Definitions / Biology of Frailty

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SIOG

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FRAILTY - DEFINITIONS

Fried

A state of age-related physiologic vulnerability resulting from impaired homeostatic reserve and a reduced capacity of the organism to withstand stress.

Rockwood

A precarious balance easily perturbed.

Clipp

A breeze could tip him over.

CLINICAL SYNDROME of FRAILTY

Symptoms

- Weight loss
- Weakness
- Fatigue
- Anorexia; decreased food intake
- Inactivity

Signs

- Sarcopenia
- Osteopenia
- Balance and gait abnormalities
- Deconditioning
- Undernutrition
- Slow gait speed

Risk

- Decreased resiliency/ability to respond to stressors

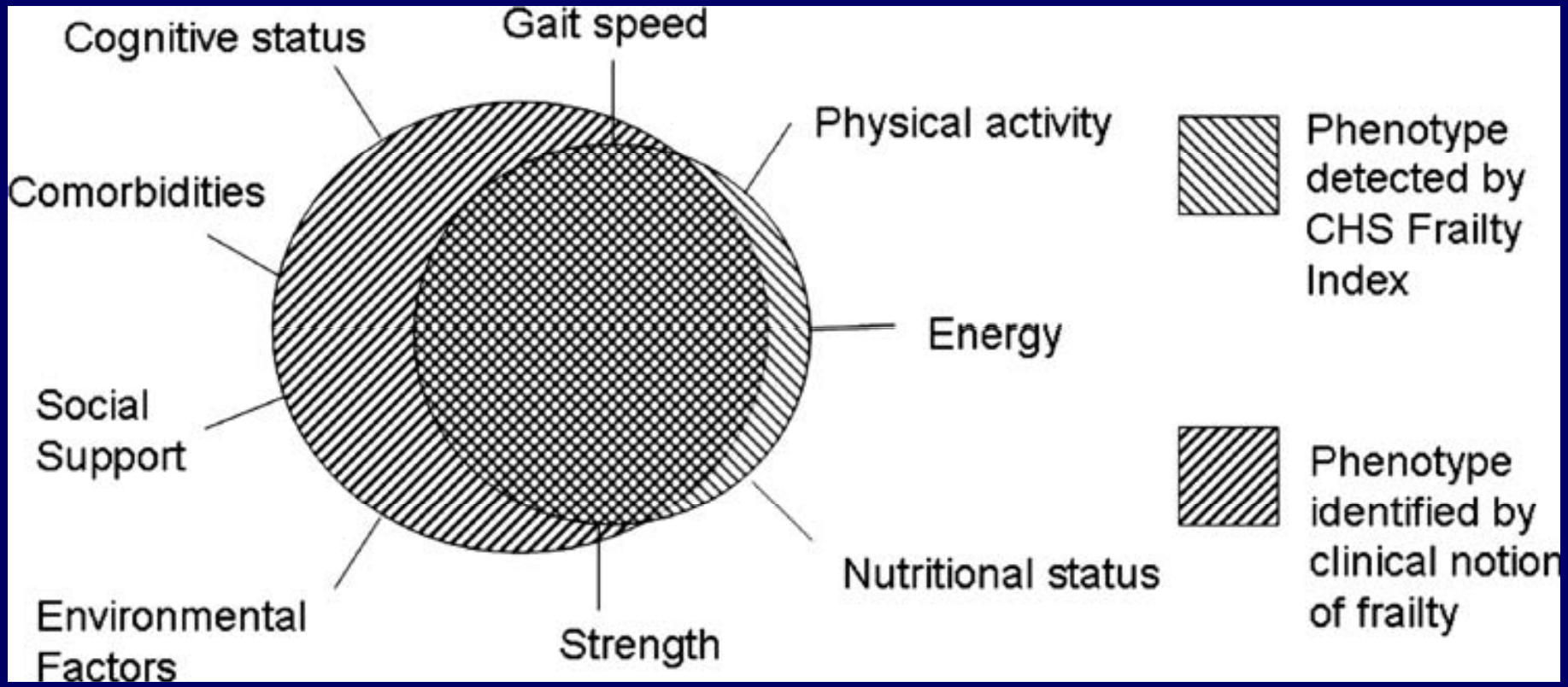
Unconventional Views of Frailty

Special Article

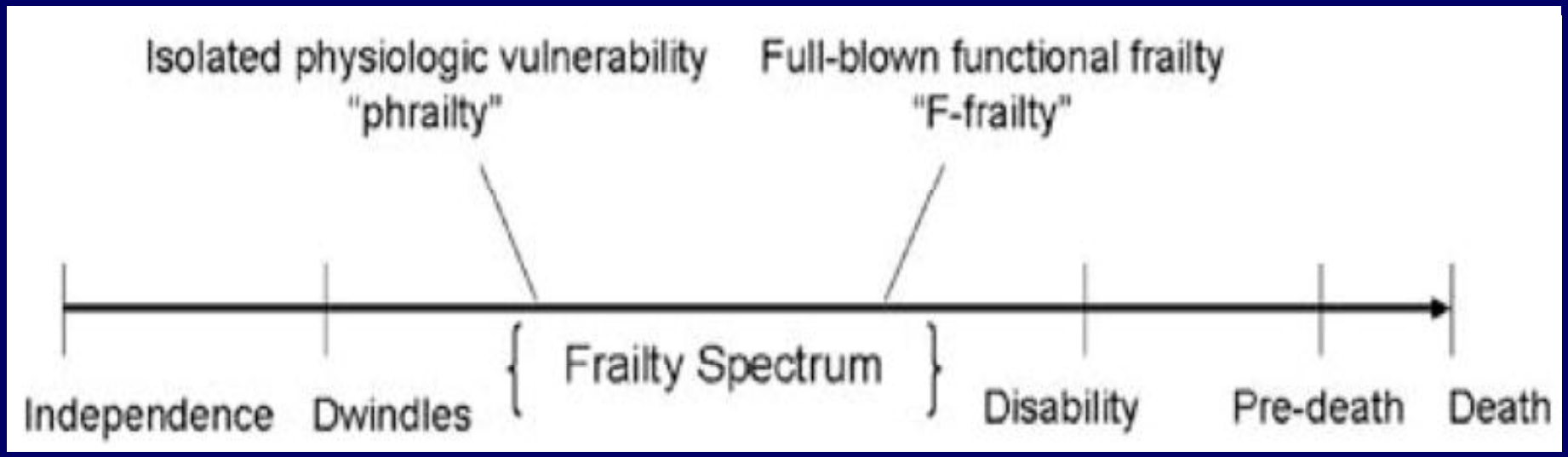
Frailty Thy Name Is … Phrailty?

Heather E. Whitson,[1,2] Jama L. Purser,[1] and Harvey J. Cohen[1,2]

