W H I T E P A P E R

Cardiovascular Disease

The Silent Path to Dependency

Heart Failure · Coronary Artery Disease · Atrial Fibrillation · Valvular Disease · Cardiac Amyloidosis

A Complete Guide for Patients, Families, and Caregivers

Prevention · Diagnosis · Medications & Devices · Rehabilitation · Caregiver Support

Published June 2026 | Health Education Resource Center

Sources: AHA, ACC, HFSA, CDC, NIH NHLBI, FDA, ClinicalTrials.gov

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1. EXECUTIVE SUMMARY

Cardiovascular disease is the leading cause of death in the United States and the single most consequential driver of dependency in older adults. Within cardiovascular disease, heart failure is the condition that most reliably converts an independent older adult into someone who needs help with the basic activities of daily life. CVD does not just end lives — it slowly takes independence, one symptom and one hospitalization at a time.

In 2026, approximately 130.6 million American adults — nearly half the adult population — have some form of cardiovascular disease. Heart failure alone affects 6.7 million Americans and is projected to reach 8.7 million by 2030. Atrial fibrillation affects more than 10.5 million Americans and is the leading cause of preventable stroke. One million heart failure hospitalizations occur each year in the United States, and roughly 25% of patients are readmitted within 30 days.

The trajectory of cardiovascular disease is unusually predictable. The natural history is: silent disease for decades → first event (myocardial infarction, stroke, new atrial fibrillation, or a heart failure hospitalization) → recovery with new medications → progressive symptoms despite optimal therapy → escalating hospitalizations → device or transplant evaluation → dependency. Understanding where you or a loved one is on that trajectory — and what interventions are available at each stage — is the most important framework for making good decisions.

Key Facts at a Glance

- **Prevalence:** Approximately 130.6 million U.S. adults have some form of cardiovascular disease. 6.7 million have heart failure; 10.5 million have atrial fibrillation; 20 million have coronary artery disease.
- **Hospitalizations:** Approximately 1 million heart failure hospitalizations occur each year. The 30-day all-cause readmission rate is 13–25%; the 1-year readmission rate reaches 35.7%.
- **Mortality:** Median survival after a heart failure diagnosis is approximately 5 years, though survival varies widely by stage, treatment, and comorbidity.
- **Dependency:** Heart failure produces predictable ADL loss — dyspnea limits bathing and dressing; falls, cognitive change, and hospitalizations further erode independence with each cycle.
- **The good news:** Patients on all four pillars of modern HFrEF therapy at optimal doses have roughly 73% lower 2-year mortality than patients on older conventional therapy. Cardiac rehabilitation reduces post-event mortality by 20–25%. TAVR, TEER, and pulsed field ablation have transformed care for older, frailer patients.

> *Cardiovascular disease is the most underestimated driver of dependency in modern medicine. The window for meaningful action is long — often decades — but it narrows at each inflection point: the first hypertension diagnosis, the first medication, the first arrhythmia, the first hospitalization, the first device. Families who fare best are those who understand where they are on the trajectory,*

> *engage the right medical team early, and mobilize community support before it is desperately needed.*

2. UNDERSTANDING CARDIOVASCULAR DISEASE

Cardiovascular disease is not one condition but a family of overlapping disorders of the heart and blood vessels. For patients and families navigating dependency, the differences among them matter enormously.

Heart Failure: The Central Player

Heart failure is a clinical syndrome in which the heart cannot pump or fill with enough blood to meet the body's needs. It is not a single disease but the common endpoint of many cardiac conditions — coronary artery disease, hypertension, valvular disease, cardiomyopathy, and others. Modern classification depends on left ventricular ejection fraction (EF), the percentage of blood the left ventricle squeezes out with each beat:

- HFrEF — Heart Failure with reduced Ejection Fraction (EF ≤ 40%)
- HFmrEF — Heart Failure with mildly reduced Ejection Fraction (EF 41–49%)
- HFpEF — Heart Failure with preserved Ejection Fraction (EF ≥ 50%)
- HFimpEF — Heart Failure with improved Ejection Fraction (previously reduced, now > 40%)

HFpEF now accounts for roughly half of all heart failure cases and is rising fastest, driven by aging, obesity, hypertension, and diabetes. HFrEF is more responsive to guideline-directed medical therapy; HFpEF has historically been harder to treat, though SGLT2 inhibitors have changed that picture meaningfully since 2022.

NYHA Functional Class

The New York Heart Association functional classification is the most clinically useful way to think about heart failure severity from an activities-of-daily-living perspective:

NYHA Class	Symptoms	ADL Impact
Class I	No limitation; ordinary activity does not cause symptoms	None
Class II	Slight limitation; ordinary activity causes mild fatigue, dyspnea, palpitations	Mild — stairs, brisk walking limited
Class III	Marked limitation; less than ordinary activity causes symptoms	Significant — bathing, dressing, walking room-to-room affected
Class IV	Symptoms at rest; any physical activity causes discomfort	Severe — most ADLs require assistance

ACC/AHA Stages A–D

The American College of Cardiology and American Heart Association stages emphasize disease progression and the opportunity for prevention:

- Stage A — At Risk (hypertension, diabetes, obesity, family history) but no structural disease and no symptoms
- Stage B — Structural heart disease (low EF, prior MI, valvular disease) but no symptoms
- Stage C — Structural heart disease with current or prior symptoms of heart failure
- Stage D — Refractory heart failure requiring specialized interventions (LVAD, transplant, hospice)

Coronary Artery Disease and Myocardial Infarction

Coronary artery disease (CAD) — the build-up of cholesterol plaque in the arteries supplying the heart — affects approximately 20 million American adults. Acute myocardial infarction (heart attack) occurs in roughly 805,000 Americans per year; about 200,000 are recurrent events. Survivors live with ischemic cardiomyopathy, which is the most common pathway to HFrEF in the United States.

