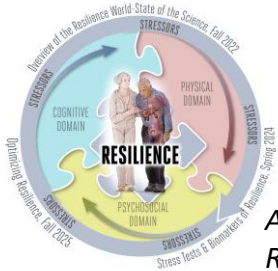


# Topic 1: Resilience in Action: What we do (not) know

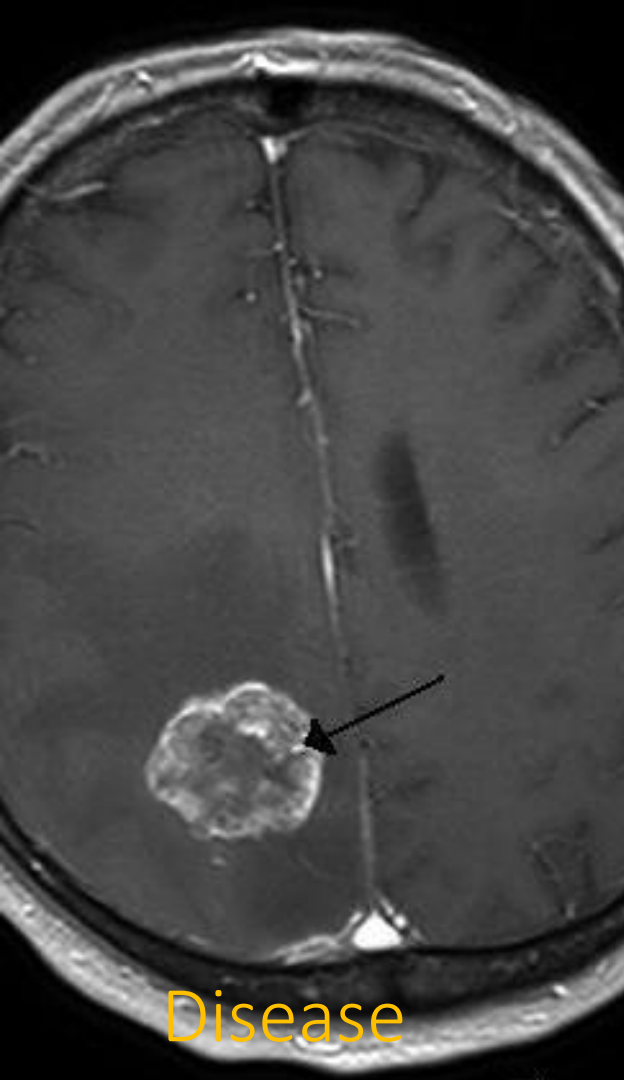
## Physical Resilience

René Melis MD PhD, senior researcher geriatric epidemiology  
Department of geriatric medicine



*AGS/NIA R13 Bench-to-Bedside Conference Series Overview of the Resilience World – State of Science – 12 & 13 October 2022*

