants for your particular genes.”

The Elixir web site’s popularity is second only to that of the frequently visited International Space Station.

Millions of people over 40 years old have flooded the site with advance orders for the new drug, which analysts believe will put the company among the world’s top 10. **JB**

# Vročinski valovi imajo raznolike posledice

## Heat wave paralyses the capital

**16.08.08** LONDON TAXIS were used as makeshift ambulances when the capital was overwhelmed by a heat wave.

After temperatures topped 35C for five consecutive days, the emergency services were unable to cope with the unprecedented number of heat-related fatalities and illnesses.

"We don't have accurate figures yet but there have been thousands of casualties," said a London health spokesman.

The bad news from the Meteorological Office is that there is unlikely

to be any relief for at least three or four days.

Most of the casualties are children or elderly people with bronchial or heart problems, but many previously healthy adults have suffered convulsions – and in some cases coma – through heatstroke.

On government advice, most building sites have been closed, and essential

outdoor work has to be carried out in the early hours of the morning.

The heat wave is the latest in a growing list of extreme climatic events. In February, a record storm surge came within a few centimetres of topping the Thames barrier and flooding central London.

Severe flash flooding in the Severn and Wye valleys resulted in what may be the permanent evacuation of parts of the West Midlands.

Many towns and villages along the coasts of Suffolk, Norfolk and Lincolnshire are having to come to terms with the reality of "managed retreat" in the face of rising sea levels.

Paradoxically, there are as many problems from too little water as from too

much. Unless next winter brings heavier than average rainfall to compensate for eight years of summer drought, there will be water shortages and restrictions throughout eastern and southern England.

Environmental campaigners are in no doubt where the blame lies.

"Despite all the fine talk in the final decade of the last millennium," said Sir Terence Moore, the president of Friends of the Future, "we are still not meeting pollution targets. Global warming is here.

"The best thing you can say about the outbreaks of cryptosporidiosis following water contamination in Hereford and Leamington Spa is that at least it wasn't cholera... not yet." **RO**



Vročinski valovi so v preteklosti že večkrat zahtevali smrtne žrtve, le nekaj odmevnih primerov iz preteklosti:

**New York, 1966**

**Chicago, 1995**

**London 1976**

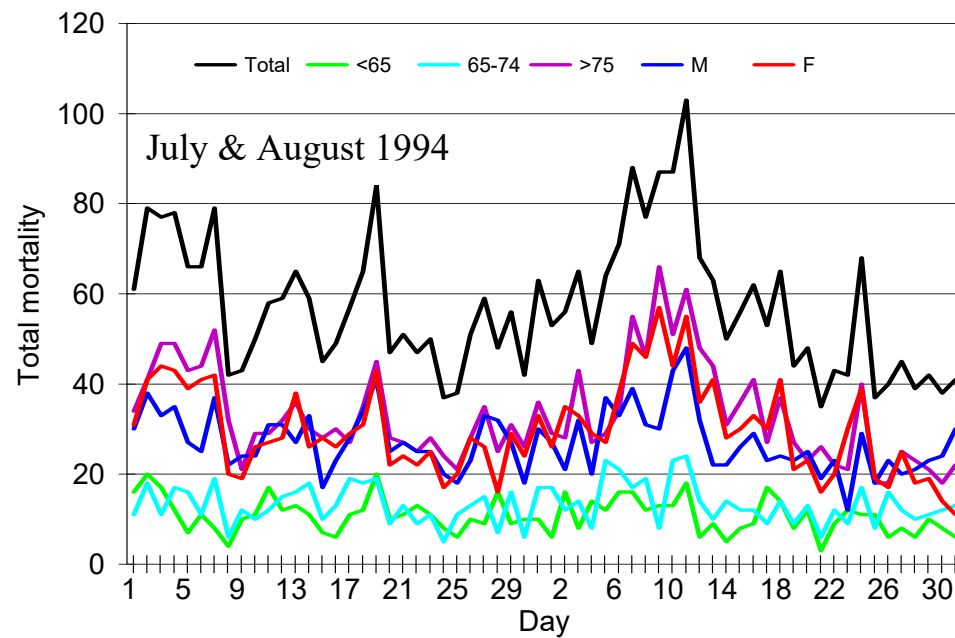
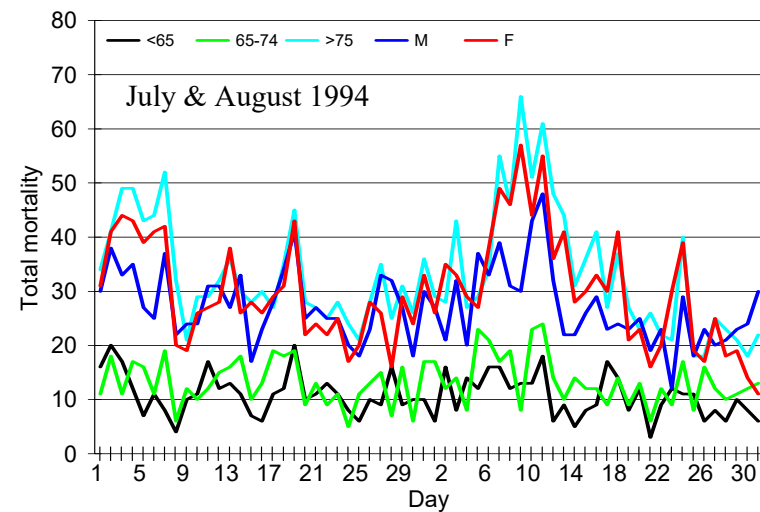
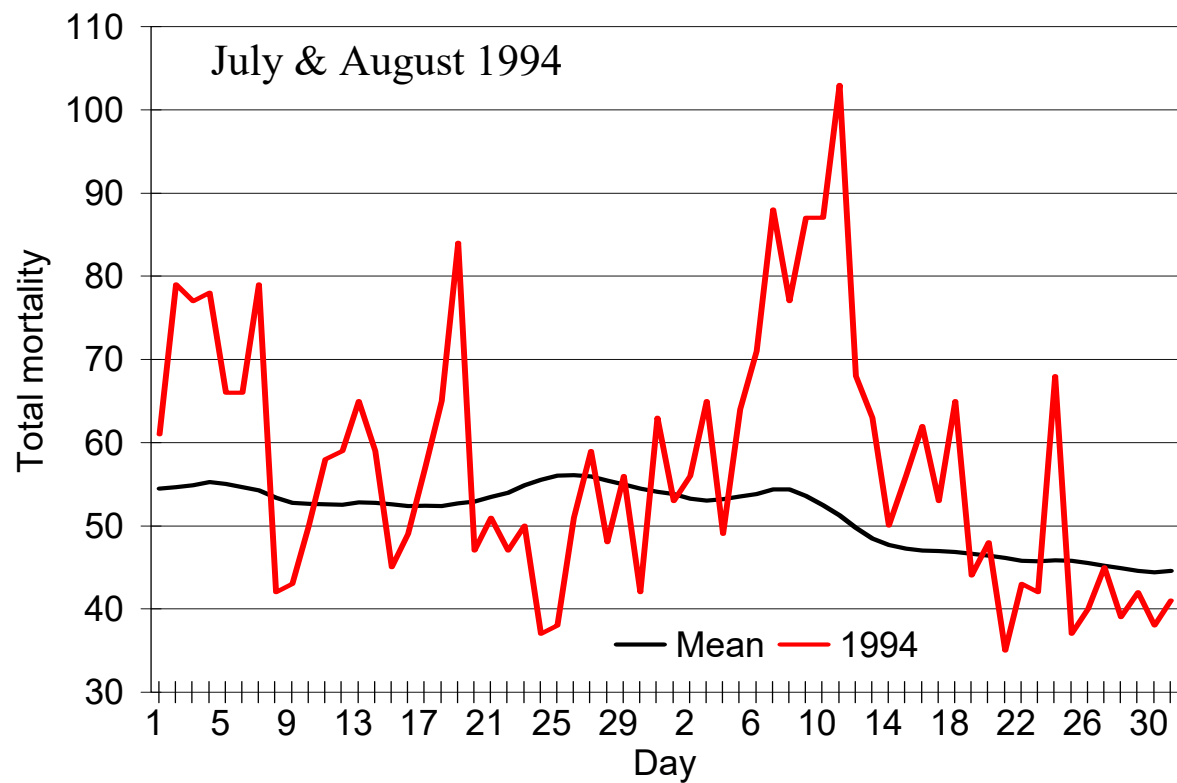
**Rim, 1994**

