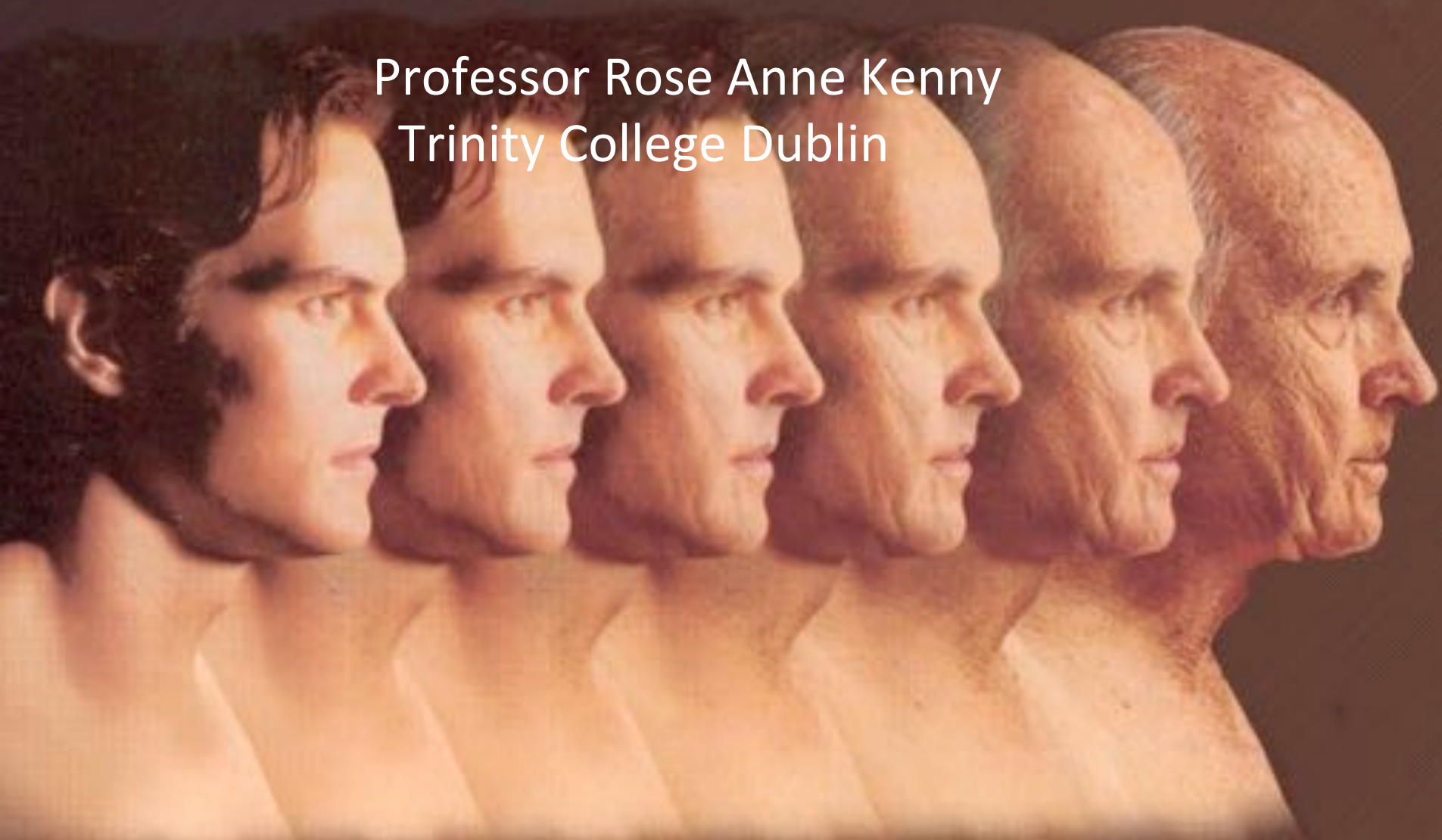
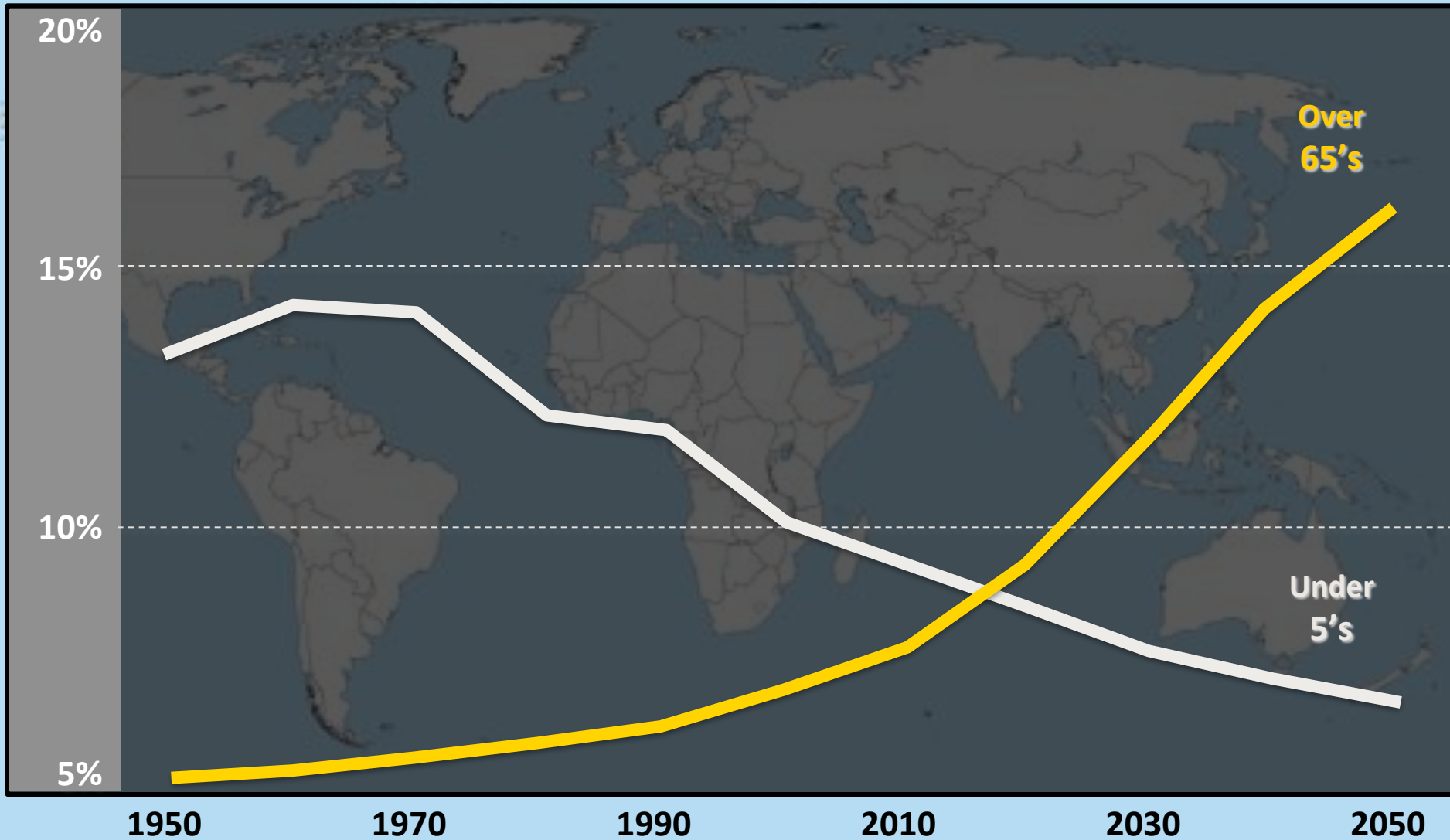


Does Autonomic Orthostatic Hypotension progress with Age

Professor Rose Anne Kenny
Trinity College Dublin



Young children and old people as a percentage of the global population





Definition

Orthostatic Hypotension

Consensus Statement

Clinical Autonomic Research

April 2011, Volume 21, Issue 2, pp 69-72

First online: 24 March 2011

Consensus statement on the definition of orthostatic hypotension, neurally mediated syncope and the postural tachycardia syndrome

Roy Freeman Wouter Weiling, et al

Causes OH in ageing

- decreased *baroreflex sensitivity*
- diminished *heart rate responses*
- impaired α_1 -*adrenergic vasoconstriction*
(splanchnic system)
- decrease *parasympathetic tone*
(less cardioacceleration vagal withdrawal standing)
- prone to *dehydration*
(impaired thirst response)

Causes OH in ageing

- *kidney* loses ability to conserve salt and water
reduction *renin, angiotensin, aldosterone*
elevation in *natriuretic* peptides
(impaired during fluid restriction)
- *heart* stiff and noncompliant,
impaired diastolic filling,
reduced stroke volume
(during decreased venous return orthostasis).

