

Plenary 1

Opportunities and Challenges of Health Promotion to Recruit and Maintain a Healthy Workforce in Health Care Settings

# **Staff health needs: biopsychosocial approach for stress management**

Dr. Cristina Aguzzoli

Coordinator of Friuli Venezia Giulia HPH Network and of the Italian networks  
Regional Authority for Coordination of Health Trust UDINE-ITALY-

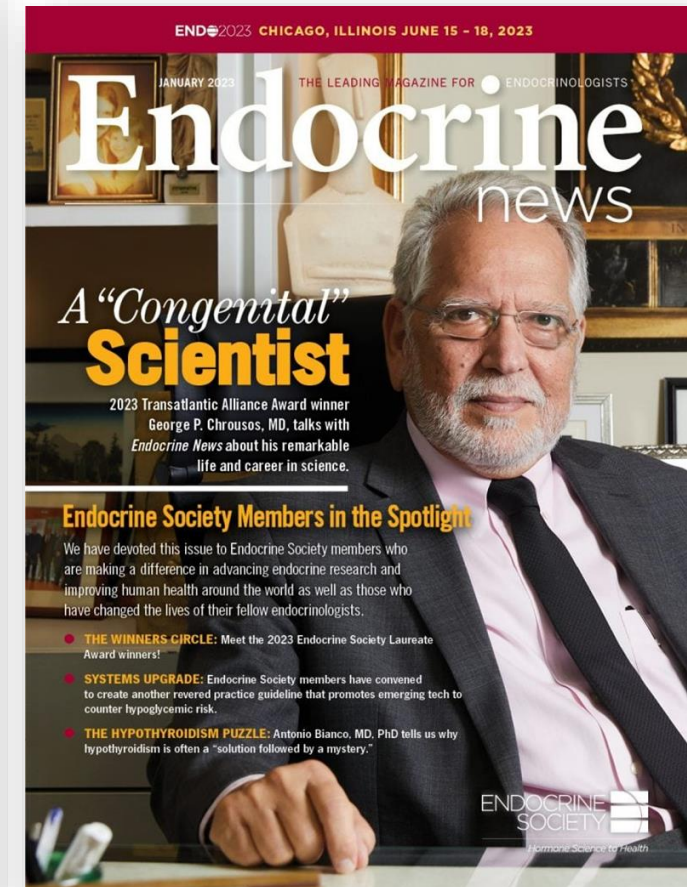
# How do human beings react to stress?

## Fight, Flight, Freeze, all activate the same pattern

### Key points

- Stress occurs when homeostasis is threatened or perceived to be so
- The stress response is mediated by the stress system, which is located in both the central nervous system and peripheral organs
- The main central effectors of the stress system are highly interconnected, and include hypothalamic corticotropin-releasing hormone and brainstem-derived norepinephrine
- Malfunction of the stress system is associated with behavioral and somatic disorders
- Stress is a major contributor to psychosocial and physical pathological conditions in humans

Chrousos, G. P. *Nat. Rev. Endocrinol.* 5, 374–381 (2009); published online 2 June 2009;



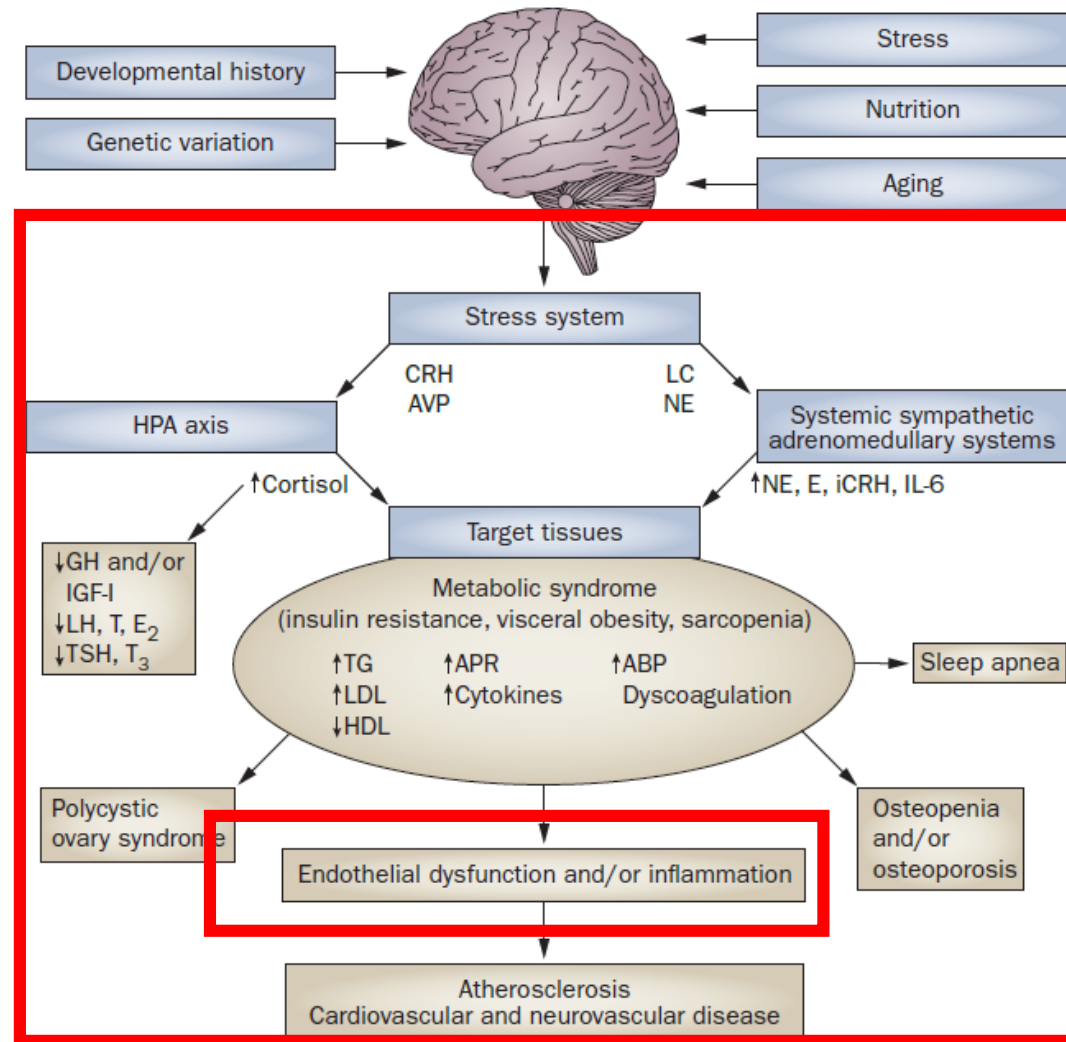
The Endocrine Society and the European Society of Endocrinology (ESE) have jointly awarded the 2023 Transatlantic Alliance Award—to **Prof. George P. Chrousos, M.D., Sc.D.**

# How does the stress system work ?

## Fight, Flight, Freeze, all activate the same pattern

Dealing with a stressor takes energy!

