



## *Transforming Everyday Life into Extraordinary Ideas*




# Measuring Frailty in Canadian Population using CLSA data

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Kanters DM, Griffith LE, Hogan DB, Patterson C, Richardson J, Raina P.
*J Epidemiol Community Health* 2017;**71:**794-799.

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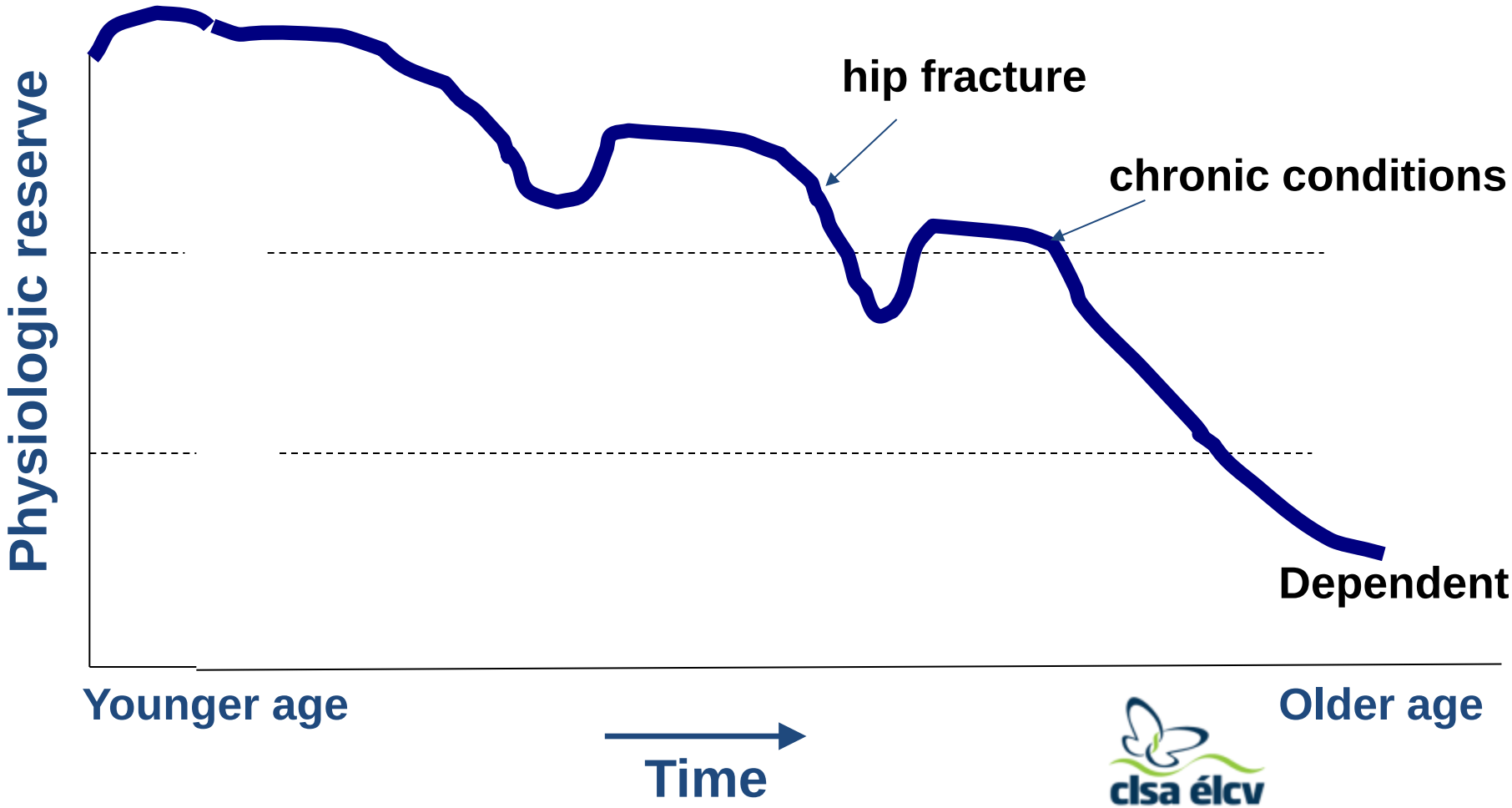
# Perception of Aging

