



**Brigham and Women's Hospital**

Founding Member, Mass General Brigham

## **Longevity Cases**

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*Associate Physician*

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*Associate Physician*

*BWH Division of General Internal Medicine, Department of Medicine*

*Instructor of Medicine, Part-Time, Harvard Medical School*



# Julia V. Loewenthal, MD



Medical school: **University of Virginia**

Internal medicine residency: **Brigham and Women's Hospital**

Geriatric medicine fellowship: **Harvard Multi-Campus Geriatrics Fellowship**

Integrative/lifestyle medicine fellowship: **Osher Collaborative Faculty Fellowship**

Current position:

- Geriatrician, BWH Division of Aging
- Assistant Program Director, BWH Internal Medicine Residency Program
- Director, Integrative and Lifestyle Medicine Education, BWH Internal Medicine Residency Program
- Primary care physician, part-time, Lutanen Health



## Jay R. Luthar, MD, DipABLM



Medical school: **Medical College of Wisconsin**  
Internal medicine residency: **Cambridge Health Alliance**

Integrative/lifestyle medicine fellowship: **Osher Collaborative Faculty Fellowship**

Current position: Primary Care Physician

- Lutanen Health, Founder and Medical Director
- Osher Clinical Center: Integrative Health Consultation

# DISCLOSURES

I have no relevant financial relationships with ineligible companies.



# OBJECTIVES

By the end of this session, learners will be able to:

- 1. Apply practical longevity strategies:** Use case-based scenarios to implement evidence-based assessments to optimize healthspan in clinical practice.
- 2. Critically evaluate popular longevity approaches:** Assess common patient-driven strategies for safety, efficacy, and quality of evidence, and provide clear counseling.
- 3. Be aware of emerging and frontier interventions.**



# Longevity Clinical Framework

Practical

Pop

Frontier



# Case 1

# Practical

## Case 1

## Practical

60 year-old female presents for annual physical exam.

Past Medical History: hypothyroidism, menopause age 52

Medications: levothyroxine 75 mcg qAM

Family History: CAD in mother

Lifestyle: walks/jogs 30 min 5 days per week for exercise; “social EtOH”

Health Maintenance: all cancer screening and immunizations up to date

LDL cholesterol creeping up over past few years:

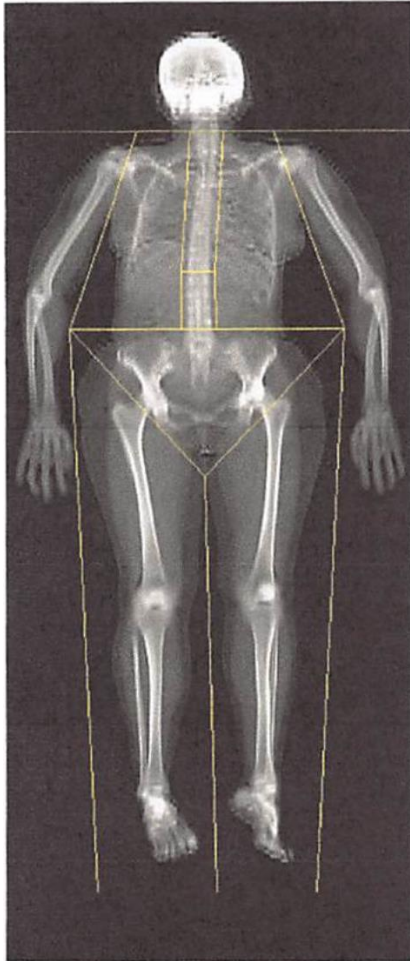
98 → 115 → 136 (PREVENT 10-yr ASCVD risk = 3.6%)