Whitson, JGMS, 62:728, 2007

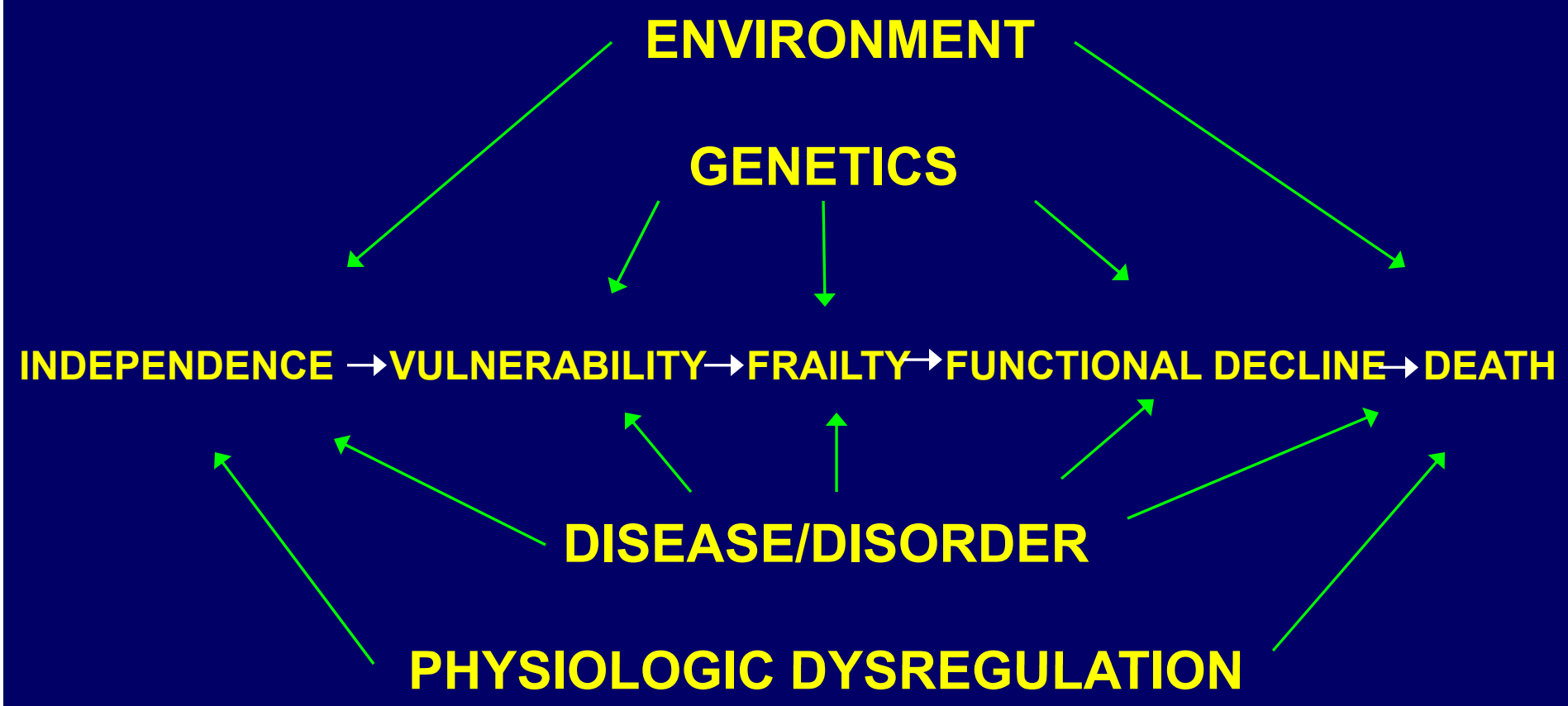


Whitson, JGMS 62:728, 2007



Whitson, JGMS, 62:728, 2007

PATHWAYS TO MORTALITY

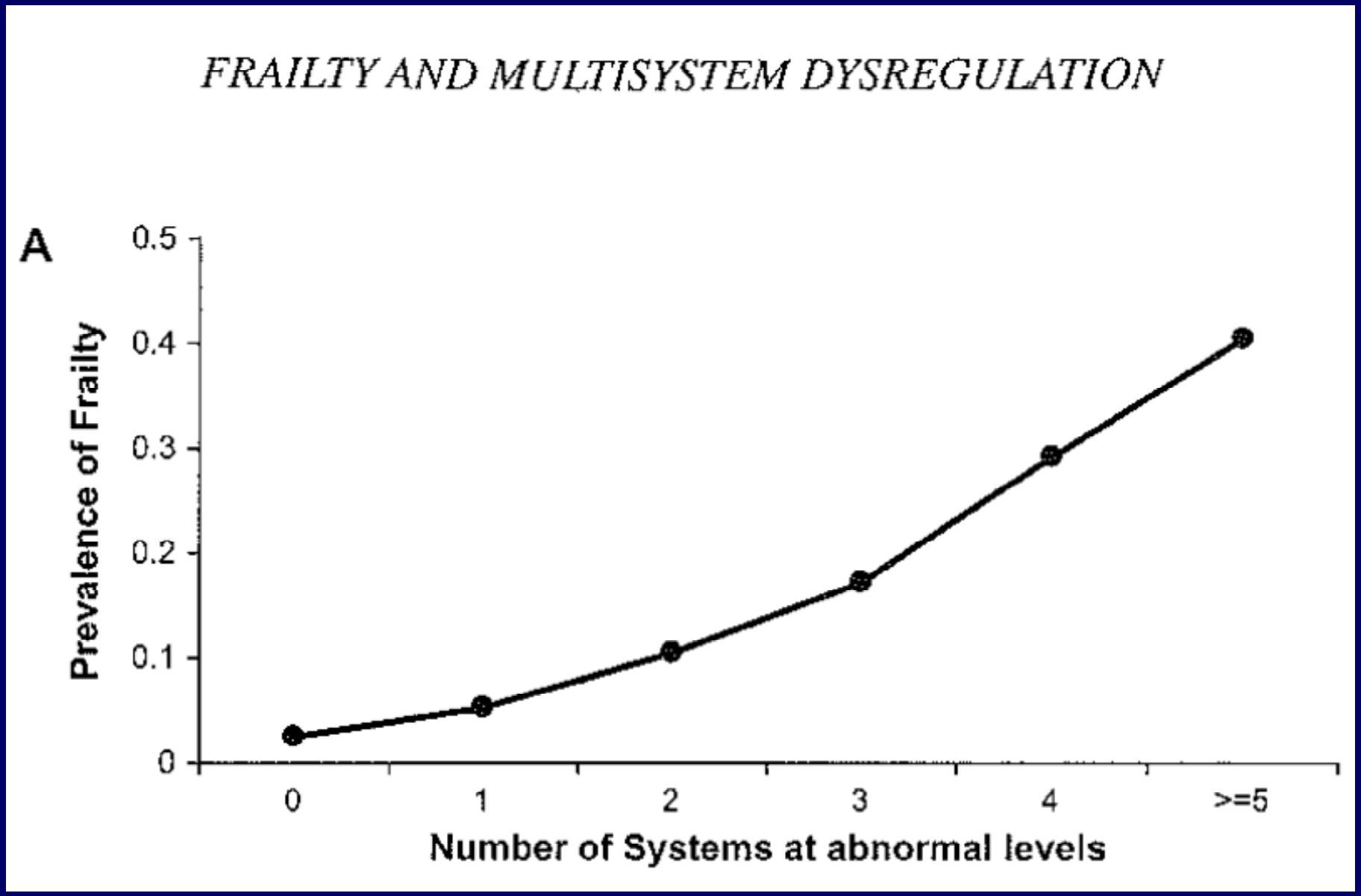


FRAILTY DEFINITIONS OBJECTIVE

1. Phenotypic*
