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Updates in Hypertension Guidelines: Translating Evidence into Practice

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EDUCATIONAL OBJECTIVES

After completing the continuing education activity, pharmacists will be able to

- Recall key updates to pharmacologic treatment recommendations, including preferred first-line therapies
- Compare new pharmacologic recommendations and their impact on therapy selection
- Apply evidence-based strategies to optimize individualized patient care
- Discuss the evolving blood pressure targets in recent hypertension guidelines and their implications for diverse patient populations

After completing the continuing education activity, pharmacy technicians will be able to

- Identify common antihypertensive medication classes and recent changes in therapeutic use
- Recall workflow and counseling points that support pharmacist-led interventions in hypertension management
- Discuss strategies to improve adherence, including refill synchronization, packaging solutions, and communication with the pharmacist and care team
- Apply updated hypertension guideline recommendations to support workflow processes

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TARGET AUDIENCE: Pharmacists and pharmacy technicians with an interest in primary care.

ABSTRACT: Hypertension remains the most prevalent modifiable risk factor for cardiovascular morbidity and mortality worldwide. New clinical trial evidence and evolving perspectives on cardiovascular risk assessment continue to shape treatment recommendations in a rapidly evolving landscape. The 2025 American Heart Association, American College of Cardiology, and American Society of Hypertension guideline update provides refined targets for blood pressure management, updated pharmacologic recommendations, greater emphasis on individualized patient care strategies, and lifestyle modifications. These updates are especially important for pharmacists and pharmacy technicians, who frequently serve as the most accessible healthcare professionals for patients managing chronic conditions. This continuing education activity reviews recent guideline changes, explores their clinical implications, and offers practical strategies to integrate them into pharmacy practice. Through case-based exploration, workflow applications, and safety considerations, learners will translate evidence into practice to optimize hypertension outcomes.

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INTRODUCTION

It's a busy Monday at The Friendly Fill pharmacy. The pharmacy's certified technician, Olivia, opens the door at 8 A.M. and three patients are waiting. Thomas "Call me Buddy" Thornton says he's in a hurry because he needs to be at work by nine. Mrs. Lawrence, who walks with a cane, says she's in no hurry and will sit in the waiting area. Ms. Vasquez slides in next to Mrs. Lawrence, saying, "Don't you live in my neighborhood?" Olivia determines what each one needs or wants and tells pharmacist Travis, "Brace yourself! It's already busy and it's going

to be a hypertension haven today!" Travis responds with, "So what's new?"

Hypertension continues to pose a critical public health challenge. Elevated blood pressure (BP) affects approximately 122 million adults in the United States (U.S.), nearly half of the adult population.[1] Despite the availability of effective therapies, control rates remain suboptimal, with fewer than half of patients achieving recommended targets.[2] Poor BP control contributes significantly to preventable cardiovascular morbidity and mortality, including myocardial infarction, stroke, heart failure, and chronic kidney disease (CKD) progression.[3]

Clinical guidelines are essential tools to translate emerging research into actionable practice standards. The 2025 American Heart Association, American College of Cardiology, and American Society of Hypertension (AHA/ACC/ASH) guideline update reflects ongoing reassessment of evidence, integration of trial data, and refinement of treatment algorithms to address persistent gaps in care.[4] For pharmacists and pharmacy technicians, understanding these updates is vital not only for accurate dispensing and counseling but also to improve patient adherence and safety at every stage of therapy.

By reinforcing this activity's objectives, pharmacists and technicians can strengthen their ability to detect medication-related problems, identify safety concerns, and improve long-term patient outcomes.

BURDEN OF HYPERTENSION AND RATIONALE FOR FREQUENT UPDATES

Hypertension remains the leading cause of global disease burden, estimated to affect more than 1.4 billion individuals worldwide.[5] As mentioned, nearly half of the adults in the U.S. are living with hypertension, with disproportionately higher prevalence among Black adults and individuals from socioeconomically disadvantaged backgrounds.[6] The financial burden is equally substantial, with direct healthcare costs and productivity losses exceeding $130 billion annually in the U.S. alone, and estimated to continue increasing.[7]

The epidemiology of hypertension reveals two concerning trends. First, prevalence increases with age, affecting more than 75% of adults older than 65 years.[4] Second, awareness and control rates plateaued or declined over the past decade, with a substantial disparity among older adults, women, and non-Hispanic Black adults.[8] These realities highlight the need for renewed strategies to drive earlier diagnosis, improve adherence, and address structural health inequities.

Guidelines Change Frequently

Guideline committees such as the AHA/ACC/ASH and international bodies such as the European Society of Hypertension (ESH) or International Society of Hypertension (ISH) frequently update recommendations for several reasons[9]:

- **Evolving trial data**: Landmark studies such as the Systolic Blood Pressure Intervention Trial (SPRINT) demonstrated the benefits of more intensive blood pressure lowering, shifting treatment targets.
- **Emerging populations**: New evidence informs management for subgroups such as older adults, patients with CKD, and individuals with diabetes.
- **Medication landscape**: The introduction of fixed-dose combinations, new safety signals, and expanded generics change therapeutic decision-making.
- **Health system priorities**: Guidelines increasingly emphasize team-based care and health equity to close persistent treatment gaps.

Pharmacists and technicians must stay current, as guideline recommendations directly affect drug selection, dispensing patterns, insurance coverage, and patient counseling.