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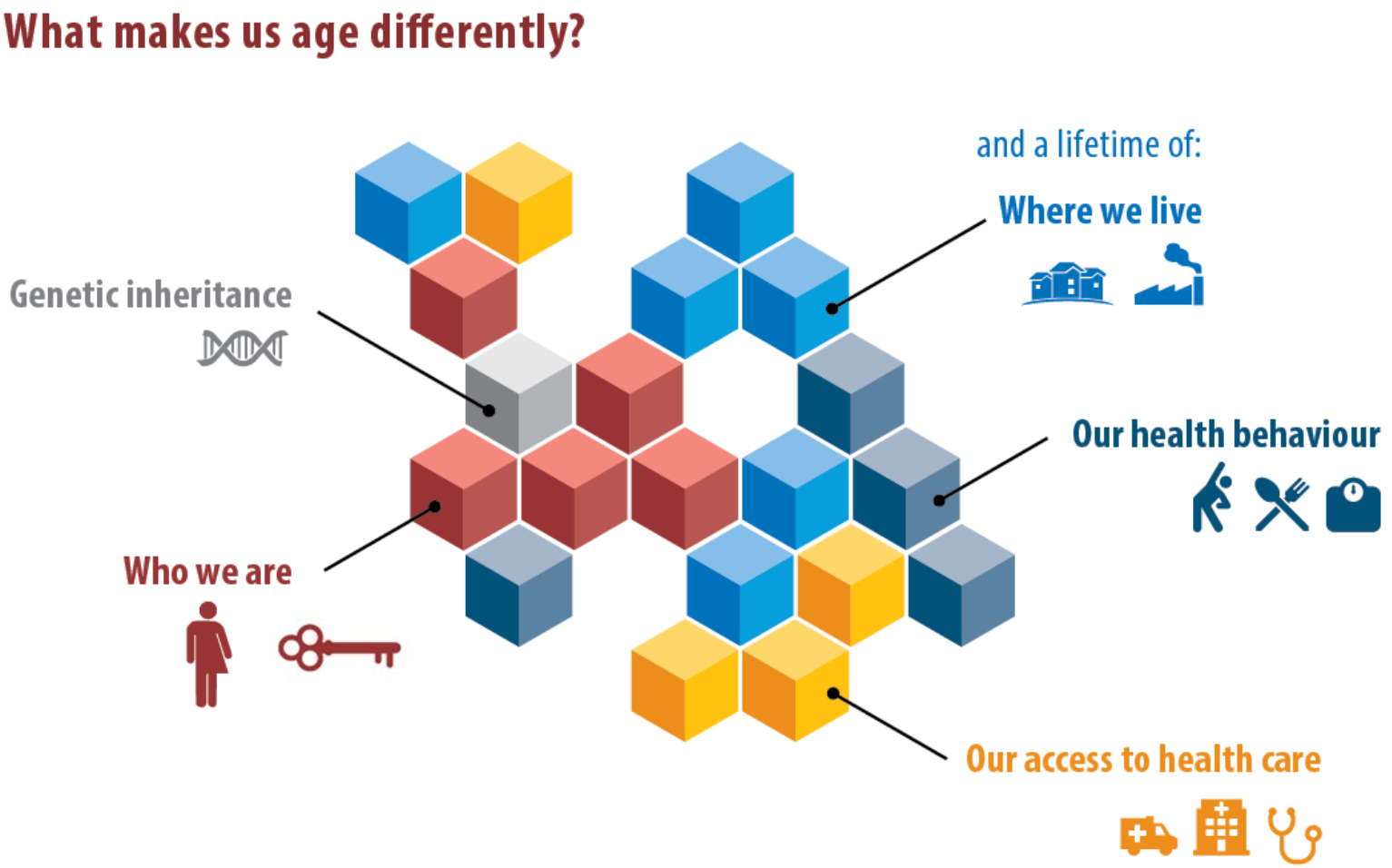