   a. Weight Loss
   b. Exhaustion
   c. Weakness
   d. Slow Walking Speed
   e. Low Physical Activity

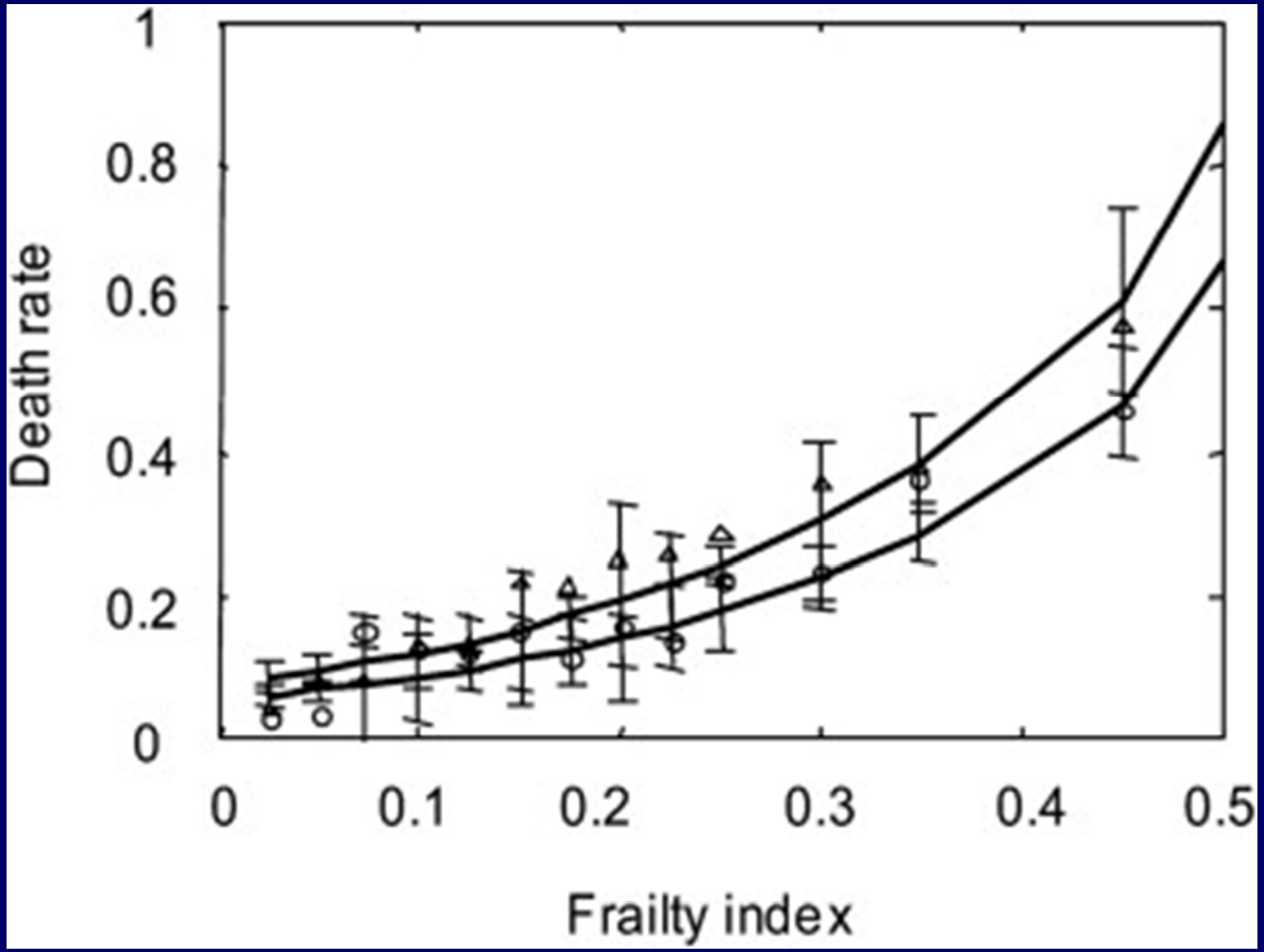
2. Deficit Accumulation Index**
   a. Total # potential deficits
   b. Actual # of deficits
