Hypertension Management
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Hypertension (high blood pressure) is defined as a sustained systolic blood pressure (SBP) ≥ 130 mmHg and/or diastolic blood pressure (DBP) ≥ 80 mmHg, according to the 2017 ACC/AHA guidelines. For adults aged 65 and older, hypertension is one of the most prevalent chronic conditions, affecting approximately 70–80% of individuals in this age group.

Aging brings physiological changes that predispose older adults to elevated blood pressure:

- Arterial stiffness: Large arteries lose elasticity with age, increasing systolic pressure.
- Endothelial dysfunction: Reduced ability of blood vessels to dilate.
- Hormonal changes: Alterations in the renin-angiotensin-aldosterone system (RAAS).
- Reduced kidney function: Impaired sodium excretion contributes to volume retention.
- Increased sympathetic nervous system activity: Raises vascular resistance.
- Baroreceptor desensitization: Reduced ability to regulate blood pressure, increasing risk of orthostatic hypotension.

Category	Systolic (mmHg)	Diastolic (mmHg)
Normal	< 120	and < 80
Elevated	120–129	and < 80
Stage 1 Hypertension	130–139	or 80–89
Stage 2 Hypertension	≥ 140	or ≥ 90
Hypertensive Crisis	> 180	and/or > 120

Types of Hypertension Common in the Elderly

- Isolated Systolic Hypertension (ISH): Elevated SBP (≥ 140 mmHg) with normal DBP (< 90 mmHg). This is the most common form in older adults and a significant risk factor for stroke and cardiovascular events.
- White Coat Hypertension: Elevated readings only in clinical settings; requires ambulatory blood pressure monitoring (ABPM) for diagnosis.
- Masked Hypertension: Normal in clinic but elevated at home; associated with higher cardiovascular risk.
- Orthostatic (Postural) Hypotension: A drop of ≥ 20 mmHg systolic or ≥ 10 mmHg diastolic upon standing; common and dangerous in the elderly.

Consequences of Uncontrolled Hypertension

Untreated or poorly controlled hypertension in elderly individuals significantly increases the risk of:

- Stroke (both ischemic and hemorrhagic)
- Coronary artery disease and myocardial infarction
- Heart failure (particularly heart failure with preserved ejection fraction)
- Chronic kidney disease
- Peripheral artery disease
- Cognitive decline and dementia (vascular)
- Atrial fibrillation
- Retinopathy and vision loss

Blood Pressure Targets for Older Adults

Setting appropriate BP targets in older adults requires balancing cardiovascular benefit against the risks of over-treatment, including falls, syncope, and acute kidney injury.

Current Guideline Recommendations

Guideline Body	Age Group	Target BP
ACC/AHA 2017	≥ 65 (community-dwelling, fit)	< 130/80 mmHg
ACC/AHA 2017	Frail elderly or with high fall risk	Individualized (< 140/90 mmHg)
ESC/ESH 2018	65–79 years	130–140/70–80 mmHg
ESC/ESH 2018	≥ 80 years	130–140 mmHg systolic
JNC 8	≥ 60 years	< 150/90 mmHg

Clinical Note: The SPRINT trial (2015) demonstrated significant cardiovascular benefit from targeting SBP < 120 mmHg in non-diabetic adults ≥ 50 years. However, in frail elderly patients, overly aggressive treatment may increase harm. Clinical judgment and shared decision-making are essential.

Individualization of Targets

The following factors should guide personalized BP goals in elderly patients:

- Frailty and functional status
- Presence of orthostatic hypotension
- Polypharmacy and drug interactions
- Cognitive status
- Concurrent conditions (diabetes, CKD, CAD, stroke history)
- Patient preference and quality of life

Lifestyle Modifications & Healthy Habits

Lifestyle modifications are the cornerstone of hypertension management and should be initiated in all patients, regardless of whether pharmacotherapy is used.

Sodium Restriction

- Recommendation: Limit sodium intake to < 2,300 mg/day; ideally < 1,500 mg/day for greater benefit.
- Expected effect: A reduction of 5–6 mmHg systolic.
- Practical tips:
  - Avoid adding salt at the table.
  - Choose "low sodium" or "no salt added" canned goods.
  - Use herbs, spices, lemon juice, and vinegar for flavoring.
  - Be cautious of hidden sodium in bread, deli meats, soups, and condiments.
  - Read nutrition labels carefully.