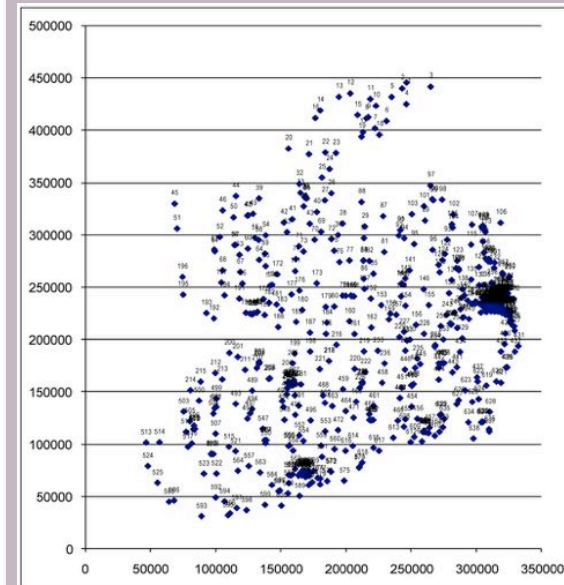
Towards making Ireland the best place in the world to grow old

tilda

Chúdar Fadaimeas na hÉireann um Dhul in Aois

The Irish Longitudinal Study on Ageing

The Irish Longitudinal study of Ageing



*Towards making Ireland the best
place in the world to grow old*

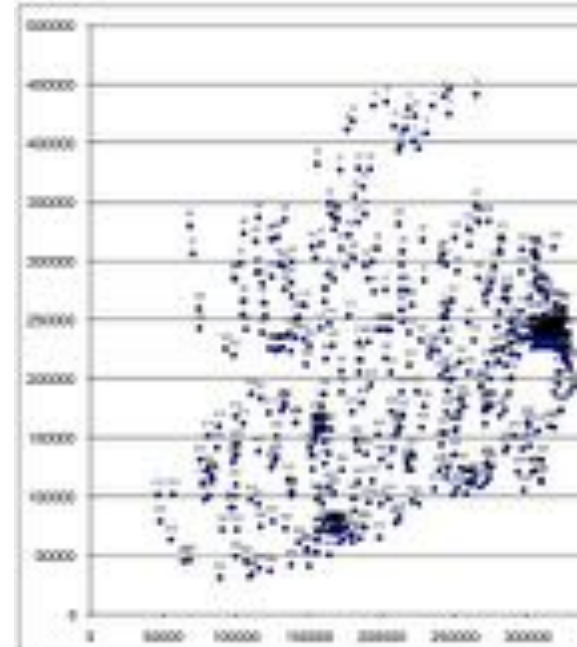
tilda

Deirdre Fódairseachta na
hÉireann um Dhul in Aoi

The Irish Longitudinal
Study on Ageing

8,504
Participants

50+



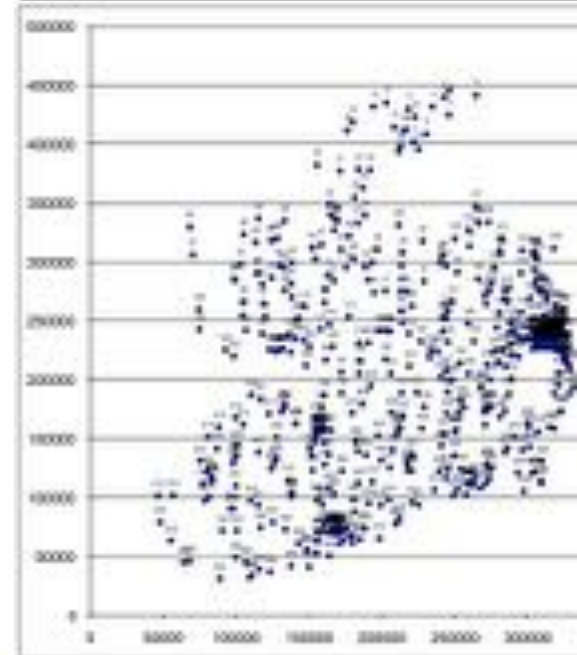
*Towards making Ireland the best
place in the world to grow old*

tilda

Deirdre Fódairseachta na
hÉireann um Dhul in Aois

The Irish Longitudinal
Study on Ageing

**Every 2 years
For 10 years**



2010, 2012, 2014, 2016.....

www.tilda.ie

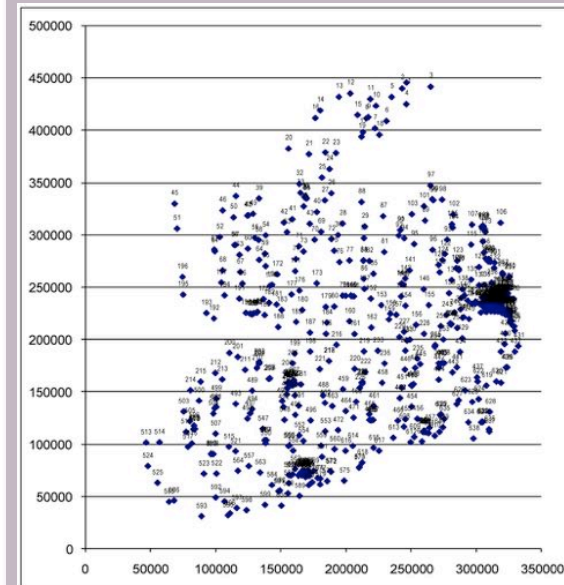
Towards making Ireland the best place in the world to grow old

tilda

Clárúil Fachtóireachta na hÉireann um Dhuil in Aois

The Irish Longitudinal Study on Ageing

8,504
50+
Range 50 – 106y
mean age 62y



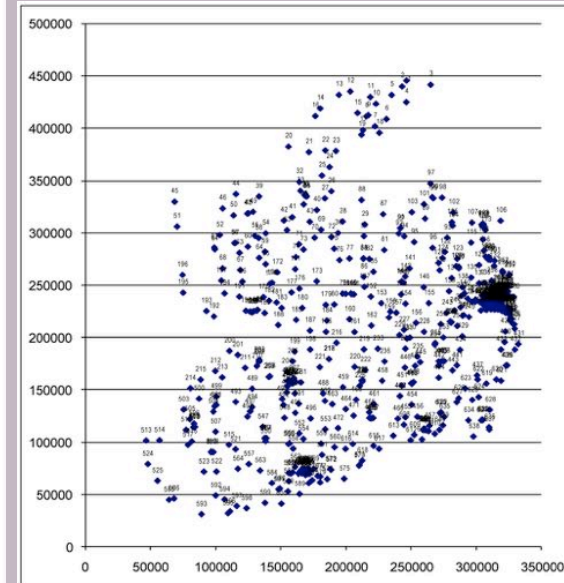
Towards making Ireland the best place in the world to grow old

tilda

Clárúil Fachtóireachta na hÉireann um Dhuil in Aois

The Irish Longitudinal Study on Ageing

Cardiovascular Locomotion Neuropsychology





**N=8175 participants aged 50 and over
(TILDA sample).**

3149 did not attend for Health Centre Assessment.

**N=5026 participants had a Health Centre
Assessment.**

**Unable, Unwilling, Technical error prevented Active Stand
collection N=117.**

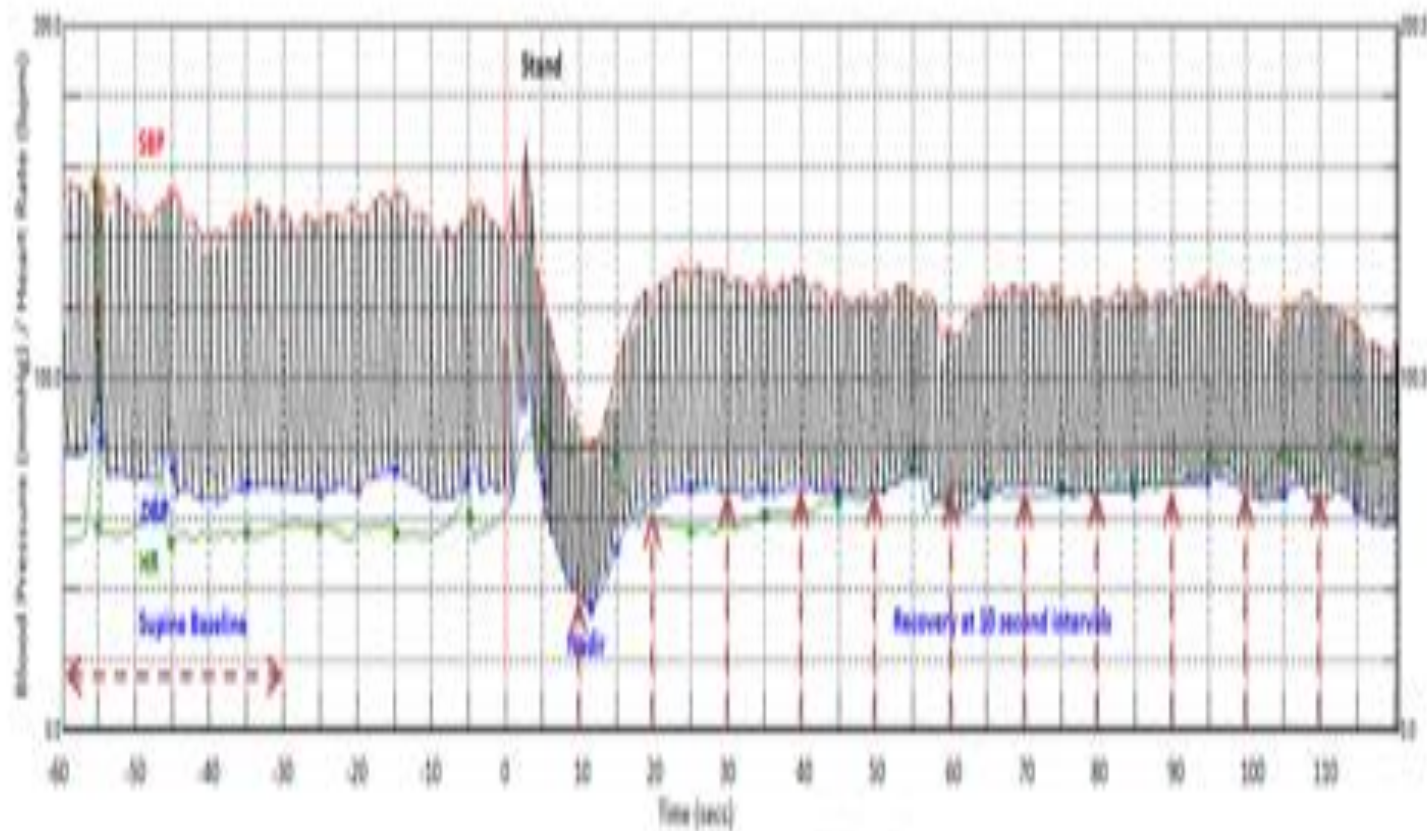
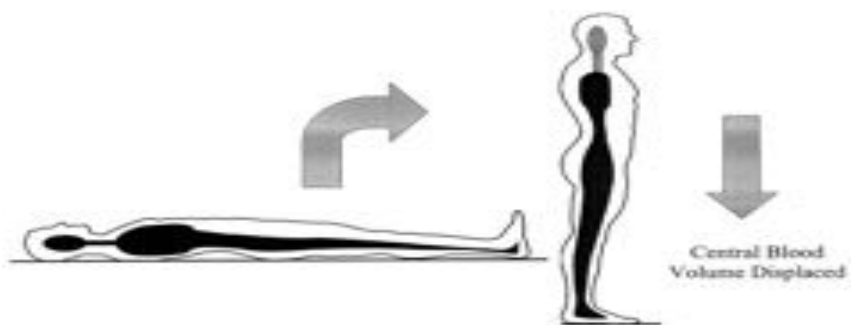
N=4909 completed active stand test.