Atrial Fibrillation

Atrial fibrillation is the most common sustained cardiac arrhythmia, affecting 10.5 million or more Americans and projected to reach 12.1 million by 2030. Untreated AFib produces stroke at approximately five times the rate of patients in sinus rhythm, contributes to heart failure, and frequently coexists with other cardiovascular conditions. The treatment revolution of the past five years — DOACs replacing warfarin, and pulsed field ablation replacing thermal ablation — has transformed AFib care.

Valvular Heart Disease

Aortic stenosis (narrowing of the aortic valve) affects 3–5% of adults age 75 and older and is the most common valve lesion requiring intervention. Mitral regurgitation, tricuspid regurgitation, and other valve diseases together represent a major and rising portion of cardiology workload. Transcatheter valve therapies — TAVR for aortic stenosis (now approximately 45% of all aortic valve replacements), TEER (MitraClip) for mitral regurgitation, and the FDA-approved-April-2024 TriClip for tricuspid regurgitation — have made valve replacement accessible to older and frailer patients who previously could not have survived open-heart surgery.

Cardiac Amyloidosis

Long thought to be rare, transthyretin (ATTR) cardiac amyloidosis is now recognized as a substantial cause of heart failure in older adults — autopsy series find amyloid deposits in 25% of hearts in patients age 80 and older. ATTR-CM is the form for which tafamidis (Vyndaqel/Vyndamax), acoramidis (Attruby, FDA approved November 2024), and vutrisiran (Amvuttra, ATTR-CM label expansion March 2025)

provide disease-modifying treatment. AL amyloidosis is a separate, more aggressive disease caused by an underlying plasma cell disorder and is treated by hematology.

Hypertrophic Cardiomyopathy

Hypertrophic cardiomyopathy (HCM) is a genetic disease affecting approximately 1 in 500 people. Obstructive HCM is now treatable with mavacamten (Camzyos), the first cardiac myosin inhibitor — a major advance over decades of symptomatic-only therapy. A second-generation myosin inhibitor, aficamten, is in late-stage development with positive Phase 3 data (SEQUOIA-HCM).

Who Is Most Affected

Cardiovascular disease burden concentrates in older adults, but the process begins decades earlier. Prevalence rises sharply after age 65; heart failure prevalence exceeds 10% in adults age 75 and older. Men experience coronary events earlier than women; women catch up after menopause. Black Americans experience heart failure at younger ages and with higher mortality than white Americans, driven in significant part by earlier and more severe hypertension. Communities with high proportions of older residents — including much of Florida, Arizona, and the Carolinas — see cardiovascular disease as the leading cause of hospitalization and functional decline in the local population.

3. THE COMPLICATIONS THAT DRIVE DEPENDENCY

This section is the clinical heart of why cardiovascular disease matters for daily life and long-term function. Each condition below produces predictable functional consequences. Taken together, they explain why CVD is the most underestimated driver of dependency in modern medicine.

3.1 Heart Failure Hospitalization — The Inflection Point

Heart failure hospitalization is the single most important event in the dependency trajectory of CVD patients. Approximately 1 million HF hospitalizations occur in the United States each year, and the 30-day all-cause readmission rate is 13–25%. One-year readmission reaches 35.7%.

The mechanism of decline is the deconditioning cascade:

- Acute decompensation → hospital admission, often 5–7 days
- Bed rest and inactivity → muscle loss (3–5% per week in older patients)
- Discharge → home or skilled nursing facility with reduced exercise capacity
- Failure to recover prior conditioning → reduced ADL capacity
- Next decompensation → repeat cycle, lower starting point each time

> *After a first heart failure hospitalization, patients have a 53% fall rate within six months. Each subsequent admission accelerates the loss of independent ambulation. By the third or fourth admission, many patients no longer return to community living. The first HF admission is the right moment to begin advance-care-planning conversations while the patient can fully participate.*

3.2 Atrial Fibrillation and the Stroke Cascade

Untreated AFib produces stroke at approximately five times the rate of patients in sinus rhythm. Stroke is one of the most functionally devastating events in the cardiovascular pathway. Patients with AFib-related strokes are disproportionately disabled because embolic clots tend to be large and to occlude major arteries — leading to substantial motor, cognitive, and swallowing deficits that often persist for the rest of life. A single embolic stroke can convert a NYHA Class II patient living independently into a NYHA Class III patient with hemiparesis requiring full ADL assistance. See our companion Stroke/CVA white paper for the full post-stroke trajectory.

