Rural Urban Differences in Cardiac Prevention

David W Schopfer, MD MAS
Cardiologist & Medical Officer
National Heart, Lung, and Blood Institute

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Disclosures

- I have no financial disclosures
Overview – Rural health disparities in chronic heart diseases

- Cardiovascular disease in rural patients
  - Epidemiology
  - Factors contributing
- Coronary artery disease management
  - Issues unique to rural patients
  - Opportunities in cardiac rehabilitation
“…a call to action for AHA and other stakeholders to make rural populations a priority in programming, research, and policy.”
Cardiovascular health in rural communities

- Higher prevalence of heart disease
  - Rural 14.2% vs. small metropolitan 11.2% vs urban 9.9%
- Higher CV death rates
  - Declining more rapidly in urban vs. rural
  - Coronary heart disease death higher in rural
- Rural women have higher maternal mortality rates
  - Driven largely by an increase in CV deaths in peripartum period
Major causes of poor CV outcomes among rural individuals

- **Individual factors**
  - Traditional risk factors – physical activity, diabetes, obesity, hypertension – all worse among rural communities
  - Mental health and substance abuse – worsening more quickly in rural communities

- **Social determinants of health**
  - Income, education, employment, housing, transportation, food insecurity

- **Healthcare delivery system**
  - Limited access to timely acute care (i.e., PCI for AMI)
    - % within 1 hour of PCI-capable hospital unchanged despite increase in PCI-capable hospitals
  - Quality? – need rural-specific metrics
  - Access to providers including specialists

Harrington RA et al. Circulation 2020;141:e615–e644
Delays in medical care can result in arrhythmias → VF → sudden cardiac death
Ongoing ischemia that is not intervened upon leads to compromised cardiac function and increased risk of heart failure
Coronary reperfusion with thrombolysis or angioplasty within the first 12 hrs can reduce mortality by 50%

Reasons for delays in timely treatment:
- Difficulty with transportation to hospital
- Facilities not able to provide revascularization
- Patient delays in seeking care:
  - Poor symptom recognition
  - Competing demands and life challenges
  - Responsibilities that are associated with gender roles
  - Time to reach the medical facility – distance, climate
Challenges with diagnosis of acute coronary syndromes

- **Difficult in diagnosing ACS:**
  - Difficulties accessing specialist advice
  - Atypical presentations that may occur in patients with complex co-morbidities
  - Limitations of troponins and serial testing

- **Treatment concerns:**
  - Revascularization within 90 minutes for STEMI
  - If fibrinolysis was used, rescue PCI is still indicated if recurrent MI, ischemia, or cardiogenic shock occurs; also with LVEF <40%, heart failure, or ventricular arrhythmias
  - Risk of death highest from arrhythmias and adequate monitoring must be available
Hospitals with a cardiac catheterization lab and capable of performing PCI increasing yet rural patients lack access.
Temporal trends in proportion of patients with STEMI receiving primary PCI <90 min

Presentation at hospitals without PCI capability are associated with delays

Transferred patients have significant delays

Masoudi et al. JACC. 2017
Cardiac rehabilitation availability for secondary prevention

- Critical to make lifestyle modifications and receive optimal therapy to reduce chance of recurrence and rehospitalization, and optimize their quality of life.
- Cardiac rehabilitation can reduce ACS recurrence, hospital readmission, and mortality and impact increases with duration of participation.
- CR program delivery has traditionally been facility-based
  - Uptake has been suboptimal with lesser uptake for residents located at a distance from a CR center and even more so for those living in rural areas
  - Especially critical if specialist access is limited
- Alternatives to facility-based CR programs have been tested and proposed and shown to result in equivalent benefits
- Landscape of CR is changing for clinicians who manage patients in rural areas
What is cardiac rehabilitation?

**Clinical indications**
- Myocardial infarction
- PCI
- CABG
- Chronic stable angina
- Valve replacement
- Heart transplant
- Heart failure (reduced EF)

**Core components of CR**
- Physical activity counseling
- Nutritional counseling
- Weight management
- Blood pressure management
- Lipid management
- Diabetes management
- Psychosocial counseling
- Tobacco cessation

**Clinical outcomes**
- CV death 26%
- CV hospitalization 18%
- Exercise tolerance
- Quality of life

*Balady et al. Circulation. 2007;115:2675-82*
Why do this study?