**Poor quality active stand, poor compliance with protocol.
N= 247.**

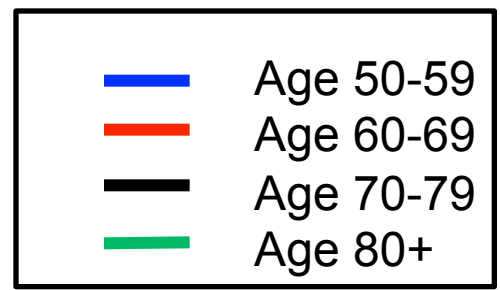
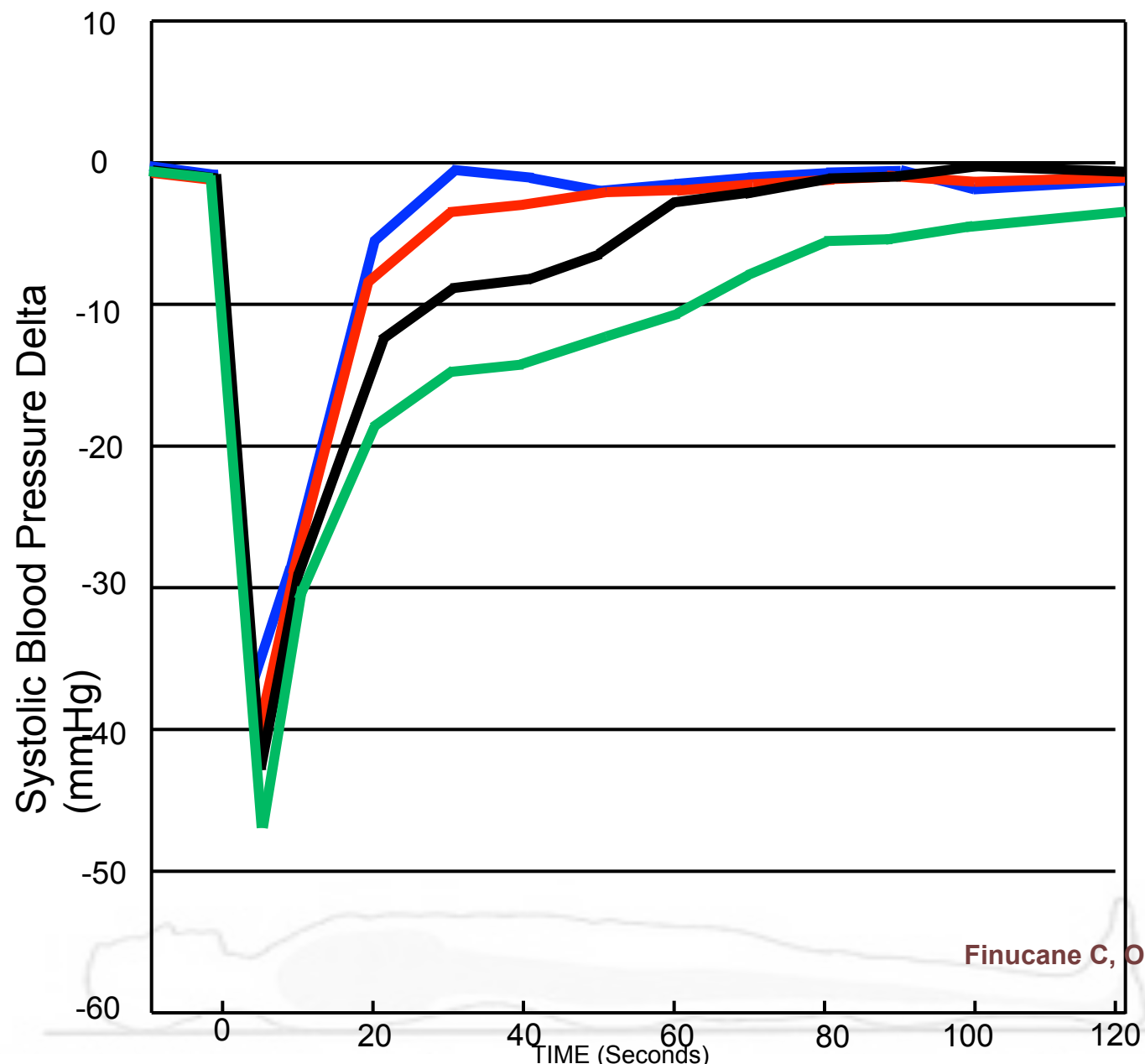
**Final sample includes active stand data in
N= 4662 participants.**



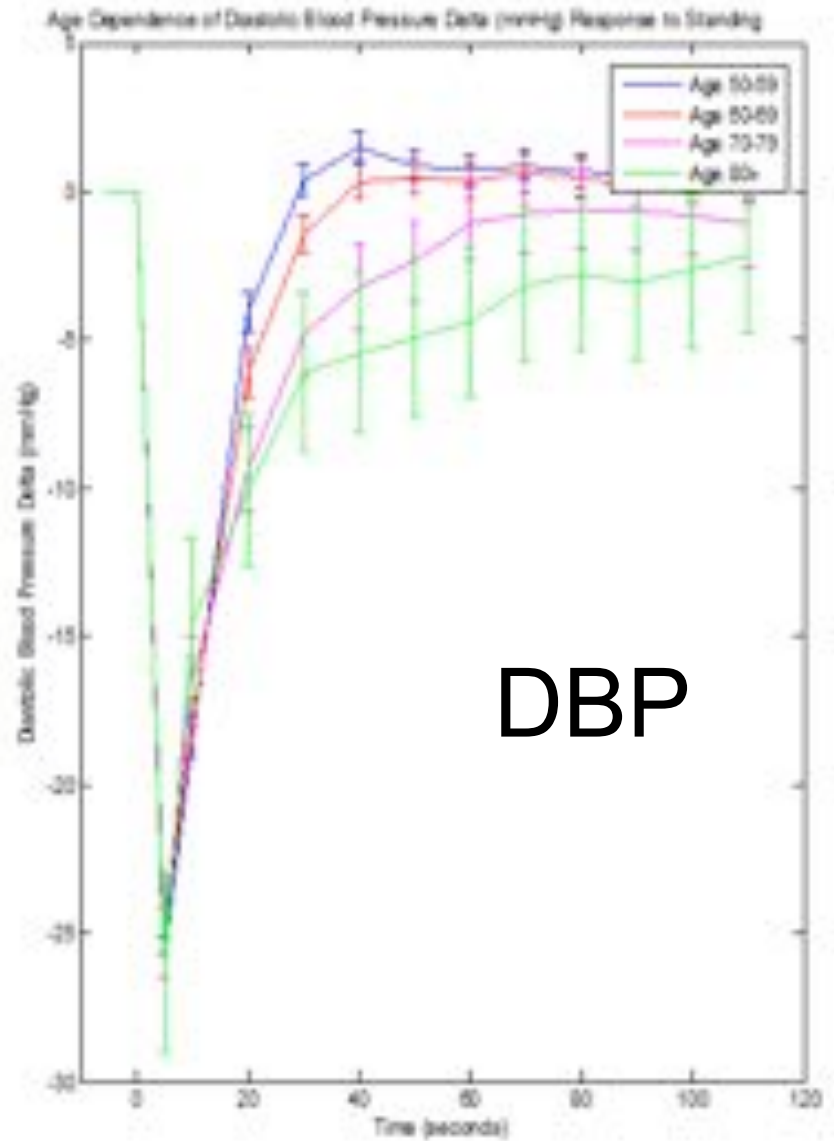
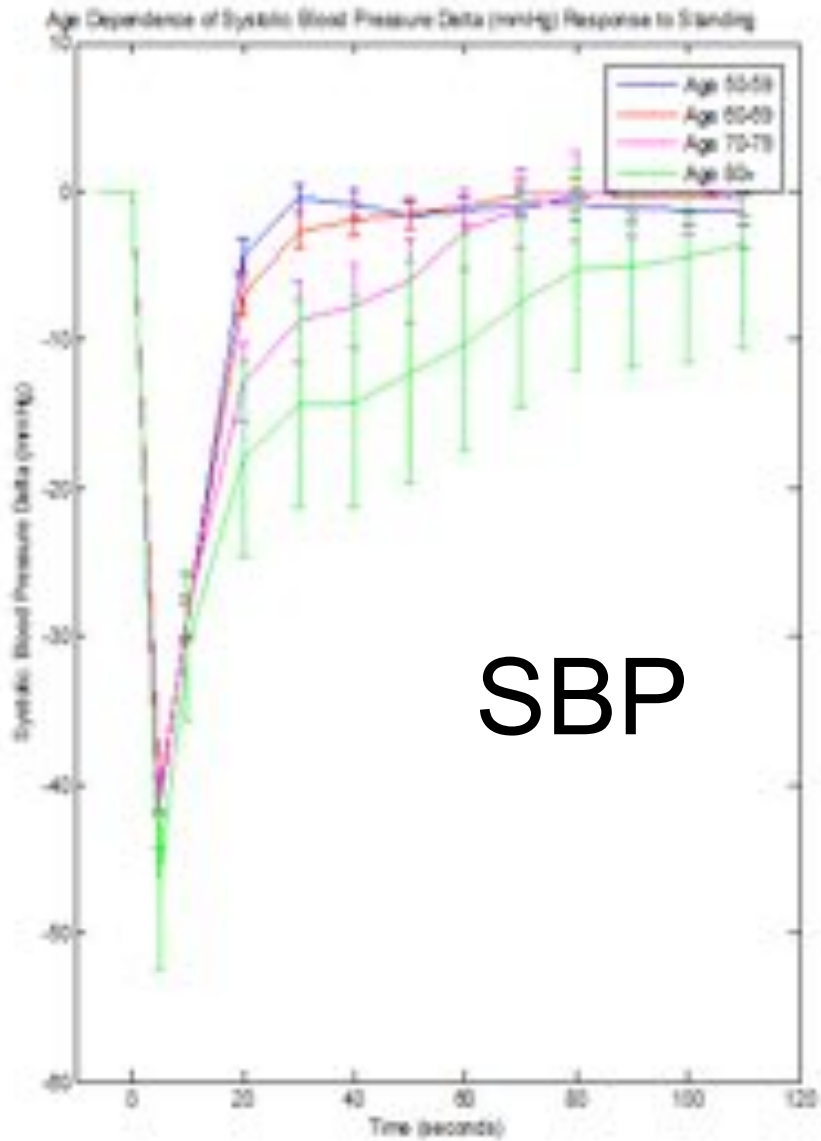
Orthostatic Hypotension