Pharmacy Team Contributions in Hypertension Care

Pharmacists remain integral to managing hypertension, from initiating therapy in collaborative practice agreements to monitoring adherence and managing adverse effects. Meta-analyses consistently demonstrate that pharmacist-led interventions significantly reduce systolic blood pressure and improve the likelihood of achieving guideline targets.[10-12]

Technicians, while not prescribers, provide critical support in ensuring accurate dispensing, preventing medication errors, and identifying red flags. Examples include[13,14]

- Detecting look-alike/sound-alike (LASA) medications such as hydralazine and hydroxyzine
- Identifying inappropriate duplication (e.g., patient receiving two ACE inhibitors (ACEi) from different prescribers)
- Recognizing over-the-counter (OTC) or complementary products (e.g., licorice, decongestants) that can worsen blood pressure
- Referring patients to pharmacists when they report elevated readings during in-pharmacy screenings

Table 1. Current Blood Pressure Classifications[4]		
Category	**Systolic BP (mm Hg)**	**Diastolic BP (mm Hg)**
Normal	<120	<80
Elevated	120–129	<80
Stage 1 Hypertension	130–139	80–89
Stage 2 Hypertension	≥140	≥90

Together, pharmacists and technicians contribute to earlier intervention, better adherence, and safer therapy.

Given the 2025 update and persistent challenges in hypertension care, it is essential that pharmacy professionals translate guideline recommendations into practical workflows. This is the first major update provided by the ACC/AHA in almost a decade. Its importance cannot be stressed enough with the rise in morbidity and mortality in hypertensive patients.

PAUSE AND PONDER: What are the key reasons that guideline committees update hypertension targets more frequently than in the past? What causes delays?

EVOLVING BLOOD PRESSURE TARGETS

For decades, the definition and treatment thresholds for hypertension have been dynamic. The 2003 Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure 7 guidelines classified hypertension as blood pressure at or exceeding 140/90 mmHg.[15,16] However, the 2017 AHA/ACC guidelines lowered the BP threshold to at or exceeding 130/80 mmHg, a shift driven by data showing that cardiovascular risk begins at levels previously labeled as "prehypertension."[3]

The 2025 AHA/ACC/ASH update reaffirms the upper threshold of 130/80 mmHg for most adults, while offering nuanced considerations for patient subgroups.[4] European and international guidelines sometimes recommend slightly higher thresholds, but the global consensus increasingly supports earlier intervention and tighter control in high-risk groups.[16,17] Most clinicians in the U.S. adhere to the AHA/ACC/ASH guidelines but it is important to be aware that the European guidelines exist.

Current Target Recommendations

The 2025 AHA/ACC/ASH update emphasizes risk-based, individualized targets rather than a uniform cutoff. **Table 1** summarizes population-specific blood pressure targets and key considerations.

The updated AHA/ACC hypertension guideline emphasizes a shift toward earlier, risk-based, and more individualized care. The PREVENT risk calculator is now central to guiding treatment decisions, replacing prior models and improving risk prediction across diverse populations. A blood pressure target of <130/80 mmHg is recommended for most adults, with pharmacologic therapy initiated based on both BP level and cardiovascular risk. The guideline supports earlier use of combination therapy when appropriate while maintaining thiazide diuretics, ACEis or ARBs, and calcium channel blockers (CCBs)as first-line agents. Additional updates include expanded screening for albuminuria and primary aldosteronism, greater emphasis on standardized and home blood pressure monitoring, reinforcement of team-based care, and continued prioritization of lifestyle interventions.

The updated guideline places greater emphasis on risk-based, individualized treatment decisions, making the PREVENT risk calculator an essential tool in clinical practice. Unlike prior risk assessment models, PREVENT incorporates a broader range of variables to improve cardiovascular risk prediction across diverse populations. This enhanced stratification allows clinicians to better align patients blood pressure goals and pharmacologic therapy with a patient's overall cardiovascular risk profile. Familiarity with the PREVENT calculator is critical, as its integration represents a meaningful shift in how hypertension management is approached in the current update.

Key Trial Evidence

SPRINT, published in 2015, was a large multicenter, randomized controlled study designed to evaluate whether more intensive SBP control would improve cardiovascular outcomes compared with standard treatment targets.[18] The trial enrolled 9,361 adults aged 50 years or older with baseline SBP between 130 and 180 mmHg and at least one additional cardiovascular risk factor. These included clinical or subclinical cardiovascular disease (excluding prior stroke), CKD with an eGFR of 20 to 59 mL/min/1.73 m^2, a Framingham 10-year cardiovascular risk of 15% or greater, or age 75 years and older. Individuals with diabetes, previous stroke, symptomatic heart failure or reduced ejection fraction, polycystic kidney disease, or those residing in nursing facilities were excluded.[18]

These researchers assigned participants to either an intensive treatment strategy targeting SBP less than 120 mmHg or a standard treatment target of less than 140 mmHg.[18] Achieving the intensive target required an average of 2.8 antihypertensive medications, while the standard group required 1.8 drugs. The treatment algorithm emphasized the use of thiazide-type diuretics, particularly chlorthalidone, with ACEi or ARBs, CCBs such as amlodipine, and beta-blockers (BB) or loop diuretics when appropriate.[18]

The primary outcome (the most important question the researchers are trying to answer) was a composite of myocardial infarction, acute coronary syndrome, stroke, acute decompensated heart failure, or cardiovascular death.[18] Intensive therapy resulted in a significant reduction in the primary composite outcome, with a 25% relative risk reduction, and a 27% reduction in all-cause mortality compared with the standard control group. These benefits were consistent across higher-risk subgroups, including adults aged 75 years and older. However, intensive control was associated with increased risks of hypotension, syncope, electrolyte abnormalities, and acute kidney injury, although fall rates did not increase. SPRINT's implications are highly relevant to contemporary practice; intensive outpatient control can provide meaningful cardiovascular benefit in appropriately selected and closely monitored patients. Achieving SPRINT-level targets in inpatient settings is more challenging and may pose added safety concerns due to acute illness, fluid shifts, and frequent medication adjustments. As a result, current recommendations emphasize individualized BP goals and cautious titration, especially in older adults and those with CKD.[18]

