MHIF FEATURED STUDY:
cvMOBIUS Registry

**DESCRIPTION:**
The purpose of cvMOBIUS (Cardiovascular Multi-dimensional Observational Investigation of the Use of PCSK9 Inhibitors) is to evaluate the effectiveness of PCSK9 inhibitors to reduce cardiovascular events among subjects with a recent ASCVD event or revascularization procedure. While large randomized trials have shown additional lipid-lowering through PCSK9i can further reduce risk of ASCVD events, real-world effectiveness of PCSK9i in subjects with ASCVD events has yet to be established.

**CONDITION:** Recent ASCVD Event
**PI:** Courtney Baechler, MD
**RESEARCH CONTACT:** Andie Sarafolean
[andrea.sarafolean@allina.com](mailto:andrea.sarafolean@allina.com) | 612-863-3941
**SPONSOR:** Amgen

**CRITERIA LIST/QUALIFICATIONS:**

**Inclusion:**
- ≥ 40 y.o.
- Hospitalization for a clinical ASCVD event (acute MI, unstable angina, IS or CLI) within 18 months of enrollment and/or coronary, peripheral, or carotid revascularization including percutaneous or surgical revascularization in the past 18 months
- LDL ≥ 70 mg/dL with no immediate plans for statin change or newly started on PCSK9i after index hospitalization/procedure (no more than 6 months prior to enrollment)

**Exclusion:** ESRD, on a PCSK9i prior to qualifying event
Equity in Cardiovascular Health Outcomes—Facts, Figures, and MHIF Strategies to Close the Gap

Courtney Jordan Baechler, MD, MS
Mosi Bennett, MD, PhD
Mario Goessl, MD, PhD

Creating a World without Heart and Vascular Disease...

FOR ALL
Context: Racial Disparities in Health

• African Americans have higher death rates than Whites for 12 of the 15 leading causes of death.
• Blacks and American Indians have higher age-specific death rates than Whites from birth through the retirement years.
• Hispanics have higher death rates than whites for diabetes, hypertension, liver cirrhosis & homicide
• Minorities get sick younger, have more severe illness and die sooner than Whites

Historical Perspective

• Health disparities between blacks and whites since first settlers arrived
• Tuskegee Syphilis Trials
• 1990’s University study on “genetic etiology of aggressive behavior”
• 2002 IOM Unequal Treatment disparities in health care delivery—less likely to be given appropriate cardiac meds, CABG
• 2004—systemic review of angiography, angioplasty, CABG, and lytics—21/23 showed that African Americans were less likely to get CABG
What is Race?

“Pure races in the sense of genetically homogenous populations do not exist in the human species today, nor is there any evidence that they have ever existed in the past... Biological differences between human beings reflect both hereditary factors and the influence of natural and social environments. In most cases, these differences are due to the interaction of both.”

American Association of Physical Anthropology, 1996

Racial and Ethnic Disparities

- Blacks have the highest rates of heart disease in the country
- Blacks are 2-3 times more likely to die from heart disease
- While the cardiovascular mortality rates have been decreasing, this is not seen for blacks
- Blacks were 42% less likely to receive an ICD in the Medicare population after a heart attack
Figure 1: Hypertension Prevalence by Sex and Race/Ethnicity

Table 1: Disparities in Outcomes Between Blacks and Whites With Diabetes
Black and Hispanic women have the highest rates of obesity in the country

Black and Hispanic women have the highest rates of diabetes and high blood pressure

Women and blacks are less likely to get a cardiac catheterization when they present with chest pain (then men and whites)
Atrial Fib Outcomes

- Blacks and Hispanics have a lower incidence of atrial fib than whites
- However, blacks are less likely to be aware they have the condition
- Higher overall risk of stroke and stroke mortality in black patients
- Greater risk of major bleeding with warfarin
- No major difference noted with DOAC’s

Heart Transplant Wait Times

2014 Outcomes:
- 19.8 months average wait time for African-Americans
- 12 months for white patients
- 12.3 months for Hispanic patients

2016 Outcomes:
- 10.4 months for African-Americans
- 8 months for white patients
- 7.4 months for Hispanic patients
The Coalition to Reduce Racial and Ethnic Disparities in Cardiovascular Disease Outcomes (credo)

- Launched in 2009
- Help the cardiology community meet the needs of an increasingly diverse patient population
- Evidenced-based tools
- Performance improvement data
- Provider education including cultural competency training
- Patient education approaches
- Goal was equitable care and outcomes for all patients, regardless of race, ethnicity, sex, and age

Clyde W. Yancy et al. JACC 2011;57:245-252

American College of Cardiology Foundation
MN has had the best cardiovascular mortality rates since 1999....
### Cardiovascular Mortality Rates in MN

<table>
<thead>
<tr>
<th>Age Group (years)</th>
<th>Crude Death Rate (per 100,000), Whites</th>
<th>Crude Death Rate (per 100,000), African Americans/Africans</th>
<th>Rate Ratio of African Americans/Africans to Whites</th>
<th>Crude Death Rate (per 100,000), American Indians</th>
<th>Rate Ratio of American Indians to Whites</th>
</tr>
</thead>
<tbody>
<tr>
<td>35-44</td>
<td>14.4</td>
<td>33.3</td>
<td>2.31</td>
<td>50.5</td>
<td>3.51</td>
</tr>
<tr>
<td>45-54</td>
<td>46.1</td>
<td>85.6</td>
<td>1.86</td>
<td>166.7</td>
<td>3.62</td>
</tr>
<tr>
<td>55-64</td>
<td>101.1</td>
<td>188.6</td>
<td>1.87</td>
<td>280.5</td>
<td>2.77</td>
</tr>
<tr>
<td>65-74</td>
<td>220.8</td>
<td>322.6</td>
<td>1.46</td>
<td>590.8</td>
<td>2.68</td>
</tr>
<tr>
<td>75-84</td>
<td>726.3</td>
<td>665.7</td>
<td>0.92</td>
<td>1175.3</td>
<td>1.62</td>
</tr>
<tr>
<td>85 and Over</td>
<td>3286.3</td>
<td>1637.5</td>
<td>0.50</td>
<td>1714.0</td>
<td>0.52</td>
</tr>
</tbody>
</table>