   c. b ÷ a = index

*Fried, J Gerontol A 56: M146, 2001
** Rockwood, Clinics in Geri Med 27:17, 2011



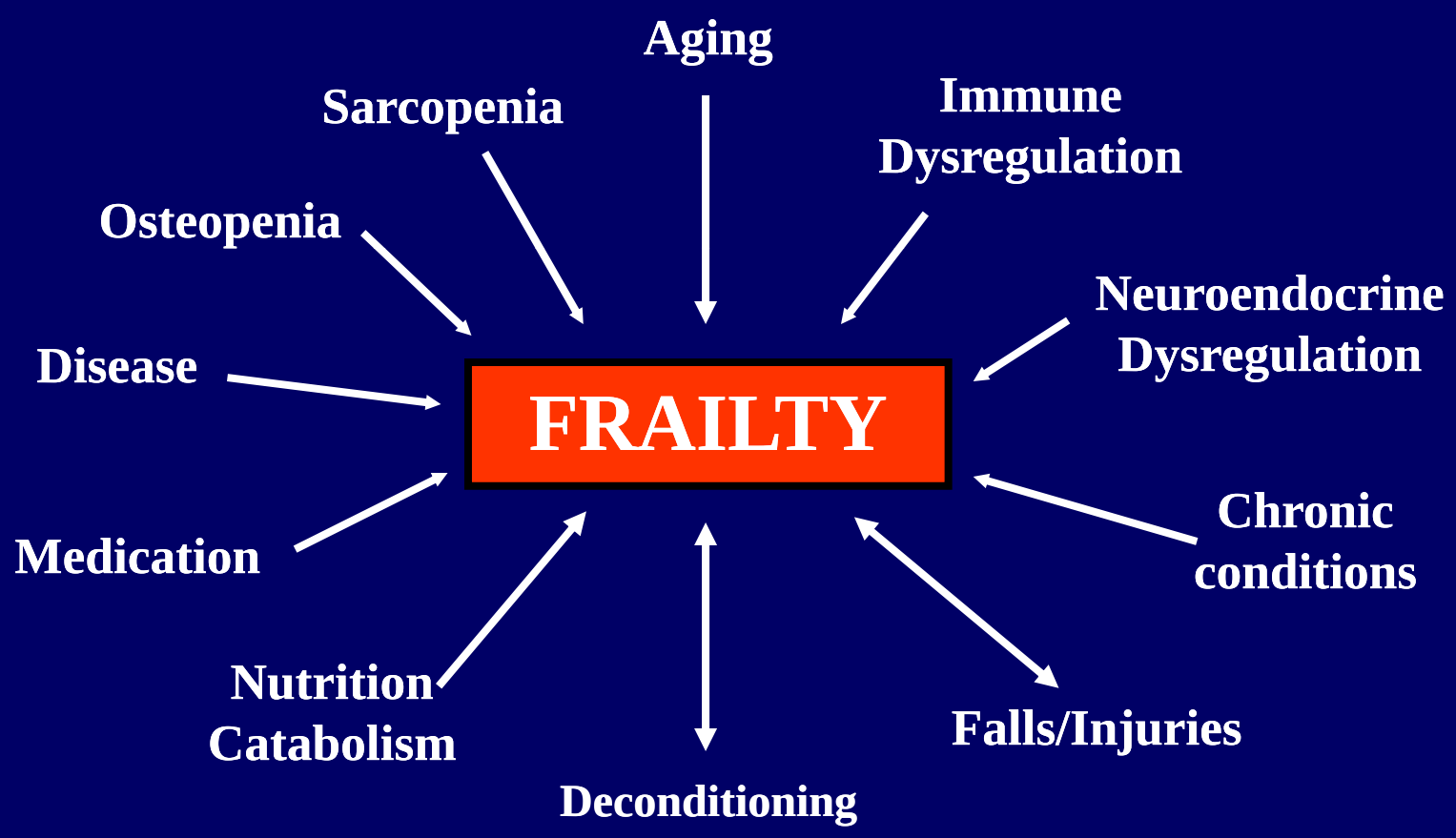
Physiologic systems: Hematologic, immune, endocrine, adiposity, neuromuscular, micronutrients