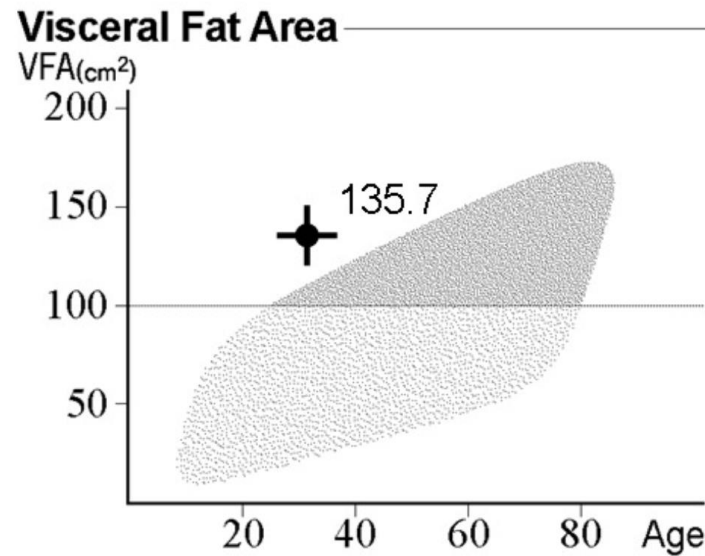


# Case 1

## Practical



Valuable testing that may be missed →  
**DEXA body composition**



| Densitometry: USA (Combined NHANES/Lunar) |                             |               |               |
|---|-----------------------------|---------------|---------------|
| Region                                    | BMD<br>(g/cm <sup>2</sup> ) | YA<br>T-score | AM<br>Z-score |
| Neck Left                                 | 0.816                       | -1.6          | -0.8          |
| Neck Right                                | 0.760                       | -2.0          | -1.2          |
| Neck Mean                                 | 0.788                       | -1.8          | -1.0          |
| Neck Diff.                                | 0.056                       | 0.4           | 0.4           |
| Total Left                                | 0.946                       | -0.5          | -0.1          |
| Total Right                               | 0.824                       | -1.5          | -1.1          |
| Total Mean                                | 0.885                       | -1.0          | -0.6          |
| Total Diff.                               | 0.122                       | 1.0           | 1.0           |



↑ **visceral fat**

↓ **bone density**

## Case 1

## Practical

- Our patient: Osteopenia with FRAX 2.6% risk hip fracture and 8% risk major osteoporotic fracture.
- Up to 24% of women age 50+ die within 1 year of hip fracture.
- Time to benefit with bisphosphonates = only 11 months.
- Also FDA approved (osteoporosis prevention): menopausal hormone therapy (MHT)



# Case 1

Practical





The NEW ENGLAND  
JOURNAL of MEDICINE

ORIGINAL ARTICLE



## Fracture Prevention with Infrequent Zoledronate in Women 50 to 60 Years of Age

**Authors:** Mark J. Bolland, M.B., Ch.B., Ph.D. , Zaynah Nisa, B.Nurs., Anna Mellar, B.Sc., Chiara Gasteiger, Ph.D., Veronica Pinel, M.D., Borislav Mihov, B.Phty., Sonja Bastin, M.B., Ch.B., Andrew Grey, M.D., Ian R. Reid, M.D. , Greg Gamble, M.Sc., and Anne Horne, M.B., Ch.B. [Author Info & Affiliations](#)

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DOI: 10.1056/NEJMoa2407031 | VOL. 392 NO. 3 | Copyright © 2025

Bisphosphonates =  
candidate longevity drug!



# Case 1

## Practical



# Case 1

## Practical

### Physical Activity:

- Strength training— essential and safe (LIFTMOR trial)
- Balance training— beyond walking  
*RCTs of walking alone in older adults → increase falls risk*



# Case 1

## Practical

### Nutrition:

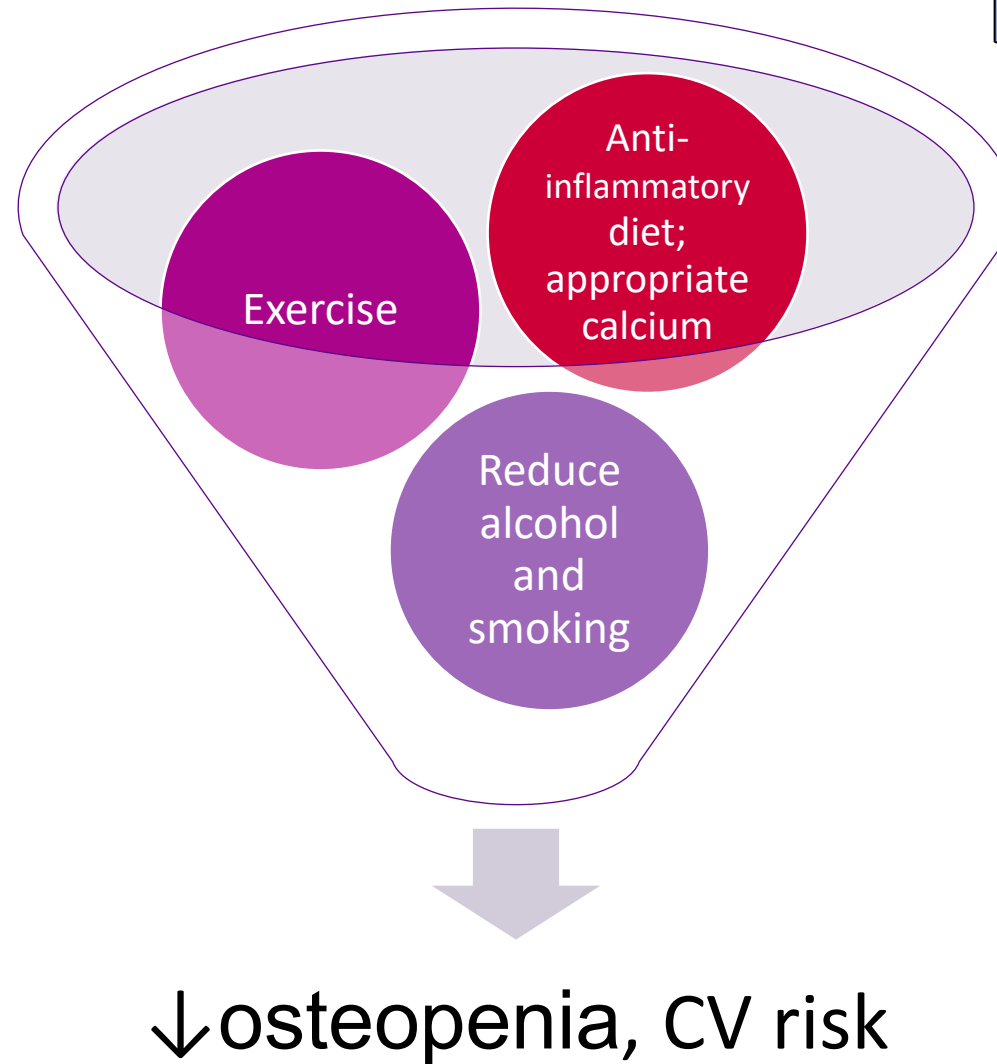
- RDA for calcium in adults:  
Women 51+ = 1200 mg/day; Men 70+ = 1200 mg/day
- On average, men and women age 60+ tend to take in **580-735 mg/day** (without supplements; use online calculator to estimate)
- Concern for increased CV risk with supplemental calcium >1000 mg/day
- Vitamin D3, K2; anti-inflammatory diet, avoid alcohol



