



60th Annual Meeting

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Shining a Light on Longevity: The Pharmacist's Role in Healthy Aging

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Disclosure

I do not have a vested interest in or affiliation with any corporate organization offering financial support or grant monies for this continuing education activity, or any affiliation with an organization whose philosophy could potentially bias my presentation (within the last 12 months).

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Pharmacist Objectives

- Describe key concepts of longevity and health span, including biological, clinical, and medication-related factors that influence healthy aging.
- Identify age-related pharmacokinetic and pharmacodynamic changes and common medication-related risks associated with aging populations.
- Explain the evolving role of pharmacists in supporting longevity through medication management, preventive care, longevity assessments, and interprofessional collaboration.

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Pharmacy Technician Objectives

- Describe foundational concepts of longevity and health span and recognize factors that influence healthy aging.
- Recognize age-related changes that may affect medication use in older adults and describe how these considerations impact pharmacy workflow and safety practices.
- Explain the pharmacy technician's role in supporting healthy aging through safe medication practices and team-based care.

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WHAT DOES LONGEVITY MEAN?

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"The science of longevity is not simply about adding years to life; it is about adding life to years."

 Simply defined Longevity refers to a long life. Historically, this meant surviving disease and extending lifespan.	 Modern meaning Today, longevity has deepened to encompass not just the years one lives, but the quality of those years — health span, function, and vitality.
 Geroscience The scientific discipline studying the biological mechanisms of aging and seeking interventions that can slow, halt, or reverse specific biomarkers of aging.	 Biological vs. Chronological Age Age is not solely determined by years lived. Epigenetic clocks, biomarkers, and functional assessments reveal a patient's true biological age.

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THE HOOK: WHY THIS MATTERS NOW

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Why Patients Are Talking About Longevity Now

- Increasing discussions in mainstream news, podcasts, and social media
- Public attention has accelerated interest in therapies, biomarkers, supplements, and off-label medication use
- This visibility is driving patients to ask pharmacist questions before strong primary-care guidance exists
- Increased awareness is creating opportunity and risk due to information outpacing evidence

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Technician Lens

- What this means for your role
 - Longevity = helping patients stay independent, clear-minded, and mobile longer
 - Most longevity risks show up first through medication and side effects
- What to notice at intake or pickup
 - "I feel tired all the time"
 - "I'm dizzy when I stand up"
 - "I've had a couple of falls lately"
- When to escalate
 - Any patient >=65 reporting new fatigue, brain fog, dizziness, or sleep issues flag —→ for pharmacist review

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So Why Longevity?

- It is not about defying death, but about embracing life
- It matters because of its profound impact on health
- Focuses on the "healthy aging" paradigm
 - Maintaining physical, mental, and socialization well-being in older age
- Evidence-based steps can be taken today that can influence our health trajectory in the coming years

Reference: [Why Longevity Matters: Infinity](#)

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Americans are living longer – But NOT Healthier

10,000

Baby Boomers turn 65 every day in the U.S.

2034

First year 65+ will outnumber children <18 in the U.S.

~12 yrs

Average gap between lifespan and health span — years burdened by disease

The real problem isn't that people die — it's that they spend their final decade disabled, dependent, or chronically ill. Longevity medicine asks: can we compress that morbidity curve?

Reference: U.S. Census Bureau; WHO Global Health Observatory; Jama Network Open study

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Systemic & Financial Impact

- Healthcare systems are strained by disease management
- Extending healthspan to align with lifespan - leads to reduced suffering, lower healthcare costs, and enables longer societal engagement
- Economic modeling published in Nature Aging (2021) estimated that a slowdown in aging increasing life expectancy by just one year could be worth \$38 trillion to the US economy (Scott, Ellison & Sinclair, Nature Aging, 2021)

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You Already See This Patient Every Day

Longevity medicine is not a new specialty — it is a new lens on existing clinical practice.