The Action to Control Cardiovascular Risk in Diabetes Blood Pressure Trial (ACCORD BP), published in 2010, was a major randomized controlled study designed to determine whether intensive systolic BP control would provide additional cardiovascular benefit in adults with type 2 diabetes.[19] The trial enrolled 4,733 participants with diabetes who were at high cardiovascular risk, including individuals with existing cardiovascular disease or multiple risk factors. Researchers assigned participants to either an intensive BP target of less than 120 mmHg or a standard target of less than 140 mmHg. Achieving the intensive goal required an average of three or more antihypertensive medications, commonly including ACEi or ARBs, thiazide diuretics, BBs, and CCBs. Over a median follow-up of 4.7 years, intensive therapy successfully lowered mean SBP levels but did not significantly reduce the primary composite cardiovascular outcome (nonfatal myocardial infarction, nonfatal stroke, and cardiovascular death). There was, however, a modest but statistically significant reduction in stroke risk, which remained a secondary outcome benefit.[19]

Intensive treatment was associated with higher rates of serious adverse events, including hypotension, syncope, bradycardia, hyperkalemia, and elevations in serum creatinine.[19] Compared with the SPRINT population, ACCORD BP differed in that all participants had type 2 diabetes, a factor believed to influence vascular responsiveness and cardiovascular risk profiles. The ACCORD BP findings contributed to more nuanced guideline recommendations, demonstrating that aggressive systolic BP targets below 120 mmHg may not yield broad cardiovascular benefits in patients with diabetes.[17,19] As a result, prescribers should individualize BP goals in this population based on patient characteristics, comorbidity burden, tolerability, and risk of adverse events.

The 2021 Kidney Disease | Improving Global Outcomes (KDIGO) Clinical Practice Guideline for the Management of Blood Pressure in Chronic Kidney Disease provided updated, evidence-based recommendations emphasizing more intensive systolic BP control for adults with CKD not receiving dialysis.[21] KDIGO recommended targeting a standardized office systolic BP of less than 120 mmHg for most patients with CKD, based largely on findings from SPRINT, including its CKD subgroup. The guideline underscored the use of standardized BP measurement techniques, noting that nonstandardized readings, like incorrect cuff size or the patient in improper position, could lead to overtreatment and increased risk of adverse events.

KDIGO continued to support the use of renin–angiotensin system inhibitors, such as ACEis or ARBs, as first-line therapy for patients with CKD and albuminuria due to their proven renal and cardiovascular benefits. It recommends adding additional medications, including thiazide-type diuretics, CCBs, and BBs, as needed to reach target BP based on individual patient characteristics and comorbidities.

The guideline emphasized lifestyle interventions for all patients with CKD, including sodium restriction to less than 2 grams per day, regular physical activity, weight optimization, and moderation of alcohol intake. Importantly, KDIGO highlighted the need for careful consideration in frail or elderly patients, those at high risk of falls or orthostatic hypotension, and individuals with

Table 2. Blood Pressure Targets by Population (Adapted from 2025 AHA/ACC/ASH Guidelines)

Population	Recommended Target	Special Considerations
General adults (<65 yrs)	<130/80 mmHg	If tolerated, emphasize lifestyle + pharmacologic therapy
Older adults (≥65 yrs)	SBP <130 mmHg	Watch for orthostatic hypotension, frailty
Diabetes	<130/80 mmHg	Prioritize ACEi/ARB if albuminuria present
CKD	<130/80 mmHg	Individualize, avoid overly aggressive lowering if symptomatic
CCD	<130/80 mmHg	Beta-blocker and ACEi/ARB preferred first line for compelling indications
Pregnancy	<140/90 mmHg	Labetalol, nifedipine, methyldopa; avoid ACEi/ARB

ABBREVIATIONS; ACEi = angiotensin-converting enzyme inhibitors; ARB = angiotensin II receptor blockers; CCD = chronic coronary disease; CKD = chronic kidney disease; SBP = systolic blood pressure

advanced CKD where volume status and electrolyte abnormalities may complicate aggressive BP management. Overall, the 2021 KDIGO guideline reinforced the value of tighter BP control to reduce cardiovascular events in CKD while stressing individualized treatment goals, standardized measurement, and vigilant monitoring for potential harms.[21]

Technician Perspective: BP Measurement Accuracy

Pharmacy technicians often help patients to measure their BP or guide their use of automated devices. Inaccurate readings may lead to inappropriate treatment changes. Key considerations include cuff size, patient positioning, and device selection. Using the wrong cuff can alter systolic readings by up to 10 mmHg. Crossing legs, talking, or failing to support the patients back/arm can falsely elevate readings. Technicians should recognize that wrist or finger monitors are less reliable than upper-arm devices. Educating patients on proper technique ensures that pharmacists and prescribers base decisions on accurate data.[22]

Health Equity and Population Disparities

The updated guideline places a stronger emphasis on health equity, particularly in addressing the disproportionate burden of hypertension among Black adults. Unlike prior recommendations, race-based treatment algorithms have been removed, and management is now guided by individualized risk assessment using the race-neutral PREVENT calculator. The guideline recognizes that Black populations experience earlier onset, higher prevalence, and lower rates of blood pressure control, driven in part by social determinants of health and structural inequities. As a result, clinicians are encouraged to incorporate social context into treatment decisions and to utilize team-based, community-engaged strategies to improve outcomes and reduce disparities. Socioeconomic factors also affect control. Patients with limited access to healthcare often delay diagnosis and treatment.[23] Pharmacists and technicians can bridge gaps by offering screenings, counseling, and referral.