## Case 1

## Practical

**An integrative approach works synergistically to increase health- and lifespan.**



# Case 2

Pop



## Case 2

Pop

58 year-old male presenting for annual physical exam. Recently started taking **sermorelin** peptide and has noticed increase in muscle mass and cognitive benefits.

Past Medical/Surgical History: L5-S1 spinal fusion, abdominal hernia repair, R biceps tear, pulmonary nodules, moderate OSA managed w/ oral appliance, psoriasis, CAC score 70 (elevated MESA score)

Family History: type 2 DM and MI in mother

Lifestyle: strength and balance training 5 days per week, aerobic exercise 1-1.5 hours 5 days per week

Physical Exam: BP 135/85 mmHg (increased over past 6 months)



## Case 2

Pop

### Medications and Supplements:

Sermorelin 1000 mcg QD

Pomegranate extract 500 mg  
QD

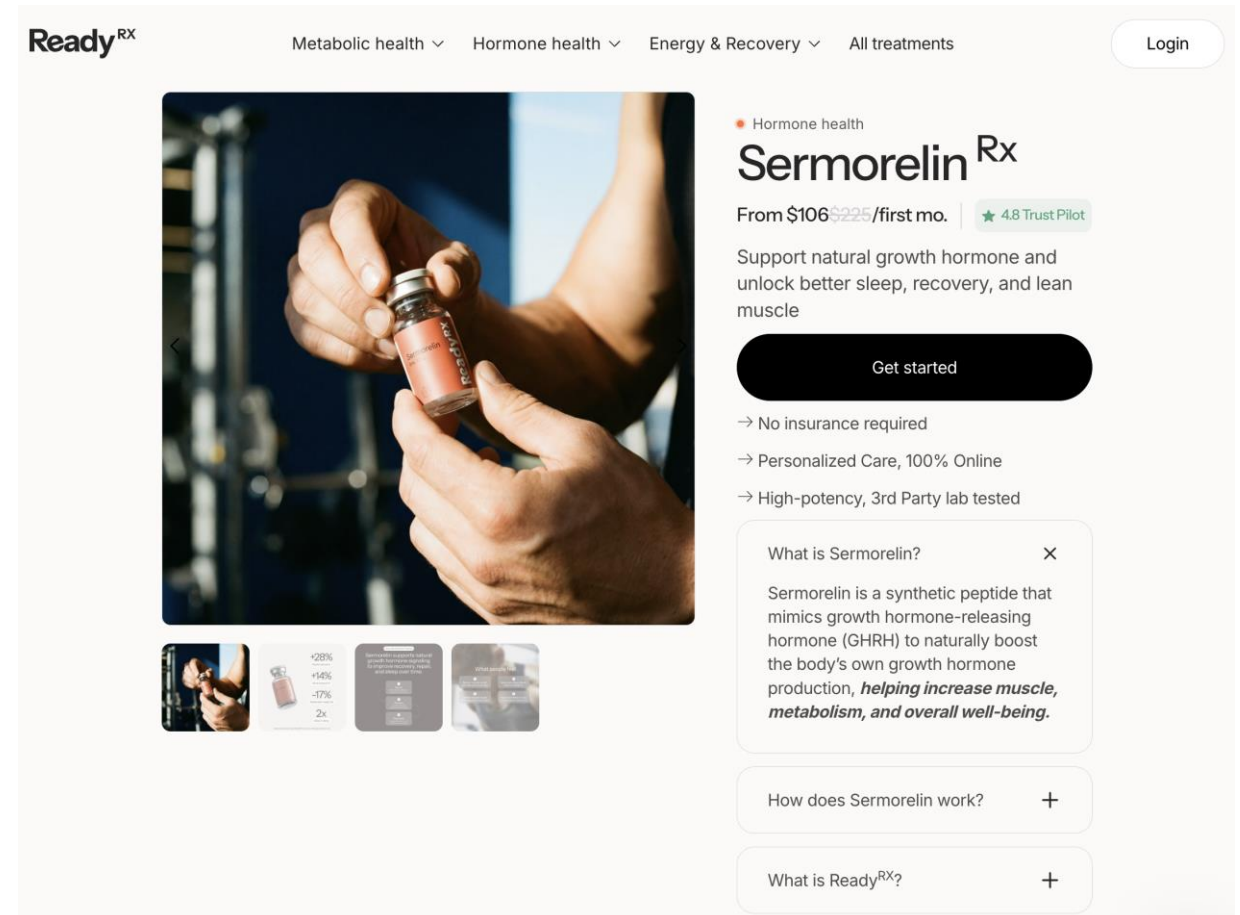
Probiotic

Ginseng

Men's multivitamin

Fish oil 1280 mg QD

Magnesium citrate



The screenshot displays the ReadyRX website interface. At the top, navigation links include 'Metabolic health', 'Hormone health', 'Energy & Recovery', and 'All treatments', along with a 'Login' button. The main section features a large image of hands holding a small vial of Sermorelin. To the right, the product is titled 'Sermorelin<sup>Rx</sup>' under the 'Hormone health' category. Pricing is listed as 'From \$106 ~~\$225~~/first mo.' with a '4.8 Trust Pilot' rating. A description states: 'Support natural growth hormone and unlock better sleep, recovery, and lean muscle'. A 'Get started' button is prominent. Below this, three bullet points highlight benefits: 'No insurance required', 'Personalized Care, 100% Online', and 'High-potency, 3rd Party lab tested'. A FAQ section is visible at the bottom with expandable questions: 'What is Sermorelin?', 'How does Sermorelin work?', and 'What is Ready<sup>Rx</sup>?'. A small data table is also present below the main image.

| Metric         | Improvement |
|----------------|-------------|
| Growth Hormone | +28%        |
| Testosterone   | +14%        |
| IGF-1          | +17%        |
| Lean Muscle    | 2x          |



## Case 2

Some FDA-Approved Peptides With Frequent Off-Label Use

| Peptide                                      | Mechanism of Action  | Off-Label Use  | FDA Indication                                 |
|--|--|--|--|
| GLP-1 peptides<br>(Semaglutide, Tirzepatide) | Gut hormone mimetics<br>Glucagon-like peptide,<br>gastric inhibitory peptide | Addiction, migraine,<br>autoimmune diseases,<br>polycystic ovary syndrome,<br>and others | Diabetes and obesity                           |