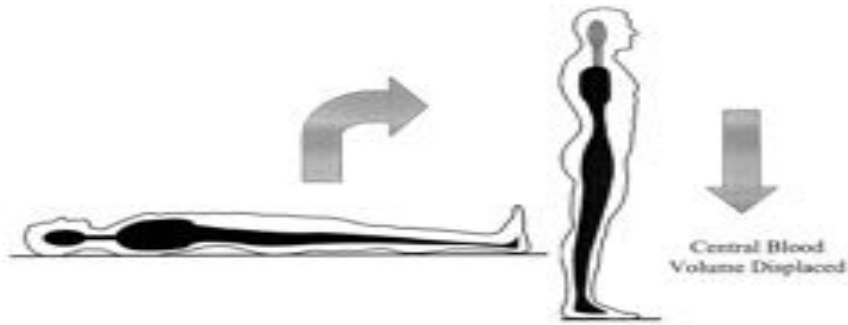
Age Dependence of Systolic Blood Pressure Delta (mmHg) Response to Standing



Finucane C, O'Connell M et al Circulation 2014



(Finucane et al Circulation 2014)



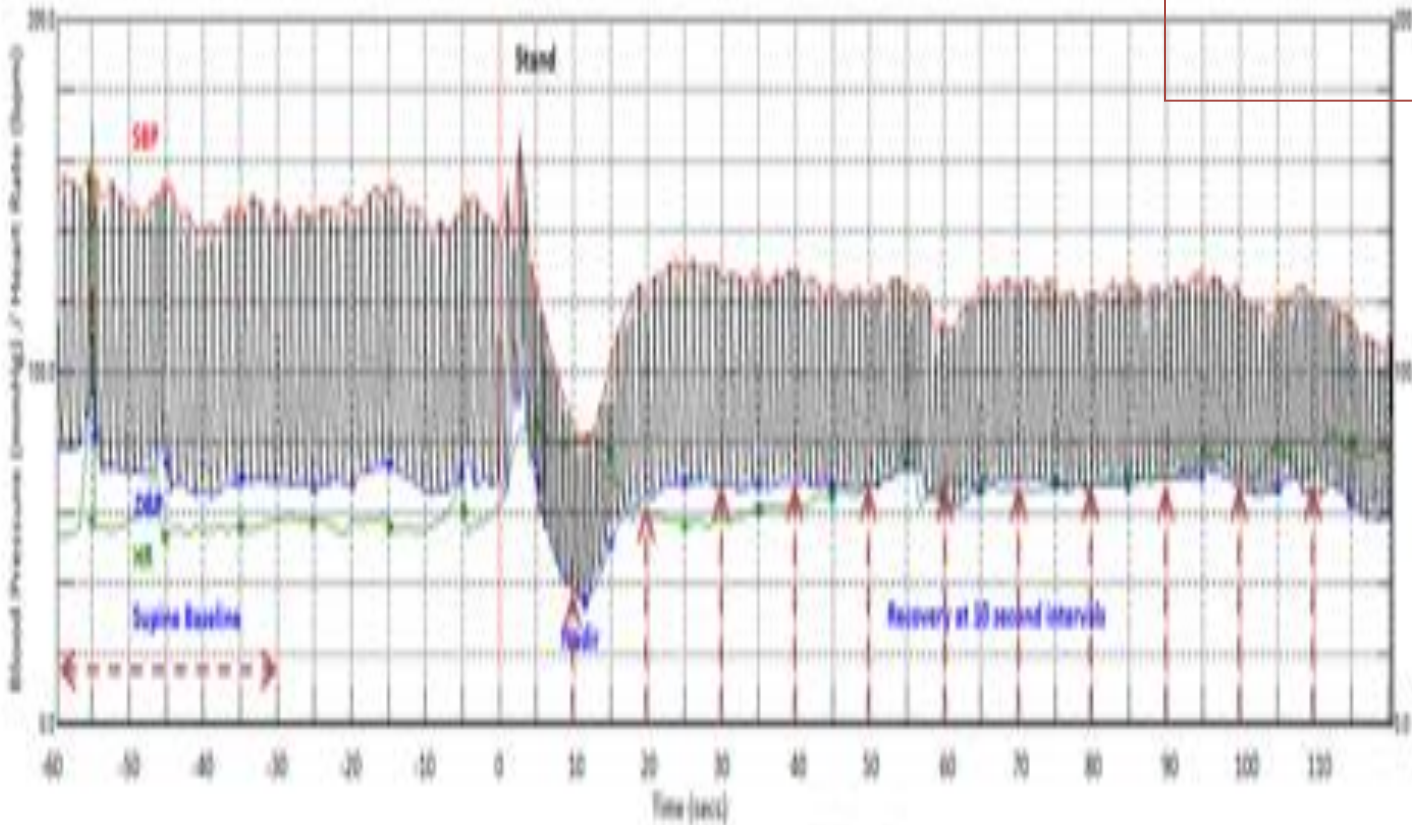
IOH 40/20

OH 20/10

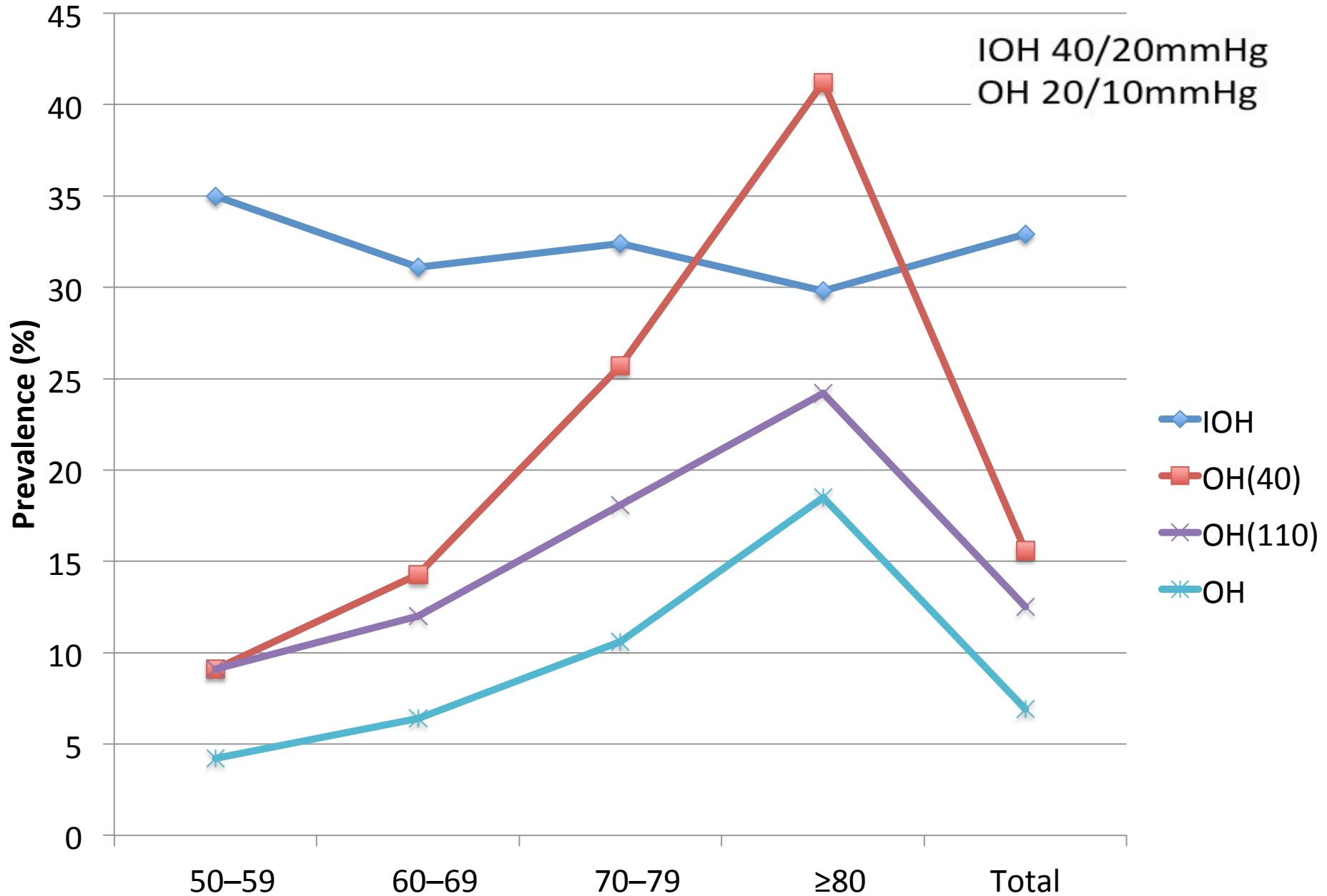
OH at 40s

OH at 110s

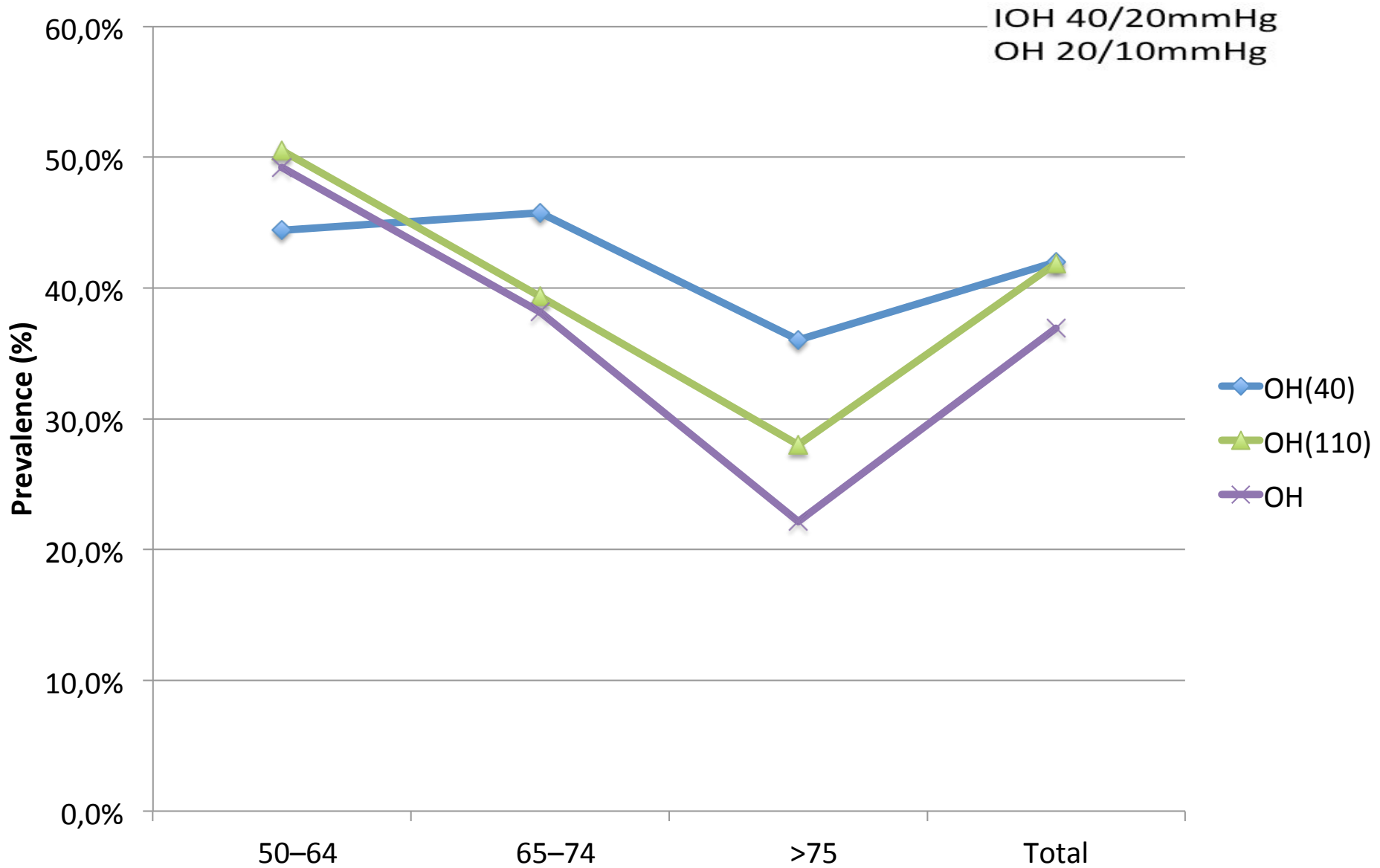
OH all time points



Prevalence by Age for type of OH



Prevalence of **Symptomatic** Orthostatic Hypotension by **Age** for type of OH



Prevalence (%) of Syncope and Falls in TILDA

| Previous year | 50 - 64yrs |
|------------------------------------|--------------|
| Syncope | 4.17 |
| Falls | 17.46 |
| non-accidental fall/syncope | 7.61 |

Prevalence (%) of Syncope and Falls in TILDA

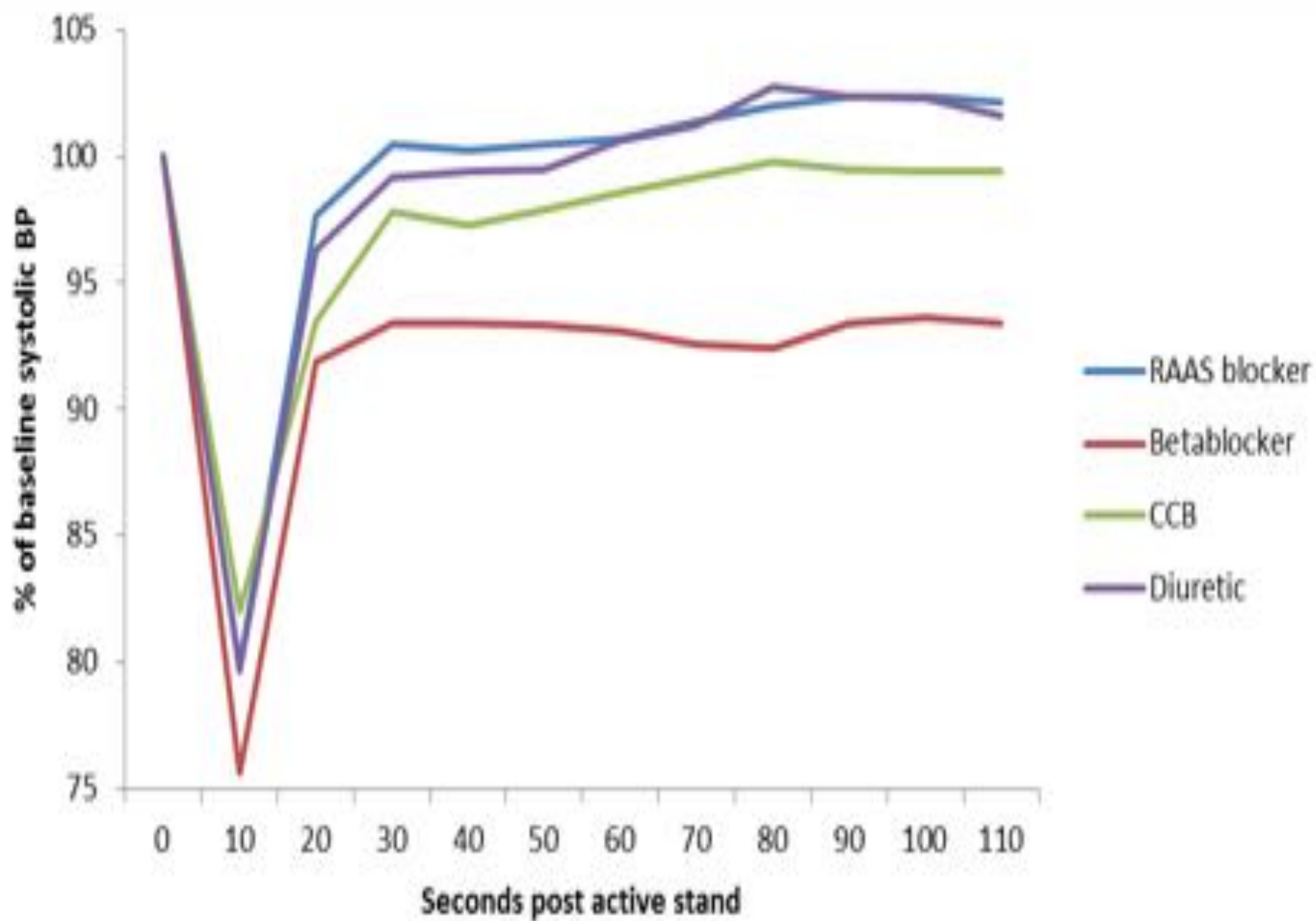
| Previous year | 50 - 64yrs | 65 - 74yrs |
|------------------------------------|--------------|--------------|
| Syncope | 4.17 | 4.74 |
| Falls | 17.46 | 19.46 |
| non-accidental fall/syncope | 7.61 | 9.41 |

Prevalence (%) of Syncope and Falls in TILDA

| Previous year | 50 - 64yrs | 65 - 74yrs | 75+yrs |
|------------------------------------|--------------|--------------|--------------|
| Syncope | 4.17 | 4.74 | 4.84 |
| Falls | 17.46 | 19.46 | 24.43 |
| non-accidental fall/syncope | 7.61 | 9.41 | 11.58 |

Prevalence (%) of Syncope and Falls in TILDA

| Previous year | 50 - 64yrs | 65 - 74yrs | 75+yrs | Total |
|--|--------------|--------------|--------------|--------------|
| Syncope | 4.17 | 4.74 | 4.84 | 4.42 |
| Falls | 17.46 | 19.46 | 24.43 | 19.19 |
| non-accidental fall/syncope | 7.61 | 9.41 | 11.58 | 8.87 |