You Counsel on Polypharmacy

- Polypharmacy cascade is the hallmark of aging pharmacotherapy
- Deprescribing is a longevity intervention
- Every Beers Criteria medication is a health span threat

You Monitor Chronic Disease

- HTN, DM, dyslipidemia — the metabolic aging triad
- Optimizing these IS longevity medicine
- Pharmacists are the most accessible touchpoint

You Flag Drug-Drug Interactions

- PK/PD shifts in aging amplify every risk
- Understanding WHY drugs behave differently is longevity science
- Your clinical instinct is already evidence-based

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BACKGROUND & HISTORY: FROM GERONTOLOGY TO LONGEVITY SCIENCE

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Watch: Animated History of Longevity (PBS)



Click to play PBS video (1:44)

<https://www.pbs.org/video/longevity-the-evolution-of-longevity-science/>

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The Evolution of Aging Science

1991	2000s	2013	2020s
Beers Criteria Published	Geriatric Pharmacotherapy	Hallmarks of Aging (Cell)	Intervention Era Begins
First explicit framework for drug risk in older adults	STOPP/START tools; polypharmacy recognized as epidemic	López-Otin et al. — 9 druggable hallmarks; now expanded to 12	Senolytics, NAD ⁺ , mTOR, GLP-1s — pharmacists now at the frontier

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KEY CONCEPTS: LIFESPAN VS. HEALTH SPAN

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LIFESPAN

Total years of life. Chronological age. The number on the birth certificate.

HEALTH SPAN

Years lived in full physical and cognitive function. Biological age. The real target.

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The 4 Pillars of Biological Aging

Metabolic Health	Inflammaging	Hormonal Balance	Cellular Resilience
Glucose regulation, insulin sensitivity, lipid optimization	Chronic low-grade inflammation — silent driver of all chronic disease	Testosterone, estrogen, DHEA, cortisol, thyroid — all decline with age	Autophagy, senescence clearance, mitochondrial function

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What Centenarian Populations ("Blue Zones") Teach Us About Health Span

- Daily Movement Is Built In**
 - Physical activity occurs naturally through walking, chores, and routine tasks -> **NOT** structured exercise programs
- Metabolic Health Is Preserved**
 - Low rates of insulin resistance and type 2 diabetes are consistently observed, reinforcing metabolic control as central to healthy aging
- Dietary Patterns Support Longevity**
 - Predominantly plant-forward diets with regular seafood intake, healthy fats, and minimal ultra-processed foods
- Social Connection and Purpose Matter**
 - Strong family ties, community engagement, and a clear sense of purpose
- Low Polypharmacy and Medication Burden**
 - Fewer chronic medications and lower exposure to sedative and anticholinergic agents

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THE PK/PD SHIFT: AGING CHANGES EVERYTHING

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Pharmacokinetic Changes with Aging

Renal Clearance ↓ 30–40%	GFR declines ~1 mL/min/yr after age 40. SCr unreliable — use CKD-EPI.	⚠ Digoxin, metformin, renally-cleared antibiotics
Hepatic Metabolism ↓ Phase I	CYP450 activity declines; reduced first-pass effect increases bioavailability.	⚠ Warfarin, statins, benzodiazepines
Volume of Distribution ↑ Fat / ↓ H ₂ O	↑ Vd for lipophilic drugs (longer half-life); ↓ Vd for hydrophilic drugs.	⚠ Diazepam accumulates; digoxin levels higher
Protein Binding ↓ Albumin	↑ Free fraction of highly protein-bound drugs — greater pharmacological effect.	⚠ Phenytoin, warfarin, NSAIDs

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Pharmacodynamic Changes with Aging

The body responds differently — even at 'appropriate' drug levels

↑ CNS Sensitivity Benzodiazepines, opioids, and anticholinergics cause exaggerated CNS depression — falls, delirium, cognitive decline at standard doses.	Blunted Baroreceptor Reflex Impaired compensatory response to position changes → orthostatic hypotension. Antihypertensives, diuretics, alpha-blockers amplify risk.	↓ Beta-Receptor Sensitivity Beta-blockers and beta-agonists have reduced efficacy. Heart rate response blunted. Clinical endpoints may not reflect expected drug effect.
Altered Thermoregulation Antipsychotics and anticholinergics impair heat dissipation — significant risk in summer months or febrile states.	↑ GI Sensitivity NSAIDs, bisphosphonates, and iron cause greater mucosal injury at lower doses — risk compounded by PPI overuse.	Bone Fragility × Drug Risk Corticosteroids, PPIs, antiepileptics reduce bone density. Falls risk (from CNS drugs) × fracture risk (from bone loss) = sentinel event.