3.3 Cardiac Cachexia and Sarcopenia

Chronic heart failure produces cardiac cachexia — involuntary weight loss, particularly muscle wasting — in 5–15% of patients, rising to 30% or more in advanced disease. Combined with age-related sarcopenia (muscle loss with aging), this produces severe deconditioning that limits every ADL. The patient who weighs 130 pounds at 5'10" with HFrEF and edema is often hiding a body composition with 70+ pounds of fat-free mass loss.

3.4 Dyspnea and the Limits of ADLs

Shortness of breath is the cardinal symptom of heart failure. Its functional impact escalates step by step:

- Stage 1 (NYHA II) — dyspnea on stairs, hills, brisk walking
- Stage 2 (NYHA III) — dyspnea on level walking, bathing, dressing
- Stage 3 (NYHA III/IV) — dyspnea at rest with any activity (lifting arms, standing)
- Stage 4 (NYHA IV) — orthopnea (cannot lie flat), paroxysmal nocturnal dyspnea, dyspnea at rest

Bathing, in particular, is a high-effort ADL — the combination of warm water (vasodilation), arm elevation (cardiac load), and physical exertion frequently exceeds NYHA III patients' tolerance. Many heart failure patients quietly stop bathing because it triggers severe dyspnea — a hidden hygiene crisis the family eventually notices.

3.5 Cognitive Impairment — 'Cardiogenic Dementia'

Heart failure increases dementia risk by approximately 60%. Cognitive impairment is present in 29% of HF patients overall and in higher percentages of patients with NYHA III–IV disease. Mechanisms include chronically reduced cerebral perfusion, microemboli (particularly from AFib), and the cumulative effect of multiple hospitalizations with delirium episodes.

> *A patient with heart failure plus mild cognitive impairment is at very high risk of medication non-adherence — and medication non-adherence in HF rapidly produces decompensation and hospitalization. This cognitive-cardiac vicious cycle is one of the strongest predictors of transitioning out of independent living in older adults, and it makes caregiver involvement in daily medication management essential.*

3.6 Falls — Orthostasis, Syncope, and Deconditioning

Cardiovascular patients fall at 2–3 times the rate of age-matched controls without CVD. Causes include:

- Orthostatic hypotension from diuretics, ARNI, ACEi/ARB, and beta-blockers
- Bradycardia from beta-blockers, AV node disease, or sick sinus syndrome
- Cardiac syncope (aortic stenosis, ventricular arrhythmia, vasovagal)
- Deconditioning and muscle loss
- Cognitive impairment with impaired hazard recognition

The fall, in turn, frequently produces a hip fracture, an emergency department visit, a hospitalization, and another step down the dependency ladder. See our companion Falls and Fractures white paper for the full cascade.

3.7 Cardiorenal Syndrome

The heart and kidneys are coupled organs — disease in one accelerates disease in the other. Approximately 50% of heart failure patients have concurrent chronic kidney disease (CKD);

approximately 50% of CKD patients have CVD. Diuretic management in cardiorenal syndrome is one of the most challenging problems in clinical medicine, and worsening renal function during HF hospitalization is a strong predictor of mortality and rehospitalization.

3.8 Polypharmacy

The typical advanced HF patient takes 8–12 medications daily, with approximately 50% of HF patients on 10 or more drugs. Polypharmacy in older adults is independently associated with falls, hospitalization, cognitive impairment, and adverse drug events. Managing a 12-medication regimen requires intact cognition, manual dexterity, and engaged family support — all of which cardiovascular disease itself can erode over time.

3.9 Implanted Cardiac Devices

Pacemakers (200,000+ implants per year in the U.S.), implantable cardioverter-defibrillators (ICDs, approximately 150,000 per year), cardiac resynchronization therapy (CRT), and Watchman left atrial appendage occlusion devices are increasingly common. These devices extend life and reduce hospitalization but bring their own complications — lead malfunction, infection (1–2% of new implants), inappropriate shocks, generator replacement every 5–10 years, and end-of-life device deactivation conversations that families and clinicians must have together.

3.10 LVAD — Mechanical Circulatory Support

Left ventricular assist devices such as the HeartMate 3 extend life in end-stage heart failure, either as a bridge to transplant or as destination therapy for patients ineligible for transplant. LVAD life expectancy now exceeds five years in many recipients. But living with an LVAD is a 24-hour caregiving project — driveline care, battery management, anticoagulation, infection vigilance, and constant readiness for emergencies. It represents one of the most demanding caregiving arrangements in all of chronic disease.

4. DIAGNOSIS AND MONITORING

Cardiovascular diagnosis is part history, part physical exam, part imaging, and part laboratory testing. Getting the diagnosis right — and the staging right — drives treatment selection and prognosis.

Natriuretic Peptides — BNP and NT-proBNP

B-type natriuretic peptide (BNP) and N-terminal pro-BNP (NT-proBNP) are released from stretched ventricular myocardium. They are the single most useful blood tests in suspected heart failure. Elevated levels strongly suggest HF in symptomatic patients; serial measurements help track response to therapy. BNP is also influenced by age, kidney function, obesity (values are lower in obese patients), and AFib.