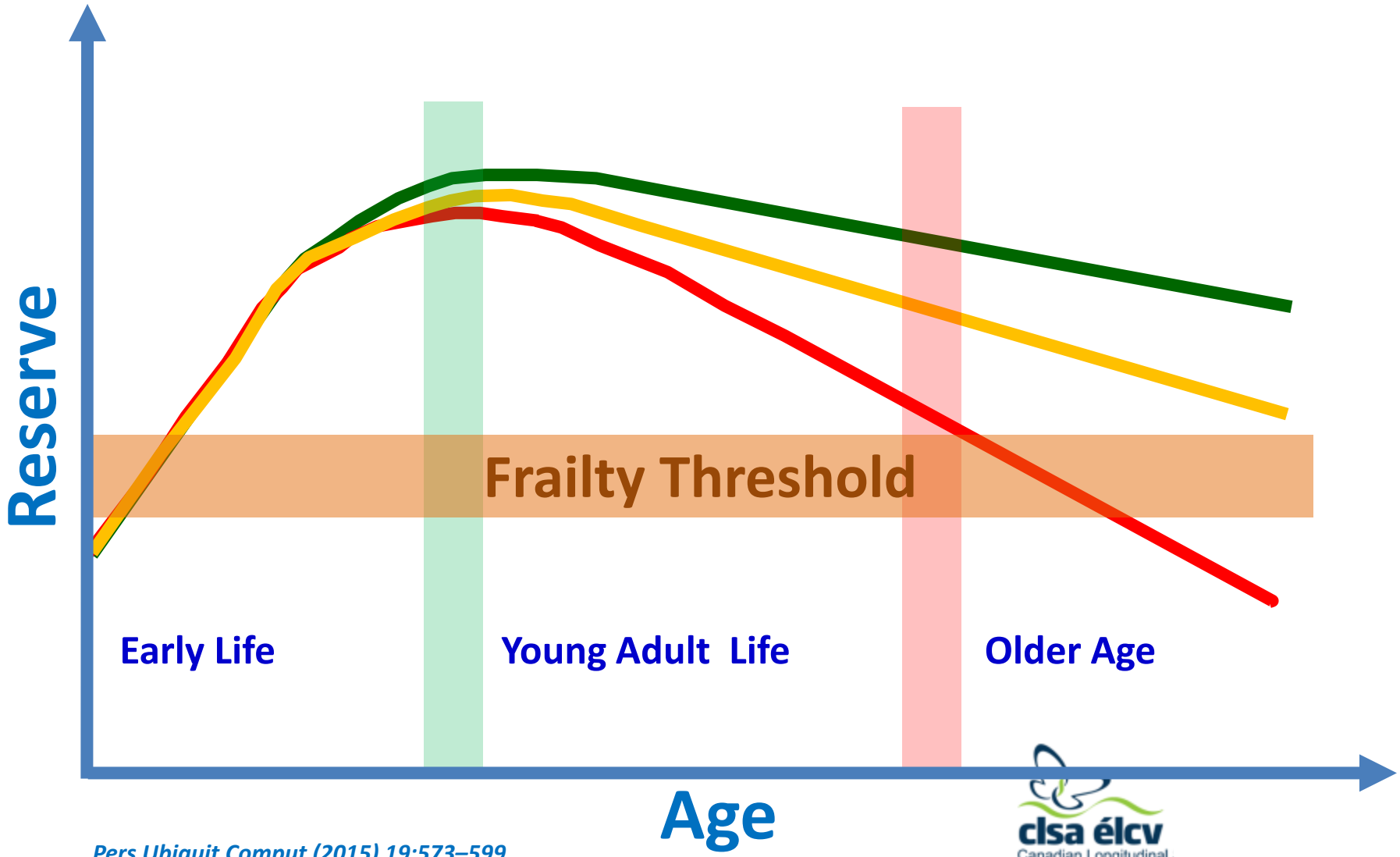
# There is no “typical” older person