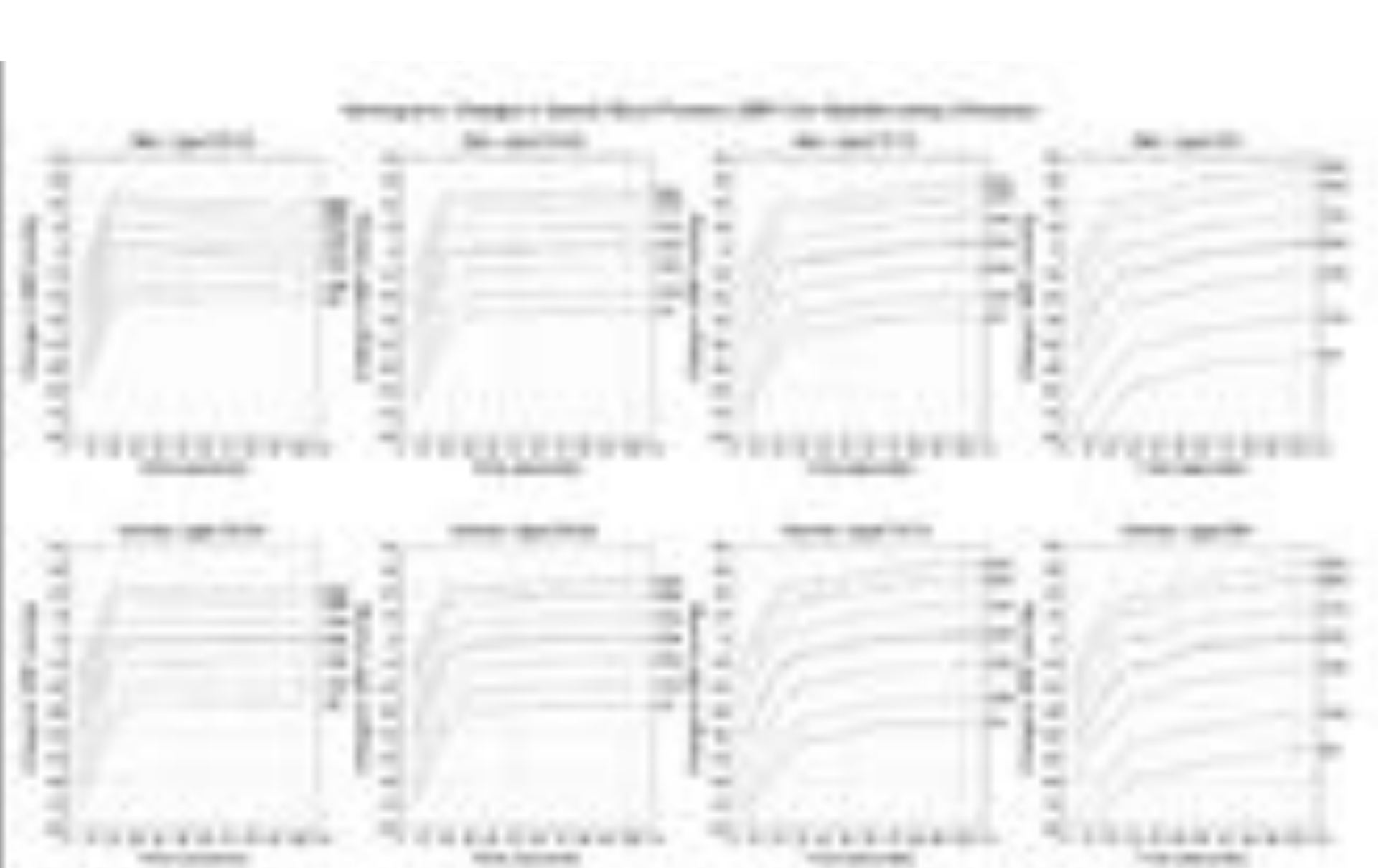


Figure 4. The evolution of the normalized velocity autocorrelation function for the linear polymer with different tail lengths. The data are shown for the linear polymer with a crosslinking density of 0.05 (top row) and 0.1 (bottom row). The different architectures are: (1) linear, (2) linear with a tail, (3) linear with a tail and a loop, and (4) linear with a tail and a loop and a tail.

Figure 4: The dependence of the normalized impedance components on the frequency for various values of the parameter β .

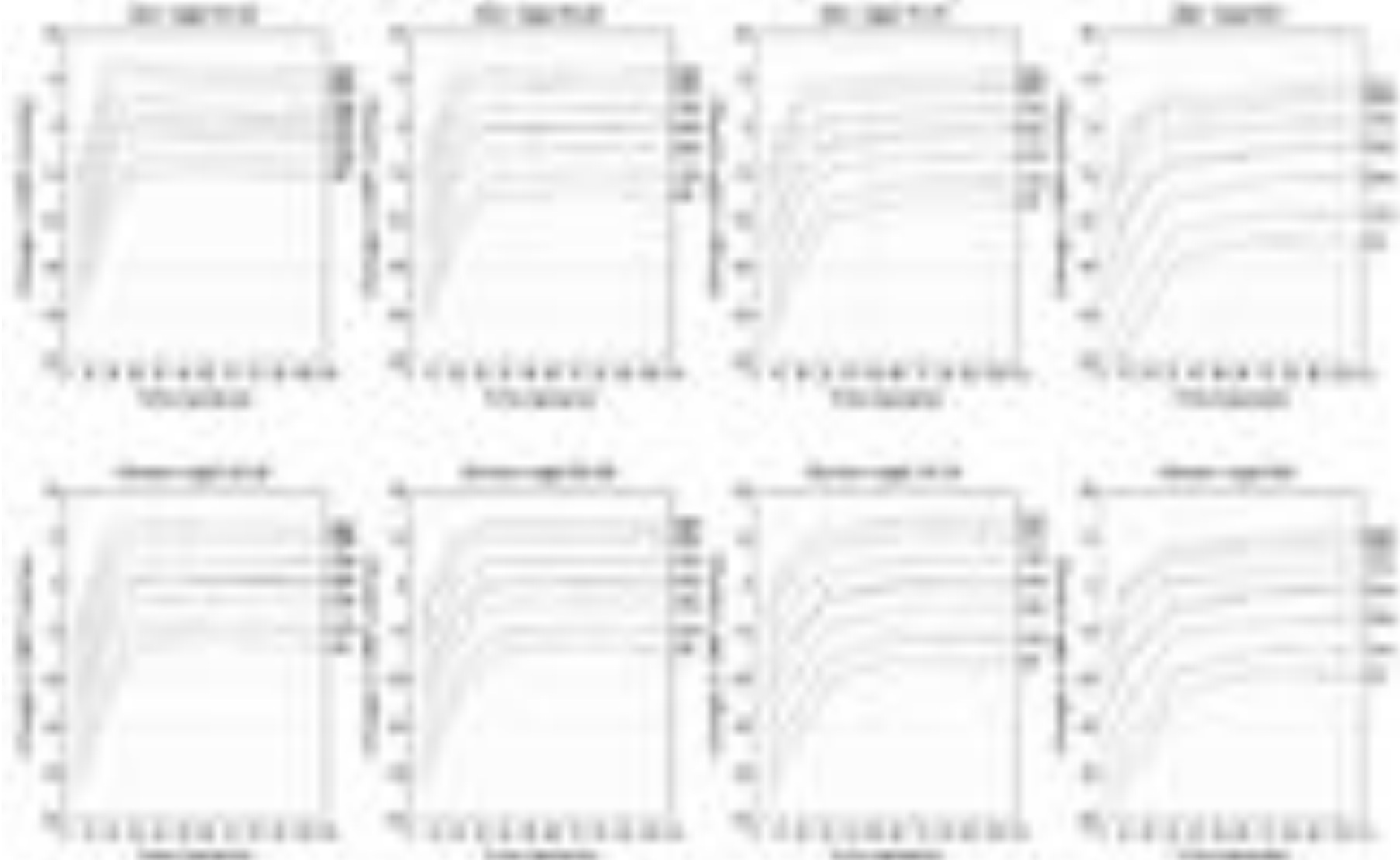


Figure 4: The dependence of the normalized impedance components on the frequency for various values of the parameter β . The plots show the real part of the impedance (Zr) and the imaginary part (Zi) for frequencies ranging from 0 to 10. The curves are labeled with their respective β values: 0.1, 0.2, 0.3, and 0.4. The impedance components generally increase with frequency and then level off. The real part (Zr) is consistently higher than the imaginary part (Zi).

