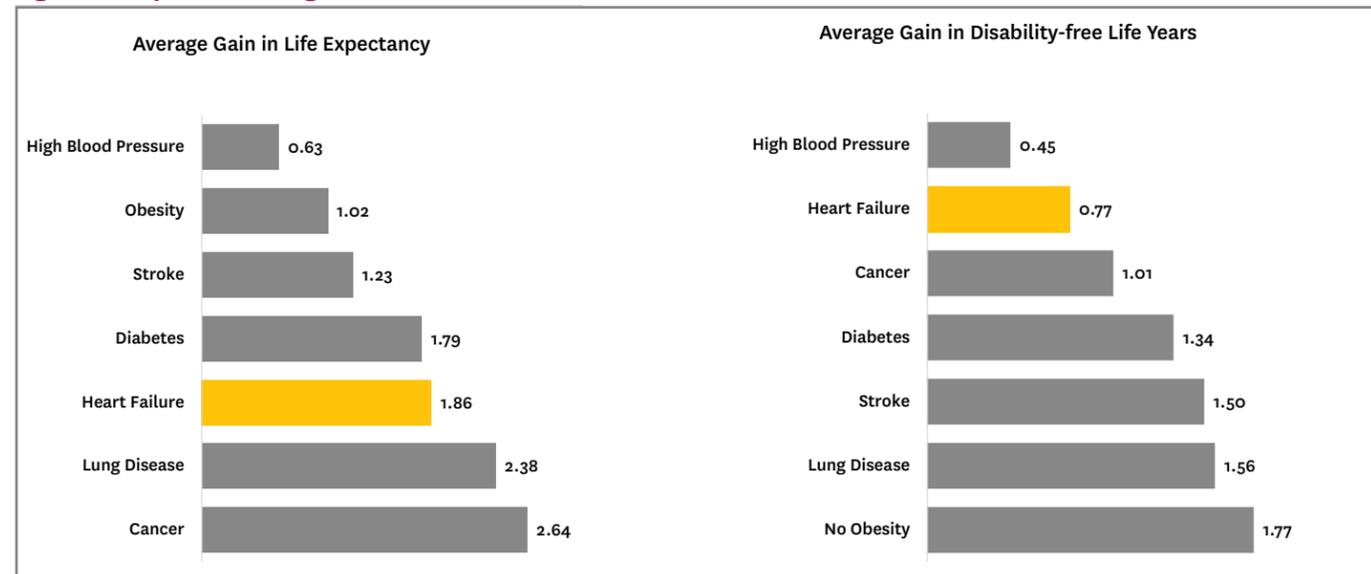


Figure 4: Impact of Curing 7 Conditions



Source: Schaeffer Center analysis using Future Americans Model.

### Policy Implications

Heart failure is just one example of the growing disease burden older Americans face as they live longer but face growing risks of disability, as other Schaeffer Center research has shown.<sup>20</sup> From a societal standpoint, policymakers and other decision makers have to balance competing aims to benefit all people generally and disadvantaged groups specifically to achieve goals of both efficiency and equity. Innovations that improve disease outcomes—not just cures—can potentially improve efficiency by increasing benefits

to society through longer, healthier, more productive lives. Some treatment innovations also can improve equity by narrowing long-standing health disparities among minorities and women.

Innovation in heart failure deserves scientific and policy attention not simply because it can contribute significantly to extending lives and reducing disability and decline in older Americans but also because it can ameliorate some racial and gender disparities in health outcomes associated with cardiovascular disease.

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Development of the Future Elderly Model was supported by the National Institute on Aging through its support of the Roybal Center for Health Policy Simulation (P30AGO24968) and a research grant (R56AGO45135). Additional support was provided by Novartis, Inc. The content does not necessarily represent the official views of the sponsors.