Stress reaction is also known as the "fight-or-flight" response because it evolved as a survival mechanism, enabling people and other mammals to react quickly to life-threatening situations.

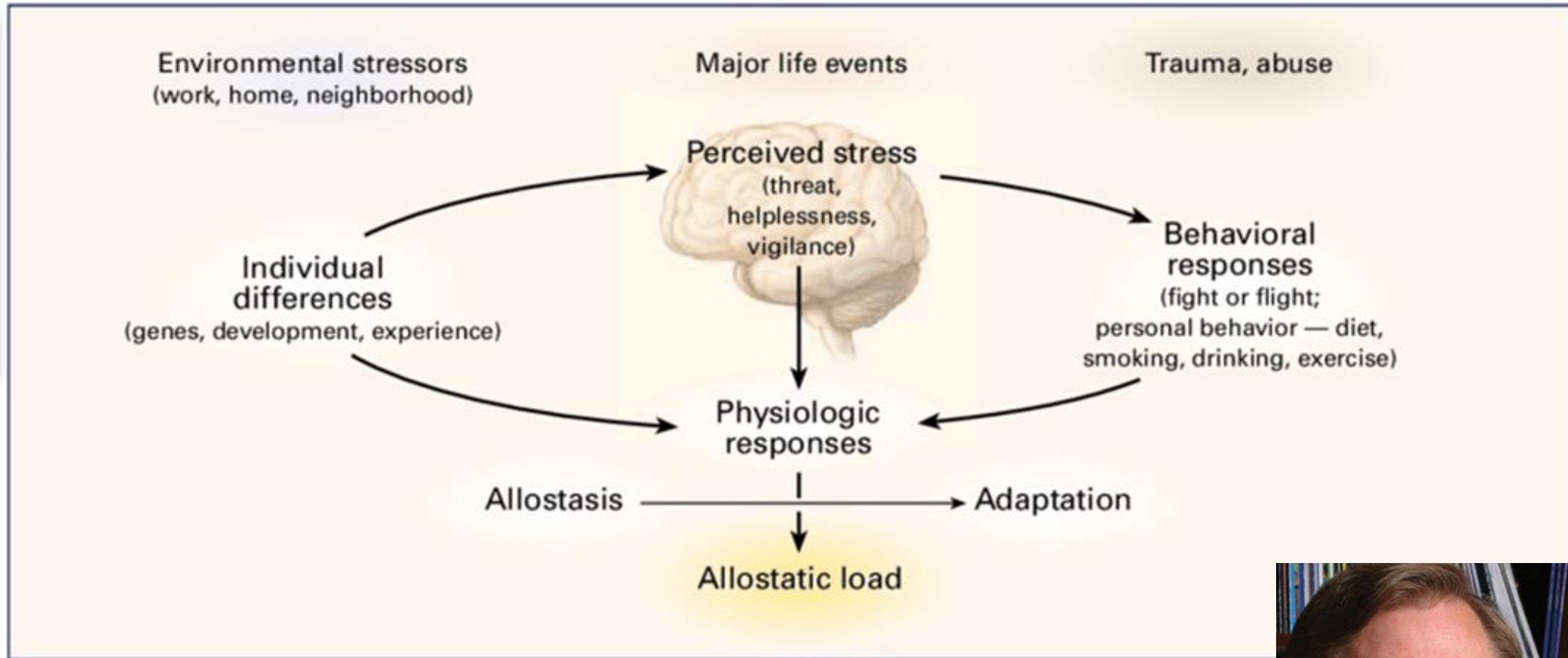


Chrousos, G. P. Nat. Rev. Endocrinol. 5, 374–381 (2009);

# Allostasis: being stable in the change has a cost

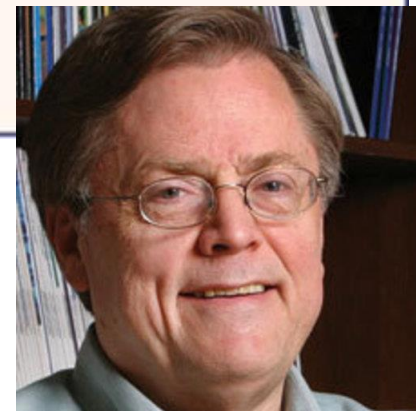
Allostasis means “achieving stability through change”; it was introduced by P. Sterling and J. Eyer in 1988.

Allostatic Load is the "wear and tear on the body" that accumulates when an individual is exposed to repetitive or chronic stress. (Mc Ewen 1998)



(1998). McEwen BS. Protective and damaging effects of stress mediators. N Engl J Med 338: 171-9. The New England journal of medicine.

Prof. Bruce McEwen

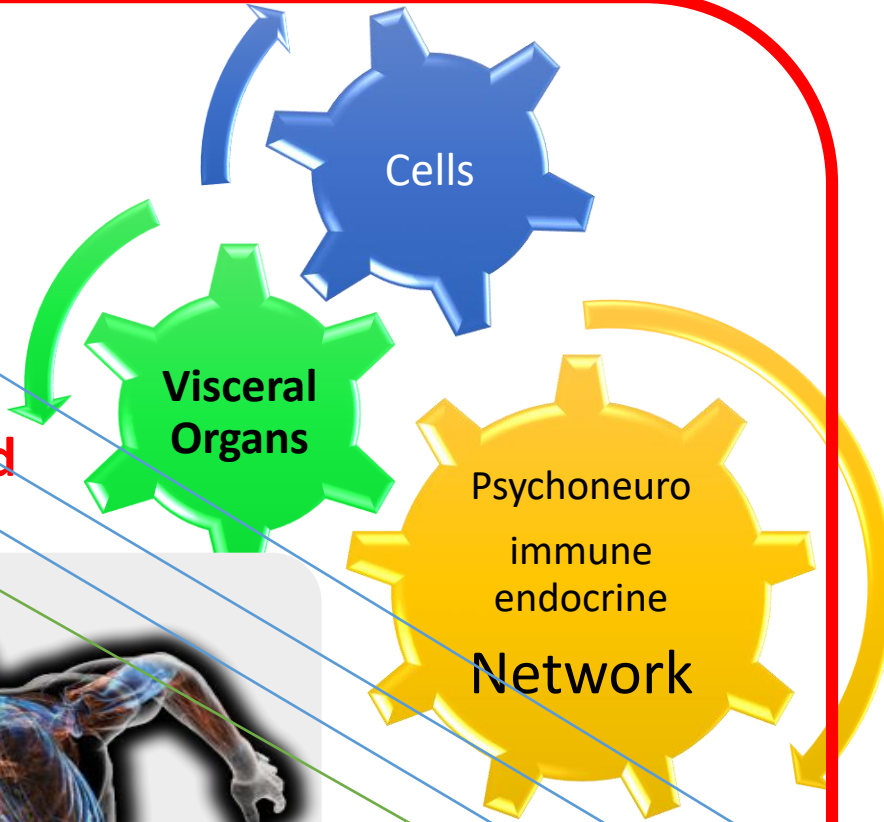
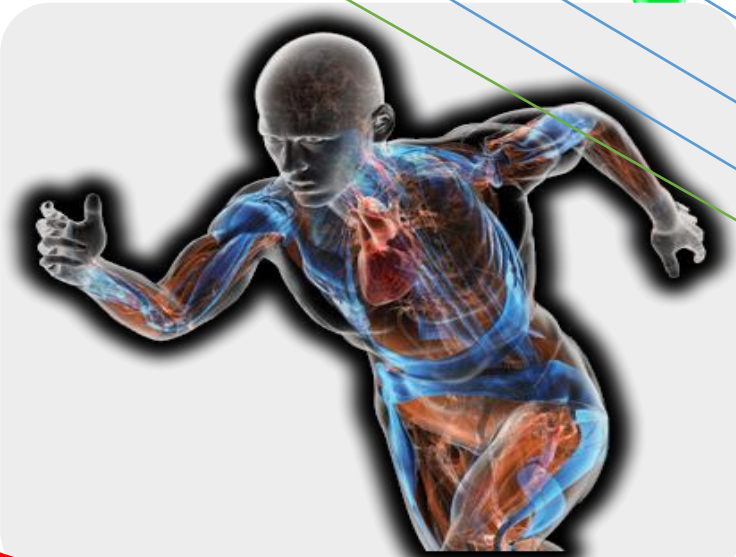