Fried LP et al. *J of Geron* 64A: 1049, 2009

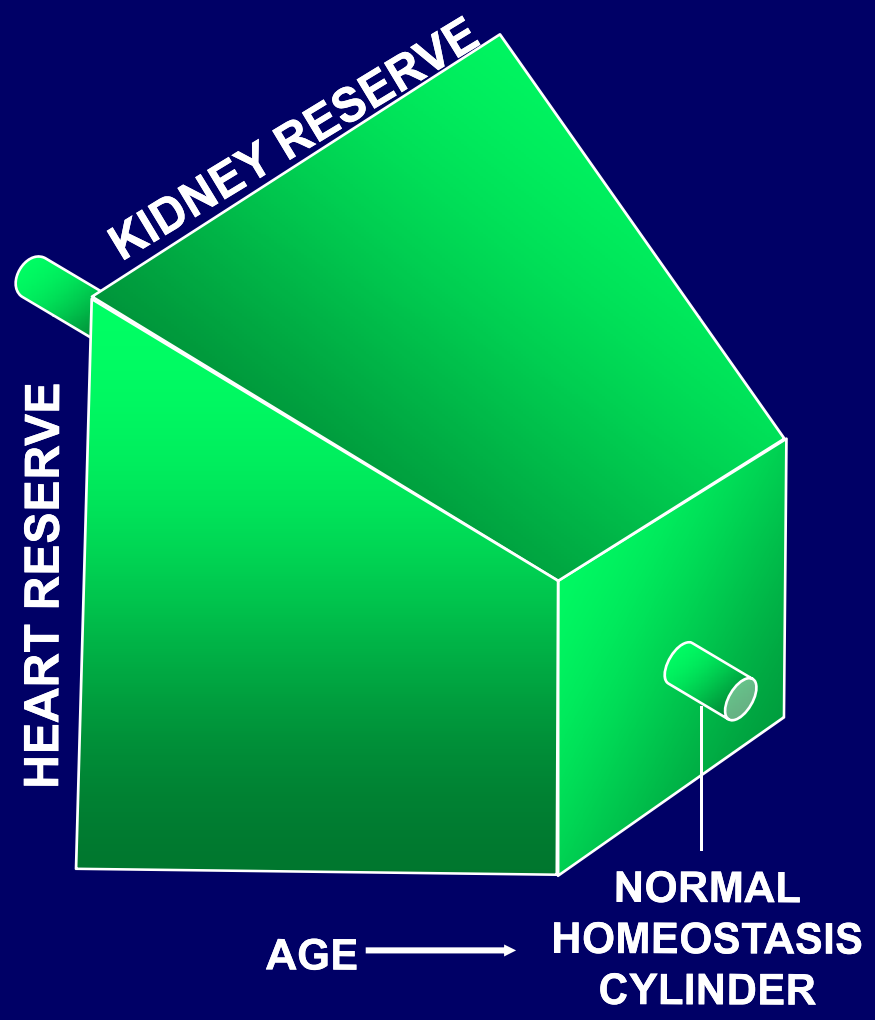


Rockwood, et al. Clin Geriatr Med. 27:17, 2011

CONTRIBUTORS TO FRAILTY

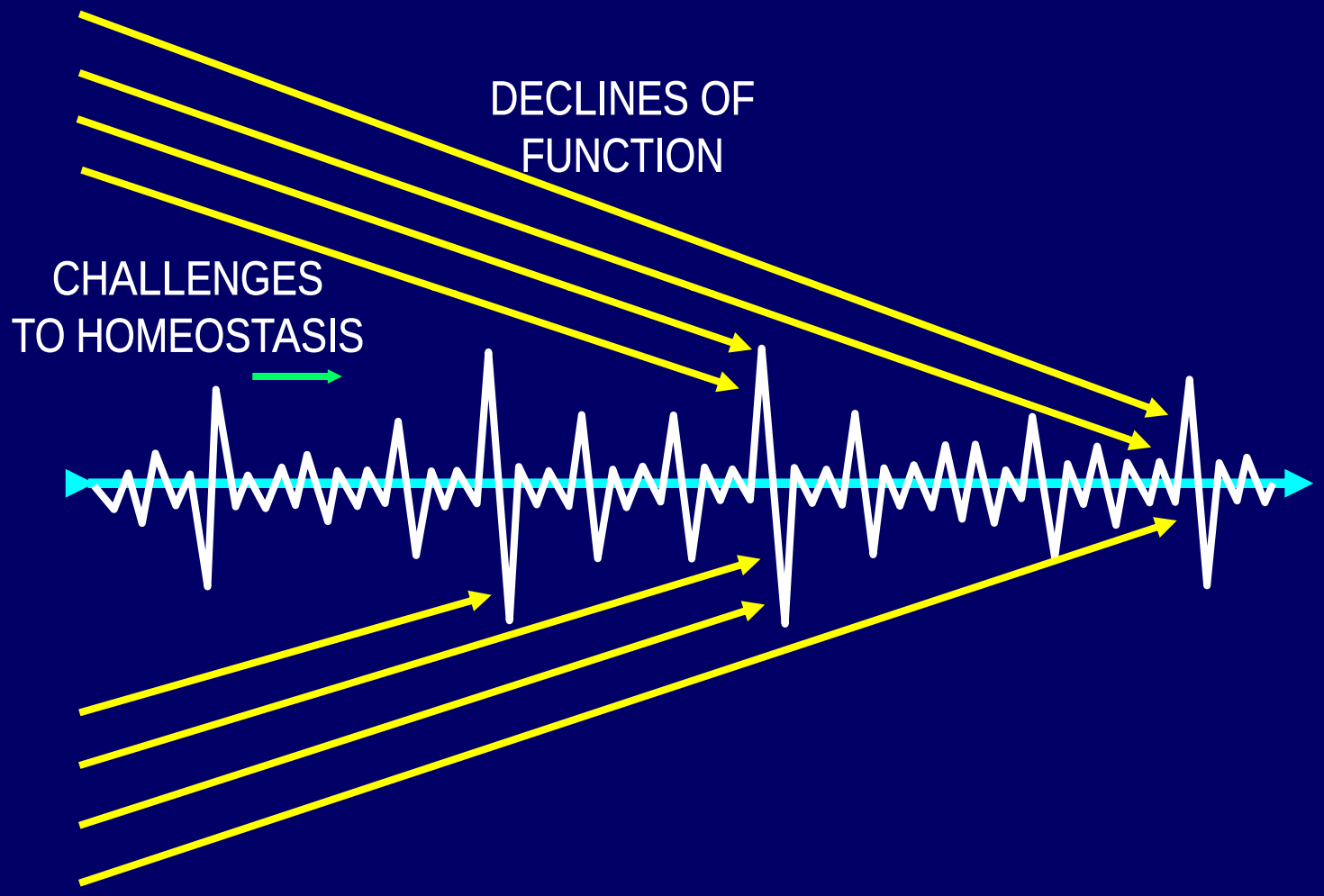


HOMEOSTATIC RESERVE

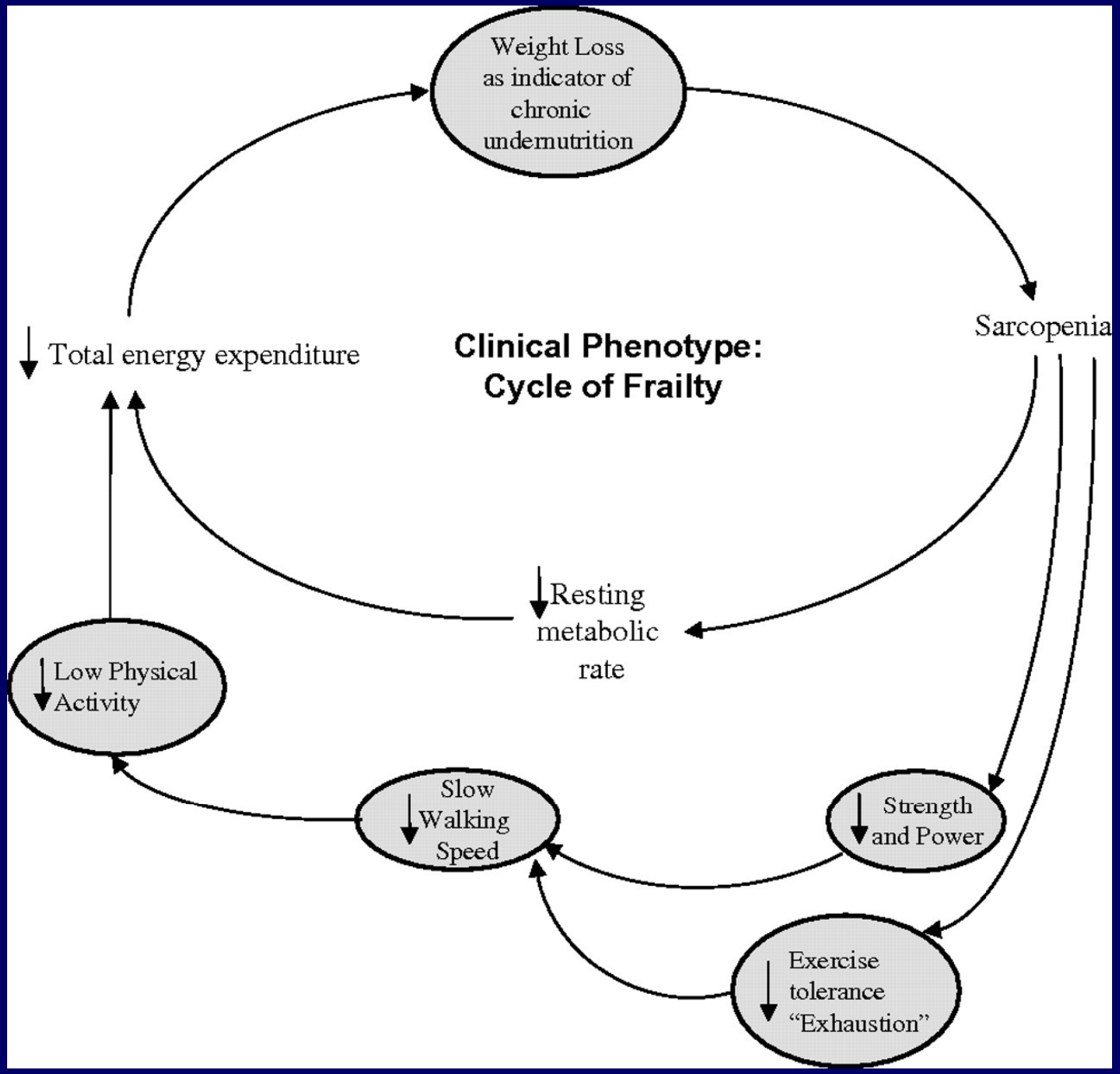


Fries, 1981