## INNOVATION IN HEART FAILURE TREATMENT: LENGTHENING LIVES AND NARROWING DISPARITIES

An estimated 5.7 million American adults suffer from congestive heart failure, a progressive, disabling and incurable disease where the heart can't pump enough blood to meet the body's needs.<sup>1</sup> People with heart failure struggle to breathe, tire easily and often lose their independence. Each year, almost 1 million more Americans are diagnosed with heart failure,<sup>2</sup> and about half die within five years of diagnosis. Heart failure is a contributing factor in 1 in 9 U.S. deaths.<sup>3</sup> Along with the human costs—premature death, disability and loss of quality of life—the economic costs of heart failure are large—almost \$32 billion annually for U.S. treatment costs and lost productivity.<sup>4</sup> Heart failure also disproportionately affects black men and women, contributing to health disparities. In recent years, evidence-based treatment of heart failure and associated risk factors has contributed to declines in hospitalization and death rates for heart failure.<sup>5</sup> Despite these gains, the incidence of heart failure is expected to double among 65- to 75-year-olds by 2030, according to a new analysis from the USC Leonard D. Schaeffer Center for Health Policy & Economics. Until recently, there has been relatively little innovation in heart failure treatments, and even clearly effective treatment innovations can face barriers in reaching patients because of lack of insurance coverage or physician unwillingness to change therapies. Ensuring patients have timely access to innovative treatments could reduce both the overall burden of heart failure and health disparities.

### Heart Disease is Public Health Enemy No. 1

Cardiovascular disease (CVD) is the No. 1 cause of death for both women and men in the United States, accounting for more than 600,000 deaths, or 1 in every 4 deaths, each year.<sup>6</sup> Heart disease also is a leading cause of disability<sup>7</sup> and a major driver of health care and other societal costs. In 2011, estimated direct and indirect CVD costs were \$316.6 billion annually and projected to nearly triple to more than \$900 billion a year by 2030, in 2012 dollars.<sup>8</sup> Heart disease includes several conditions—coronary artery disease, which can cause heart attacks, is the most common, but heart failure also plays a leading role in CVD.

An estimated 5.7 million American adults suffer from congestive heart failure (CHF), which causes them to have trouble breathing, tire easily and risk losing their ability to live independently. Risk factors for heart failure include

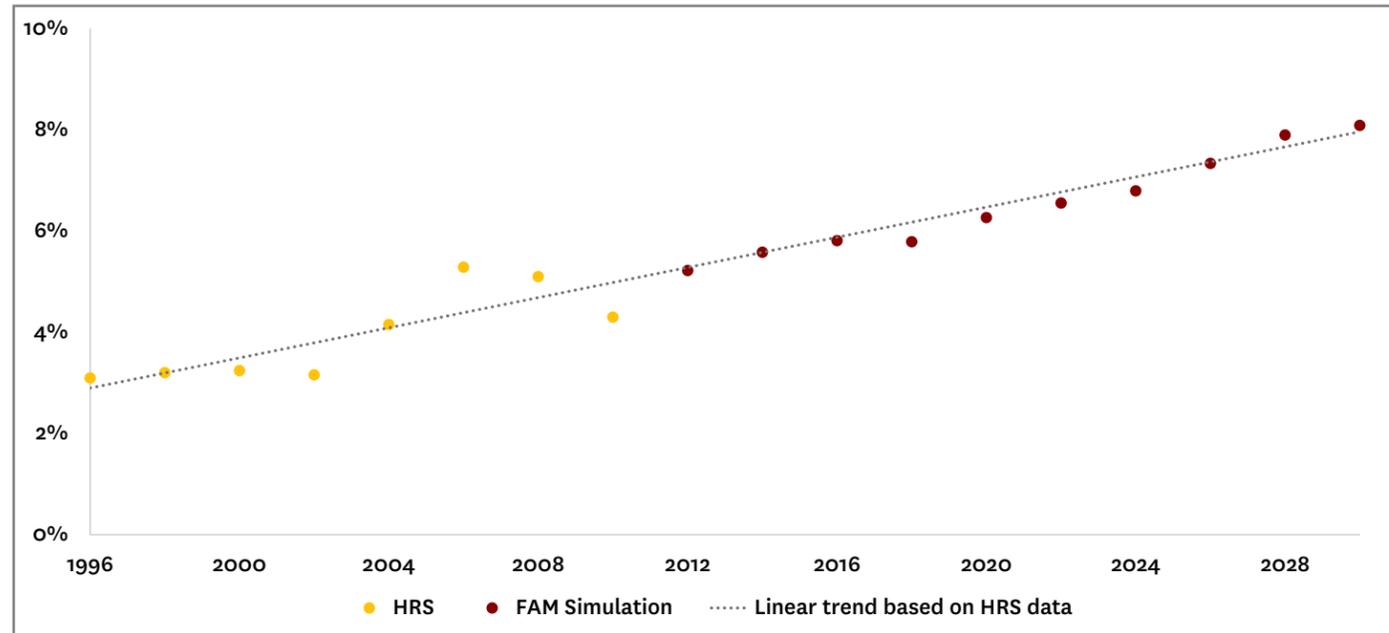
coronary artery disease, high-blood pressure and diabetes, and unhealthy behaviors—smoking, lack of exercise, a diet high in fats, cholesterol and sodium, and obesity—also add to risk of heart failure. Heart failure is a contributing factor in 1 in 9 U.S. deaths.<sup>9</sup>

