State of the State: Heart Failure in Arkansas

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US Prevalence of Heart Failure (HF)

• About 6.2 million Americans ≥20 years of age have HF (NHANES, 2013-2016)

• HF prevalence is estimated to increase 46% by 2030, i.e. >8 million adults with HF

US Prevalence of HF for adults by sex and age (NHANES, 2013-2016)

Source: National Center for Health Statistics and National Heart, Lung, and Blood Institute.
US Incidence of HF

- HF incidence approaches 21 per 1,000 population after age 65\(^1\)
- HF before age 50 is more common among African Americans (AA) vs Whites\(^2\)
- African Americans have the highest risk of developing HF, followed by Hispanics, Whites, and Chinese Americans (4.6, 3.5, 2.4, and 1.0 per 1,000 person-years, respectively)\(^3\)

Lifetime Risk of HF

- Overall lifetime risks of HF are 20-45% for ages 45-95
- Lifetime risks for HF are 30-42% in White males, 32-39% in White females, 20-29% in AA males, and 24-46% in AA females
- People with BMI ≥30 kg/m² are at twice the lifetime risk of HF than those with BMI <25 kg/m²
- People with BP >160/90 mmHg are at 1.6 times the lifetime risk of HF than those with BP <120/90 mmHg

First acute decompensated HF annual event rates (ARIC, 2005–2014)

Source: Atherosclerosis Risk in Communities Study (ARIC) and National Heart, Lung, and Blood Institute.
Risk Factors for HF

• At least 1 risk factor is present in up to 1/3rd of the US adult population\(^1\)

• Traditional risk factors are responsible for 52% of incident HF in the population\(^2\):
  • CHD: OR 3.1, PAR 20%
  • Hypertension: RR 1.4, PAR 20%
  • DM: OR 2.7, PAR 12%
  • Obesity: RR 2.0, PAR 12%
  • Cigarette smoking: RR 1.4, PAR 14%

Risk Factors for HF (contd.)

- Better profiles in smoking, BMI, PA, diet, cholesterol, BP, and glucose are associated with a lower lifetime risk of HF\(^1\)

- Non-traditional risk factors for incident HF include\(^2\):
  - ↑ Serum γ-glutamyl transferase and hematocrit
  - Baseline and changes in high-sensitivity troponin levels
  - WBC count, CRP, albuminuria, HbA1c among individuals without DM, cardiac troponin, PVCs, and SES
  - Plasma N-terminal pro-BNP and MRI-determined LV mass index for incident symptomatic HF

Hospital Discharges for HF: US

• Hospital discharges for HF ↓ from 2004-2014, with principal diagnosis discharges of 1.04 and 0.9 millions, respectively

• Rates of HF rehospitalization or cardiovascular death were greatest for those previously hospitalized for HF

• Annual incidence of recurrent hospitalized HF for those ≥ age 50 is 11.6 and 6.6 per 1,000 people, respectively

• Of incident hospitalized HF events, 53% have HF with reduced EF and 47% have preserved EF

1. CDC, 2010 National Hospital Ambulatory Medical Care Survey.
<table>
<thead>
<tr>
<th>Principal diagnosis at the index stay</th>
<th>7-day readmissions</th>
<th>30-day readmissions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Index stays, N</td>
<td>Rank</td>
</tr>
<tr>
<td>Total inpatient stays</td>
<td>27,098,161</td>
<td>5.0</td>
</tr>
<tr>
<td>Schizophrenia and other psychotic disorders</td>
<td>374,007</td>
<td>2.0</td>
</tr>
<tr>
<td>Alcohol-related disorders</td>
<td>340,076</td>
<td>7.5</td>
</tr>
<tr>
<td><strong>Congestive heart failure: nonhypertensive</strong></td>
<td><strong>795,709</strong></td>
<td><strong>7.4</strong></td>
</tr>
<tr>
<td>Heart valve disorders</td>
<td>117,788</td>
<td>7.3</td>
</tr>
<tr>
<td>Hypertension with complications, secondary hypertension</td>
<td>223,366</td>
<td>7.2</td>
</tr>
<tr>
<td>Respiratory failure; insufficiency; arrest (adult)</td>
<td>311,005</td>
<td>7.2</td>
</tr>
<tr>
<td>Aspiration pneumonia; food/vomit</td>
<td>128,019</td>
<td>7.1</td>
</tr>
<tr>
<td>Acute and unspecified renal failure</td>
<td>436,833</td>
<td>7.0</td>
</tr>
<tr>
<td>Diabetes mellitus with complications</td>
<td>487,947</td>
<td>9.9</td>
</tr>
<tr>
<td>Complication of device, implant or graft</td>
<td>572,761</td>
<td>8.7</td>
</tr>
<tr>
<td>Septicemia</td>
<td>1,202,893</td>
<td>8.7</td>
</tr>
<tr>
<td>Deficiency and other anemia</td>
<td>171,160</td>
<td>5.6</td>
</tr>
<tr>
<td>Intestinal obstruction without hemia</td>
<td>313,598</td>
<td>5.8</td>
</tr>
<tr>
<td>Fluid and electrolyte disorders</td>
<td>339,954</td>
<td>8.5</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>113,351</td>
<td>8.5</td>
</tr>
<tr>
<td>Complications of surgical procedures or medical care</td>
<td>417,361</td>
<td>8.5</td>
</tr>
<tr>
<td>Gastrointestinal hemorrhage</td>
<td>331,739</td>
<td>8.5</td>
</tr>
<tr>
<td>Pancreatic disorders (not diabetes)</td>
<td>276,834</td>
<td>5.2</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease and bronchiectasis</td>
<td>521,955</td>
<td>8.1</td>
</tr>
<tr>
<td>Acute myocardial infarction</td>
<td>480,338</td>
<td>8.1</td>
</tr>
<tr>
<td>Intestinal infection</td>
<td>195,644</td>
<td>5.7</td>
</tr>
<tr>
<td>Peripheral and visceral atherosclerosis</td>
<td>127,624</td>
<td>5.6</td>
</tr>
</tbody>
</table>