# Health and Functional Abilities in older age are not random



# Heterogeneity of Aging




*Pers Ubiquit Comput (2015) 19:573–599*

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# What is Frailty?

- Current consensus definition:

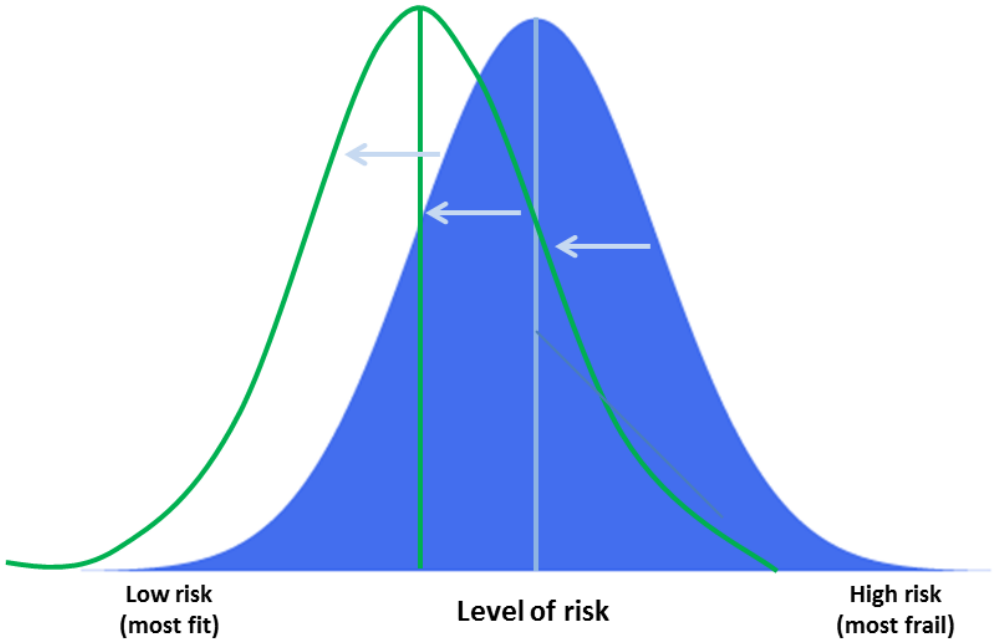
*"Frailty is a clinical state in which there is an **increase** in an individual's **vulnerability** for developing increased **dependency** and/or **mortality** when exposed to a **stressor***."*

*A "stressor" is a health problem or life event that happens to you, such as a new diagnosis, hospitalization, or death of a loved one.

**Morley JE, Vellas B, Abellan van Kan G, Anker SD, Bauer JM, Bernabel R et al. Frailty consensus: a call to action. J Am Med Dir Assoc. 2013. 14(6): 392-7**

# Why Measure Frailty?

- Early identification of frailty
- Better prevention and treatment options
- Shift level of population risk