Along with the individual costs of heart failure—premature death, disability and loss of quality of life—the economic costs of heart failure are large—almost \$32 billion annually for U.S. treatment costs and lost productivity.<sup>10</sup> Heart failure also disproportionately affects black men and women, contributing to health disparities. In recent years, evidence-based treatment of heart failure and associated risk factors has been credited with contributing to declines in hospitalization and death rates for heart failure.<sup>11</sup>

### Heart Failure Rate Predicted to Nearly Double by 2030

Despite treatment improvements, the incidence of heart failure is expected to double among 65- to 75-year-olds by 2030, according to a new analysis from Schaeffer Center researchers (see Figure 1). Researchers used the Future American Model (FAM)—a microsimulation model of health and economic outcomes for older Americans—to generate a snapshot of changing heart failure demographics between 2012 and 2030. The FAM follows Americans aged 51 years and older, projecting their health and medical spending over time and the evolution of individual-level health trajectories and economic outcomes, rather than the average or aggregate characteristics of a cohort.<sup>12</sup> According to the FAM simulation, 8.1 percent of Americans aged 65 to 75 years will suffer from heart failure in 2030, up from 5.2 percent in 2012.

**Figure 1: Prevalence of Congestive Heart Failure Among U.S. 65-70 Year Olds**



Sources: Health & Retirement Survey and Future American Model Simulation.

**Medicare and Heart Failure**

Heart failure is the most common reason for hospitalizations of people aged 85 and older, and the second most common reason for people aged 65 to 85 years. In 2011, more than 700,000 hospitalizations for heart failure—predominantly paid for by Medicare—occurred among people aged 65 and older.<sup>13</sup>

Because heart failure occurs so commonly in older people, the Centers for Medicare & Medicaid Services (CMS), which administers Medicare, has prioritized improving care for beneficiaries with heart failure. For example, since 2012, the CMS Hospital Readmission Reduction Program has targeted heart failure as one of the conditions that can trigger payment reductions for hospitals with higher than expected readmission rates. Similarly, CMS has publicly reported risk-adjusted 30-day mortality rates for heart failure patients for all hospitals since 2007<sup>14</sup> and often includes heart failure as a condition of interest in demonstration programs testing new payment and quality approaches, including bundled payments and disease management programs.

**Blacks, Especially Women, Face Greater Risks**

Research shows that the risk of developing heart failure between ages 45 and 75 is higher among black men (21.3%) than white men (19.1%) and highest among black women (23.9%).<sup>15</sup> About 1 in 4 black women aged 45 to 75 is at risk for heart failure, compared to 1 in 7 white women (13.4%).