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Clinical Risk Frameworks: Your Evidence-Based Toolkit

Beers Criteria American Geriatrics Society	Explicit list of medications to avoid or use cautiously in adults 65+. Updated every 3 years. Focus: drugs where risk > benefit regardless of indication.	Clinical Use: Deprescribing, MTM reviews, prior auth pushback
STOPP/START European Geriatric Medicine Society	STOPP = drugs to stop. START = drugs to start (addresses undertreatment). More sensitive than Beers for detecting prescribing omissions.	Clinical Use: Comprehensive medication review, discharge reconciliation
Drug Burden Index Research-validated tool	Quantifies anticholinergic and sedative load. Higher DBI → greater cognitive and physical impairment. Actionable at the pharmacy counter.	Clinical Use: Fall risk screening, cognitive complaint workups

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Technician Lens

- Simple rule
 - Older bodies handle drugs more slowly and respond more strongly
- High-alert symptom reports to flag immediately
 - Excessive sleepiness
 - Confusion or memory complaints
 - Dizziness or balance issues
 - GI upset that seems "new" or worse
- Common high-risk categories you'll see
 - Sleep aids (OTC or Rx)
 - Benzodiazepines
 - Strong pain medications
 - Anticholinergic meds (many allergies & bladder meds)

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How Might Deprescribing Improve Health Span, Not Just Safety?

- Falls ↓
- Cognitive clarity ↑
- Fracture risk ↓
- Independence preserved

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01	GLP-1 Receptor Agonists SELECT trial: semaglutide reduced major cardiovascular events by 20% independent of weight loss. Emerging neuroprotective and anti-inflammatory data. Far beyond obesity treatment.
02	Hormone Optimization Paradigm shifting from "avoid" to "individualize." Testosterone in men, HRT in women, DHEA, thyroid optimization — studied in longevity cohorts with positive functional outcomes.
03	Peptide Therapeutics Thymosin Alpha-1, BPC-157, CIC-1295, Selank. FDA regulatory landscape evolving. Emerging, largely investigational therapies with evolving regulatory oversight — requiring pharmacist interpretation and risk mitigation.
04	NAD⁺ Precursors & Senolytics NMN/NR supplement → cellular energy production. Senolytic protocols (dasatinib + quercetin) entering clinical trials.
05	Biomarker-Driven Practice Continuous glucose monitoring, DEXA body composition, epigenetic clocks, hs-CRP, IGF-1. Patients arriving with data — pharmacists need fluency to interpret.

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THE PHARMACIST'S EVOLVING ROLE

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Traditional Role	Expanded Role	Longevity Role
Dispense & counsel	MTM, medication reviews	Longevity assessments, biomarker interpretation
Screen for interactions	Deprescribing	Optimize for health span, not just safety
Referral to physician	Collaborative practice agreements	Interprofessional longevity team member
Beers Criteria flag	Polypharmacy cascade identification	Proactive protocol design with providers

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Most Accessible Healthcare Provider

No appointment needed. Average American visits a pharmacist 12x per year — more than any other provider.

Medication Expert

Deep pharmacotherapy expertise uniquely positions pharmacists to interpret longevity protocols and prevent iatrogenic harm.

Preventive Care Touchpoint

Immunizations, metabolic screening, bone health, deprescribing — all evidence-based longevity interventions.

Interprofessional collaboration is not optional in longevity medicine — it is the model.

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Non-Pharmacological Counseling Tips

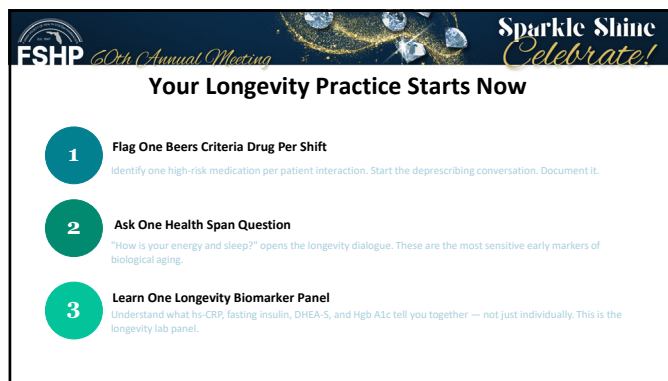
- Move regularly — even if moderately
- Eat well — rich in plants, healthy fats, and lean proteins
- Sleep enough — quality sleep can help the body repair itself
- **Stay connected** — strong social relationships (strong predictor of longevity)
- Manage stress — find ways to decompress
- Know numbers — track key biomarkers and understand baseline health metrics

Reference: [What is Longevity? Definition, Healthspan & Why It Matters | Longevity USA](#)

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