- Cardiac rehab programs are underutilized in patients with cardiovascular disease despite evidence of benefit

<20% of all eligible patients participate

- Home-based cardiac rehab has potential to overcome logistical barriers and improve participation

- But does home rehab work?

Beatty et al. Circulation. 2018;137:1899-1908
Limited access to cardiac rehab for rural veterans

9.1 million Veterans currently enrolled in VHA

6.9 million (76%) live more than 60 minutes from a VA with an onsite CR center
Major barriers to participation in cardiac rehab

- Travel / Distance: 68%
- Patient desire: 41%
- Lack of VA program: 30%
- Cost: 27%
- Provider unawareness / inexperience: 27%
- Inter-provider communication: 13%

Proportion of interviewees who identified factor

Why do cardiac rehab at home?

- Integrate behavior change into daily lifestyle
- Effects may be longer-lasting
- Less fear about being active alone
- Incorporate spouse or family into the changes

Home-based offers unique opportunities

Many logistic barriers to traditional CR
Potential benefits of home-based cardiac rehab

- Shorter time to enrollment
- Reduce capacity issues
- Flexible scheduling
- No transportation issues
- Integrated with regular home routine
- Lower cost?
- Greater capacity
## Potential disadvantages of home-based cardiac rehab

<table>
<thead>
<tr>
<th>Disadvantage</th>
<th>Overcoming Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less intensive exercise</td>
<td>In short term, but is this sustained?</td>
</tr>
<tr>
<td>Less social support</td>
<td>Engage family or friends, online support?</td>
</tr>
<tr>
<td>Less patient accountability</td>
<td>Overcome with technology?</td>
</tr>
<tr>
<td>Lack of published standards</td>
<td>Work in progress, more data coming</td>
</tr>
<tr>
<td>Less monitoring and communication</td>
<td>Potential for more with wearables?</td>
</tr>
<tr>
<td>Safety concerns for high risk</td>
<td>Not supported by data, goal to ↑ safety</td>
</tr>
<tr>
<td>Lack of reimbursement</td>
<td>Not everywhere, new solutions coming</td>
</tr>
</tbody>
</table>

In short term, but is this sustained?
Engage family or friends, online support?
Overcome with technology?
Work in progress, more data coming
Potential for more with wearables?
Not supported by data, goal to ↑ safety
Not everywhere, new solutions coming
Rural vs. Urban Participation in Cardiac Rehab

**Agree to ENROLL in any CR**
- Rural: 50%
- Urban: 50%
- Adj OR 1.49 (95% CI 1.03-2.14)
- p=NS

**CHOOSE home-based CR**
- Rural: 100%
- Urban: 60%
- Adj OR 1.80 (95% CI 1.20-2.71)
- p<0.001

**COMPLETED home-based CR**
- Rural: 80%
- Urban: 60%
- Adj OR 1.49 (95% CI 1.03-2.14)
- p=0.03
Referrals to home-based cardiac rehab

- **Rural or Highly Rural**
- **Urban**

Home-based CR initiated

2013

2014

2015
Reasons for not participating when home option available

- I already know what to do for my heart
- I don’t think cardiac rehab is necessary for my care
- I don’t like getting phone calls
- I am not interested in making the lifestyle changes
- I can’t change daily habits
- I don’t have transportation
- Not enough time
- I am concerned about financial issues
- Other more important competing issues
- Want to discuss with physician first
- I fear that cardiac rehab might be harmful

Schopfer et al. J Cardiopulm Rehabil Prev. 2020
Categories after including interviews

- **System**
  - Programmatic
    - Scheduling
    - Travel
    - Finances
  - Consultation effectiveness
    - Lack of understanding of CR
    - Unclear about CR benefits
    - No memory of consult

- **Personal**
  - Modifiable
    - Lack of motivation
    - Lack of confidence
  - Non-modifiable
    - Competing priorities
    - Prior experience
    - Desire for independence
PCORI study of home-based vs facility-based cardiac rehab