Similarly, in an analysis of 2010-12 Health Retirement Survey data among patients with cardiovascular disease, Schaeffer Center researchers found the age-adjusted incidence of heart failure is highest for black women (4.72%), followed by black men (4.06%), then white women (4.0%) and white men (3.46%).

**Heart Failure and Disability**

People with heart failure often have other serious medical conditions, such as arthritis (62%) or diabetes (38.3%); are unable to walk two to three blocks or walk up 10 steps (56.9%); need help with activities of daily living, such as getting in and out of bed, dressing, and eating (11.1%); and take an average of 6.4 prescription medications.<sup>16</sup> Heart failure also affects people's

ability to live independently, with needs ranging from help from an informal caregiver to hiring home care aides to moving to a nursing home or other facility.

The onset of heart failure can be relatively sudden, and for many patients, can be preceded by relatively good health. Once diagnosed, however, the onset of disability is often rapid. Schaeffer Center researchers, for example, compared the age-adjusted proportion of patients reporting limitations in three or more activities of daily living in the subpopulation developing heart failure before and after heart failure diagnosis.

Overall, they found that the proportion of the population with three or more limitations nearly doubled, from 9.6 to 17.4 percent after heart failure diagnosis. The onset of significant disability with the diagnosis of heart failure is particularly severe among black men: Before diagnosis, 7.4 percent of black males reported three or more limitations, but immediately after diagnosis, the proportion reporting significant disability increased to 20 percent. Among black women who develop CHF, 20.3 percent reported significant

disability before CHF diagnosis, rising to 30.2 percent after diagnosis (see Figure 2). Medical expenditures follow a similar pattern: Just prior to their diagnosis, patients who will develop CHF are somewhat sicker than the average person of the same age, with medical expenditures that are 25 to 30 percent higher than those of people without CHF. But after diagnosis, CHF patients are much sicker than similar patients without CHF, with medical expenditures 50 to 56 percent higher. The increment is especially large among black women (see Figure 3).

**The Benefits of Innovation in Heart Failure Treatment**

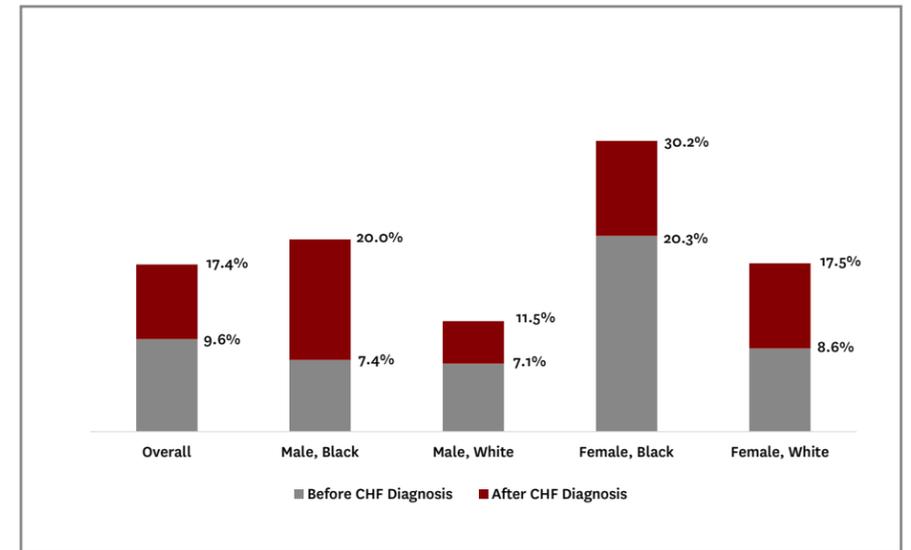
Until recently, there has been relatively little innovation in treatments for heart failure patients, with standard care involving multiple medications to treat symptoms, including angiotensin-converting enzyme, or ACE, inhibitors; beta blockers; and diuretics. In July 2015, the Food and Drug Administration approved a new type of drug for heart failure, known as angiotensin receptor neprilysin inhibitors, or ARNIs, representing what some have characterized as a “breakthrough” treatment that reduced the risk of death or hospitalization from heart failure by 20 percent in a clinical trial.<sup>17</sup>