| Sermorelin                                   | Analog to growth<br>hormone-releasing<br>hormone                             | Muscle mass increase, fat<br>mass decrease, wound<br>healing, anti-aging                 | Children with growth<br>hormone deficiency     |
| Tesamorelin                                  | Analog to growth-<br>hormone releasing factor                                | Muscle mass increase,<br>abdominal fat decrease,<br>cognitive health                     | HIV Lipodystrophy                              |
| Thymosin Alpha-1<br>(Zadaxin)                | Hormone-like peptide<br>produced by thymus                                   | Immune system health   | Chronic hepatitis B and<br>cancer chemotherapy |



Table credit: Eric Topol, MD

# Case 2

Pop

## Sermorelin

| Side Effects from Clinical Studies | Off-Label Use (supraphysiologic doses) | Quality Concerns |
|------------------------------------|--|------------------|
| Transient facial flushing          | Hypertension                           | Mislabeled       |
| Injection site pain                | Insulin resistance                     | Contamination    |
| Transient hyperlipidemia           | Dyslipidemia                           |                  |
| Arthralgia                         | Cardiovascular hypertrophy             |                  |
| Myalgia                            |  |                  |
| Carpal tunnel syndrome             |  |                  |
| Gynecomastia                       |  |                  |



## Case 2

Pop

58 year-old male presenting for annual physical exam. Recently started taking **sermorelin** peptide and has noticed increase in muscle mass and cognitive benefits.

Past Medical/Surgical History: L5-S1 spinal fusion, abdominal hernia repair, R biceps tear, pulmonary nodules, moderate OSA managed w/ oral appliance, psoriasis, **CAC score 70 (elevated MESA score)**

Family History: type 2 DM and MI in mother

Lifestyle: strength and balance training 5 days per week, aerobic exercise 1-1.5 hours 5 days per week

Physical Exam: **BP 135/85 mmHg (increased over past 6 months)**



## Case 2

Pop

**(1) Framing the conversation:** emphasize mutual interest in your patient's longevity

**(2) Explore reasons for concern and unexamined areas:**

- Patient concerned about mother's history wary of heart attack.
- Wary of statin side effects (taking a pill = "I'm sick")
- Fearful of aging
- Increased job stress
- Concerned about loss of purpose with upcoming retirement

**(3) Building on strengths:**

- Physical activity is excellent
- Paying attention to health in his own way → taking supplements