Echocardiography

Transthoracic echocardiogram (TTE) is the workhorse cardiac imaging test. It provides ejection fraction measurement, structural assessment (chamber sizes, wall thickness, valve function), and many derived hemodynamic estimates. Most heart failure patients have echos repeated annually or after significant clinical changes. Transesophageal echo (TEE) is reserved for specific questions (left atrial appendage clot before cardioversion, endocarditis, complex valve assessment).

ECG and Ambulatory Monitoring

The 12-lead electrocardiogram remains the foundational test for arrhythmia, ischemia, conduction disease, and chamber enlargement. Ambulatory monitoring — Holter (24–48 hours), longer-duration patch recorders (Zio, BodyGuardian), and implantable loop recorders (Reveal LINQ, BIOMONITOR) — diagnoses paroxysmal arrhythmia and unexplained syncope. AI-augmented ECG screening (Eko Health FDA-cleared April 2024, AliveCor KardiaMobile) expands primary-care diagnostic capability for reduced ejection fraction, aortic stenosis, and AFib.

Cardiac MRI and CT

Cardiac magnetic resonance imaging (CMR) provides the most accurate ejection fraction measurement, detects scar (late gadolinium enhancement) and infiltration (amyloid, sarcoid), and is essential for cardiomyopathy workup. Coronary CT angiography has largely replaced diagnostic catheterization for evaluating chest pain in many settings, with high negative predictive value for ruling out obstructive CAD.

Cardiac Catheterization

Left heart catheterization with coronary angiography evaluates CAD and enables percutaneous coronary intervention. Right heart catheterization measures filling pressures and is essential in advanced HF evaluation, particularly for transplant or LVAD candidacy and for pulmonary hypertension workup.

Specialized Diagnostics for Amyloidosis

Technetium-99m pyrophosphate (Tc-PYP) scintigraphy diagnoses ATTR cardiac amyloidosis non-invasively. A positive scan in a patient with HFpEF and increased wall thickness essentially confirms ATTR-CM and triggers consideration of disease-modifying therapy such as tafamidis, acoramidis, or vutrisiran. The diagnostic algorithm has been transformed since 2019; tens of thousands of patients now diagnosed with ATTR-CM were previously labeled as HFpEF of unknown cause.

5. THE MEDICATION LANDSCAPE

Cardiovascular pharmacology has transformed three times in the past decade — the introduction of ARNI (sacubitril/valsartan), the SGLT2 inhibitor revolution that expanded into HFpEF in 2022, and the wave of disease-modifying therapies for previously untreatable conditions like ATTR-CM and HCM.

5.1 The 'Four Pillars' of HFrEF Therapy

Modern guideline-directed medical therapy (GDMT) for HFrEF rests on four foundation drug classes. All four should be initiated promptly after diagnosis and uptitrated to maximally tolerated doses within weeks to months — the 'rapid sequential' approach has replaced the older slow approach.

Pillar 1: ARNI (Angiotensin Receptor / Neprilysin Inhibitor)

- Sacubitril/valsartan (Entresto) — replaced ACEi/ARB as first-line in HFrEF
- Reduces HF hospitalization by 21% and cardiovascular death by 20% versus enalapril (PARADIGM-HF)

Pillar 2: Evidence-Based Beta-Blockers

- Carvedilol (Coreg) — most commonly used
- Metoprolol succinate (Toprol XL) — extended release
- Bisoprolol — alternative
- Caution: only these three are evidence-based for HFrEF; immediate-release metoprolol and atenolol are not GDMT

Pillar 3: Mineralocorticoid Receptor Antagonist (MRA)

- Spironolactone (Aldactone) — first-line, well-tolerated in most patients
- Eplerenone — used when gynecomastia develops with spironolactone
- Finerenone (Kerendia) — newer non-steroidal MRA; FDA approved for HFmrEF/HFpEF in July 2025 (FINEARTS-HF)

Pillar 4: SGLT2 Inhibitor

- Dapagliflozin (Farxiga) — DAPA-HF for HFrEF, DELIVER for HFpEF
- Empagliflozin (Jardiance) — EMPEROR-Reduced for HFrEF, EMPEROR-Preserved for HFpEF
- Now approved for heart failure across the entire ejection-fraction spectrum — the only drug class to demonstrate this

> *The 'four pillars' represent the most consequential advance in heart failure therapy in a generation. Patients on all four pillars at optimal doses have approximately 73% lower 2-year mortality risk than patients on conventional therapy without these agents. Yet only about 25% of eligible HFrEF patients are on all four pillars — undertreatment is the single largest opportunity in heart failure care today.*

5.2 Other Heart Failure Medications

- Vericiguat (Verquvo) — soluble guanylate cyclase stimulator; for HFrEF with recent worsening
- Ivabradine (Corlanor) — for HFrEF with elevated resting heart rate despite maximally tolerated beta-blocker
- Loop diuretics — furosemide, torsemide, bumetanide; mainstay of volume management
- Hydralazine + isosorbide dinitrate — particularly effective in self-identified Black HF patients (A-HeFT)
- Digoxin — limited role; reduces hospitalization, not mortality