Cost remains one of the most significant barriers to optimal hypertension care, particularly for low income or uninsured patients, who may not be able to afford the out-of-pocket cost. Even when generic options are available, the cumulative cost of antihypertensive medications, office visits, laboratory monitoring, and transportation can be prohibitive. Out-of-pocket expenses often compete with other essential needs such as food, housing, and childcare, leading to medication underuse or discontinuation. Studies consistently demonstrate that patients with limited financial resources are less likely to achieve target BP levels, and cost-related nonadherence directly contributes to worse cardiovascular outcomes.[23,24]

Hypertension does not affect all populations equally.[23] Beyond race and ethnicity, geography, socioeconomic status, education, and access to healthcare drive disparities. Rural communities often face reduced access to primary care providers and specialists, resulting in delayed diagnosis and fewer opportunities for BP monitoring or adjustment of therapy. Urban populations may live closer to healthcare resources but face their own challenges, including limited access to safe spaces for physical activity, higher exposure to environmental stressors, and greater difficulty affording fresh, healthy food.[23] Both contexts underscore the reality that where patients live significantly impacts their ability to manage chronic conditions.

Health literacy is another key factor in BP control. Patients with limited understanding of hypertension may underestimate its risks, fail to recognize the importance of daily adherence, or misinterpret instructions on medication labels.[24] Cultural differences and language barriers can further complicate communication, or when educational materials are not tailored to their needs.

Pharmacists and technicians can contribute greatly to narrowing these gaps. By using plain language, simplified graphics, or teach-back methods, pharmacy teams can reinforce understanding and empower patients to take ownership of their health. Pharmacists can collaborate with interpreters and community health workers to identify relevant social and cultural factors and provide culturally competent care. Pharmacy technicians, who are often the first point of contact for patients, are well positioned to identify communication barriers and recognize when patients appear confused, disengaged, or overwhelmed. Technicians can then refer these patients to the pharmacist for additional counseling and support.[25]

Community outreach also offers opportunities to address disparities outside the pharmacy's walls. BP screening events at churches, schools, and community centers allow pharmacists and technicians to meet patients where they are, building trust in populations that may have historical skepticism toward healthcare institutions.[25] These efforts, although often requiring additional time and resources, can strengthen relationships, improve early detection, and ultimately reduce long-standing inequities in hypertension care.

Table 3. Pharmacologic Classes in Hypertension (Adapted from 2025 AHA/ACC/ASH Guidelines)			
Class	**Example Agents**	**Pharmacist Pearls**	**Technician Notes**
Thiazide diuretics	HCTZ, chlorthalidone, indapamide	Chlorthalidone preferred for potency and duration	Look-alike risk: HCTZ vs hydralazine
ACEi	Lisinopril, enalapril, benazepril	Avoid in pregnancy; monitor for cough, angioedema, hyperkalemia	Sound-alike: lisinopril vs lamictal
ARBs	Losartan, valsartan, olmesartan	Similar efficacy to ACEis; fewer adverse effects	Patient confusion: losartan vs loratadine
CCBs (DHP)	Amlodipine, nifedipine ER	Useful in Black adults and elderly; risk of edema	Confusion: nifedipine vs nicardipine
CCBs (non-DHP)	Verapamil, diltiazem	Use in arrhythmias; avoid in HFrEF	Always double check ER vs IR formulations
Beta-blockers	Metoprolol, carvedilol, atenolol	Use in CAD, HFrEF, arrhythmias	Watch for mix-ups: metoprolol tartrate vs succinate
Other agents	Hydralazine, clonidine, minoxidil	Adjunct only; significant adverse effects	Clonidine patches: monitor removal/ application dates
ABBREVIATIONS: ACEi = angiotensin-converting enzyme inhibitors; ARB = angiotensin II receptor blockers; CCB = calcium channel blocker; DHP = dihydropyridine; non-DHP = nondihydropyridine; CAD = coronary artery disease; HFrEF = heart failure with reduced ejection fraction; ER = extended-release; IR = immediate-release; HCTZ = hydrochlorothiazide			

By acknowledging and responding to these layers of disparity, pharmacy teams expand their contribution beyond medication dispensing. They become advocates for equitable care, working to ensure that the benefits of updated hypertension guidelines reach all patients, regardless of background or circumstance. Some practical takeaways for pharmacy teams include:

- Strive for less than 130/80 mmHg in most patients, but tailor goals based on age, comorbidities, and tolerance.
- Reinforce accurate measurement and patient self-monitoring.
- Use technician touchpoints (register, OTC aisles, refill calls) to identify patients with uncontrolled BP or medication-related problems.
- Consider social determinants of health when counseling patients and refer for community resources if needed.

PAUSE AND PONDER: When considering initial therapy for a patient with diabetes and hypertension, which classes of antihypertensives are prioritized, and why?

Lifestyle Modification: Foundational Therapy

Nonpharmacologic strategies remain first-line for stage 1 hypertension and are always recommended alongside medication. Pharmacists and technicians can make valuable contributions in guiding patients to realistic modifications to their daily routine.

Major recommendations include[4,20]

- **The Dietary Approaches to Stop Hypertension or DASH diet**: This diet is high in fruits, vegetables, and low-fat dairy, reduced saturated fat.
- **Sodium restriction**: Aim for less than 1,500–2,300 mg/day (1/4 -1/2 tsp)
- **Weight loss**: Patients generally experience a 1 mmHg reduction per kg (2.2 lbs) lost.
- **Physical activity**: Targeting at least 150 minutes/week of moderate activity is best.
- **Alcohol moderation**: Patients should aim for two or fewer drinks/day in men and fewer than three drinks/day in women. (Standard drink is approximately 12 oz beer, 5 oz wine, or 1.5 ounces spirits.)
- **Tobacco cessation**: Although not directly antihypertensive, eliminating tobacco reduces cardiovascular risk overall.