## Case 2

## Practical



## Case 2

Pop

### **Potential approaches:**

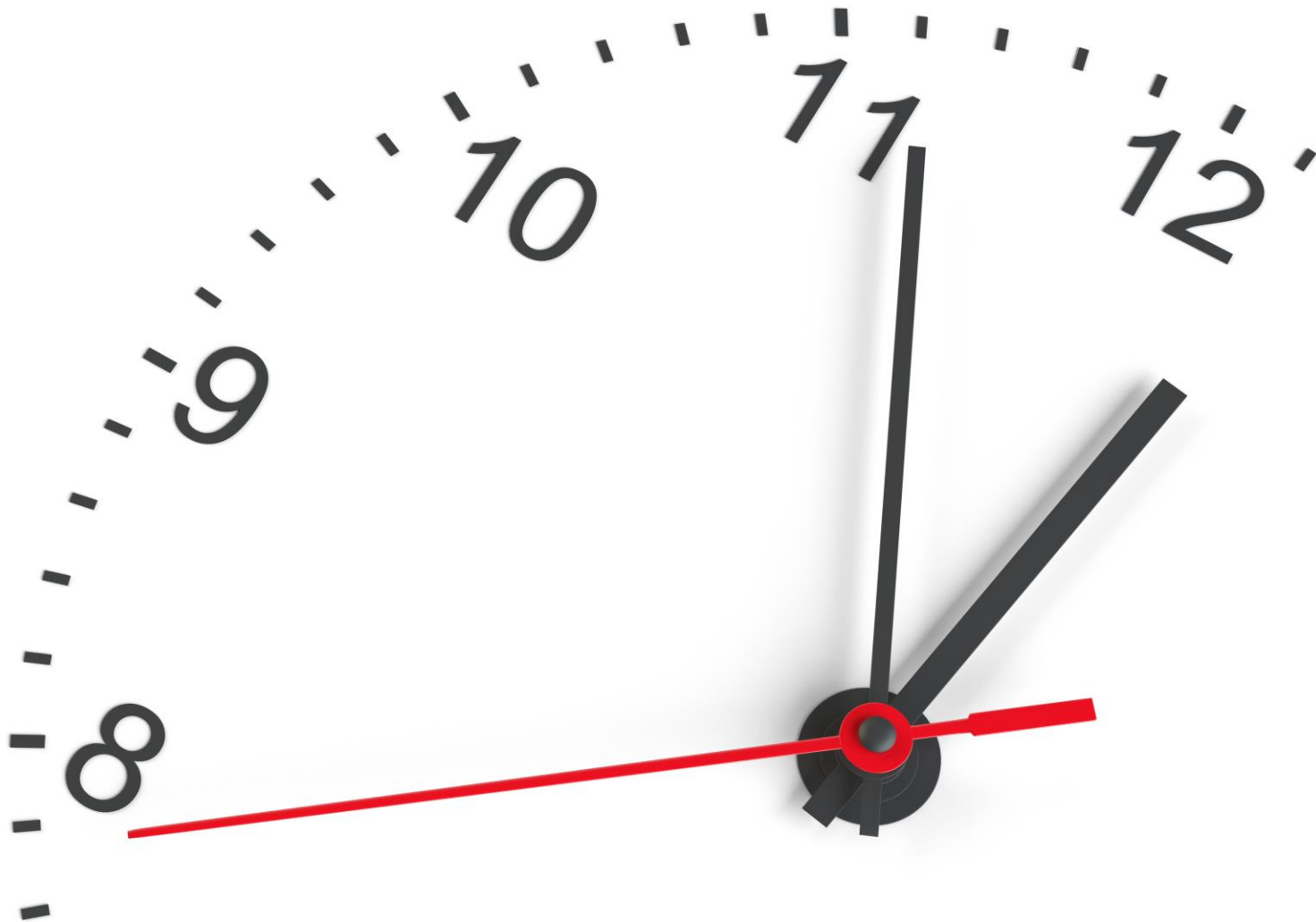
- Repeat sleep study given hx OSA and increasing BPs
- Psychotherapy to explore stress, sense of purpose, existential concerns
- Mind-body approaches (e.g., meditation, yoga)
- Delve into diet:
  - Mediterranean Diet
  - DASH
  - Plant-based
  - Portfolio diet
- If not ready for statin, could consider supplements:
  - Plant sterols/stanols – 2-3 g/day may lower LDL by 9-12%
  - Blond psyllium – 10 g/day may lower LDL by 7%





## Case 2

Pop



# Future Longevity

Frontier

- Epigenetic reprogramming
- Senolytics
- Mitochondrial restoration therapies
- Stem Cell and Immune System Therapies
- PSCK9 and other gene editing
- Cancer Vaccines
- AI multi-omic aging diagnostics and precision therapeutics