Radboudumc



Disease

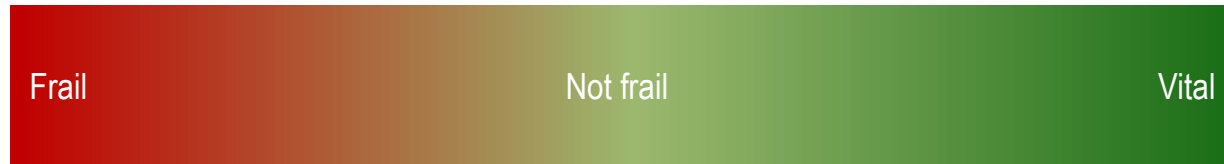


Personalized care

SDM

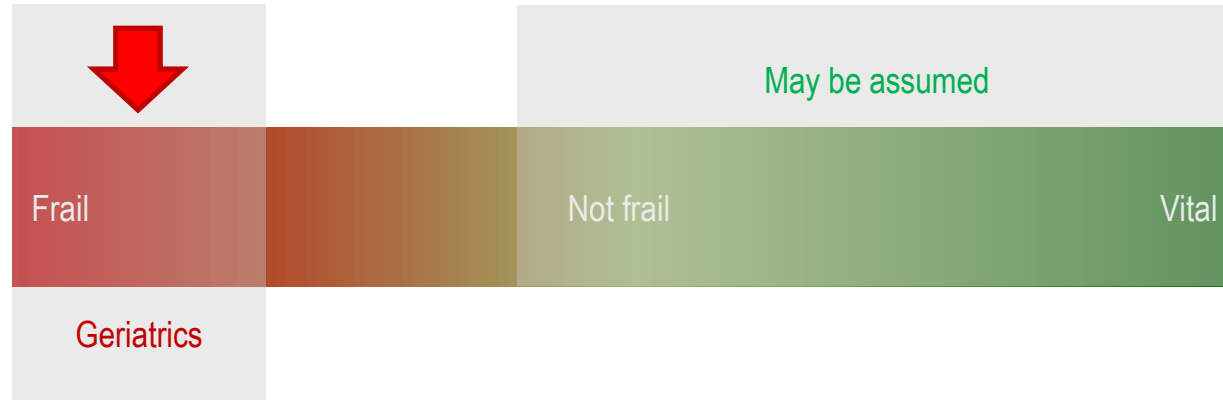
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# Aging spectrum



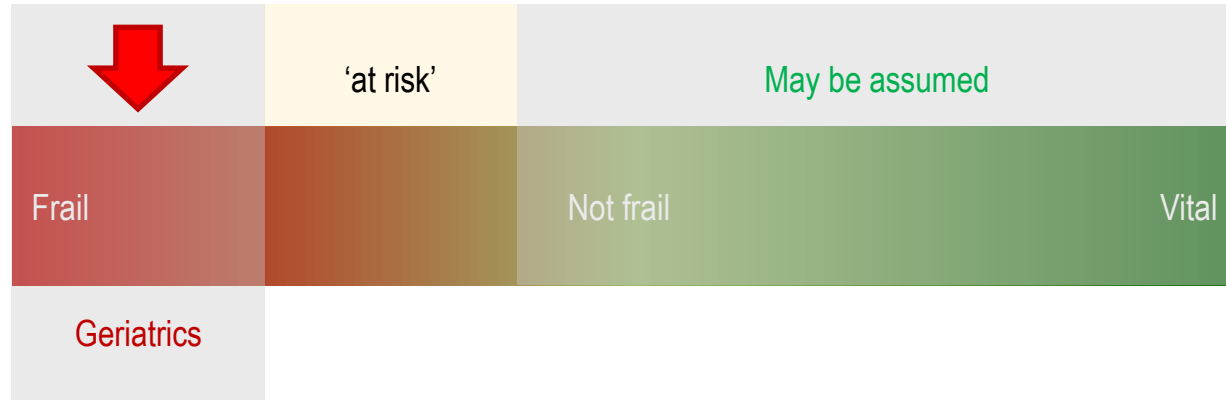
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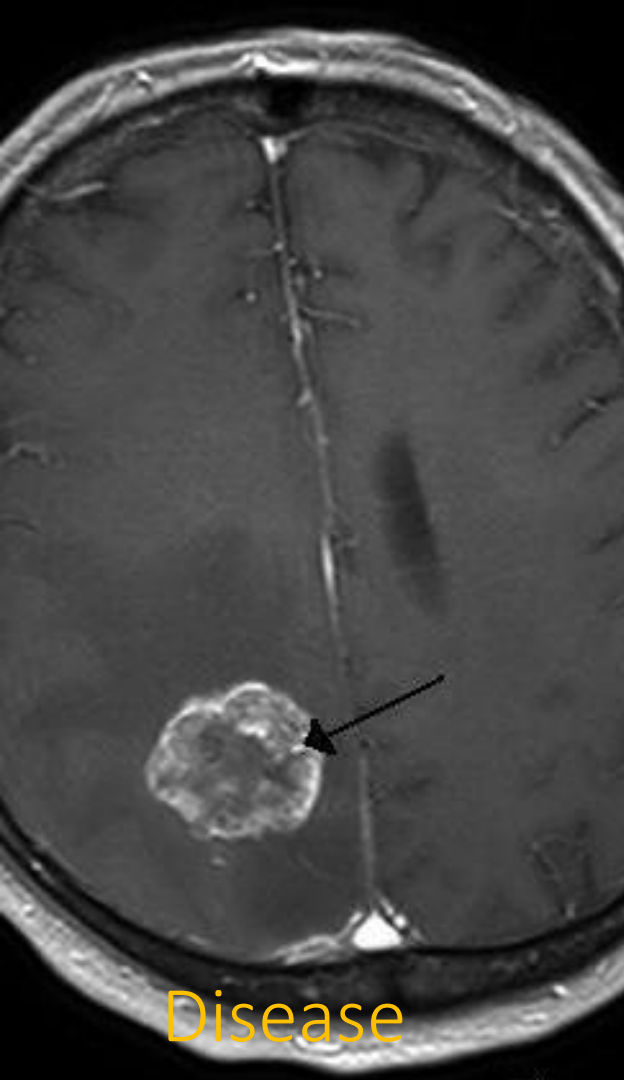
# Recovery capacity