UPDATED PHARMACOLOGIC RECOMMENDATIONS

Pharmacologic therapy remains the cornerstone of hypertension management when lifestyle interventions alone fail to achieve BP goals. The 2025 AHA/ACC/ASH update continues to endorse four primary classes of antihypertensive drugs as first-line options[4]:

1. Thiazide diuretics
2. ACEis
3. ARBs
4. CCBs

BBs are not considered first-line except in specific populations. Centrally acting medications, direct vasodilators, and alpha-blockers are relegated to adjunctive roles due to safety and tolerability concerns.[4] **Table 3** outlines the key pharmacologic classes further.

Initial Therapy

The 2025 AHA/ACC/ASH guideline recommends antihypertensive medication for all adults with average BP of 140/90 mmHg or higher and for selected adults with BP of 130/80 mmHg or higher who have clinical cardiovascular disease, prior stroke, diabetes, CKD, or a 10-year PREVENT risk of 7.5% or greater. Adults with stage 1 hypertension who have no clinical cardiovascular disease and a PREVENT risk below 7.5% should begin with lifestyle modification alone, with medication added if BP remains at least 130/80 mmHg after three to six months. For stage 2 hypertension, the guideline recommends initiating 2 first-line agents of different classes, preferably as a single-pill combination to improve adherence and accelerate BP control.

Combination Therapy

For patients with stage 1 hypertension, monotherapy remains appropriate when pharmacologic treatment is indicated (elevated PREVENT risk or comorbid conditions). However, the guideline reinforces that timely escalation to combination therapy should occur if BP targets are not achieved, rather than prolonged titration of a single agent.[4]

The 2025 AHA/ACC/ASH hypertension guideline places significantly greater emphasis on early combination therapy for patients with stage 2 hypertension. This is evident by the recommendation of routine use of 2 first-line antihypertensive agents of different classes at treatment initiation for most patients, particularly when BP is ≥20/10 mmHg above target.[4]

Importantly, the guideline now prioritizes single-pill, fixed-dose combination therapy over prescribing separate agents. This shift reflects accumulating evidence that fixed dose combinations improve medication adherence, persistence, and speed of blood pressure control, all of which translate to better cardiovascular outcomes.[4]

Pharmacists can help patients weigh risks and benefits, particularly when navigating adverse effects that could reduce adherence (e.g., cough with ACEis, edema with amlodipine, or diuretic-induced electrolyte disturbances). Technicians enhance this process by recognizing early refill gaps or frequent OTC purchases (e.g., NSAIDs) that may worsen BP control.

At The Friendly Fill Pharmacy, technician Olivia is chatting with Buddy Thornton, a 48-year-old man, who is waiting for a refill for lisinopril 20 mg as she takes his blood pressure. He mentions persistent headaches. Olivia recalls seeing him purchase ibuprofen frequently. She slips Travis a piece of paper with the BP reading (145/119), and Travis raises his eyebrows. When reviewing Buddy's profile, he sees that Buddy's lisinopril is his only antihypertensive. Travis reviews Buddy's BP log (Buddy keeps it on his phone), showing persistent readings of roughly 150/95 mmHg. Travis also notes an amlodipine prescription that was picked up once over a year ago but never refilled. Travis counsels Buddy on avoiding frequent use of NSAIDs, discusses

combination therapy, and coordinates with his prescriber to add a diuretic (Travis learns Buddy experienced significant edema while on Amlodipine). The technician's vigilance prevented a missed opportunity.

SPECIAL POPULATIONS

Diabetes Mellitus

Patients with diabetes represent a special population in hypertension management because chronic hyperglycemia accelerates microvascular and macrovascular damage, making them particularly vulnerable to renal and cardiovascular complications. The updated guideline emphasizes a risk-based approach using the PREVENT calculator to guide treatment intensity. ACEis and ARBs are preferred because they reduce intraglomerular pressure, lower albuminuria, and slow the progression of diabetic nephropathy when a patient also has CKD. This renal protection is supported by extensive evidence demonstrating reduced proteinuria and improved long-term kidney outcomes with renin–angiotensin system blockade.[26] When additional therapy is needed, thiazide diuretics or CCBs are effective second-line options but if CKD isn't present all are deemed equally efficacious.

Chronic Kidney Disease

In patients with CKD, hypertension both contributes to and results from kidney dysfunction, creating a cycle of progressive decline. ACEis and ARBs are foundational therapies in this population because they reduce proteinuria and slow structural kidney damage through efferent arteriolar vasodilation (widening the small blood vessels that carry blood away from the kidneys). However, dual blockade with an ACEi and ARB is contraindicated because studies such as the Ongoing Telmisartan Alone and in Combination with Ramipril Global Endpoint Trial (ONTARGET) have demonstrated higher rates of kidney injury, hyperkalemia, and hypotension without added renal benefit.[27] Thiazide diuretics are thought to become less effective as CKD progresses and eGFR falls below 30 mL/min, prompting a transition to loop diuretics (furosemide, bumetanide) for adequate volume control. However, recent evidence is beginning to potentially change this viewpoint despite more studies being needed.[28] These

pharmacologic considerations highlight the importance of individualized therapy based on kidney function, electrolyte profile, and risk of adverse outcomes.