Alcohol Limitation

- Recommendation: ≤ 1 standard drink/day for women; ≤ 2/day for men.
- Expected effect: Reducing heavy alcohol use can lower SBP by 4 mmHg.
- Alcohol also interacts with antihypertensive medications, increasing fall risk.

Smoking Cessation

- Smoking causes acute and chronic increases in blood pressure.
- Cessation reduces cardiovascular risk independently of BP reduction.
- Available cessation aids: nicotine replacement therapy (NRT), varenicline (Chantix), bupropion, and behavioral counseling.

Weight Management

- Recommendation: Maintain a BMI of 18.5–24.9 kg/m². Waist circumference should be < 102 cm (men) and < 88 cm (women).
- Expected effect: Each 1 kg reduction in body weight lowers BP by approximately 1 mmHg.
- In the elderly, weight loss goals should be modest (0.25–0.5 kg/week) to avoid sarcopenia and nutritional deficiencies.

Hydration

- Older adults have a diminished thirst sensation and are prone to dehydration, which paradoxically can worsen hypertension through neurohormonal activation.
- Recommendation: Aim for 6–8 cups (1.5–2 L) of water daily unless contraindicated by heart failure or kidney disease.
- Avoid excess caffeine, which can transiently raise BP.

Medication Adherence

- Non-adherence is a leading cause of uncontrolled hypertension.
- Strategies to improve adherence:
- Simplify regimens (once-daily dosing where possible)
- Use pill organizers or blister packs
- Set phone reminders
- Involve caregivers
- Regular follow-up with the healthcare team

Dietary Recommendations

The Dietary Approaches to Stop Hypertension (DASH) diet is the most evidence-based dietary intervention for hypertension management.

Core principles:

Food Group	Daily Servings	Examples
Fruits	4–5	Berries, bananas, oranges, melons
Vegetables	4–5	Leafy greens, broccoli, carrots, sweet potato
Whole grains	6–8	Brown rice, oats, whole wheat bread, quinoa
Low-fat dairy	2–3	Skim milk, low-fat yogurt, reduced-fat cheese
Lean meats/poultry/fish	≤ 6 oz	Skinless chicken, salmon, tuna, turkey
Nuts, seeds, legumes	4–5/week	Almonds, walnuts, lentils, kidney beans
Fats & oils	2–3	Olive oil, avocado
Sweets & added sugars	≤ 5/week	Limit all processed sweets
Sodium	< 2,300 mg/day	(see sodium restriction above)

Expected effect: The DASH diet can lower SBP by 8–14 mmHg.

Key Nutrients That Lower Blood Pressure

- Potassium (target: 3,500–5,000 mg/day): Found in bananas, oranges, potatoes, spinach, lentils. Counteracts sodium's effect on BP.
- Magnesium: Found in nuts, seeds, dark leafy greens, legumes. Supports vascular relaxation.
- Calcium: Found in dairy, fortified plant milks, tofu, sardines. Plays a role in vascular smooth muscle contraction.
- Omega-3 fatty acids: Found in fatty fish (salmon, mackerel, sardines), flaxseed, chia seeds. Reduce inflammation and vascular resistance.
- Dietary fiber: Found in oats, beans, fruits, vegetables. Associated with modest BP reduction.

Foods to Limit or Avoid

- High-sodium foods: Processed meats, canned soups, fast food, pickled foods, soy sauce
- Saturated and trans fats: Butter, lard, full-fat dairy, fried foods, commercially baked goods
- Added sugars: Sodas, pastries, candy, sweetened cereals
- Licorice (glycyrrhizin): Can significantly raise BP — a commonly overlooked dietary culprit
- Grapefruit: Interferes with calcium channel blockers (*e.g.*, felodipine, nifedipine)

The Mediterranean Diet

As a practical alternative to DASH, the Mediterranean diet emphasizes:

- Olive oil as the primary fat
- Abundant vegetables, legumes, and whole grains
- Moderate fish and seafood consumption
- Limited red meat and processed foods
- Moderate red wine (with caution in elderly patients on medications)

<u>Physical Activity & Exercise</u>

Benefits of Exercise in Elderly Hypertensives

Regular physical activity:

- Lowers SBP by 5–8 mmHg on average
- Reduces arterial stiffness
- Improves baroreceptor sensitivity
- Reduces body weight and insulin resistance
- Enhances mood and cognitive function

Aerobic Exercise (First-Line)

- Type: Walking, swimming, water aerobics, cycling (stationary or outdoors), dancing, tai chi
- Frequency: ≥ 5 days/week
- Intensity: Moderate (able to carry a conversation; 50–70% of maximum heart rate)
- Duration: 30–60 minutes/session; can be broken into 10-minute bouts
- Expected BP reduction: 5–8 mmHg systolic