# Staff healthcare and organization answers: succumbing, resisting or improving and re-motivating?

Human Being and  
stress system answer

- Fight
- **Flight**
- Freeze
- **Tend and be friend**



Complex Organization and stress system answer

- High Conflict and violence
- **High absence of healthcare personnel or flight...**
- Low Performance
- **Cooperation and helping each other**

## Protecting circadianity: a must skill for those who are engaged as shift workers

**In addition to stressors, life is influenced by daily light/dark changes**

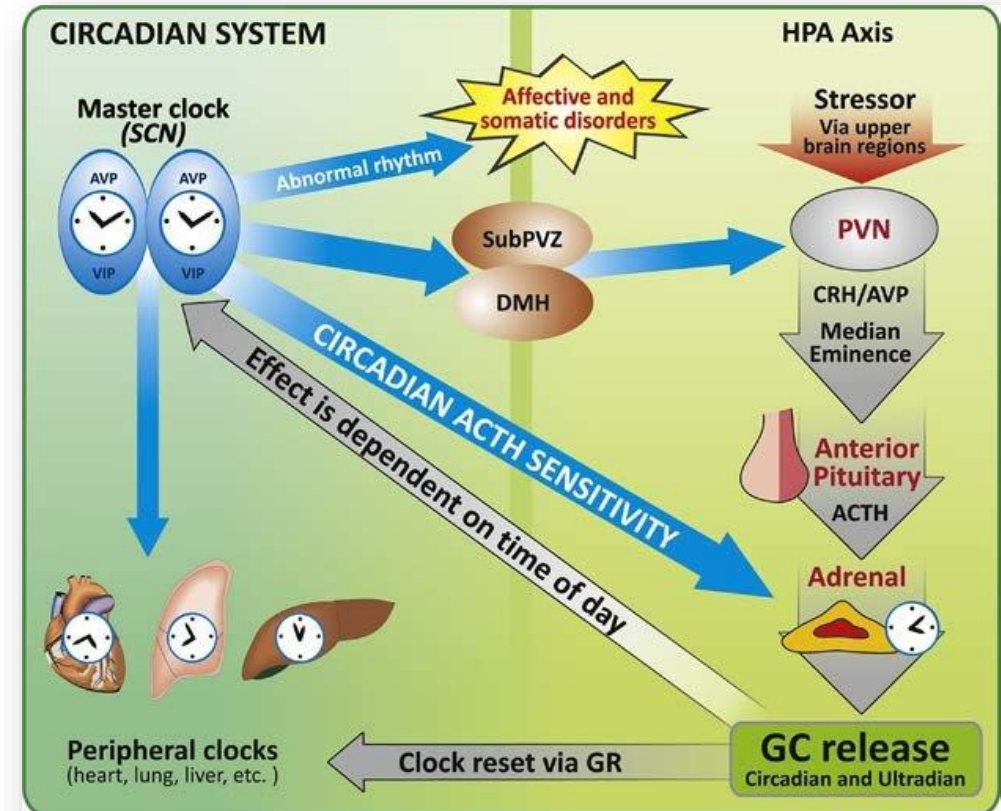
**The stress system, through the HPA axis, communicates with the clock system of our visceral organs (heart, lung, liver...)**

**Some lifestyles disrupt this communication**, such as by delayed sleep and mistimed meals and exercise.

**Fortunately, small changes in our daily routines such as:**

- **reducing short wavelength light exposure at night**
- **restricting food access only during early hours**
- **avoiding large meals at night**
- **exercising at more appropriate times than late at night**

**can have largely positive impact on life expectancy and life quality. Chronotherapy** is a simple and low-cost non-pharmacological approach for improving overall health, in particular for **nightshift workers**