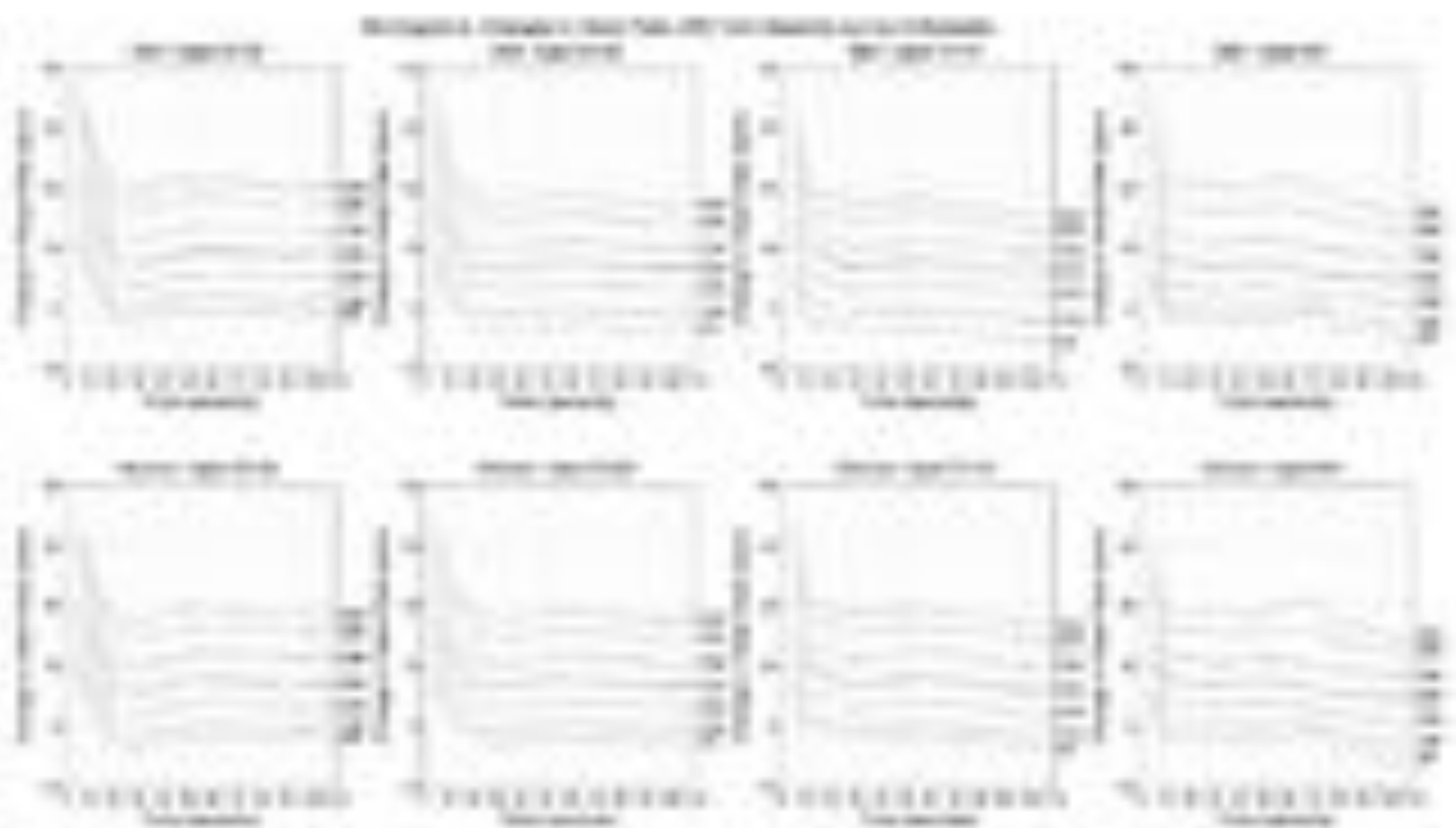
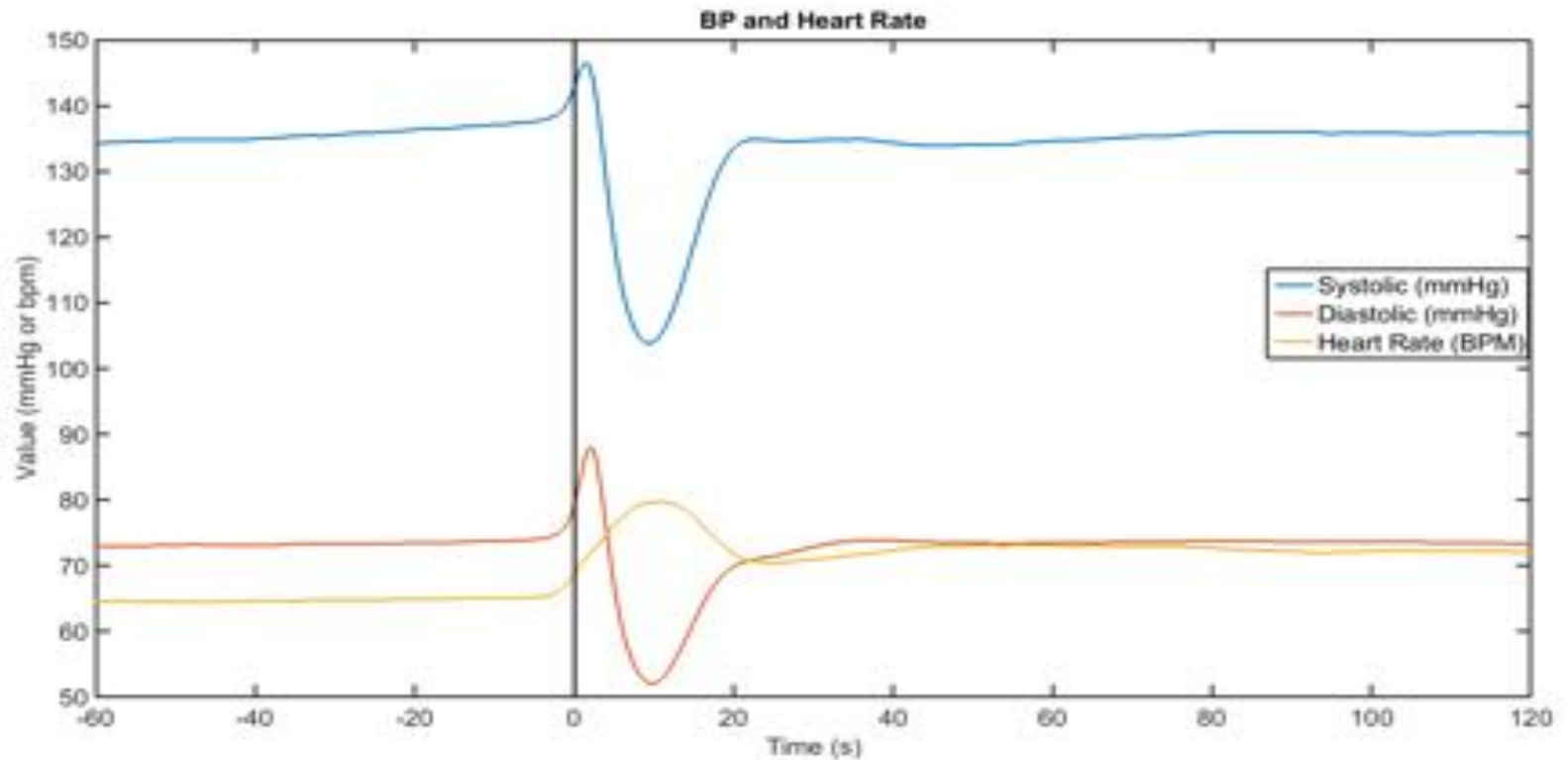
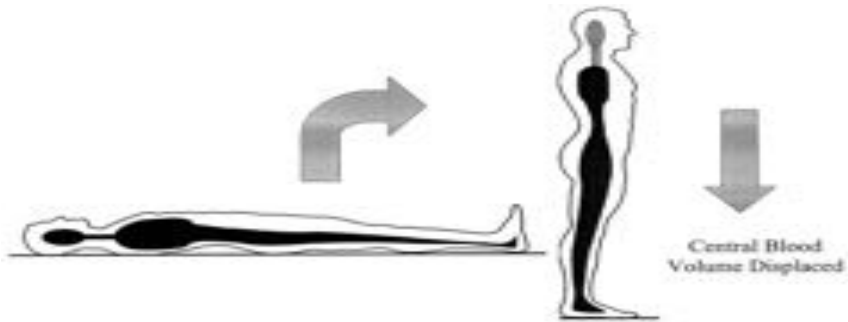


Figure 6: The evolution of the number of active nodes in a network of N nodes, for $\alpha = 0.5$ (top row) and $\alpha = 0.1$ (bottom row). The number of active nodes is plotted against time. The network size is $N = 100, 200, 500$ and 1000 nodes. The network is initially fully active. The network size is $N = 100, 200, 500$ and 1000 nodes.