# Hallmarks of aging: Geroscience

Frontier

## 12 Hallmarks of aging

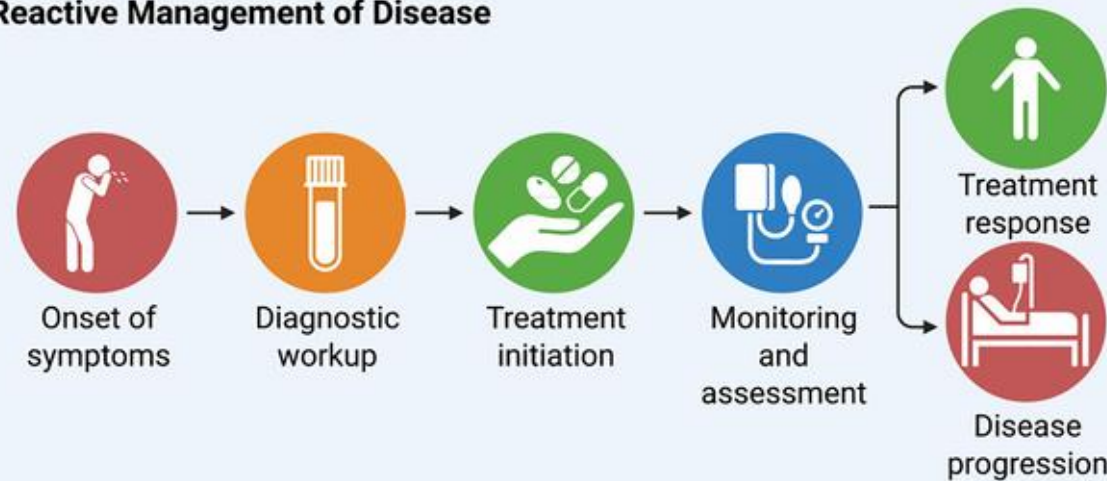
- Genomic instability
- Telomere attrition
- Epigenetic alterations
- Loss of proteostasis
- Disabled macroautophagy
- Deregulated nutrient sensing
- Mitochondrial dysfunction
- Cellular senescence
- Stem cell exhaustion
- Altered intercellular communication
- Chronic inflammation
- Dysbiosis

## Longevity Interventions

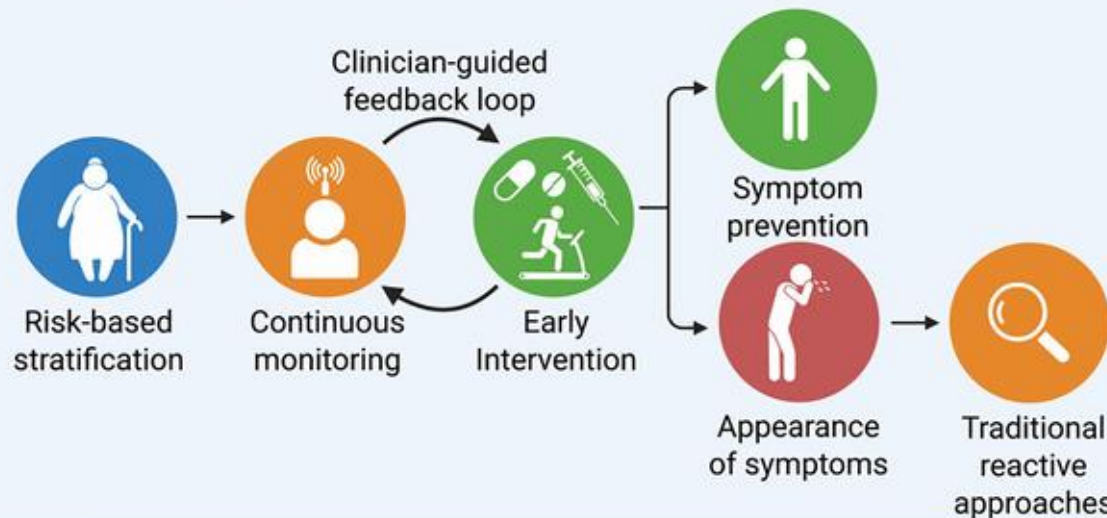
Longevity interventions will modify multiple hallmarks simultaneously (e.g., exercise improves mitochondria, nutrient sensing, inflammation, proteostasis). Novel therapeutics are next in the frontier.