Ambulatory Care & ED Visits for HF: US

• In 2015, there were 2.6 million physician office visits with a primary diagnosis of HF\(^1\)
• In 2015, there were 4.8 million ED visits for HF\(^2\)

1. CDC, National Ambulatory Medical Care Survey: 2015 State and National Summary Tables.
2. CDC, National Hospital Ambulatory Medical Care Survey: 2015 Emergency Department Summary Tables.
### Ambulatory Care Visits for HF vs Other Chronic Conditions: US

<table>
<thead>
<tr>
<th>Condition</th>
<th>Total Patients</th>
<th>Visited Primary Care Physician</th>
<th>Percent</th>
<th>Visited Subspecialist</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td>62,170,492</td>
<td>52,086,268</td>
<td>84%</td>
<td>44,432,708</td>
<td>71%</td>
</tr>
<tr>
<td>Diabetes</td>
<td>25,663,376</td>
<td>22,019,702</td>
<td>86%</td>
<td>18,765,232</td>
<td>73%</td>
</tr>
<tr>
<td>Asthma</td>
<td>19,047,216</td>
<td>15,723,148</td>
<td>83%</td>
<td>12,700,747</td>
<td>67%</td>
</tr>
<tr>
<td>Arthritis</td>
<td>15,379,356</td>
<td>12,487,497</td>
<td>81%</td>
<td>12,831,979</td>
<td>83%</td>
</tr>
<tr>
<td>Glaucoma</td>
<td>4,193,069</td>
<td>3,109,622</td>
<td>74%</td>
<td>3,893,425</td>
<td>93%</td>
</tr>
<tr>
<td><strong>Congestive Heart Failure</strong></td>
<td><strong>1,976,929</strong></td>
<td><strong>1,675,103</strong></td>
<td><strong>85%</strong></td>
<td><strong>1,786,331</strong></td>
<td><strong>90%</strong></td>
</tr>
<tr>
<td>Multiple Sclerosis</td>
<td>695,295</td>
<td>528,726</td>
<td>76%</td>
<td>585,317</td>
<td>84%</td>
</tr>
<tr>
<td>Parkinson’s</td>
<td>541,854</td>
<td>508,272</td>
<td>94%</td>
<td>521,756</td>
<td>96%</td>
</tr>
</tbody>
</table>

Source: Medical Expenditure Panel Survey (MEPS), 2014.
HF Mortality: US

• Overall 1-year HF mortality rates have shown uneven declines across states\(^1\)
• Survival after HF onset has improved in older adults\(^2\)
• Case fatality rates following hospitalization for HF are\(^3\):
  • 10.4% after 30 days
  • 22% after 1 year
  • 42.3% after 5 years

Cost of HF: US

- In 2012, total cost for HF was estimated to be $30.7 billion\(^1\)
- By 2030, the total cost of HF will increase by 127% to $69.8 billion\(^1\)
- Costs associated with treating HF comorbidities and exacerbations in youths is significant at \(\approx\$1\) billion for inpatient care\(^2\)

HF Prevalence: AR vs US

Centers for Medicare & Medicaid Services
HF Hospital Discharges: AR

- Numbers of HF hospitalizations from 2012 to 2016:
  - 2012: 10,557
  - 2013: 9,982
  - 2014: 10,231
  - 2015: 10,549
  - 2016: 9,139

State In-Patient Hospital Discharge Data System
# HF Mortality: AR vs US

<table>
<thead>
<tr>
<th>Year</th>
<th>AR</th>
<th>AR’s Rank Among States</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>28.8</td>
<td>5th</td>
<td>18.0</td>
</tr>
<tr>
<td>2014</td>
<td>26.4</td>
<td>8th</td>
<td>18.6</td>
</tr>
<tr>
<td>2015</td>
<td>27.1</td>
<td>8th</td>
<td>19.9</td>
</tr>
<tr>
<td>2016</td>
<td>26.7</td>
<td>9th</td>
<td>20.3</td>
</tr>
<tr>
<td>2017</td>
<td>25.0</td>
<td>11th</td>
<td>20.4</td>
</tr>
</tbody>
</table>