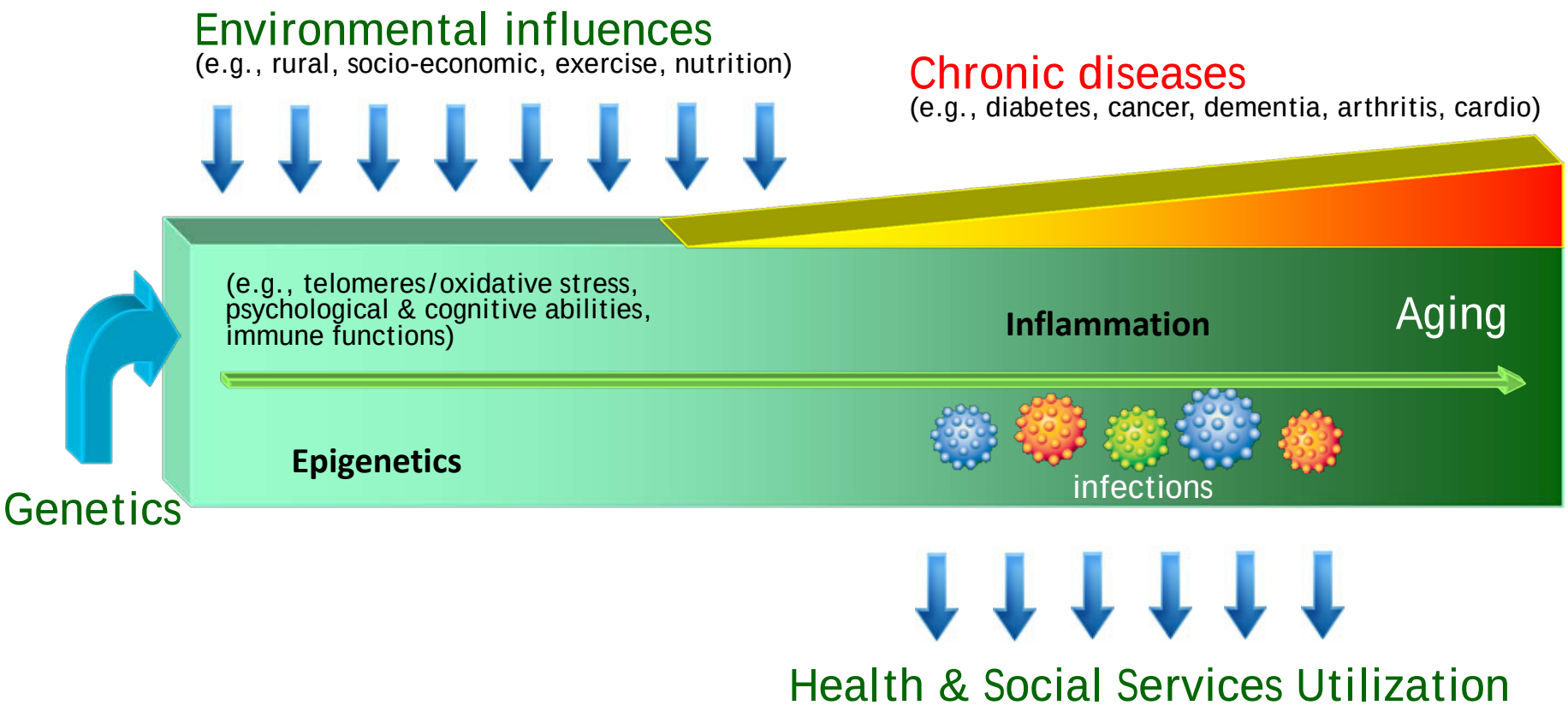


# Challenges

- A good measure should help us understand more about frailty, including:
  - How it develops biologically
  - How it affects function and health over time
  - How it relates to social, environmental and behavioural factors
- This requires longitudinal, population-based data with great breadth