**London 1995**

**Zahodna Evropa 2003**

**Moskva 2010**

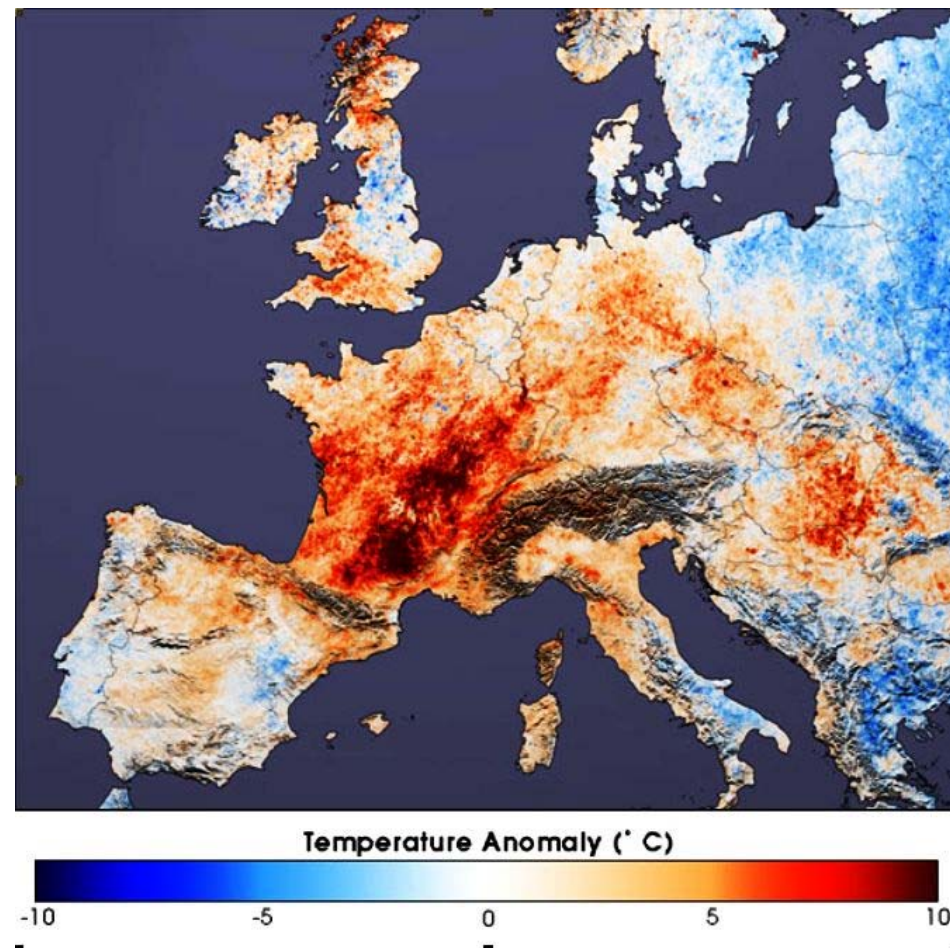
# Analiza dveh izrazitih vročinskih valov v Rimu