Centers for Disease Control & Prevention, 2017
Primary Care Implications for HF

• Gaps in transitions of care (TOC) for patients with HF
• Emphasis should be on early collaborative care between cardiologists and PCPs for ambulatory HF patients discharged from the hospital or ED\(^1\)
• Multidisciplinary HF guidelines-based care is associated with increased medication adherence, CVD diagnostic testing, and better outcomes\(^2\)
• There should also be a focus on clinical risk reduction of HF antecedent risk factors in the patient-centered medical home (PCMH) setting

TOC Concerns for HF

Primary Care Points of View

• Identify the high-risk patient population
• Collaboration with other subspecialties
• Guideline-Directed Medical Therapies
• Transitions of care
Management of HF

Primary aims of therapy

• Improve symptoms and quality of life
  • Relieve circulatory congestion
  • Increase tissue perfusion

• Prolong life by slowing disease progression
  • Reduce vasoconstriction
  • Inhibit activation of the renin-angiotensin-aldosterone system and the sympathetic nervous system
  • Inhibit progressive enlargement or remodeling of the left ventricle

At Risk for Heart Failure

**STAGE A**
At high risk for HF but without structural heart disease or symptoms of HF

- e.g., Patients with:
  - HTN
  - Atherosclerotic disease
  - DM
  - Obesity
  - Metabolic syndrome
  - Patients using cardiotoxins
  - With family history of cardiomyopathy

- **THERAPY**
  - Goals: Heart healthy lifestyle
  - Prevent vascular, coronary disease
  - Prevent LV structural abnormalities
  - Drugs: ACEI or ARB in appropriate patients for vascular disease or DM
  - Statins as appropriate

- **Development of Heart Failure**
- **Structural Heart Disease**

**STAGE B**
Structural heart disease but without signs or symptoms of HF

- e.g., Patients with:
  - Previous MI
  - LV remodeling including LVH and low EF
  - Asymptomatic valvular disease

- **THERAPY**
  - Goals: Prevent HF symptoms
  - Prevent further cardiac remodeling
  - Drugs: ACEI or ARB as appropriate
  - Beta blockers as appropriate
  - In selected patients:
    - ICD
    - Revascularization or valvular surgery as appropriate

**STAGE C**
Structural heart disease with prior or current symptoms of HF

- e.g., Patients with:
  - Known structural heart disease and HF signs and symptoms

- **THERAPY**
  - Goals: Control symptoms
  - Improve HRQOL
  - Prevent hospitalization
  - Prevent mortality
  - Drugs for routine use:
    - Diuretics for fluid retention
    - ACEI or ARB
    - Beta blockers
  - Aldosterone antagonists
  - Drugs for use in selected patients:
    - Hydralazine/isosorbide dinitrate
    - ACEI and ARB
    - Digoxin
    - In selected patients:
      - CRT
      - ICD
      - Revascularization or valvular surgery as appropriate

Heart Failure

**STAGE D**
Refractory HF

- e.g., Patients with:
  - Marked HF symptoms at rest
  - Recurrent hospitalizations despite GDMT

- **THERAPY**
  - Goals: Control symptoms
  - Improve HRQOL
  - Reduce hospital readmissions
  - Establish patient’s end-of-life goals
  - Options:
    - Advanced care measures
    - Heart transplant
    - Chronic intolerances
    - Temporary or permanent MCS
    - Experimental surgery or drugs
    - Palliative care and hospice
    - ICD deactivation

# Central Illustration: Characterization of HFPoEF, HFMoEF, and HFReEF

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Outcomes</th>
<th>Guideline-Directed Medical Therapies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HFPoEF (LVEF &gt; 50%)</strong></td>
<td>+++ + ++</td>
<td>++ ++</td>
</tr>
<tr>
<td><strong>HFMoEF (LVEF 40-50%)</strong></td>
<td>++ ++ +++</td>
<td>++/++++ ++</td>
</tr>
<tr>
<td><strong>HFReEF (LVEF &lt; 40%)</strong></td>
<td>+ +++ +++</td>
<td>+++ +++</td>
</tr>
</tbody>
</table>

Effective systems of care coordination with special attention to TOC should be deployed for every patient with chronic HF that facilitate and ensure effective care that is designed to achieve GDMT and prevent hospitalization.

Every patient with HF should have a clear, detailed and evidence-based plan of care that ensures the achievement of GDMT goals, effective management of comorbid conditions, timely follow-up with the healthcare team, appropriate dietary and physical activities, and compliance with Secondary Prevention Guidelines.

Palliative and supportive care is effective for patients with symptomatic advanced HF to improve quality of life.

Public Health Implications for HF

• Currently there are no dedicated HF prevention programs in AR
• Public health efforts are focused on prevention and control of HF risk factors, such as Hypertension, diabetes, hypercholesterolemia
• ADH’s long-term goals are to establish a system of care for HF in the state in collaboration with AHA, cardiologists, PCPs, and other stakeholders
• Plans are to implement a state-wide HF registry in collaboration with AHA’s GWTG-HF program, hospitals, and primary care partners to improve the state of HF in AR
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