**→ The CLSA**

# CLSA

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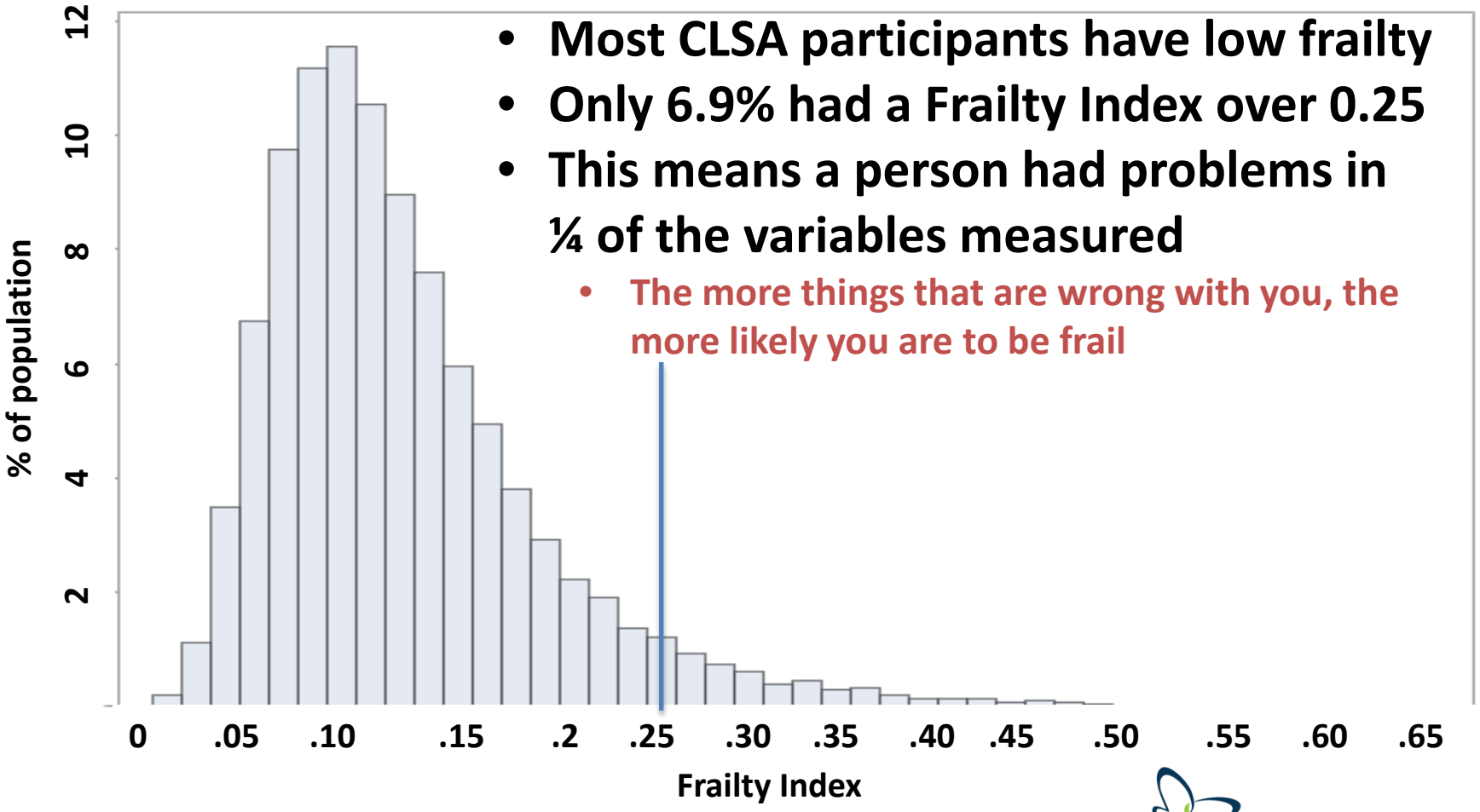
# Objectives

- Measure frailty in the CLSA
  - Create a Frailty Index that can be used to measure frailty in the population
  - Measured as proportion of many health deficits
    - Includes physical, psychological, and social measures
- What do we think is related to frailty?
  - How closely does the Frailty Index fit these expectations?

# Frailty Index Distribution




- **Most CLSA participants have low frailty**
- **Only 6.9% had a Frailty Index over 0.25**
- **This means a person had problems in ¼ of the variables measured**
  - **The more things that are wrong with you, the more likely you are to be frail**