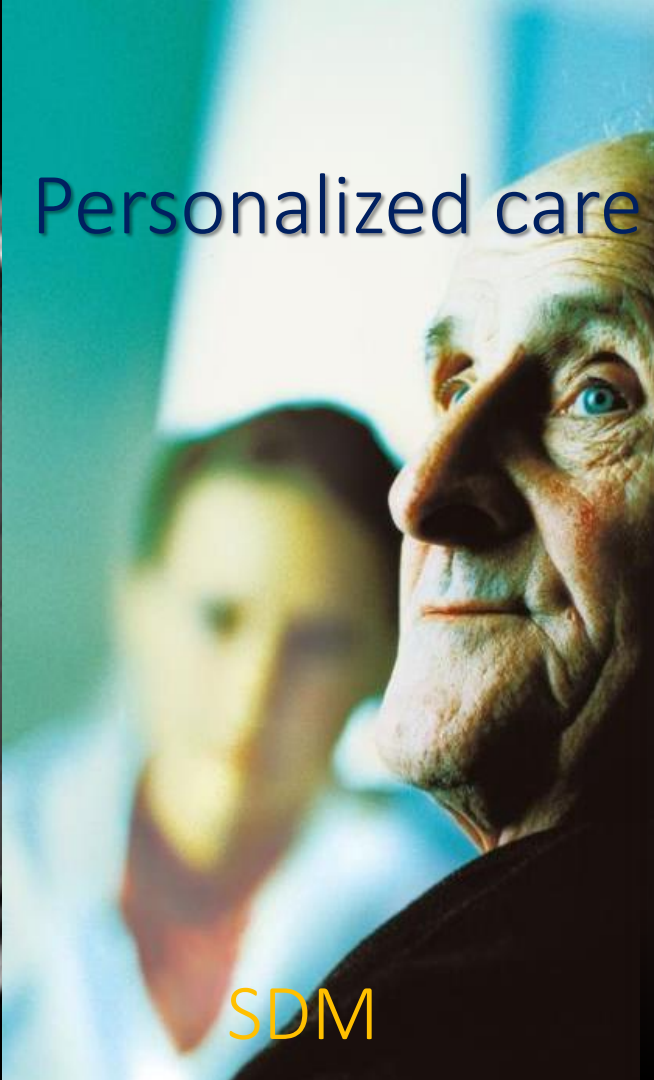
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# Recovery capacity