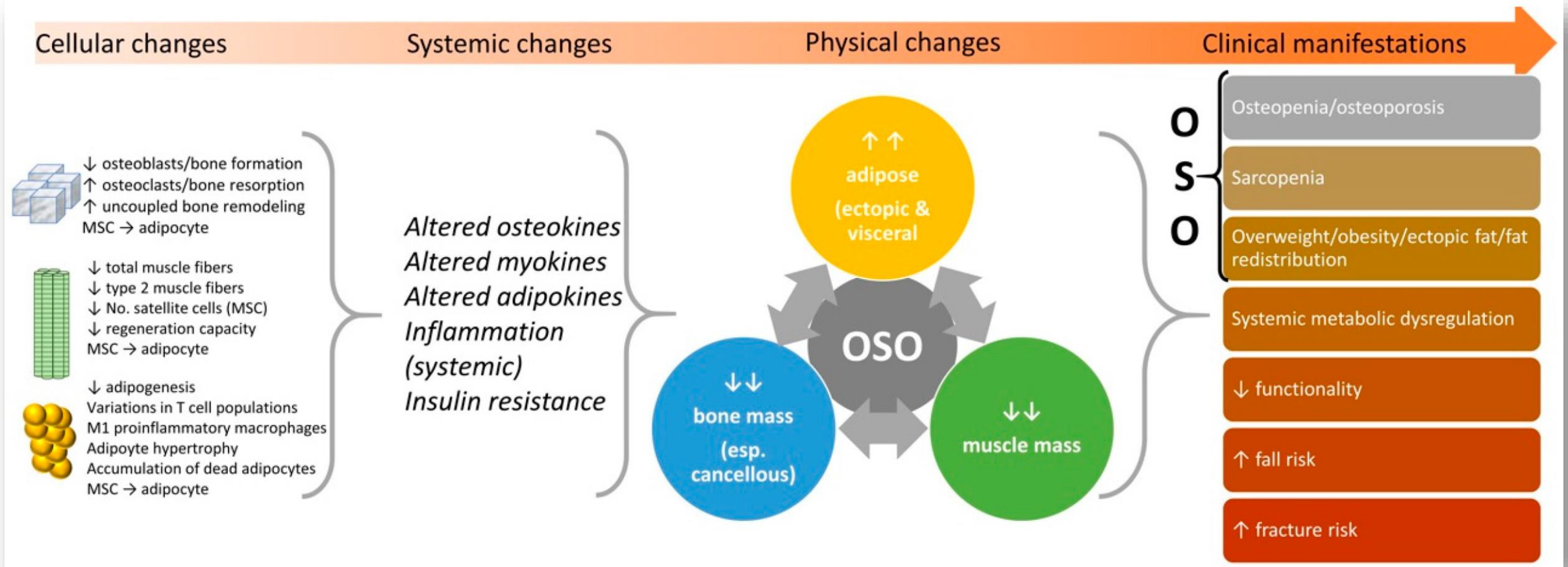


### Interactions between the circadian system and the HPA axis.

Source: Bartlang, M.S. & Lundkvist, Gabriella. Stress and the Central Circadian Clock. (2017).

[https://www.researchgate.net/publication/312152701\\_Stress\\_and\\_the\\_Central\\_Circadian\\_Clock](https://www.researchgate.net/publication/312152701_Stress_and_the_Central_Circadian_Clock)

# Allostatic load and Osteosarcopenic obesity: stress disorders and energetic imbalance



Kelly OJ, Gilman JC, **Boschiero D**, **Ilich JZ**. Osteosarcopenic Obesity: Current Knowledge, Revised Identification Criteria and Treatment Principles. *Nutrients*. 2019; 11(4):747.

# Can allostatic load and stress system be measured?



**Prof. Bruce  
McEwen**

## **BIOMARKERS ANALYSIS (blood sample):**

Seeman, Teresa &  
**McEwen, Bruce** & Rowe,  
John & Singer, Burton.  
(2001).

## **CLINIMETRIC ANALYSIS QUESTIONNAIRE:**

**Fava GA, McEwen BS,**  
Guidi J, Gostoli S, Offidani  
E, Sonino N. **2019**

**Prof. George P.  
Chrousos**



**Dario Boschiero,**  
Bachelor of  
Engineering,  
L.H.D.

Coordinator of  
project "M.U.S."

Founder of Open  
Academy of  
Medicine in  
Venice

[http://www.openaca  
demyofmedicine.org  
/?language=en](http://www.openacademyofmedicine.org/?language=en)



## **FAST AND NON-INVASIVE WAY**

### **SUBJECTIVE AND OBJECTIVABLE PARAMETERS TOGETHER:**

**-MEDICALLY UNEXPLAINED SYMPTOMS,  
BODY COMPOSITION AND AUTONOMIC  
NERVOUS SYSTEM ANALYSIS**

**BY NON-INVASIVE MEDICAL DEVICES**

Tsigos C, Stefanaki C, Lambrou GI, **Boschiero D,**  
**Chrousos GP.** Stress and inflammatory biomarkers  
and symptoms are associated with bioimpedance  
measures. Eur J Clin Invest. **2015**

**Chrousos GP, Boschiero D.** et al. **2022**



# Tools to measure allostatic load : subjective parameters

## MEDICALLY UNEXPLAINED SYMPTOMS

MUS

### MUS® - Medically Unexplained Symptoms Self-Evaluation

Do you suffer from chronic and persistent fatigue?  
Have you been suffering from mood disorders for long?  
Do you suffer from persistent insomnia or awakenings from sleep?  
Do you suffer from persistent drowsiness during the day?  
Have you been experiencing anxiety?  
Have you been experiencing apathy?  
Have you been suffering from panic attacks?  
Have you been experiencing abnormal heart beats (arrhythmia or tachycardia) at rest?  
Have you noticed changes in your appetite (excessive hunger or loss of appetite)?  
Do you suffer from night hunger pangs (night binge eating disorder)?  
Have you been suffering from heartburn, stomach fullness, bloating or nausea?  
Do you suffer from irritable bowel syndrome?  
Have you periodically been suffering from constipation or altered bowel movement?  
Do you usually have cold hands and feet?  
Do you suffer from altered perspiration during sleep?  
Do you often wake up in a bad mood?  
Have you been experiencing feelings of unjustified guilt?  
Do you have difficulties in experiencing pleasure or relief, as a result of positive events?  
Have you recently experienced significant weight loss?

All rights reserved BioTekna - Italy. MUS® - Medically Unexplained Symptoms Self-Evaluation n.2012001626, 2012.

## SELF ASSESSMENT

## CHRONIC FATIGUE SYNDROME SYMPTOMS



fatigue



severe headaches



loss of memory  
or concentration



sleeping problems



muscle pain



sore throat

Tsigos C, Stefanaki C, Lambrou GI, **Boschiero D**, **Chrousos GP**. Stress and inflammatory biomarkers and symptoms are associated with bioimpedance measures. Eur J Clin Invest. 2015 Feb;45(2):126-34. doi: 10.1111/eci.12388.

<https://mus.global/>

# Medically unexplained symptoms as signals of chronic inflammation and allostatic load for healthcare system

European Journal of  
Clinical Investigation

European Journal  
Clinical Investigat  
OFFICIAL JOURNAL OF THE EUROPEAN SOCIETY OF CLINICAL INVESTIGATION

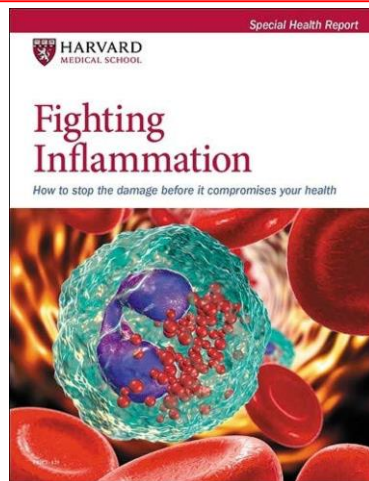
Original Article

**Stress and inflammatory biomarkers and symptoms are associated with bioimpedance measures**

Constantine Tsigos, Charikleia Stefanaki, George I. Lambrou, Dario Boschiero, George P. Chrousos

Eur J Clin Invest. 2015

**MUS are officially indicators of the presence of persistent low-grade chronic inflammation.**



## Allostatic load for healthcare system

*MUS: presence of persistent bodily symptoms without an obvious cause*

They account for up to one in five requests for visit in primary care.  
This can be even higher in some secondary care clinics.