Back at the Friendly Fill Pharmacy, Mrs. Lawrence, a 62-year-old Black woman with type 2 diabetes and stage 2 CKD (eGFR 58 mL/min), is still chatting with Ms. Vasquez but gives technician Olivia her blood pressure log for Travis to see. She is taking HCTZ and amlodipine and is 100% adherent. Travis sees that her current medications include amlodipine 10 mg daily and hydrochlorothiazide 25 mg daily. Her average home BP readings are 156/92 mmHg. Recent labs show persistent microalbuminuria. At pickup, Olivia notes that Mrs. Lawrence refills her medication routinely, but Olivia hears Mrs. Lawrence tell Ms. Vasquez that she "adds salt to almost everything" because food tastes bland otherwise. She wonders aloud if that's why her ankles swell. Meanwhile, Travis sees that this patient has three related issues addressed by the guideline update: (1) BP more than 20/10 mmHg above target, and thus uncontrolled, (2) diabetes, and (3) albuminuria. He asks her if it's OK to call her prescriber, and she says, "Fine, fine, go ahead…" and resumes her chat. Travis explains his concerns to the prescriber and suggests adding an ACEi or ARB to reduce intraglomerular pressure and provide renal protection. He also asks the prescriber to assess Mrs. Lawrence for CCB-related peripheral swelling or volume status concerns at her next visit.

When he counsels Mrs. Lawrence, Travis explains why he called the prescriber. He also tells her that liberal use of salt may be contributing to increased fluid in her circulation (a patient-friendly way to say "volume expansion") and poor BP control. He says, "Sadly, people of your ethnicity tend to be more salt-sensitive than other patients. We know that the most you should use is 1,500 to 2,300 mg per day—that's about one quarter to one half teaspoon." Olivia reinforces lifestyle messaging during prescription pickup.

Pregnancy

Management of these patients balances maternal risk reduction and fetal safety. Patients within the severe-range (systolic ≥160 or diastolic ≥110 mmHg) should be treated promptly. Patients with persistent readings ≥140/90 mmHg should be considered for treatment based on maternal risk. First-line agents in pregnancy include labetalol, long-acting nifedipine, and methyldopa, while ACE inhibitors and ARBs are contraindicated because of fetal toxicity. Care should include fetal growth monitoring, assessment of maternal end-organ function, close coordination with obstetrics, and a clear plan for postpartum follow-up.[4]

Post Partum Hypertension

BP often changes in the first six weeks after delivery, and women with chronic or pregnancy-related hypertension require continued monitoring and management. Check BP frequently in the first 72 hours and arrange early outpatient follow up through six to twelve weeks. Continue or adjust antihypertensive therapy as needed with preferred drugs that are safe for breastfeeding such as labetalol and nifedipine. Enalapril or captopril can be used with counseling about lactation. Watch for delayed onset postpartum preeclampsia up to twelve weeks post-birth and give clear discharge instructions and a plan for follow up.[4]

Elderly

Effective prevention and treatment of hypertension across midlife and later life reduces the risk of cognitive decline and vascular dementia. Older adults require special consideration because age-related changes present additional challenges. This includes progressive arterial stiffness, reduced renal function, and an impaired ability to adjust BP when changing positions, resulting in an increase to both their susceptibility to hypertension and their vulnerability to treatment-related adverse effects. Initiating therapy at low doses and titrating gradually is essential to minimize orthostatic hypotension, dizziness, electrolyte disturbances, and falls. Evidence suggests that intensive BP lowering may reduce cardiovascular events in older adults, but healthcare providers must weigh these benefits against frailty and fall risk, as highlighted by contemporary trials and geriatric hypertension experts.[29]

Secondary Stroke Prevention

Controlling BP after an ischemic stroke or a transient ischemic attack is proven to reduce the chance of another stroke. Aim for a BP near 130 over 80 mmHg if the patient tolerates it. Start or increase BP medicines as part of the secondary prevention plan. Choose drugs that fit the patient's other conditions, for example, ACEis, ARBs, and thiazide diuretics which have shown benefit in secondary stroke prevention in RCTs. CCBs have limited data in stroke prevention but can still be used if the patient requires additional control. The care team should monitor for low blood pressure and signs of poor brain perfusion in patients with large vessel disease or a recent large infarct. Work with neurology to set the timing and targets after the acute phase.[4]

Black Adults

Black adults experience a disproportionate burden of hypertension, including earlier onset, higher prevalence, and lower rates of blood pressure control. The 2025 guideline removes race-based treatment recommendations and instead

emphasizes individualized, risk-based care using the PREVENT calculator. Antihypertensive therapy should be selected based on comorbid conditions, cardiovascular risk, and patient-specific factors rather than race alone. The guideline also highlights the critical role of social determinants of health, including access to care, medication affordability, and culturally competent education, in driving disparities. Addressing these factors through team-based and patient-centered care is essential to improving outcomes. Combination therapy is often required due to the high prevalence of salt-sensitive hypertension, but treatment selection should remain individualized.

Resistant Hypertension

Resistant hypertension is BP that remains uncontrolled despite the use of three antihypertensive medications, including a diuretic, at optimal doses. Patients with resistant hypertension represent a clinically complex population because they often have underlying physiologic contributors such as excess aldosterone, renal disease, or sympathetic overactivity, a state in which the patient's "fight or flight" response is overreactive.[28] Spironolactone has proven to be an effective fourth-line agent due to its ability to antagonize aldosterone, a key driver of resistant hypertension, as demonstrated in the Prevention And Treatment of Hypertension With Algorithm-based therapy-2 trial (PATHWAY-2)[30]

Evaluation for secondary causes of hypertension is a critical component of managing apparent resistant hypertension. The guideline recommends a systematic workup for conditions such as primary aldosteronism, renal parenchymal disease, renovascular disease, and obstructive sleep apnea. Early identification and treatment of these conditions can substantially improve blood pressure control. Referral to a specialist is appropriate when a secondary cause is suspected or when hypertension remains uncontrolled despite optimized therapy.[4]

Clinicians should optimize the core antihypertensive regimen before escalation. This includes ensuring use of a long-acting thiazide-like diuretic (chlorthalidone or indapamide) and adding a mineralocorticoid receptor antagonist when blood pressure remains uncontrolled on standard triple therapy. When using mineralocorticoid receptor antagonists, careful monitoring of kidney function and serum potassium is essential.[4]

The guideline does not recommend routine use of loop diuretics solely to offset potassium-sparing effects. However, loop diuretics may be appropriate in patients with reduced kidney function or volume overload, where thiazide-type diuretics are less effective and additional control is needed.[4]

Pharmacist Perspective

Pharmacists can take four steps to optimize care:

- Assess for secondary causes or adherence issues before intensifying therapy.
- Counsel patients on adverse effects (e.g., cough with ACEis, edema with amlodipine).
- Encourage home BP monitoring and medication synchronization.
- Evaluate drug–drug interactions (e.g., ACEi/ARB with potassium-sparing diuretics).