Despite three cost-effectiveness analyses showing that more costly ARNIs offer good value compared to older, cheaper generic drugs,<sup>18</sup> the new drugs have been slow to gain favor with both insurers and physicians, reflected in delays in adding them to insurer formularies and some doctors’ unwillingness to switch stable patients to a new medicine.<sup>19</sup>

The potential benefits from innovation in heart failure treatment are substantial. To evaluate their magnitude, Schaeffer researchers modeled the extreme case of a cure,<sup>20</sup> in which every individual aged 50 in 2015 would be prevented from ever acquiring congestive heart failure.

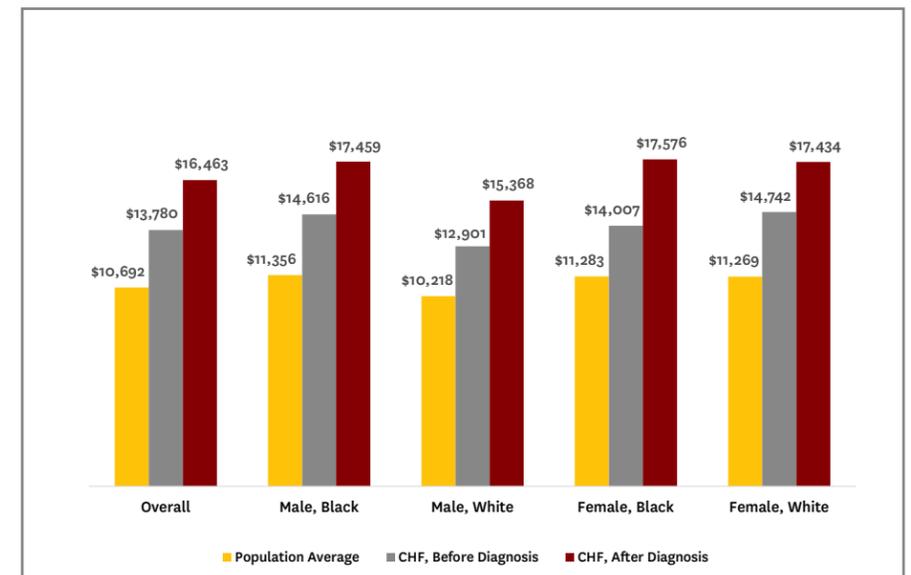
**Longer lives and less disability.** For those who would have acquired heart failure, average life expectancy would increase by

**Figure 2: Percent of CHF Population Reporting Limitations in 3 or More Activities of Daily Living Before and After CHF Diagnosis, by Race and Gender, Age-Adjusted**



Source: Schaeffer Center analysis of Health & Retirement Survey 2000 to 2012 data.

**Figure 3: Annual Per-Capita Medical Expenditures, by Race and Gender**



Source: Schaeffer Center analysis of MCBS and MEPS data from 2008 to 2012, and HRS data from 2000-2012.

1.86 years. This is a bigger life expectancy gain than similar “cures” for high blood pressure, obesity or stroke, and the same as a cure for diabetes (see Figure 4). Among the population aged 50 in 2015, 2.7 million life years would be gained, translating to an estimated societal benefit of over \$400 billion. At the same time, people who would have had heart failure will live disability-free by 0.77 years longer on average.

**Reduced health disparities.** A “cure” for heart failure also could reduce racial disparities since both black men (2.06 years) and women (2.27 years) would gain larger increases in average life expectancy than white men (1.86 years) and women (1.78 years). While a true cure for heart failure may be unlikely, gains from improved treatment that falls short of a cure would be proportional to these estimates.