**The annual cost attributable to MUS due to lost productivity and decreased quality of life is over £14 billion to the UK economy.**

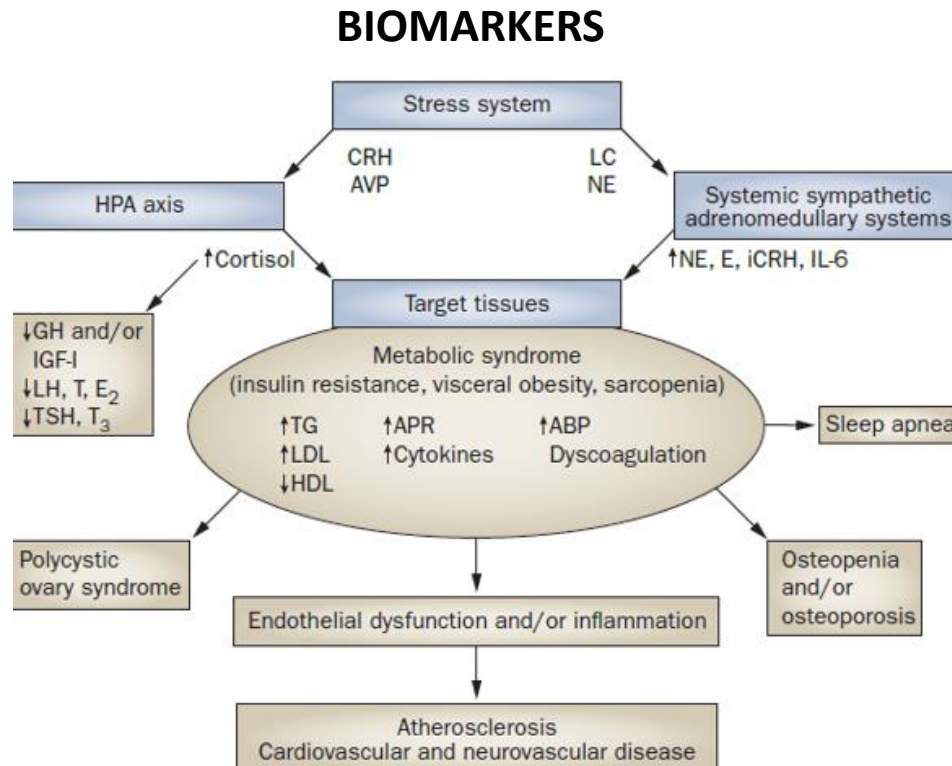
Husain M, et al Medically unexplained symptoms: assessment and management. Clin Med (Lond). 2021 Jan;21(1):13-18. Jadhakhan F, Romeu D, Lindner O, et al Prevalence of medically unexplained symptoms in adults who are high users of healthcare services and magnitude of associated costs: a systematic reviewBMJ Open 2022;

# Tools to measure allostatic load : objective parameters

## Body composition clinical analysis (NON-INVASIVE)

BIA-ACC® device (BioTekna, Italy).

- TBW, Total Body Water
- ECW, ExtraCellular Water
- ICW, IntraCellular Water
- FFM, Fat-Free Mass
- FM, Fat Mass
- ECMatrix, ExtraCellular Matrix
- BMR, Basal Metabolic Rate
- HPA Axis Index



## Analysis, monitoring and biofeedback of the autonomic nervous system and the heart rate variability (NON-INVASIVE)

PPG Stress Flow® device (BioTekna, Italy)

- SDNN
- Mean HR
- VLF power
- LF power
- HF power
- Scatter – Heart rate
- Bilateral flow
- ANS Balance

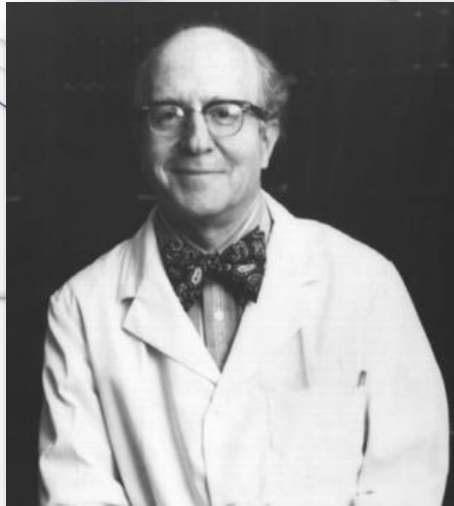


**Chrousos GP**, Papadopoulou-Marketou N, Bacopoulou F, Lucafò M, Gallotta A, **Boschiero D**.

Photoplethysmography (PPG)-determined heart rate variability (HRV) and extracellular water (ECW) in the evaluation of chronic stress and inflammation. Hormones 2022

**Chrousos, G. P.** Stress and disorders of the stress system Nat. Rev. Endocrinol. (2009);

# The influence of biopsychosocial approach on wellbeing in helping relationship



Engel GL.

The need for a new medical model: a challenge for biomedicine. Science. 1977

## Italian National Institute of Health

Wellbeing and stress management according to the biopsychosocial model: focus on school, university and health.

2021, iv, 108 p. Rapporti ISTISAN 21/4 (in Italian)

A document to enlight and improving **the value of perceived well-being in the population**, with particular reference to the **professionals** involved in the **helping relationship**.

## “CARING FOR THOSE WHO CARE” UPDATING NATIONAL PROJECT

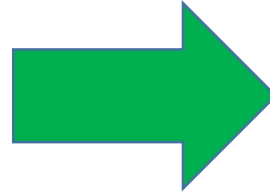
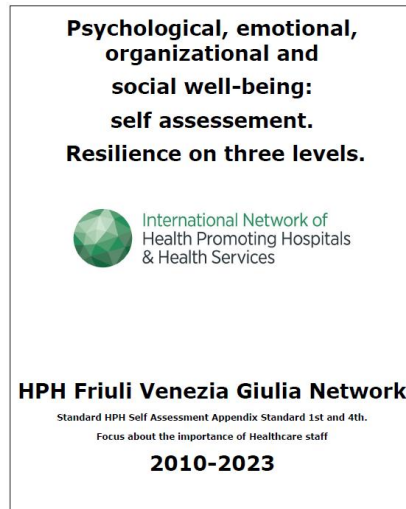
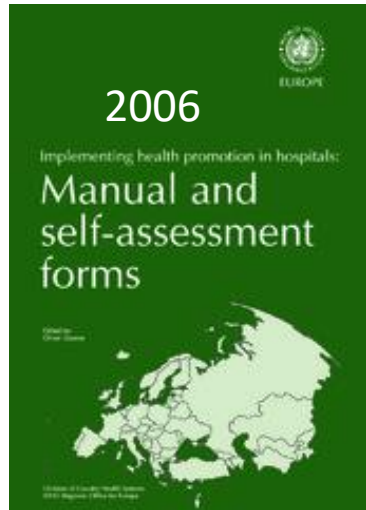
The focus is on **well-being**, its protection and on risk factors, according to the indications of the **World Health Organization** which refers to **health Engel’s Model** – developed in the 1980s – which considers