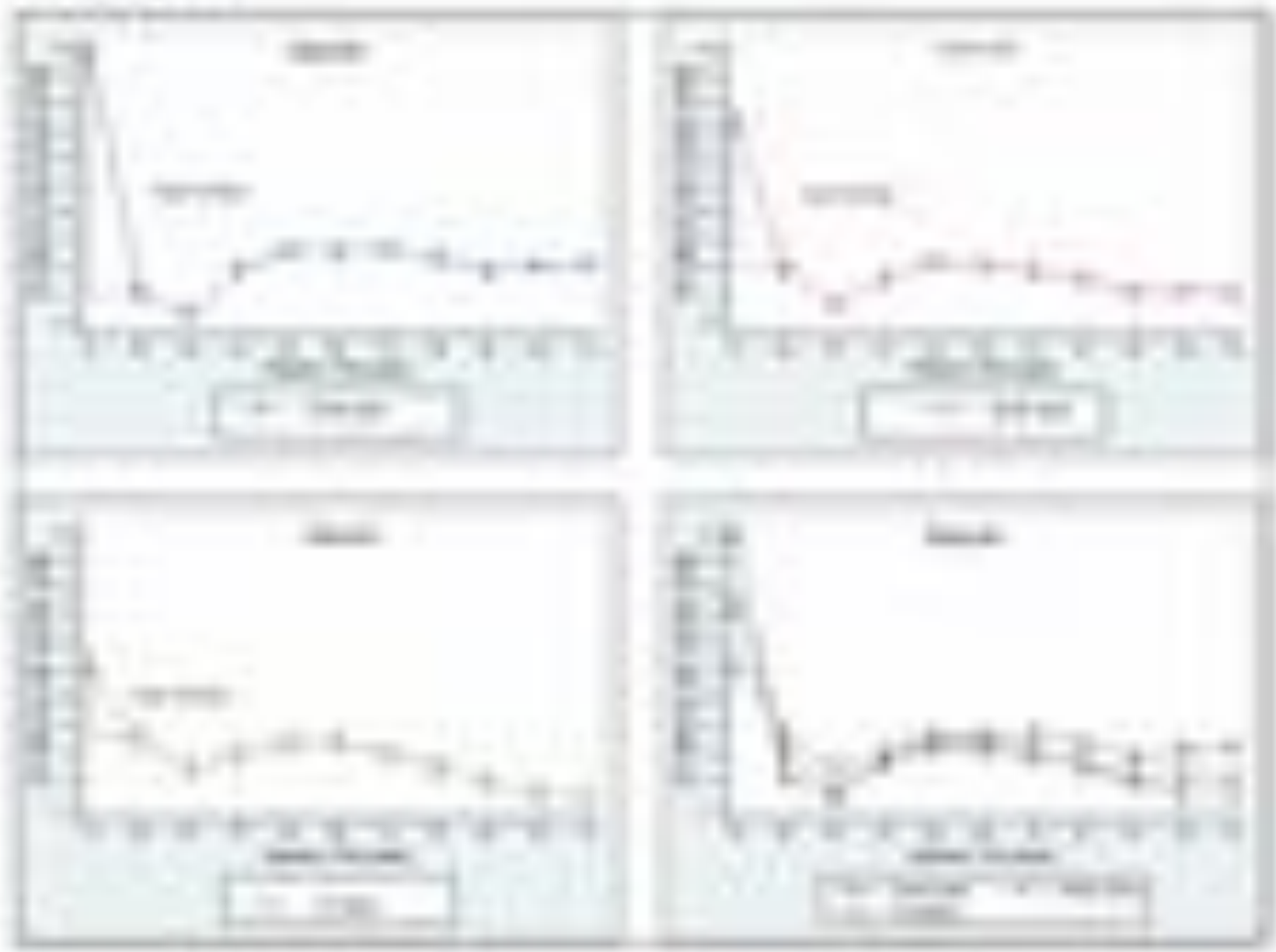


Orthostatic Heart rate

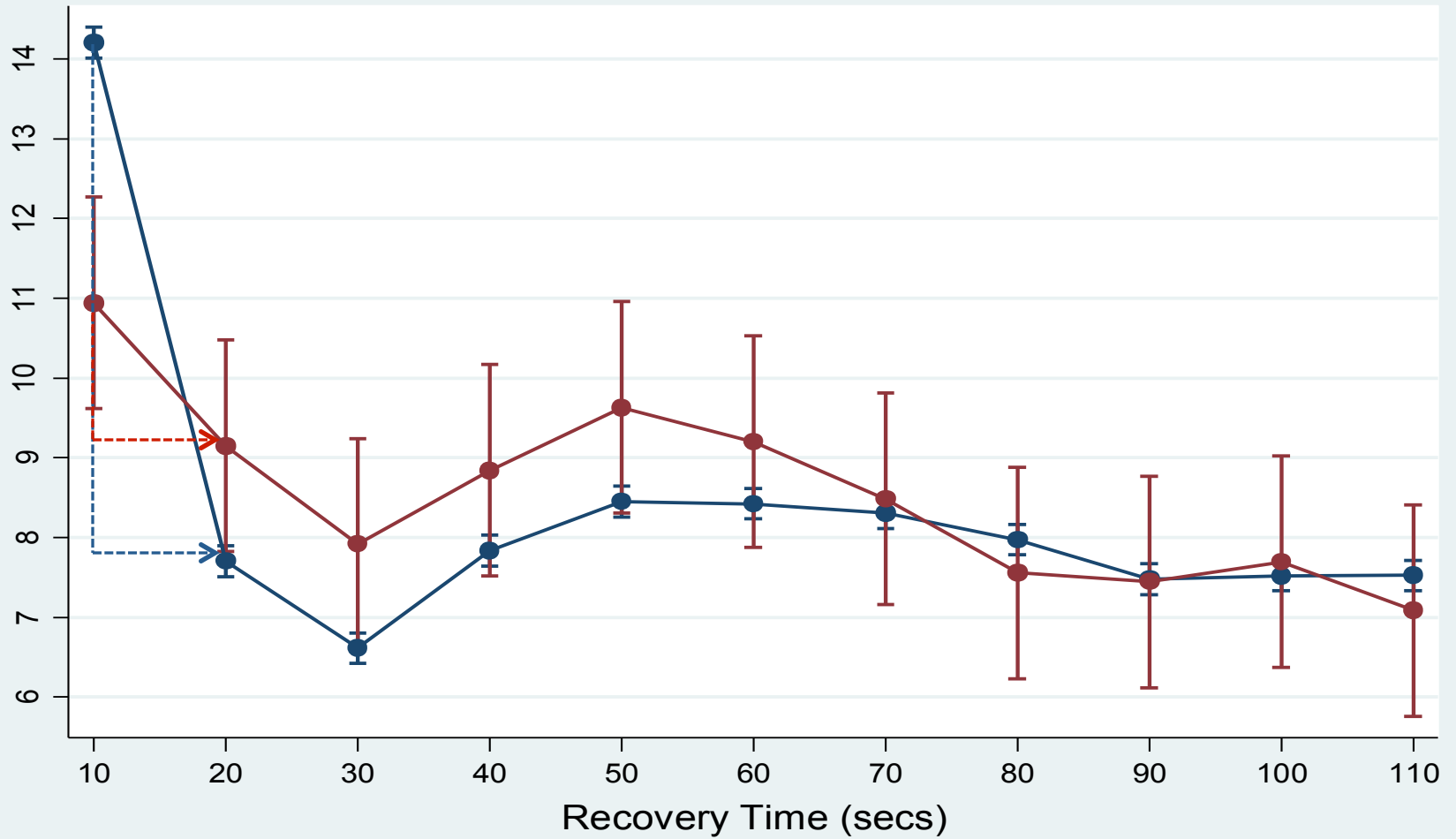
The Active Stand



**Figure 2. (a) Effect of Water Flow Velocity Following Disturbance on the
 (b) of τ_{cr}**

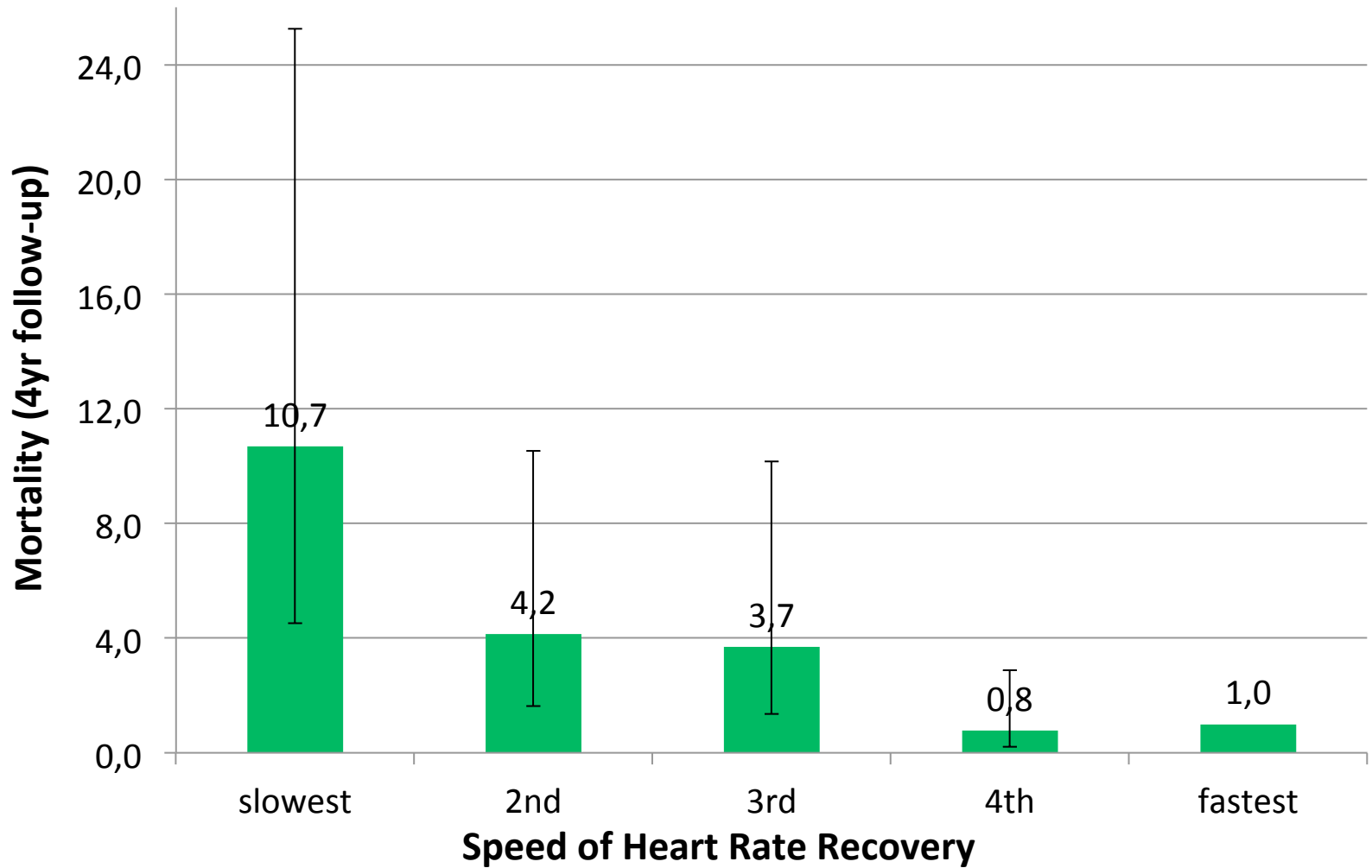


Heart Rate Recovery and Mortality



—●— Alive (4yr follow-up) —●— Deceased (4yr follow-up)

Slow Heart Rate Recovery and Mortality



Does Autonomic Orthostatic Hypotension progress with Age

Professor Rose Anne Kenny
Trinity College Dublin