Disease



Personalized care

SDM



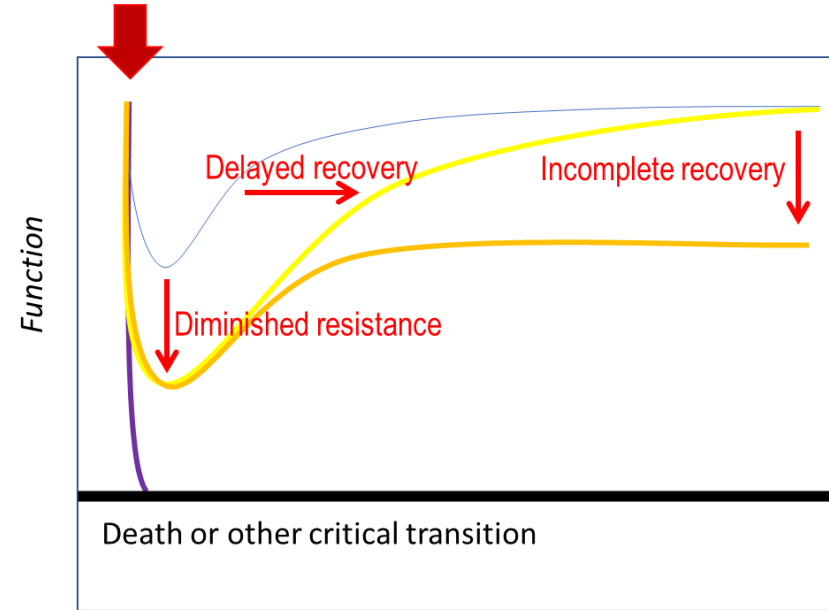
Resistance & recovery

# Physical resilience

- “Ability to resist or recover from functional decline following *health* stressor(s)”



Disease, treatment or  
other stressor

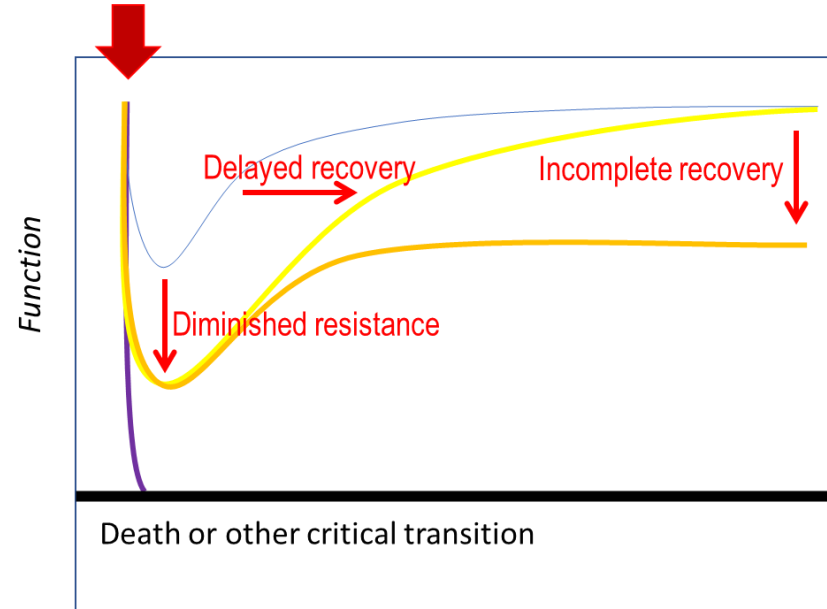


Time

# Physical resilience

- Dynamic response to a stressor/perturbation
- Resilience is an outcome
  - Stressor  $\leftrightarrow$  older person
- No two stressors are the same
- Needs to be assessed longitudinally!
- Resilience trajectory