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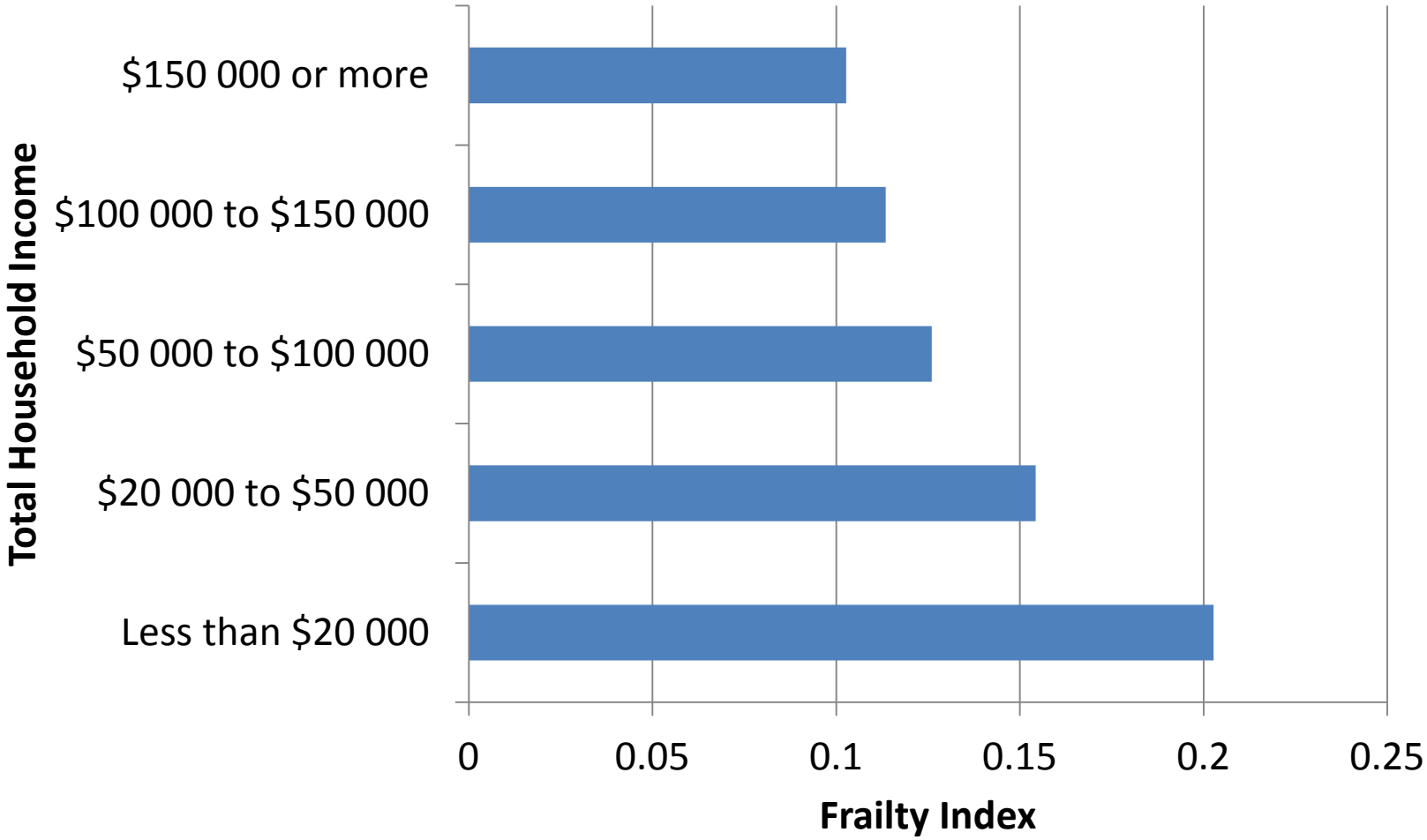
# Frailty and Income

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# How did we assess the validity of the CLSA Frailty Index?

| Less Frail | More Frail |
| --- | --- |
| • Younger | • Older |
| • Male | • Female |
| • High income | • More falls |
| • High education | • More injuries |
| | • Need home care |
| | • Use a cane, walker, or wheelchair |
| | • Social Isolation |

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# Frailty ➡ Limitations ➡ Social Isolation and its Impact on Biology

**BRAIN**

**Social Isolation (STRESS)** ➡ **Sympathetic Nervous System β-adrenergic stimulation**

⬇

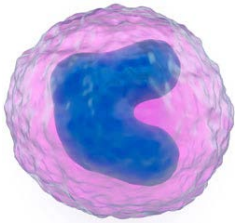
***Norepinepherine***

➡ ***GM-CSF*** **(from Monocytes?)** ➡

**Monocyte expansion**

**Bone Marrow**

⬆



**New monocytes are….**

- **↑ Inflammation**
- **↓ IFN genes**
- **↓ GC sensitivity**
- **↑ CTRA (Conserved Transcriptional Response to Adversity)**