Technician Perspective

Technicians frequently encounter dispensing and OTC-related issues that can affect hypertension management:

- **Dispensing errors**: Look-alike or sound-alike errors (e.g., HCTZ and hydralazine, losartan and loratadine) are more common than they should be.
- **Formulation confusion**: Metoprolol tartrate vs succinate (short- vs long-acting).
- **OTC interactions**: nonsteroidal anti-inflammatory drugs (NSAIDs), decongestants (pseudoephedrine, phenylephrine), and herbal products like ginseng or licorice can raise BP.
- **Refill management**: Missed refills may indicate poor adherence; technicians can flag for pharmacist follow-up.

By recognizing these issues and starting a discussion with patients or pharmacists, technicians strengthen the pharmacist's ability to provide comprehensive care.

PAUSE AND PONDER: How can technicians help identify potential errors when dispensing antihypertensive therapy, and how does this support patient safety?

Individualized Patient Care Strategies

Hypertension is not a one-size-fits-all condition. Two patients may share the same BP readings but differ in cardiovascular risk, comorbidities, socioeconomic factors, and treatment preferences. The 2025 AHA/ACC/ASH update underscores tailoring management to the individual to improve both safety and adherence.[4] Pharmacists and technicians serve integral functions in implementing this approach within the pharmacy setting.

Medication Adherence and Persistence

Up to 50% of patients discontinue their antihypertensive medications within the first year of treatment, a trend strongly linked to poor BP control and increased cardiovascular risk.[31] Several factors contribute to declining adherence, including bothersome adverse effects, complex medication regimens, high out-of-pocket costs, and limited understanding of the long-term risks associated with uncontrolled hypertension. Many patients also struggle to recognize the importance of daily adherence because hypertension is largely asymptomatic, making the benefits of therapy feel abstract or distant compared with the immediate inconvenience of taking medications.[31]

Pharmacists can help identify barriers and improve patient adherence. Medication synchronization programs can simplify refill schedules and reduce gaps in therapy by aligning all prescriptions to a single pickup date.[32,33] Pharmacists can also counsel patients on managing expected adverse effects, such as peripheral edema from amlodipine, offering reassurance, recommending mitigation strategies, or adjusting therapy in collaboration with prescribers. Motivational interviewing techniques allow pharmacists to explore patient beliefs, correct misconceptions, and support patients in developing intrinsic motivation to their own care.

Pharmacy technicians also make meaningful contributions to adherence efforts. As the team members most frequently interacting with patients at the counter or on the phone, technicians are often the first to notice patterns such as delayed refills, missed pickups, or patient comments indicating confusion or dissatisfaction. They can bring these issues to the pharmacist's attention for timely intervention. Technicians also assist patients with navigating copay assistance programs if the patient requires certain brand name medications, identifying lower-cost generic options, and coordinating insurance processes, all of which can reduce financial barriers and support sustained adherence. Together, pharmacists and technicians form an integrated support system that helps patients overcome obstacles, understand their therapy, and stay engaged in long-term hypertension management.

Olivia and Travis know about issues related to nonadherence; they see nonadherence often. Mrs. Vasquez is at The Friendly Fill Pharmacy today, and this 60-year-old woman is picking up her lisinopril and hydrochorthiazide refills three weeks late. Olivia notices the delay and alerts Travis, who speaks with Ms. Vasquez and discovers that she has been taking her medications inconsistently because she "feels fine" and does not see an immediate need for daily treatment. Travis explains, "Hypertension is often 'silent,' meaning you don't feel any different. When you don't take daily medicine, you increase your risk of heart attack, stroke, and kidney damage even if you have no symptoms right now." After reinforcing the importance of consistent daily dosing, Travis consults with the prescriber to ensure her regimen is optimized. As he does, Olivia provides adherence tools such as a pill organizer and works on medication synchronization. Olivia also asks, "When do you take your blood pressure?" and Ms. Vasquez admits she doesn't have a BP machine and can't afford one. Olivia says, "I see you in here often. How about you let me take it whenever you're in the store?"

Integrating Comorbidities

Pharmacists must consider comorbidities that significantly influence antihypertensive therapy selection and monitoring. An ACEi or ARB is specifically recommended in patients with diabetes who have albuminuria or CKD, given their ability to reduce progression of kidney disease and provide cardiovascular benefit. In the absence of albuminuria, other first-line agents may be used as initial therapy, and treatment selection should be guided by patient-specific factors and blood pressure goals rather than diabetes alone.[4]

For individuals with CKD, these same drugs help slow disease progression, although careful monitoring of kidney function and serum potassium is essential. Patients with heart failure benefit most from evidence-based BBs and ACEis or ARBs, while prescribers should avoid non-DHP CCBs (verapamil, diltiazem) due to their negative inotropic effects (decrease in strength of cardiac muscle contraction).[4] In older adults, heightened sensitivity to adverse effects, increased fall risk, and the prevalence of polypharmacy necessitate cautious use of diuretics and thoughtful regimen simplification to reduce treatment burden and improve safety.[4]

Patient Preferences and Shared Decision-Making

Guidelines highlight patient-centered care. Adherence improves when patients feel heard and are engaged in decisions. Preferences may include once-daily rather than twice-daily dosing, brand as opposed to generic formulations, and avoiding medications that interfere with work (e.g., diuretics in long-distance drivers). Pharmacists can provide education, while technicians reinforce instructions during handoff at the counter, adding another touchpoint every time a patient receives their medications.