235 Patients

San Francisco VA
Ann Arbor VA
Pittsburgh VA

Home CR
Facility CR

120 patients
115 patients

Schopfer et al. J Am Heart Assoc. 2020;9:e016456
Time from event to participation shorter in home cardiac rehab

Cardiac event

1\textsuperscript{st} session of CR: 25 vs 77 days (p<0.001)

Facility

Home

Days after index event

0

25

77

Schopfer et al. J Am Heart Assoc. 2020;9:e016456
Patients in home cardiac rehab more likely to complete all sessions

- >50% sessions: 76% (Home) vs. 53% (Facility), p<0.001
- 100% sessions: 54% (Home) vs. 26% (Facility), p<0.001

Schopfer et al. J Am Heart Assoc. 2020;9:e016456
Patients increased their walking distance more with home cardiac rehab.

<table>
<thead>
<tr>
<th>Facility</th>
<th>354</th>
<th>+41</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>p=0.52</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Home</th>
<th>352</th>
<th>+95</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>p&lt;0.001</td>
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Schopfer et al. J Am Heart Assoc. 2020;9:e016456
## Additional improvements

<table>
<thead>
<tr>
<th></th>
<th>Home</th>
<th>Facility</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of life ↑</td>
<td>45%</td>
<td>12%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Duke activity status index ↑</td>
<td>76%</td>
<td>60%</td>
<td>0.15</td>
</tr>
<tr>
<td>Exercise self-efficacy ↑</td>
<td>39%</td>
<td>61%</td>
<td>0.03</td>
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Schopfer et al. J Am Heart Assoc. 2020;9:e016456
Subgroup: urban vs rural

<table>
<thead>
<tr>
<th>Stratum</th>
<th>Mean increase in 6MWT HBCR</th>
<th>Mean increase in 6MWT FBCR</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban (n=130)</td>
<td>+104</td>
<td>+45</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Rural (n=45)</td>
<td>+73</td>
<td>+37</td>
<td>0.17</td>
</tr>
</tbody>
</table>
Conclusions

- Home participants:
  - Time to enrollment significantly shorter
  - Greater increases in 6-min walking distance at 3 months
Why this matters

- For patients who are unable to or cannot attend facility rehab, home rehab could be a good alternative.
- Not everyone can participate in facility rehab (transportation, distance, employment, and other barriers).
- Not everyone wants to participate in a supervised group.
- Fills in large gap for potential non-participants.

Schopfer et al. J Am Heart Assoc. 2020;9:e016456
Recent expanded use of telehealth occurring with COVID-19

Federal government has expanded authorization for reimbursement in Medicare and states in Medicaid programs
  - Congress and CMS receiving many requests to make changes to telehealth guidelines permanent

Patient use of telehealth increased from 11% in 2019 to 46% in 2020

19% “very likely” and 43% “somewhat likely” to use telehealth services after COVID-19

McKinsey & Company’s COVID-19 consumer survey
Harris Poll, 2020
NHLBI research in rural communities

- Risk Underlying Rural Areas Longitudinal (RURAL) study
  - Address gaps in knowledge about heart and lung disorders
  - 4600 participants
  - Assess impact of lifestyle, genetics, poverty, minority status on risk
- Mobile Health Intervention for Rural Atrial Fibrillation
  - Evaluate intervention to improve anticoagulation adherence
- Improved Cardiovascular Risk Reduction to Enhance Rural Primary Care (ICARE)
  - Use of pharmacist supported primary care improves adherence to some CV medications
What opportunities to investigate further?

- Rural-Urban disparities in CV health persist despite efforts
- What do we still need to learn about rural disparities in CVD?
- How can we address them?
- Some broad categories to consider investigating further:
  - Quality improvement efforts
  - Interventions to improve quality of care or medication adherence
  - Self-management interventions
Potential solutions

- Address shortage of providers
- Rural focused team-based care
- Sustainable funding and payment models
- Alternative delivery care sites
  - Pharmacy, schools, churches
- Telehealth and digital tools
  - Monitoring of chronic disease
  - Access to more providers
  - Specialty support for primary care

Harrington RA et al. Circulation 2020;141:e615–e644