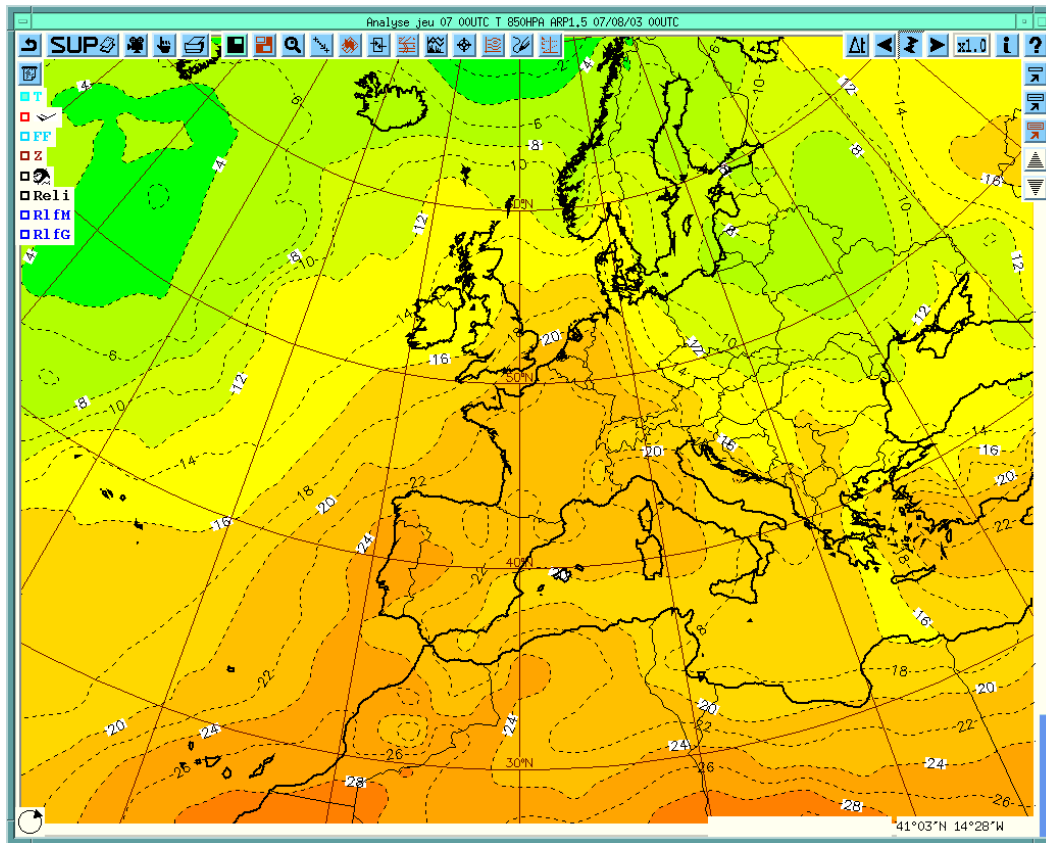


V Evropi postanejo HHWWS  
splošno razširjeni po poletju  
2003

Temperature Anomalies in Europe in  
Summer 2003  
(Source: NASA Earth Observatory)  
*Compared 2001/2003*