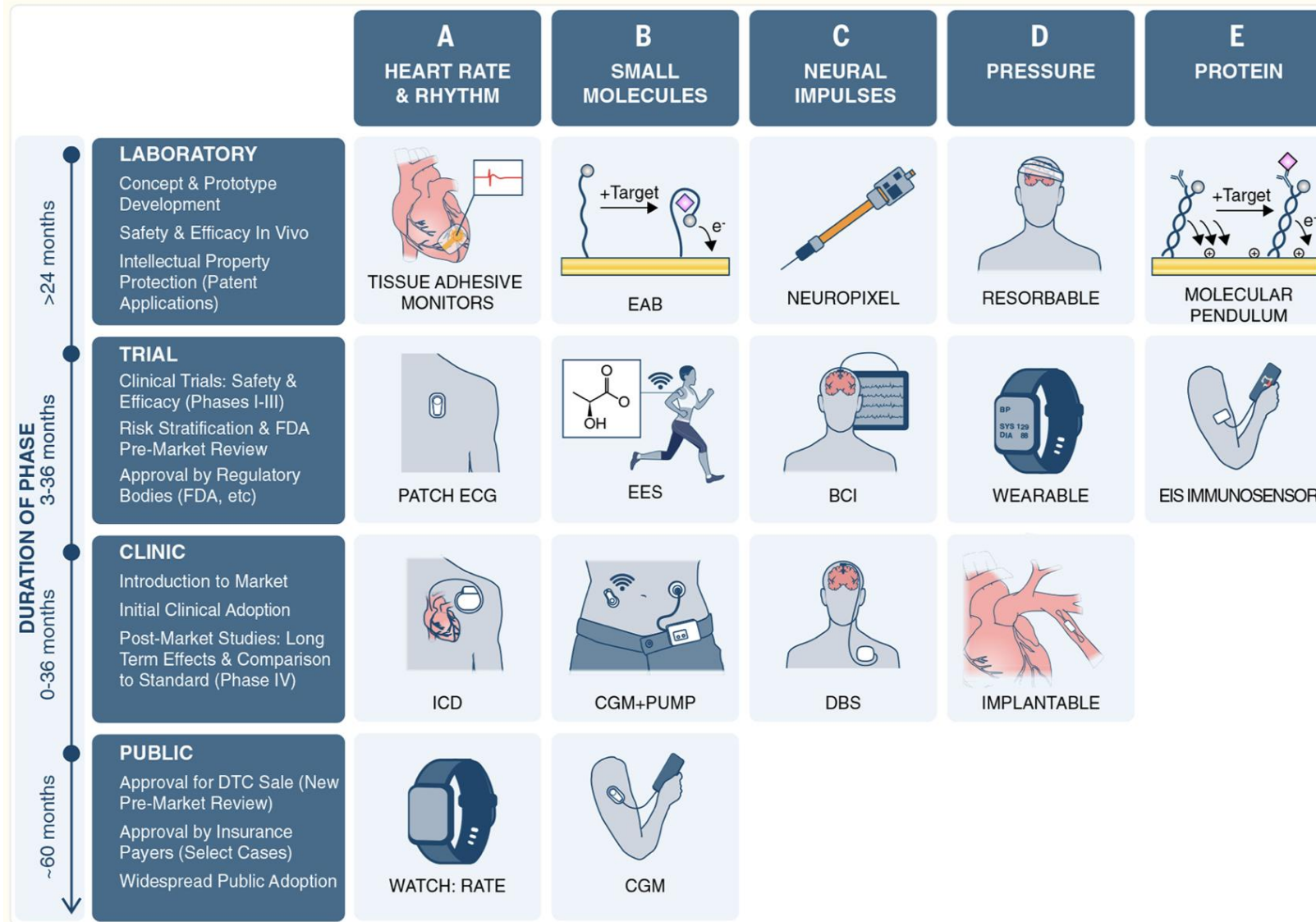


## Reactive Management of Disease



## Proactive Management of Health and Disease Using Continuous Monitoring





Donnelly JM, Neff RA, Sedlack AJH, Juska VB, Ayala-Cardona LF, Bass J, McNally EM, Shah SJ, Alshurafa N, Kimchi EY, Budinger GRS, Kelley SO. From reactive to proactive: Continuous protein monitoring for preventive health care. *Science*. 2025 Sep 25;389(6767):eady6497. doi: 10.1126/science.ady6497. Epub 2025 Sep 25. PMID: 40997178; PMCID: PMC12687573.

63 year-old male with obesity, OSA, T2DM with dramatic weight loss and A1c improvement from 9.3 >> 6.1 on 15mg/week Tirzepatide. 90 lb weight loss in last year.

Past Medical History: Above + exertional angina due to atherosclerosis s/p stent

Medications: Tirzepatide, Dapagliflozin, Lisinopril, HCTZ, Rosuvastatin, Ezetimibe, Aspirin

Lifestyle: Mostly Sedentary, eager to start personal training

Physical Exam: BP 108/65 mmHg



## Case 3

### Frontier

Presents with sudden, painless vision loss in his right eye upon waking. He describes a “dark shadow” in the lower half of his visual field. He denies eye pain, headache, scalp tenderness, or jaw claudication.

On exam:

- Visual acuity: decreased in the right eye
- Relative afferent pupillary defect (RAPD) in the right eye
- Fundoscopy: **optic disc edema**
- Visual field testing: **altitudinal defect**



## Case 3

### Frontier

Ophthalmology Confirms NAION – Non Ischemic Arteric Optic Neuropathy

Rare side effect 1 in 10,000 with GLP-1

Possible theory: rapid changes in blood sugar or blood pressure

New Medical Treatments >> New Medical Side Effects?

Many are hopeful GLP-1s are our best “longevity drug”.