Resistance/Strength Training

- Type: Light free weights, resistance bands, machine weights, bodyweight exercises
- Frequency: 2–3 days/week (non-consecutive days)
- Sets/Reps: 1–3 sets of 10–15 repetitions; start with low resistance

- Precautions: Avoid Valsalva maneuver (breath-holding); exhale on exertion
- Expected BP reduction: 2–4 mmHg systolic

Flexibility & Balance Training
- Examples: Yoga, tai chi, stretching, balance exercises
- Frequency: Daily or as part of each session
- Benefits: Reduces fall risk (critical in elderly hypertensives on BP-lowering medications)

Exercise Precautions for Elderly Patients
- Pre-exercise screening: Consult physician before starting a new exercise program, especially if sedentary or managing multiple comorbidities.
- Warm-up and cool-down: 5–10 minutes of low-intensity activity before and after.
- Blood pressure monitoring: Check BP before exercise; delay if resting SBP > 180 mmHg or DBP > 110 mmHg.
- Hydration: Drink water before, during, and after exercise.
- Footwear and environment: Use supportive, non-slip footwear; avoid hot and humid conditions.
- Orthostatic precautions: Rise slowly after floor or seated exercises to prevent dizziness and falls.
- Signs to stop exercise: Chest pain, severe shortness of breath, dizziness, palpitations, or sudden severe headache.

Sedentary Behavior
Prolonged sitting is independently associated with higher BP. Encourage:
- Standing or short walks every 30–60 minutes
- Use of standing desks or chairs with lumbar support
- Light household activities (gardening, tidying) as movement breaks

Stress Management & Mental Health

Chronic psychological stress activates the hypothalamic-pituitary-adrenal (HPA) axis and sympathetic nervous system, raising circulating catecholamines and cortisol, which elevate BP acutely and contribute to long-term hypertension. In older adults, common stressors include bereavement, social isolation, chronic pain, caregiving burden, financial concerns, and loss of independence.

Evidence-Based Stress Reduction Techniques
- Mindfulness-Based Stress Reduction (MBSR): Structured 8-week program; shown to lower BP by 4–5 mmHg.
- Deep breathing exercises: Slow, diaphragmatic breathing (6 breaths/min) activates the parasympathetic nervous system and acutely lowers BP.
- Progressive muscle relaxation (PMR): Systematic tensing and releasing of muscle groups.
- Biofeedback: Device-guided training to improve autonomic regulation.
- Yoga and tai chi: Combines physical activity with mindful movement and breathing.
- Cognitive Behavioral Therapy (CBT): Addresses maladaptive thought patterns contributing to chronic stress and anxiety.

Social Connectedness
Social isolation is associated with higher BP and mortality. Encourage:

- Regular family and community engagement
- Senior centers, clubs, and volunteer opportunities
- Pet ownership (associated with lower BP in some studies)
- Telehealth and video calls for homebound individuals

Addressing Depression and Anxiety
Depression is highly prevalent in elderly hypertensives and associated with medication non-adherence. Screen regularly using validated tools (GDS-15, PHQ-9). Treatment with counseling and/or antidepressants should be coordinated carefully with antihypertensive therapy.

Sleep Hygiene

Sleep and Blood Pressure
Blood pressure naturally dips during sleep ("nocturnal dipping"). Disrupted sleep — particularly obstructive sleep apnea (OSA) — eliminates this dip and contributes to resistant hypertension.

- OSA affects up to 50% of hypertensive elderly adults.
- Symptoms include loud snoring, witnessed apneas, gasping awakenings, and excessive daytime sleepiness.
- Diagnosis: Polysomnography or home sleep apnea test.
- Treatment: Continuous Positive Airway Pressure (CPAP) — reduces SBP by 2–10 mmHg.

Good Sleep Hygiene Practices

- Consistent schedule: Sleep and wake at the same time daily, including weekends.
- Dark, quiet, cool environment: Optimal temperature 65–68°F (18–20°C).
- Limit screen time: Avoid blue-light-emitting devices ≥ 1 hour before bed.
- Limit evening fluids and caffeine: Reduce nocturia and sleep disruption.
- Short naps only: Limit daytime naps to < 20 minutes; avoid late afternoon naps.
- Avoid heavy evening meals: May worsen nocturnal reflux and disrupt sleep.
- Limit alcohol close to bedtime: Despite sedative effects, alcohol fragments sleep architecture.