5.3 Coronary Artery Disease Medications

- High-intensity statins — atorvastatin 40–80 mg, rosuvastatin 20–40 mg; foundational for secondary prevention
- Ezetimibe — add-on for LDL not at goal on statins
- PCSK9 inhibitors — alirocumab (Praluent), evolocumab (Repatha); injectable, every 2 weeks
- Inclisiran (Leqvio) — small interfering RNA, twice yearly subcutaneous
- Bempedoic acid (Nexletol) — oral, for statin-intolerant patients
- Antiplatelets — aspirin 81 mg for secondary prevention; clopidogrel, ticagrelor, prasugrel post-PCI

5.4 Atrial Fibrillation Medications

- Apixaban (Eliquis) — most prescribed direct oral anticoagulant; twice daily
- Rivaroxaban (Xarelto) — once daily
- Dabigatran (Pradaxa)
- Edoxaban (Savaysa)
- Warfarin remains in use for mechanical valves and select cases; replaced by DOACs for non-valvular AFib
- Rate control — metoprolol, diltiazem, verapamil
- Rhythm control — amiodarone, dofetilide, flecainide, propafenone, dronedarone

5.5 Disease-Modifying Therapy for ATTR Cardiac Amyloidosis

Three FDA-approved therapies now exist for ATTR-CM, a condition that was untreatable a decade ago:

- Tafamidis (Vyndaqel 80 mg / Vyndamax 61 mg) — TTR stabilizer, oral, FDA approved 2019
- Acoramidis (Attruby) — TTR stabilizer, oral, FDA approved November 2024; the ATTRibute-CM trial demonstrated mortality and hospitalization benefit
- Vutrisiran (Amvuttra) — RNAi-based TTR silencer; ATTR-CM label expansion March 2025; subcutaneous injection every three months

> *The arrival of three disease-modifying therapies for ATTR-CM in five years is one of the great*

> *cardiology stories of the 2020s. A previously fatal, untreatable disease is now a diagnosis with real options — provided it is recognized in time.*

5.6 Hypertrophic Cardiomyopathy

- Mavacamten (Camzyos) — first cardiac myosin inhibitor; FDA approved 2022 for symptomatic obstructive HCM; requires REMS program for risk monitoring
- Aficamten (Cytokinetics) — next-generation cardiac myosin inhibitor; SEQUOIA-HCM Phase 3 positive in 2024; anticipated FDA action in 2026

5.7 Obesity-HFpEF and GLP-1 Agonists

Semaglutide (Wegovy/Ozempic) and tirzepatide (Zepbound) — GLP-1 and GLP-1/GIP agonists originally developed for diabetes and weight loss — have now demonstrated clear cardiovascular benefit. The STEP-HFpEF trial showed semaglutide improves symptoms and reduces hospitalization in obese HFpEF patients. Tirzepatide showed similar benefits in the SUMMIT trial (2024). This represents a new treatable category: obesity-HFpEF.

6. PROCEDURES AND DEVICES

Procedural and device cardiology has been transformed by the catheter-based revolution. Procedures that required open-heart surgery a decade ago are now performed through a groin puncture with same-day or next-day discharge.

6.1 Percutaneous Coronary Intervention (PCI) and CABG

Approximately one million PCI procedures (angioplasty with stenting) are performed annually in the United States. Drug-eluting stents are now standard; bare-metal stents have largely disappeared. Coronary artery bypass grafting (CABG) remains the preferred approach for left main and multivessel disease in many patients, particularly those with diabetes. CABG volume has declined as PCI capabilities have expanded, but it remains a substantial procedure with predictable post-operative rehabilitation needs.

6.2 Transcatheter Valve Therapy

TAVR — Transcatheter Aortic Valve Replacement

TAVR has been the most transformative cardiac procedure of the past 15 years. From a niche option for inoperable patients in 2011, TAVR now accounts for approximately 45% of all aortic valve replacements in the United States and is expanding into low-risk and younger patient populations. Standard recovery involves a 1–3 day hospital stay and 2–4 weeks of light-duty restrictions — a fraction of the surgical (SAVR) recovery.

TEER — Transcatheter Edge-to-Edge Repair

The MitraClip device clips the mitral valve leaflets together, reducing mitral regurgitation in patients who cannot tolerate open surgery. Indications have expanded from primary mitral regurgitation to functional MR in heart failure (the COAPT trial). The TriClip system received FDA approval on April 1, 2024 as the first transcatheter therapy for tricuspid regurgitation — a condition affecting an estimated 1.6 million Americans, most of whom had been untreatable until 2024.

6.3 Cardiac Implantable Electronic Devices

Device	Indication	Annual U.S. Volume
Pacemaker	Bradycardia, sick sinus syndrome, heart block	~200,000
Leadless pacemaker (Micra)	Bradycardia with anatomy favoring leadless	Growing rapidly
ICD	Primary or secondary VT/VF prevention	~150,000

Device	Indication	Annual U.S. Volume
CRT (CRT-P or CRT-D)	HFrEF with LBBB and wide QRS	~70,000
Watchman FLX	AFib with bleeding contraindication to DOAC	Growing

6.4 Catheter Ablation for Atrial Fibrillation

Catheter ablation has become an increasingly first-line strategy for symptomatic AFib, particularly paroxysmal AFib. The major innovation of 2023–2024 is pulsed field ablation (PFA) — a non-thermal energy modality that selectively ablates cardiac tissue while sparing the esophagus, phrenic nerve, and pulmonary veins. The Medtronic Affera mapping and PFA system received FDA approval in October 2024, joining the Boston Scientific FARAPULSE system. PFA is faster than radiofrequency ablation, with comparable or better efficacy and a substantially reduced complication profile.