FUNCTION AND MORTALITY



From Fries, 1981

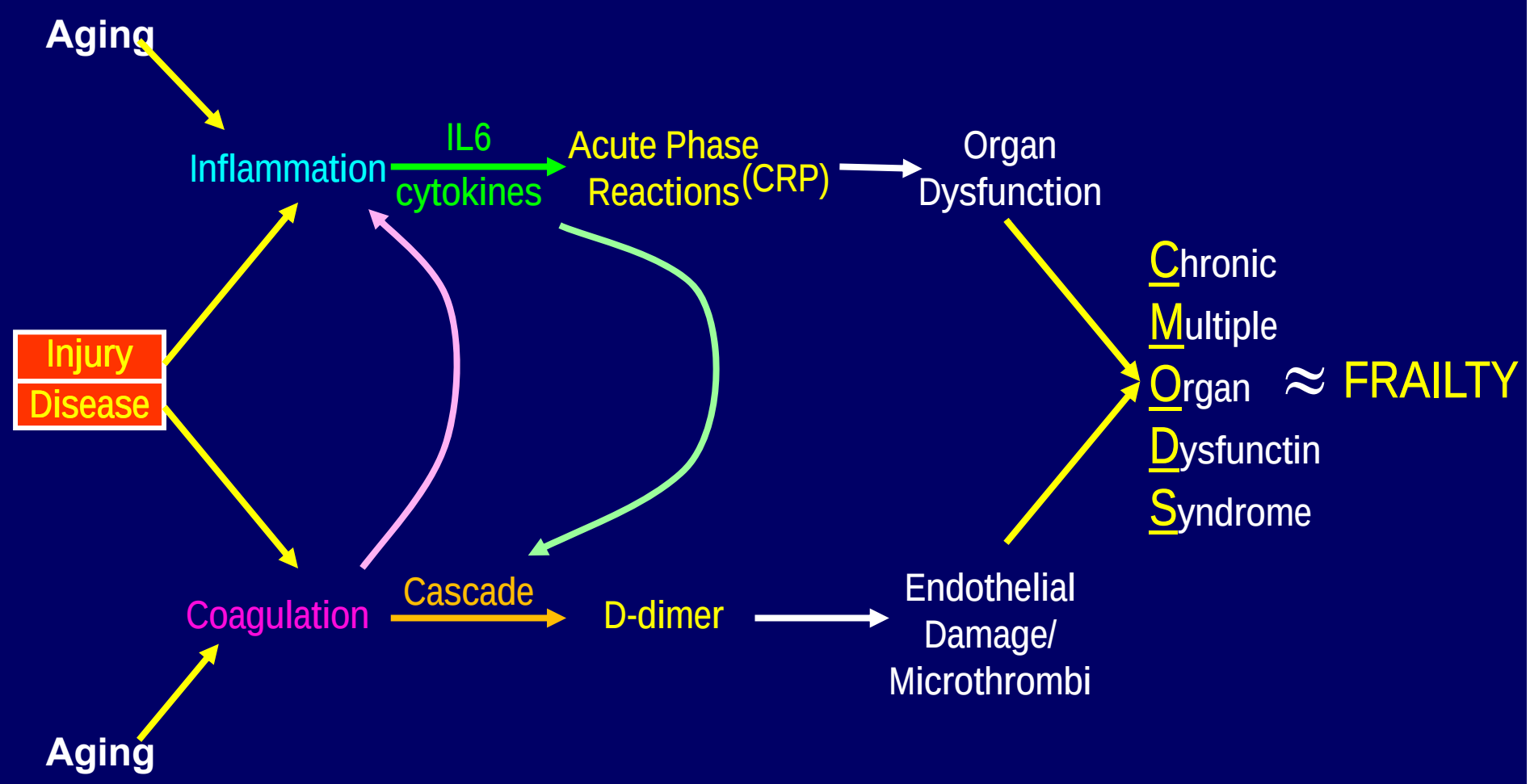


Fried LP et al. *J of Geron* 64A: 1049, 2009

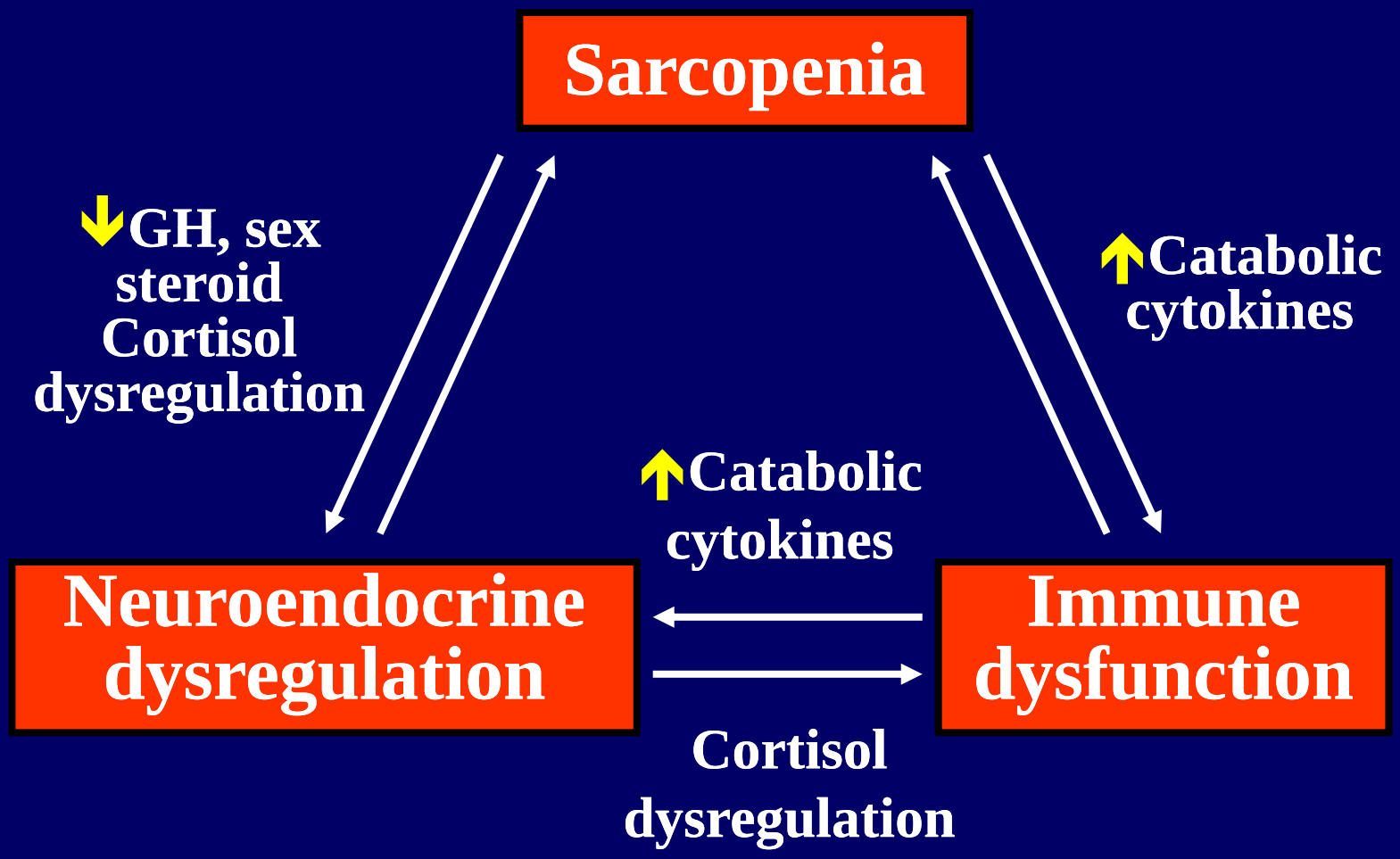
AGE-RELATED PHYSIOLOGIC SYSTEM DECLINES CENTRAL TO THE SYNDROME OF FRAILTY

Sarcopenia	Immune Dysregulation	Neuroendocrine Dysfunction
↓ Skel muscle mass	↑ Memory cells	↓ Growth hormone
↓ Vo2max	↓ Naive cells	↓ Estrogen
↓ Strength exer. tol	↓ IL-2	↓ Testosterone
↓ Thermoreg	↑ IgG, IgA	Cortisol dysteg
↓ Energy expend	↑ IL-6, IL-1β	↑ Sympath tone
↑ Insulin resist	↓ Mitogen resp.	

INFLAMMATION - COAGULATION INTERFACE AND FRAILTY



DYNAMICS OF FRAILTY



Cellular Factors in Loss of Homeostasis

- Apoptosis
- Senescence
- Repair
  - Autophagy

The sign in the West Virginia lunch counter read:
Don't criticize the coffee.
You may be old and weak yourself someday.