**how the individual is strongly influenced by psychological, social, and family components, according to the so-called bio-psycho-social perspective**

[https://www.iss.it/rapporti-istisan/-/asset\\_publisher/Ga8fOpveOfNN/content/id/5683198](https://www.iss.it/rapporti-istisan/-/asset_publisher/Ga8fOpveOfNN/content/id/5683198)



# The importance of being in this network to experience the change as protagonists



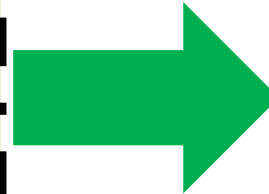
## UPDATED STANDARDS december 2020 4.1. Staff health needs, involvement, and health promotion

- 4.1.1. Our organization offers regular assessments of staff health needs and offers health promotion concerning tobacco, alcohol, diet/nutrition, physical inactivity, and psychosocial stress.
- 4.1.2. During exceptionally demanding periods, these health needs assessments are adapted in order to identify possible support needs in a timely manner.
- 4.1.3. Our organization develops and maintains staff awareness of health issues.
- 4.1.4. Our organization ensures the involvement of staff in decisions impacting clinical work processes and their working environment.
- 4.1.5. Our organization develops working practices involving multidisciplinary teams where appropriate.
- 4.1.6. Our organization establishes a health promoting workplace, addressing the psychosocial work environment.



**May 2020 HPH  
IMPROVEMENT  
PLAN**

«TAKE CARE OF  
THOSE WHO **TOOK** CARE  
OF US»



**June 2021-2023 HPH  
IMPROVEMENT  
PLAN**  
«TAKE CARE OF  
THOSE WHO **TAKE** CARE  
OF US»

Psychological, emotional,  
organizational and social well-  
being: self assessment.  
Resilience on three levels.



International Network of  
Health Promoting Hospitals  
& Health Services

HPH Friuli Venezia Giulia Network

Standard HPH Self Assessment Compendium.  
Focus about the importance of Healthy Staff in Healthcare setting  
2010-2020

## 10. COVID-19 as a booster in the application of the model

4.8.1 Does the occupational physician in charge offer rapid **self-evaluation system for stress / distress?**

### IMPROVEMENT PLAN 2020 “Take care of those who took care of us»

Application of Subjective and  
Objective evaluation of the  
**allostatic load**

- MUS, Distress, Self Related health
- Body composition clinical analysis
- Analysis, monitoring and biofeedback of the autonomic nervous system and the heart rate variability



International Network of  
Health Promoting Hospitals  
& Health Services



ARCS  
Azienda Regionale  
di Coordinamento  
per la Salute



REGIONE AUTONOMA  
FRIULI VENEZIA GIULIA

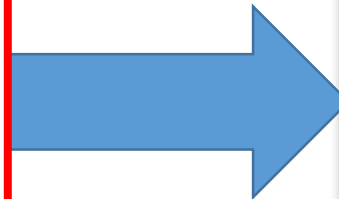
Psychological, emotional,  
organizational and  
social well-being:  
self assessment.  
Resilience on three levels.



HPH Friuli Venezia Giulia Network  
Standard HPH Self Assessment Appendix Standard 1st and 4th.  
Focus about the importance of Healthcare staff  
2010-2023

# COVID 19 as a booster in the application of the model

4.10.2 Pathways for **lifestyle improvement** on the regulation of **breathing** for the activation of the relaxation response, tips for **circadian nutrition** and postural balance, muscle relaxation techniques



**IMPROVEMENT PLAN 2020**  
“Take care of those who took care of us»

**minimal intervention on lifestyle and Resonant breathing Biofeedback for recovery of circadian rhythms and cardiac coherence**



# COVID 19 as a booster in the application of the model

## 4.9 Monitoring and updating: tools for self-assessment of organizational well-being

Training for the **transformation of needs into services**,  
according to the change of the action context  
following the Deming cycle strategy.

### TRANSFORMATION OF NEEDS INTO SERVICES

The results of the pilot study were  
positive.

The HPH members are in the process  
of **making stable the service** in each  
Hospital and Health Service of our  
region.

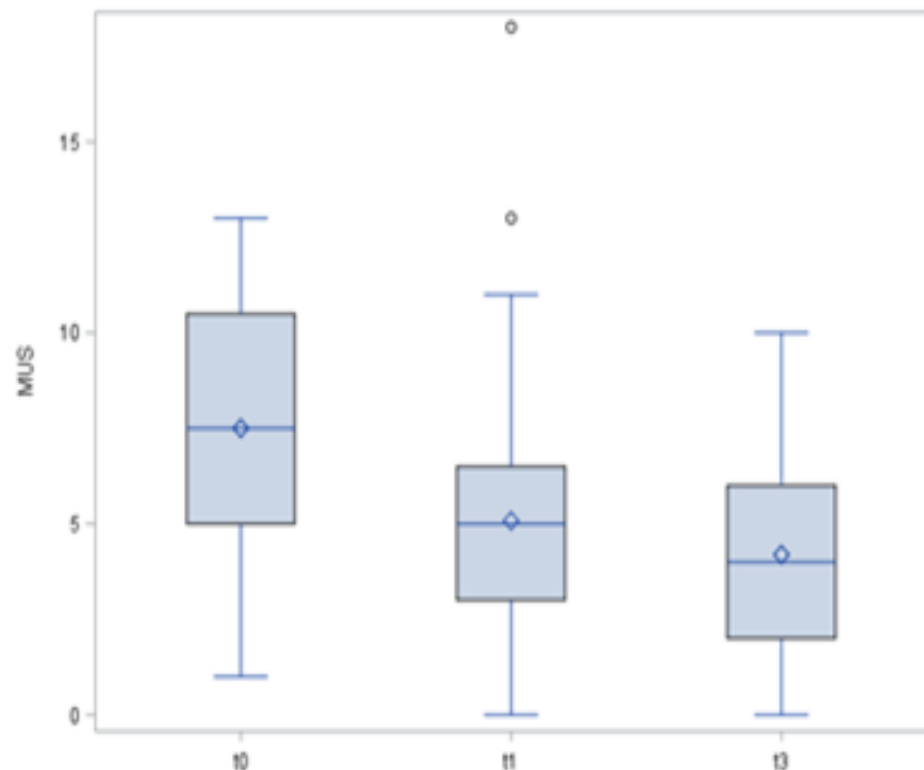
The details of the method “**New integrated stress management strategies for Medically Unexplained Symptoms reduction through lifestyle and circadianity**» will be presented tomorrow, by Dr. Pietro Del Giudice, one of the physicians involved in the project