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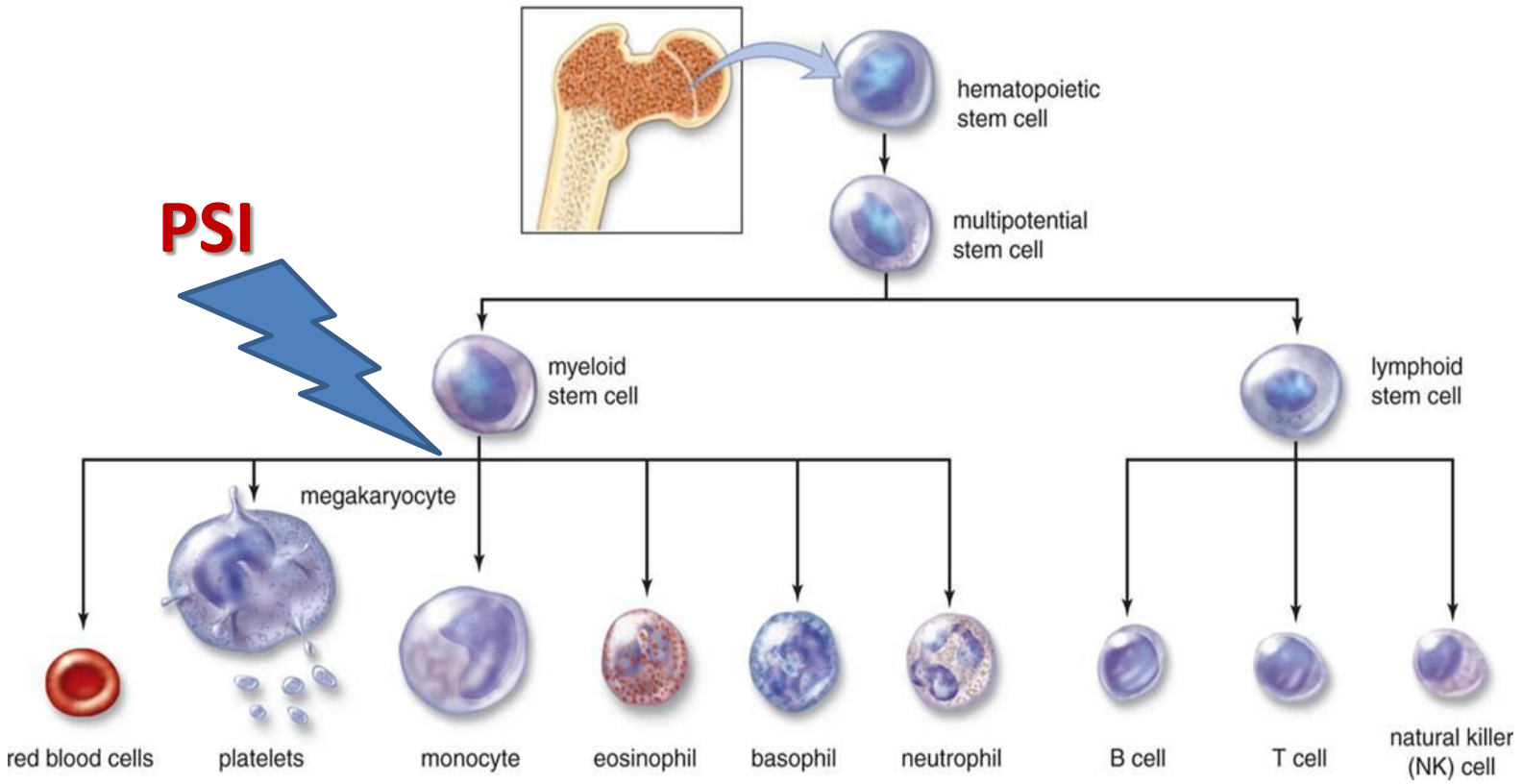
# Myeloid cells

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# Summary

- Why measure frailty in the population?
  - Changes in frailty over time will allow us to develop trajectories to assess health and community care needs of aging populations
  - Identify triggers of frailty at the population and individual levels to design health promotion strategies to prevent decline and dependence
  - Inform the development of Interventions for clinical care at the level of individuals





# Are there any questions?