**What do we still need to learn while on the frontier?**

**Are there Frontier Treatments for Frontier Problems?**





## Case 3

### Frontier

Many are hopeful GLP-1s are our best “longevity drug”

**What do we still need to learn while on the frontier?**

**Are there Frontier Treatments for Frontier Problems?**



## Case 3



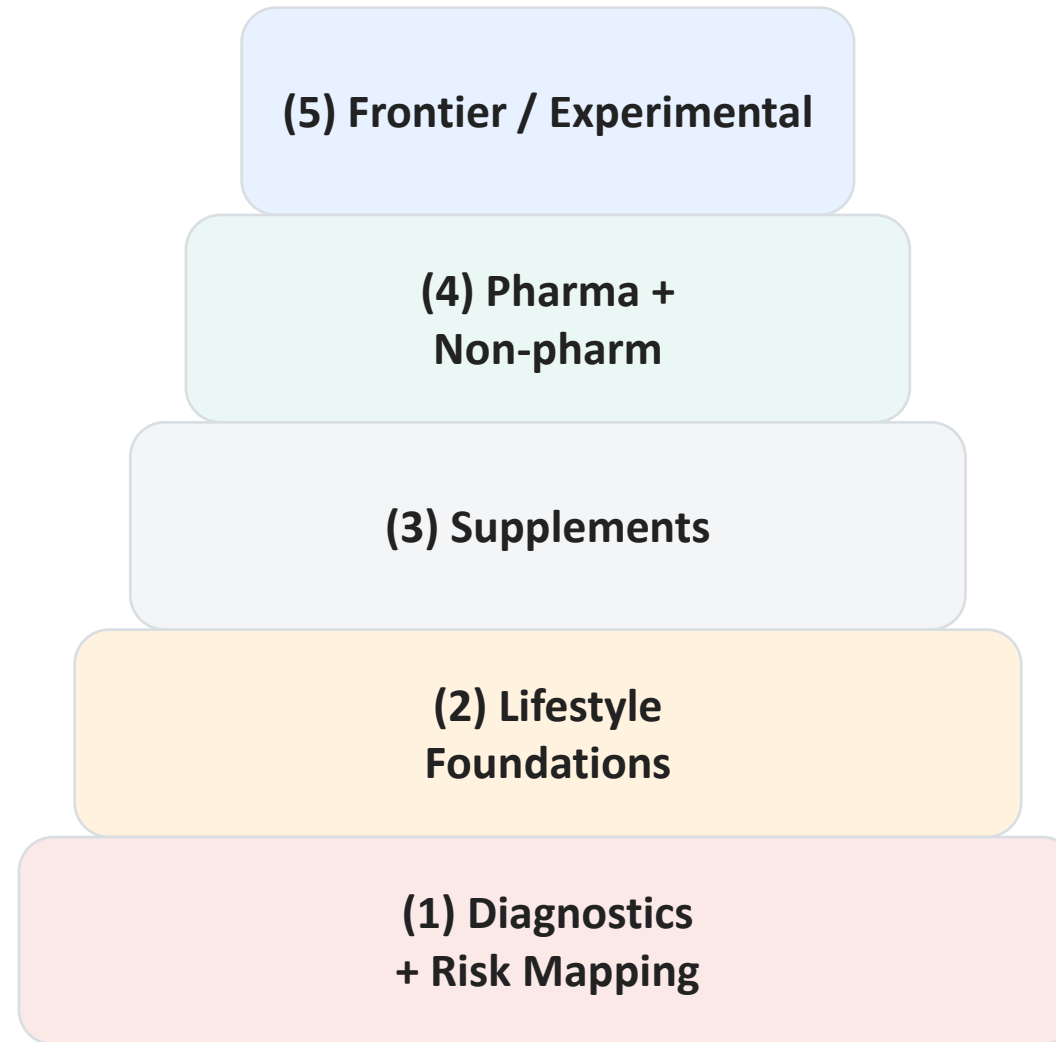
Frontier



Lu, Y., Brommer, B., Tian, X. *et al.* Reprogramming to recover youthful epigenetic information and restore vision. *Nature* **588**, 124–129 (2020). <https://doi.org/10.1038/s41586-020-2975-4>

# The Longevity Pyramid (layered care)

Martinović A, Mantovani M, Trpchevska N, Novak E, Milev NB, Bode L, Ewald CY, Bischof E, Reichmuth T, Lapides R, Navarini A, Saravi B, Roider E. Climbing the longevity pyramid: overview of evidence-driven healthcare prevention strategies for human longevity. Front Aging. 2024 Nov 26;5:1495029. doi: 10.3389/fragi.2024.1495029. PMID: 39659760; PMCID: PMC11628525.



# MOC REFLECTIVE STATEMENT (BRIEF TAKE HOME NOTES FOR REFERENCE)

- **Integrate individualized, function-focused care:** I will incorporate appropriate practical assessments (e.g., body composition, physical function) and tailor interventions to better optimize healthspan.
- **Engage patients around popular longevity practices:** I will more effectively explore patients' motivations for supplements, peptides, and other trends, using shared decision-making to guide them toward safe, evidence-based strategies.
- **Critically navigate emerging therapies:** I will apply a structured, evidence-based approach to evaluating novel and “frontier” longevity interventions, balancing openness to innovation with appropriate skepticism to avoid harm.