# Project prototype 2020« Take care of those who took care of us»

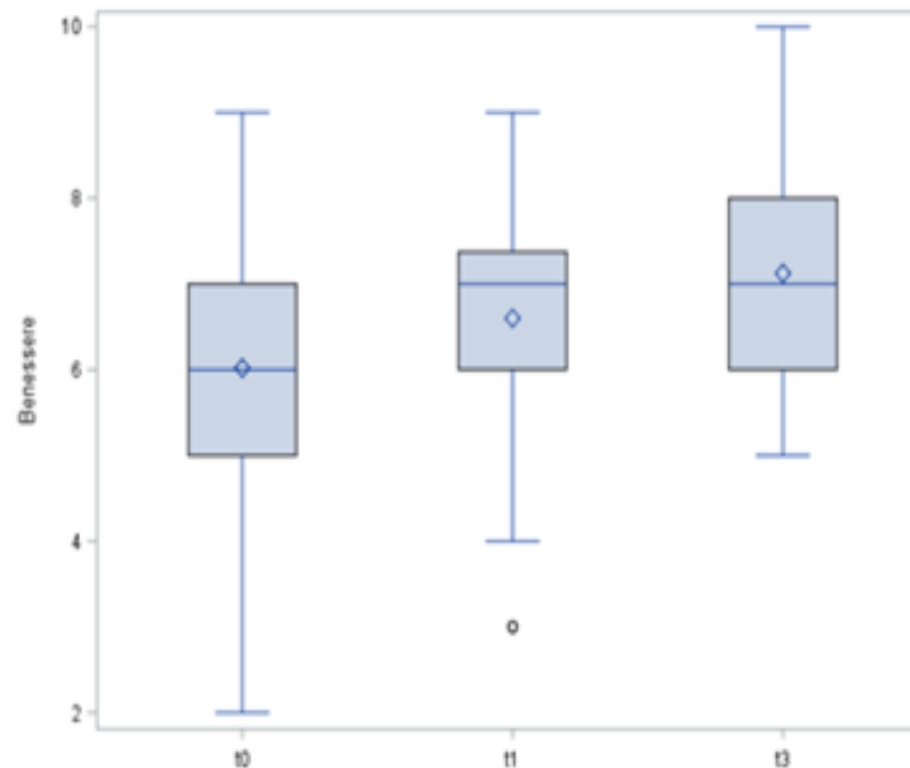
MUS



Wilcoxon Two-Sample Test.  $p < .001$

**Medically Unexplained Symptoms decrease  
from T0 to T2**

SELF RELATED HEALTH



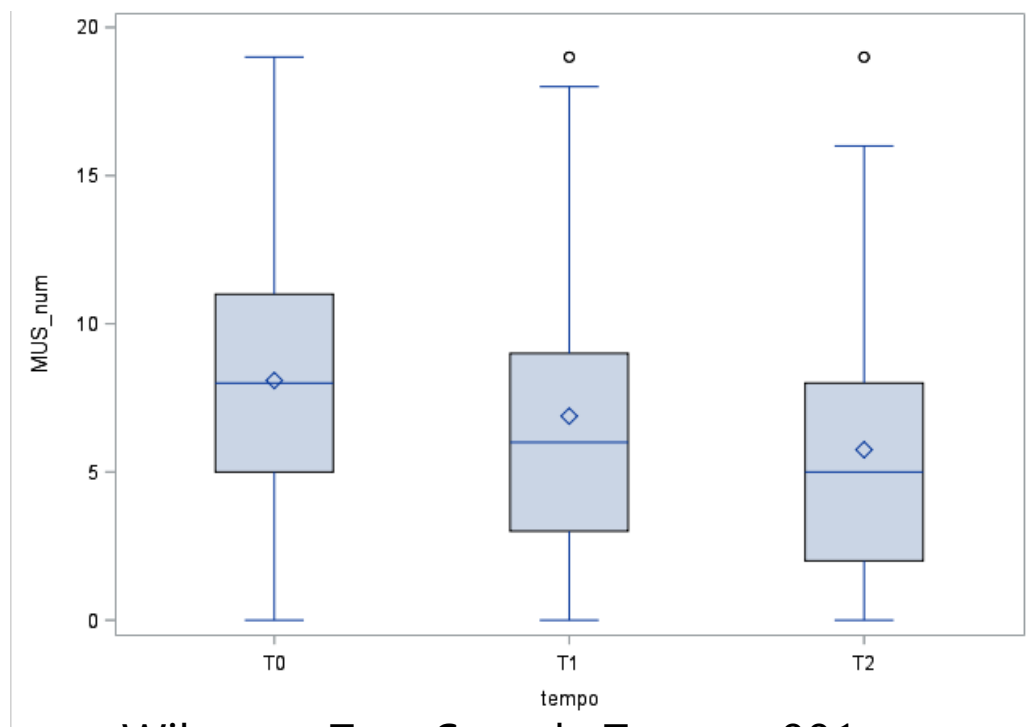
Wilcoxon Two-Sample Test.  $p < .001$

**SELF RATED HEALTH increases from T0 to T2**

# Pilot Study 2021-2023 « Take care of those who take care of us»

- Subjective measures (preliminary analysis)