August 7, 2003 – Vročinski val je bil dobro napovedan,  
izostali so ukrepi



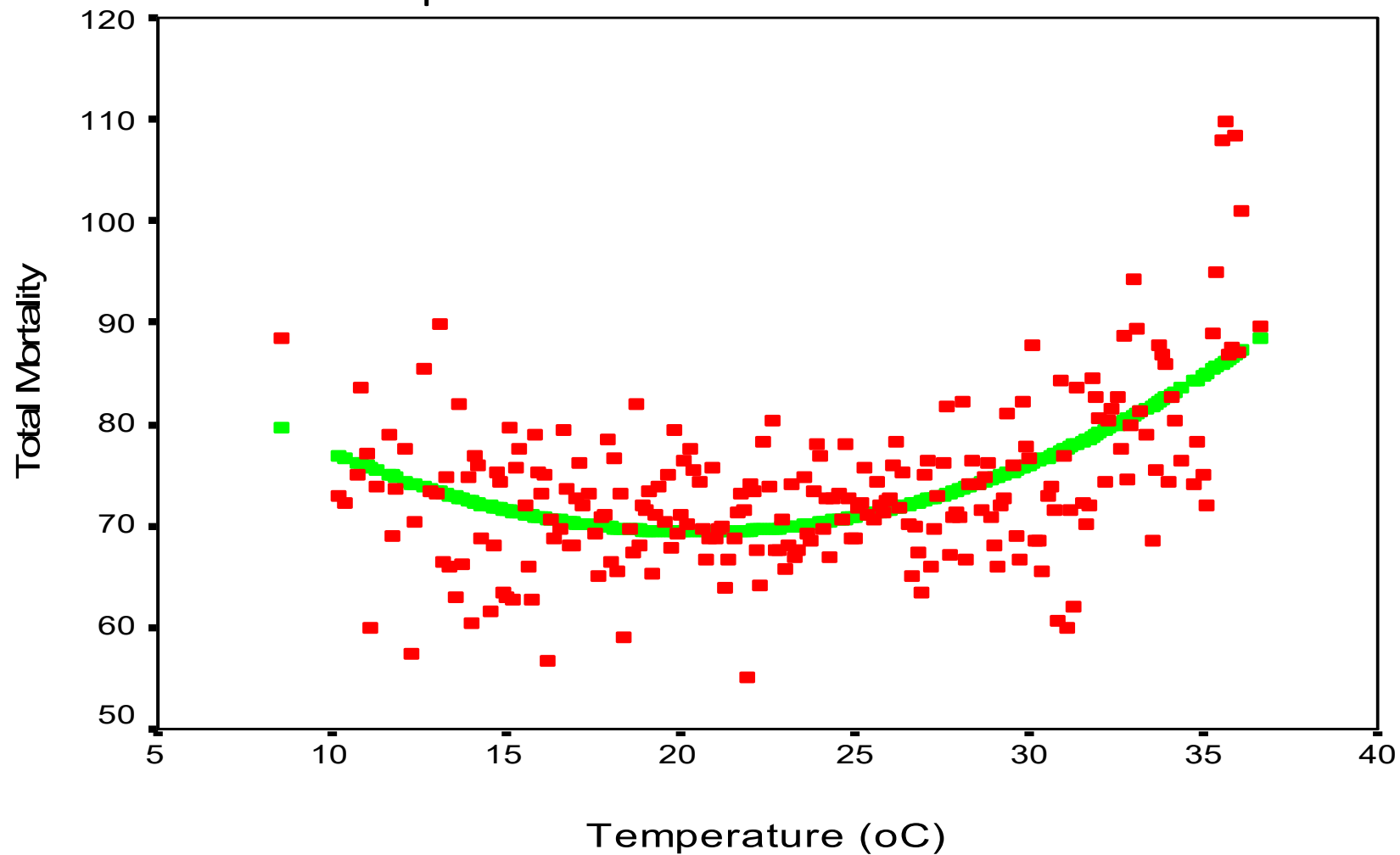
Pierre Bessemoulin

Direction de la Climatologie

**Meeting of experts to develop  
Guidelines on Heat-Health Warning  
Systems**

**Freiburg, 14-16 April, 2004**

# Primer: povezava med temperaturo in smrtnimi primeri v Budimpešti



## Kaj je HHWWS?

- System to predict, in advance, potentially oppressive weather conditions that could negatively affect health
- WWS includes mitigation plans, in the form intervention strategies, that can be implemented in order to reduce the health effects of heat stress
- WWS is therefore of direct benefit to society as it will help people to prepare for “heat waves” and reduce heat-related sickness and death

## Synoptični pristop k HHWWS

- Examines **how** people have responded in the past to different weather conditions
- These responses are usually in the form of number of hospitalisations or deaths
- Responses are “relative” to the local climate
- Examines the weather **holistically**, not by a single measure
- Weather conditions described by weather or air mass types

# Pristopi k obravnavi vpliva vročinskih valov na počutje in zdravje prebivalcev

- Sinoptična klasifikacija, ki najprej opredeli zračne gmote in šele nato za izbrane zračne gmote išče povezave s počutjem in zdravjem
- Preprosti indeksi za opis toplotnih razmer
- Celoviti modeli za ponazoritev toplotne bilance telesa (stacionarni in dinamični, ki upoštevajo tudi prilagajanje na spremembe v toplotnem okolju)

V literaturi najdemo nad 100 različnih indeksov, od preprostih do zelo zapletenih

# Učinki (bistveno: variabilnost, ekstremi):

- Začetni učinki
- Pričakovana prilagoditev
- Preostali neto učinek

odvisno od:

- Izpostavljenosti ekstremnim dogodkom
- Prilagoditvena sposobnost

# Stavbe

- Meščani preživijo večino časa v stavbah
- Toplotna obremenitev je lahko na prostem in/ali v zaprtih prostorih
- Podnebje in ekonomski status sta pomembna dejavnika
- Reprezentativnost podatkov na prostem za razmere v stavbi?
- Pomen arhitekture in urbanizacije – zasnova in zgradba mesta

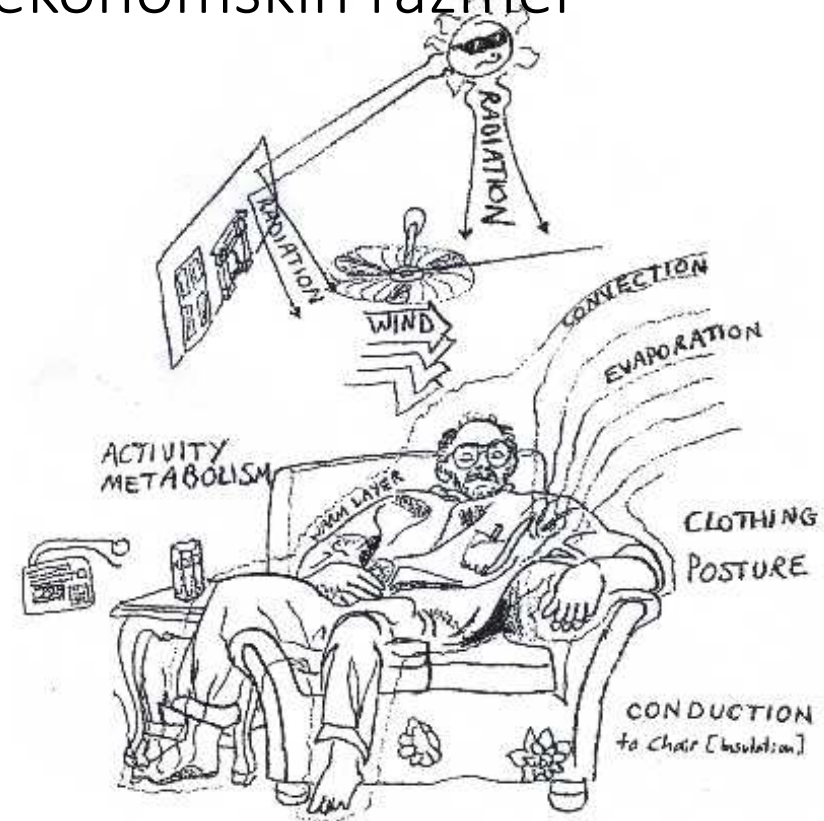


# Stavbe, ljudje in udobje

- Izogibanje obremenitvi v stavbi je del naravnega odziva na okolje
- Pazljivo načrtovanje stavb zmanjša razpon razmer v stavbi in hitrost spreminjanja
- Nočno ohlajanje, pasivno ogrevanje, prezračevanje in toplotna vztrajnost lahko zagotovijo udobje z majhno porabo energije
- Hlajenje energijsko bolj potratno od ogrevanja

“Toplotne razmere, v katerih živimo, niso zgolj rezultat potreb po določenih lastnostih toplotnega okolja, ampak so skupek vplivov družbenih in ekonomskih razmer”

*R Levins & R Lewontin, The Dialectical Biologist*



Picture:  
Sab  
Ventriss

### 3am Temperature Control vs. White Roofed Homes Summer 2001



# Extremni dogodki

- takojšen odziv



- izobraževanje



- preventiva



# Vročinski valovi in drugi dejavniki

- Onesnaženost zraka – ozon, delci (požari)
- Nevrotropni učinek vremena
- Psihofizična kondicija, zdravstveno stanje
- Aklimatizacija in poznavanje mikropodnebnih značilnosti
- Gmotne/bivalne razmere

## Kaj smo se naučili v Rimu?

- Pomen baze podatkov
- Standardizacija podatkov
- Najtežje je izvesti dobre intervencijske ukrepe
- Napovedljivost
- Reprezentativnost podatkov