6.5 Mechanical Circulatory Support

LVAD — Left Ventricular Assist Device

The HeartMate 3 (Abbott) is the dominant LVAD in current practice. As destination therapy (not bridge to transplant), LVAD survival now reaches 5 years in more than half of patients in some series. LVAD care is highly specialized and requires an experienced center and a committed 24-hour caregiver.

Heart Transplantation

Approximately 3,800 heart transplants are performed annually in the United States — the ceiling is set by donor availability. One-year survival exceeds 90%; five-year survival approaches 75%. Immunosuppression is lifelong, and rejection surveillance is ongoing.

6.6 Cardiac Rehabilitation

Cardiac rehabilitation — a structured program of supervised exercise, education, and risk-factor management — is one of the most underutilized evidence-based interventions in cardiology. It reduces mortality by 20–25% after MI, CABG, or PCI. Only about 25% of eligible patients enroll. Medicare covers up to 36 sessions for qualifying patients, and home-based cardiac rehab has expanded access since 2020. Enrollment is one of the highest-yield actions a cardiovascular patient can take after a hospitalization.

7. THE 2026 PIPELINE

Cardiology in 2026 has multiple genuinely novel mechanisms in late-stage development.

7.1 CRISPR Gene Editing for ATTR Amyloidosis

> *Nexiguran ziclumeran (NTLA-2001), developed by Intellia Therapeutics with Regeneron, is a CRISPR-Cas9 in-vivo gene-editing therapy delivered by lipid nanoparticle that durably knocks out hepatic TTR production with a single intravenous infusion. The Phase 3 MAGNITUDE trial has been enrolling patients with ATTR cardiomyopathy. This is the first CRISPR therapy aimed at a major chronic cardiovascular disease — a one-time treatment for a previously progressive condition. The program experienced a safety pause in October 2025 for evaluation of liver-related adverse events; further regulatory development is being closely watched by the field.*

7.2 Lp(a)-Lowering Therapies

Lipoprotein(a) — Lp(a) — is a genetically determined atherogenic particle present at elevated levels in approximately 20% of the population. Until now, no targeted therapy has existed to lower Lp(a). Three late-stage candidates in 2026:

- Pelacarsen (Novartis) — antisense oligonucleotide, Phase 3 HORIZON trial reading out in 2026
- Olpasiran (Amgen) — small interfering RNA, Phase 3 OCEAN(a)-Outcomes
- Lepodisiran (Lilly) — long-duration siRNA, Phase 3 ACCLAIM-Lp(a)

If any of these demonstrate cardiovascular outcome benefit, it would establish a new disease-modifying category and identify a previously untreatable population at high cardiovascular risk.

7.3 Factor XI Inhibitors — Safer Anticoagulation

Factor XI inhibition offers the promise of anticoagulation without bleeding — based on the observation that congenital Factor XI deficiency causes minimal spontaneous bleeding. Asundexian (Bayer) and milvexian (BMS/Janssen) are in Phase 3 trials. If successful, Factor XI inhibitors would expand safe anticoagulation to older AFib patients currently denied DOACs because of bleeding risk.

7.4 Aficamten for HCM

Aficamten (Cytokinetics) is a next-generation cardiac myosin inhibitor for obstructive HCM. The SEQUOIA-HCM Phase 3 trial reported positive results in 2024. FDA approval is anticipated in 2026. Aficamten may offer a more favorable pharmacokinetic profile and simpler monitoring than mavacamten — expanding access for HCM patients.

7.5 Next-Generation LVADs and Total Artificial Hearts

Smaller, fully implantable, transcutaneous-power LVADs are in early development. Partial heart replacement devices attempt to provide pulsatile flow and easier implantation. The BiVACOR total artificial heart received its first human implants in 2024–2025, opening a new avenue for patients ineligible for transplant.

7.6 AI-Augmented Diagnostics

AI-enabled ECG analysis has been one of the most successful applications of AI in medicine. Mayo Clinic's algorithm identifies reduced ejection fraction from a 12-lead ECG with high accuracy. Eko Health received FDA clearance in April 2024 for an AI stethoscope identifying low EF and AFib. AliveCor's KardiaMobile continues to expand consumer-grade ECG diagnostics. These tools democratize cardiology screening — particularly important in primary care and resource-limited settings.

7.7 HFpEF Therapeutics Beyond SGLT2

HFpEF — historically the harder-to-treat half of heart failure — is finally getting sustained attention. SGLT2 inhibitors and finerenone are now established; semaglutide and tirzepatide have demonstrated benefit in obesity-HFpEF. The pipeline includes selective aldosterone modulators, novel anti-inflammatory agents, and metabolic modulators. The next five years should see HFpEF treatment options approach the depth of HFrEF therapy.