Pharmacists in Team-Based Care

Pharmacists increasingly engage in collaborative practice agreements and chronic disease management programs.

Evidence shows pharmacist-led interventions can reduce systolic BP by 7 to 10 mmHg.[10] Accessibility and trust equip pharmacists with ample opportunity to benefit the team's future decision making. Responsibilities include initiating or titrating therapy under protocol, monitoring home BP logs, and conducting medication therapy management (MTM).

Technicians in Workflow and Safety

Technicians' contributions, while often underrecognized, directly affect hypertension outcomes. Their expertise in preventing medication errors is critical, such as distinguishing between metoprolol tartrate and metoprolol succinate to ensure patients receive the correct formulation. Technicians also help identify potential risks associated with OTC products by noticing when patients purchase medications like pseudoephedrine while taking multiple antihypertensives, prompting timely pharmacist intervention. They support BP screening initiatives by assisting with in-pharmacy BP checks and ensuring that monitoring devices are properly calibrated. Technicians are also well positioned to identify referral triggers, such as encountering consistently elevated BP readings above 180/110 mmHg and guiding patients to speak with the pharmacist or seek emergency care when appropriate.

Social Determinants of Health

The guideline also emphasizes addressing barriers beyond medication.[4] Pharmacists and technicians can assist patients in overcoming transportation challenges by coordinating mail-order services or arranging prescription delivery. They can support individuals with low health literacy by using pictograms, simplified instructions, or teach-back methods to ensure understanding. Enrolling patients in assistance programs or recommending lower-cost generic alternatives, when appropriate, may mitigate cost barriers. By recognizing and responding to these social and structural influences, pharmacy teams can help improve BP control and reduce disparities in patient outcomes.

Pro Tips

In patients requiring multiple medications, fixed-dose combinations improve adherence and reduce pill burden, but cost and formulary restrictions may be barriers. Pharmacists and technicians should assess insurance coverage and provide alternatives when needed.

Pharmacists should leverage each patient encounter to address medication adherence and reinforce lifestyle goals. Short, structured counseling moments whether at prescription pick up, during BP screenings, or over the phone can make measurable differences in patient outcomes. Technicians should consistently monitor refill histories and OTC purchases to identify potential red flags.

Although pharmacist and technician intervention can improve hypertension outcomes, real-world barriers such as time and staffing constraints often limit implementation. In busy community and health-system settings, pharmacists and technicians may have limited opportunity for extended counseling, follow-up, or collaboration with other providers.

Pharmacy technicians may process several hundred prescriptions per shift, which leaves them little opportunity to flag adherence concerns or discuss OTC risks. These constraints not only contribute to professional burnout but also create gaps in care that disproportionately affect patients with the greatest social and economic barriers. Without adequate time, even the most motivated pharmacy teams may struggle to deliver truly individualized care. Addressing these limitations requires workflow optimization, investment in technician training, and system-level support such as scheduling adjustments, use of synchronization technology, and collaborative practice agreements to ensure guideline implementation remains realistic and sustainable.

Pharmacists should use medication therapy management and collaborative practice agreements to intensify therapy when clinically appropriate. Technicians should flag missed refills, OTC risks, and look alike/sound alike errors for pharmacist review. Both pharmacists and technicians should reinforce lifestyle modifications during brief patient encounters.

These real-world applications show how small actions at the pharmacy level can translate into better BP control across entire patient populations. As a staple to many communities, pharmacies, and their workers, are foundational in optimizing outcomes from a population health perspective. In retail settings, friendly, consistent employees go a long way in making patients feel welcome and important.

CONCLUSION

Hypertension remains the most prevalent, preventable driver of cardiovascular morbidity and mortality. The 2025 AHA/ACC/ASH guideline update emphasizes early detection, tighter BP targets, individualized pharmacologic strategies, and comprehensive team-based care.

For pharmacists, these updates demand vigilance in drug selection, patient counseling, adherence monitoring, and clinical decision-making. For technicians, the focus is on dispensing accuracy, recognizing red flags, and supporting patients at the counter. Together, pharmacy professionals form the most accessible layer of hypertension management with an expanding horizon. As frontline providers, pharmacists and technicians hold the power to transform evidence into daily practice. Through ongoing education, vigilance, and patient-centered care, pharmacy teams can meaningfully reduce the burden of hypertension and improve public health outcomes.

Figure 1. Staying on Track with the Hypertension Guidelines

Best

1. **Serve as community champions** by providing screening, education, and outreach to improve cardiovascular outcomes
2. **Address health equity and social determinants of health** that affect hypertension control
3. **Collaborate actively with prescribers and physical therapists**, and know if your state allows you to refer patients directly to physical therapy

Better

1. **Identify medication-related problems** such as duplication, LASA errors, and adherence barriers
2. **Use refill histories and patient conversations** to uncover uncontrolled hypertension or nonadherence
3. **Collaborate with prescribers** to optimize therapy and support guideline-based treatment

Good

1. **Reinforce proper BP measurement** and encourage home monitoring
2. **Flag missed refills and OTC risks** (NSAIDs, decongestants, licorice) for pharmacist review
3. **Promote lifestyle changes** including DASH diet, sodium reduction, and physical activity

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