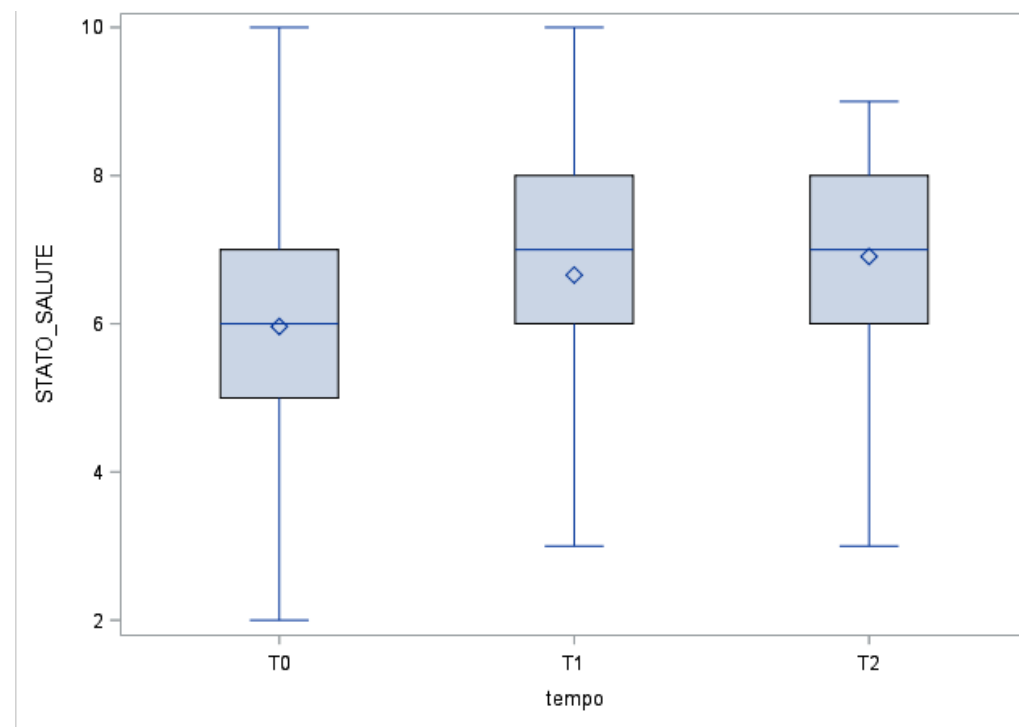
MUS



Wilcoxon Two-Sample Test.  $p < .001$

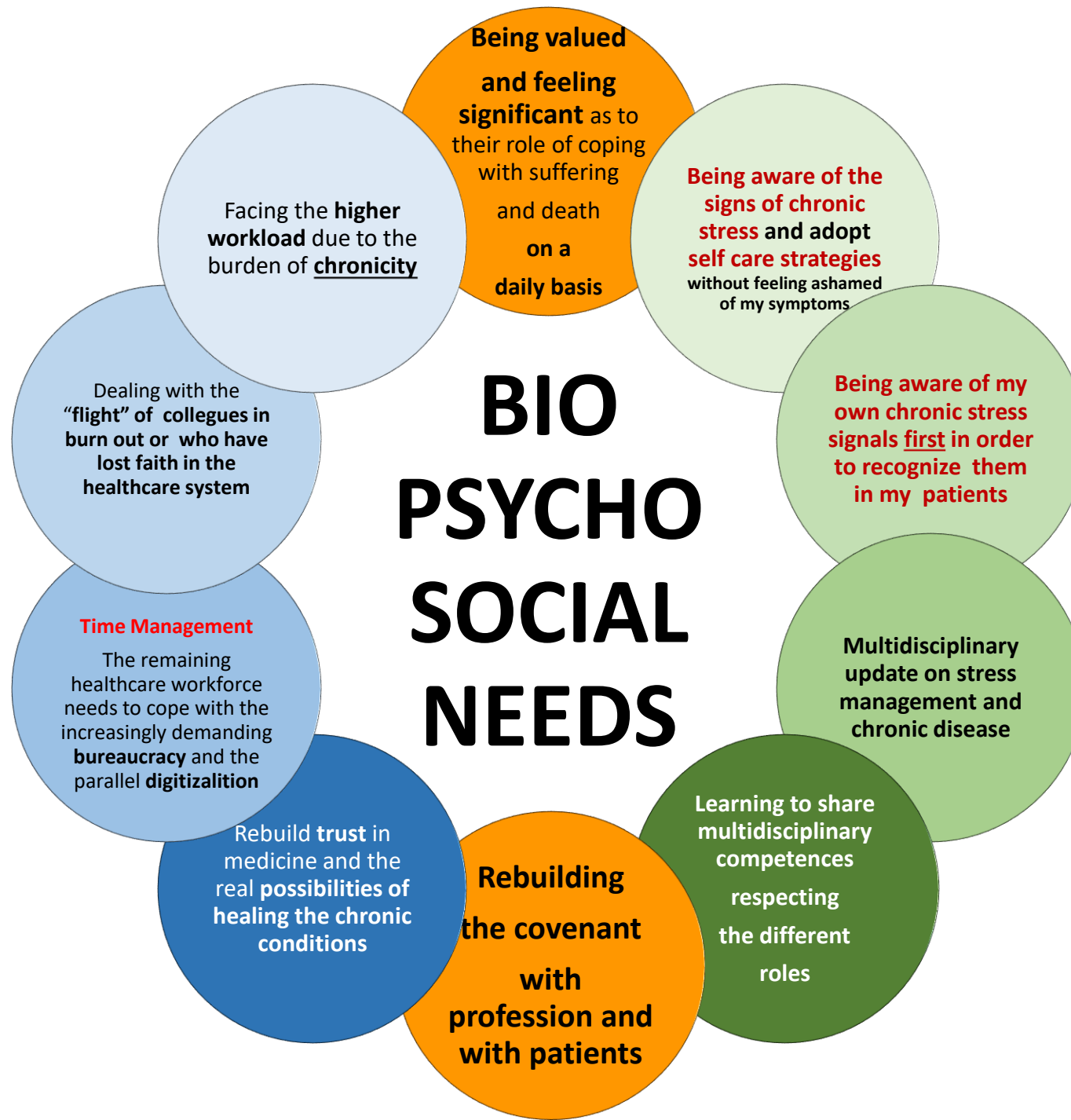
Medically Unexplained Symptoms  
decrease from T0 to T2

SELF RELATED HEALTH



Wilcoxon Two-Sample Test.  $p < .001$

SELF RATED HEALTH increases from T0 to T2





# THE CRUCIAL ROLE OF LEADERSHIP IN THE CHANGE PROCESS

Thanks Prof. Dr. Jürgen Pelikan  
The one who started the change process

**STOP THINKING STRESS  
AS ONLY PSYCHOLOGICAL**

**SELF ASSESSMENT AND IMPROVEMENT  
PLANS**

**SCIENTIFIC UPDATE ON THE CAUSES OF  
MEDICALLY UNEXPLAINED SYMPTOMS  
(MUS), INFLAMMATION AND RELATION  
WITH NCD**

**BEING AWARE OF THE ALLOSTATIC  
LOAD OF THE INDIVIDUAL AND OF  
THE ORGANIZATION**

**ADVOCATE LIFESTYLE  
INTERVENTION IN THE  
HEALTHCARE SETTING**

## *Health Organization*

QUARTERLY STUDIES AND INFORMATION ON HEALTH SYSTEMS

Anno XLVI - N. 4 Ottobre-Dicembre 2022

### **SOMMARIO / SUMMARY**

**La Rete Health Promoting Hospitals and Health Services (HPH)  
nella Regione Friuli Venezia Giulia:  
uno strumento utile per promuovere il benessere degli operatori sanitari ..... 3**  
J. POLIMENI, M. ANDREATTI, C. AGUZZOLI

*Network of Health Promoting Hospitals and Health Services (HPH) in Friuli Venezia Giulia Region:  
a useful tool to improve wellbeing of health professionals*

Network of Health Promoting Hospitals and Health Services (HPH) in Friuli Venezia Giulia Region: a useful tool to improve wellbeing of health professionals.

**HIGH ATTENTION TO RECIPROCITY  
BETWEEN WELLBEING OF HEALTHCARE  
WORKERS AND TRUST OF PATIENTS IN  
HEALTHCARE SYSTEM**



# Thanks for your attention!

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