8. THE CAREGIVER BURDEN

Cardiovascular caregiving — particularly for heart failure — is among the most time-intensive and emotionally demanding forms of family caregiving. Daily decisions about medications, weight, fluid intake, and symptoms shape outcomes; small lapses can trigger hospitalization.

60–80+ hrs/month Typical heart failure caregiver time commitment

100+ hrs/month LVAD caregiver time, first 6 months post-implant

29% of heart failure patients have coexisting cognitive impairment — sharply increasing caregiver load

2x rate of caregiver depression and anxiety versus age-matched non-caregivers

8.1 Time Demands

- Medication management — typically 8–12 medications daily, often with different schedules
- Symptom monitoring — daily weights, edema check, dyspnea assessment, blood pressure and heart rate
- Fluid and sodium restriction — meal planning, label reading, intake tracking
- Appointments — cardiology every 1–3 months, primary care, lab visits, device checks, cardiac rehab three times weekly initially
- Hospital and emergency-department visits — average 1–2 per year in advanced heart failure

8.2 Medication Management Complexity

A typical NYHA III heart failure patient on optimal therapy plus comorbidity treatments takes:

- ARNI (Entresto) — twice daily
- Beta-blocker (carvedilol) — twice daily
- MRA (spironolactone) — once daily
- SGLT2 inhibitor (Jardiance) — once daily
- Loop diuretic (furosemide or torsemide) — once or twice daily, often with PRN escalation on weight-gain days
- Potassium supplement — once daily
- DOAC (Eliquis) — twice daily, if AFib
- High-intensity statin — once daily
- Aspirin — once daily
- Plus diabetes, BPH, mood, and sleep medications as comorbidities require

Twelve medications, three or more times of day, with weight-based diuretic escalation. Most older patients cannot manage this alone — and medication non-adherence is the leading cause of heart failure rehospitalization.

8.3 Recognition of Decompensation

Caregivers become front-line clinical observers. They learn to recognize:

- Weight gain of 2 lb in 24 hours or 5 lb in a week — call the heart failure clinic
- Increasing edema in legs, abdomen, or scrotum
- Orthopnea — needing more pillows to sleep
- Decreasing exercise tolerance — fewer minutes of walking, more time in the chair
- New or worsening confusion — often the earliest sign of low cardiac output

Early recognition of decompensation, paired with telephone access to the heart failure clinic, can prevent hospitalizations. But this requires a knowledgeable, present caregiver — and a clinic that answers the phone.

8.4 Emotional Burden

Heart failure caregivers report depression and anxiety rates substantially above the general population. The combination of constant vigilance, progressive decline despite best efforts, hospitalizations and near-death experiences, difficult conversations about advance directives, DNR status, and ICD deactivation, and anticipatory grief takes a heavy emotional toll. Caregiver support programs, respite care, and palliative care involvement substantially help — but most families do not access them until the final months.

8.5 Where Caregivers Can Turn

- Family Caregiver Alliance (caregiver.org) — caregiver education, support groups, condition-specific fact sheets, respite guidance
- Area Agencies on Aging (eldercare.acl.gov, 1-800-677-1116) — respite care, adult day programs, home modification programs, transportation, case management
- Medicaid waiver programs — available in most states for eligible individuals to fund in-home services and respite
- Veteran service organizations — for eligible veterans, VA benefits include home health, respite, and caregiver stipends
- Faith communities and community-based nonprofits — informal but often invaluable networks of practical help
- Mended Hearts and WomenHeart — peer support for heart patients and their families
- Adult day programs — structured daytime care that allows caregivers to work, rest, or attend to their own health

> *The most common caregiver mistake is trying to do it all alone. Heart failure caregiving is a marathon, not a sprint — and no one runs a marathon without water. Accepting help is not weakness. It is the difference between sustainable care and caregiver collapse.*

9. KEY RESOURCES

Organization	What They Offer	Website
American Heart Association	Patient education, statistics, advocacy, hospital-recognition programs	heart.org
American College of Cardiology	Clinical guidelines; CardioSmart for patients	acc.org · cardiosmart.org
Heart Failure Society of America	HF-specific clinical and patient resources	hfsa.org
HeartFailureMatters.org	Patient-focused heart failure education, videos, symptom tracking	heartfailurematters.org
CDC Heart Disease Program	Prevalence data, prevention resources, million hearts initiative	cdc.gov/heartdisease
NIH NHLBI	Research and patient education across all cardiovascular conditions	nhlbi.nih.gov
Mended Hearts	Peer support for heart patients and families; hospital visits	mendedhearts.org
WomenHeart	Women's heart disease education, support, and advocacy	womenheart.org
ClinicalTrials.gov	Current enrolling trials for CRISPR ATTR, Lp(a), aficamten, factor XI, and more	clinicaltrials.gov
National Academy of Elder Law Attorneys (NAELA)	Locate an elder law attorney for advance directives and healthcare proxy documents	naela.org
Family Caregiver Alliance	Caregiver education, support groups, respite guidance, condition-specific fact sheets	caregiver.org
AARP	Caregiver resources and Medicare guidance	aarp.org
Eldercare Locator	Federal service connecting older	eldercare.acl.gov