Disease, treatment or  
other stressor



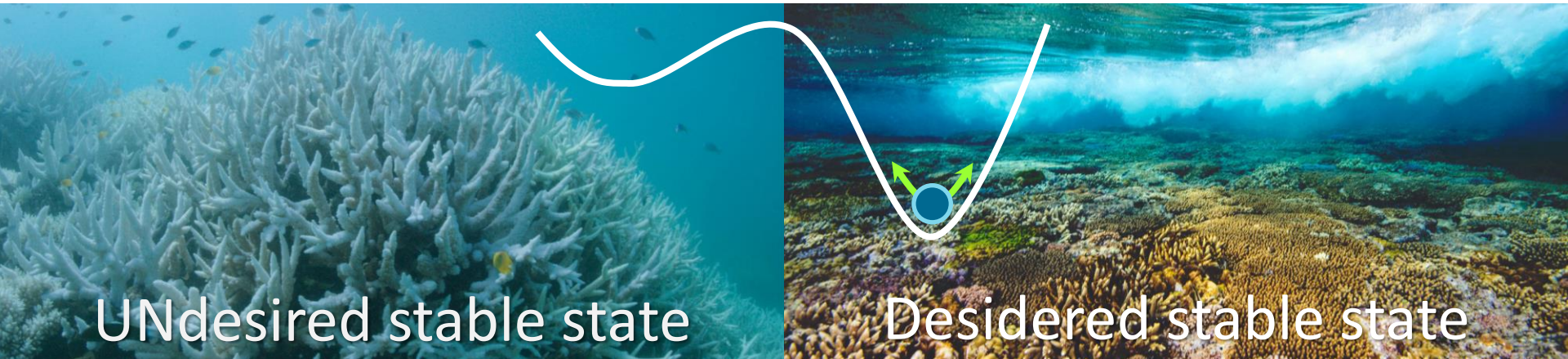
Time



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# Resilience

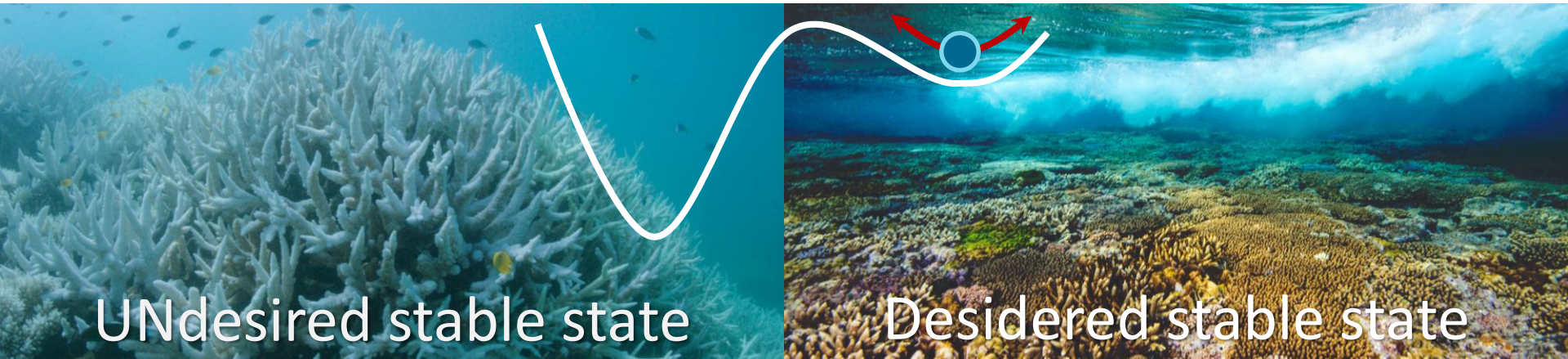
- Ecology:
  - Dynamic, complex (eco)system
  - Several stable states OR equilibria
  - Resilience reflects the stability of an equilibrium



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# Resilience

- Ecology:
  - Dynamic, complex (eco)system
  - Several stable states OR equilibria
  - Resilience reflects the stability of an equilibrium



# Frailty

- Resources available for showing resilience



# Resilience

- Resource recruitment



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# Understanding Resilience

## Knowledge gap:

- How are systems across multiple spatial and temporal scales involved in the emergence of resilience of aging humans against health stressors?
  - How does resilience come about?
  - How are human systemic resilience and subsystem resiliencies related?
  - How do resilienc(ies) change across the aging life span?
  - What is the relation of resilience with type, intensity and timing of stressors?
  - How to quantify the intensity of a stressor?

## Research opportunity:

- Linking research across multiple disciplines such as biology, computational science, complexity science, epidemiology, psychology



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# Resilience measurement

## Knowledge gap:

- Can we upfront and during the recovery predict/monitor which resilience trajectory a person will follow in response to health stressor?

## Research opportunity:

Development and validation of a resilience measurement framework

- Stressor (type and intensity)
- Outcome (trajectory): multidimensional
- Predictors
  - Multidimensional
  - Structure of system: static indicators of resilience, e.g., frailty
  - Process/function operated by system: dynamic indicators of resilience

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# Resilience management

## Knowledge gap:

- How can we use physical resilience in the clinical management of older persons to support recovery?

## Research opportunity:

Develop, implement and evaluate a resilience management framework

- Triage & clinical decision support systems
- Actively support resource (recruitment) available for resilience
  - Integrate with prehabilitation and (geriatric) rehabilitation support programmes for better targeting
- Teaching and training programmes