Organization	What They Offer	Website
	adults and families to local services (1-800-677-1116)	
Area Agencies on Aging (AAA)	Local case management, respite, adult day, home-modification help, transportation	eldercare.acl.gov

10. NEXT STEPS — PREVENT, TREAT, PROTECT

> *Cardiovascular disease is the most preventable and the most treatable of the major causes of dependency in older adults — and it is also the most under-addressed until symptoms are advanced. The patients and families who navigate this well are those who act on modifiable risk before the first event, engage the full modern medication toolkit after an event, and mobilize community and legal support before it is urgently needed.*

Whether you are working to prevent a first cardiovascular event, recovering from a recent heart attack or heart failure diagnosis, or caring for a loved one with advanced disease, the following steps protect what matters most:

Step 1 — Start Prevention at 40, Not at 60

Aggressive management of hypertension, diabetes, dyslipidemia, and obesity in midlife produces dramatically lower cardiovascular event rates over the following decades. The 50-year-old with 'borderline' blood pressure of 145/90, LDL of 145, and BMI of 31 is not low risk — that patient is on a 20-year trajectory toward coronary disease, heart failure, and dependency. Ask your primary-care team specifically about statin eligibility, blood pressure targets, and weight management options including GLP-1 medications when appropriate.

Step 2 — Ask About the Four Pillars

If you or a loved one has HFrEF, the single most valuable question to ask the cardiologist is: 'Am I on all four pillars — ARNI, beta-blocker, MRA, and SGLT2 inhibitor — at maximally tolerated doses?' Only about a quarter of eligible patients are. If the answer is no, ask why not, and ask what needs to happen to get there. Patients on all four pillars have roughly 73% lower two-year mortality than patients on older conventional therapy.

Step 3 — Weight, Sodium, Fluid — Every Day

Daily morning weight, on the same scale, at the same time, after voiding — recorded. Sodium restriction (target 2,000–2,300 mg per day). Fluid restriction when prescribed. These are not lifestyle suggestions. They are clinical interventions that prevent hospitalization. Most heart failure decompensations are predicted by two or three days of weight gain that no one noticed.

Step 4 — Enroll in Cardiac Rehabilitation

After myocardial infarction, CABG, PCI, valve surgery, or a new heart failure diagnosis, Medicare covers up to 36 cardiac rehabilitation sessions. Cardiac rehab reduces mortality by 20–25% and improves quality of life. Yet only about 25% of eligible patients enroll. If your cardiologist did not refer you, ask. Home-based cardiac rehab has been widely available since 2020 for patients who cannot travel.

Step 5 — Consider Palliative Care Early

Palliative care is not hospice — it is specialized symptom management and family support that runs alongside disease-directed treatment. In advanced heart failure, palliative care consultation reduces hospitalizations, improves symptom control, and supports family decision-making about ICD deactivation, DNR status, and end-of-life preferences. It is appropriate at NYHA III, not only at NYHA IV. Ask your cardiologist for a referral.

Step 6 — Execute Legal Documents While You Have Capacity

Before advanced heart failure, a cardiac arrest, or a stroke from atrial fibrillation, finalize:

- Durable Power of Attorney (financial) — allows a trusted person to manage finances if you cannot
- Health Care Proxy / Durable POA for Healthcare — allows a trusted person to make medical decisions
- Living Will / Advance Directive — specifies wishes for CPR, mechanical ventilation, ICD deactivation, and other end-of-life care
- Will and trusts as appropriate — updated to reflect current circumstances

After a serious cardiac event with cognitive impairment — from cardiac arrest, embolic stroke, or delirium — signing these documents may not be possible for weeks or months, and the family may need to seek guardianship through the courts. Advance directives are conversations, not just documents; share them with the family members and clinicians who will need to honor them.

Step 7 — Engage Your Medical Advocacy Team

Your most important allies after a cardiovascular event are the cardiologist, the primary-care physician or geriatrician, the heart failure or electrophysiology nurse coordinator, the pharmacist, and — after hospitalization — the case manager, physical therapist, and cardiac rehab team. Ask directly for a written care plan that includes medication reconciliation, follow-up appointments, target weight, warning signs that require a phone call, and referrals to community-based support. If your loved one is admitted for heart failure, ask whether the hospital has a heart failure disease-management program with post-discharge telephone follow-up — these programs reduce readmissions substantially.

Step 8 — Connect to Community and Caregiver Support

Contact your Area Agency on Aging (eldercare.acl.gov, 1-800-677-1116) for respite care, adult day programs, home modification help, transportation, and case management. Contact the Family Caregiver Alliance (caregiver.org) for caregiver education, support groups, and condition-specific fact sheets. Contact Mended Hearts (mendedhearts.org) or WomenHeart (womenheart.org) for peer support from people who have lived through a heart event. Connection with others who have navigated advanced cardiovascular disease is consistently cited by families as one of the most valuable resources of the entire journey.

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> *DISCLAIMER: This white paper is provided for educational purposes only. It does not constitute medical advice or legal advice. Information about clinical trials and medications is current as of June 2026 and may change. Consult qualified medical and legal professionals for guidance specific to your situation.*