### Controlling High Blood Pressure by Race and Ethnicity, Minnesota Health Care Program Members, 2017

<table>
<thead>
<tr>
<th>Race</th>
<th>Rate</th>
<th>Comparison to State Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Indian/Alaskan Native</td>
<td>69%</td>
<td>No difference*</td>
</tr>
<tr>
<td>Black/African American</td>
<td>57%</td>
<td>Lower</td>
</tr>
<tr>
<td>Asian</td>
<td>72%</td>
<td>No difference*</td>
</tr>
<tr>
<td>White</td>
<td>74%</td>
<td>Higher</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>74%</td>
<td>No difference*</td>
</tr>
</tbody>
</table>
Optimal Vascular Care Goals among Minnesota Adults with Ischemic Vascular Disease by Race, 2017

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>% Meeting all four goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Indian</td>
<td>45%</td>
</tr>
<tr>
<td>Asian</td>
<td>68%</td>
</tr>
<tr>
<td>African American/African</td>
<td>45%</td>
</tr>
<tr>
<td>Multi-Racial</td>
<td>50%</td>
</tr>
<tr>
<td>Native Hawaiian/Other Pacific Islander</td>
<td>55%</td>
</tr>
<tr>
<td>White</td>
<td>63%</td>
</tr>
</tbody>
</table>

MN Death Rate due to Stroke by Race and Ethnicity, 2014-2018

![Bar chart showing age-adjusted death rate per 100,000 for different races and ethnicities]
What is Health Equity?

“Health equity is a state where all persons, regardless of race, creed, income, sexual orientation, gender identification, age or gender have the opportunity to reach their full health potential without the limits of structural barriers.”


A Tale of Two Cities

• https://youtu.be/Eu7d0BMRt0o
What is the Center for Health Equity?

MDH directed by Legislature in 2013 to prepare a report on Advancing Health Equity in MN
1. To provide an overview of MN’s health disparities and health inequities
2. To identify inequitable conditions that produce health disparities
3. To make recommendations to advance HE in MN
### Statewide Health Assessment

- Shows a picture of health and well-being across the state, including:
  - Who is healthy and who is not?
  - What conditions shape health for all the different populations in Minnesota?
  - What do we have, and what do we need, to assure that all people in Minnesota can enjoy healthy lives and healthy communities

### People: highlights

- About 14% of all children in Minnesota live in poverty.
- About 9% of Minnesotans 18-64 have a disability; almost 1 in 5 families with children have a child with special health needs.
- Racial and ethnic diversity is expected to increase to about 25% by 2035.
- The LGBTQ population in Minnesota faces many challenges and barriers to health.
- The population over 65 is growing rapidly.
“Opportunity means having the chance to experience success at every stage of life, from our early childhood through our old age. Our opportunity is shaped by the conditions that constrain or expand the choices available to us.”

“These conditions include what schools we can go to, what jobs are open to us, and even what kind of food is available to us. Whether we have a permanent home, find work with good pay and health insurance, or have safe places to play creates or reduces our chances to be healthy.”
Opportunity: education

- Education is one of the clearest and strongest predictors of lifelong health.

ON-TIME GRADUATION RATE BY RACE/ETHNICITY

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Graduation Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>White (Non-Hispanic)</td>
<td>87%</td>
</tr>
<tr>
<td>Asian</td>
<td>84%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>65%</td>
</tr>
<tr>
<td>Black</td>
<td>65%</td>
</tr>
<tr>
<td>American Indian</td>
<td>53%</td>
</tr>
</tbody>
</table>

Source: Minnesota Compass

Connecting education to health

DIABETES
Adults (18+) diagnosed with diabetes by educational attainment, Minnesota, 2015
Source: Minnesota Compass / BRFSS

INADEQUATE PRENATAL CARE
Adequacy of prenatal care (Kessner Index), Minnesota, 2011
Source: CDC / PRAMS

SMOKING
Current smoking by education in Minnesota, 2015
Source: Minnesota Public Health Data Access / BRFSS
Opportunity: income

MINNESOTANS BELOW POVERTY LEVEL, 2010-2012

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHITE (NON-HISPANIC)</td>
<td>8%</td>
</tr>
<tr>
<td>ASIAN</td>
<td>10%</td>
</tr>
<tr>
<td>TWO OR MORE RACES HISPANC</td>
<td>23%</td>
</tr>
<tr>
<td>ASIAN [SOUTHEAST]</td>
<td>24%</td>
</tr>
<tr>
<td>OTHER RACE</td>
<td>27%</td>
</tr>
<tr>
<td>BLACK [FOREIGN BORN]</td>
<td>35%</td>
</tr>
<tr>
<td>AMERICAN INDIAN</td>
<td>40%</td>
</tr>
<tr>
<td>BLACK [U.S. BORN]</td>
<td>41%</td>
</tr>
</tbody>
</table>

MINNESOTANS WHO LIVE OUTSIDE URBAN AREAS AND WORK FULL TIME ARE 2X AS LIKELY TO LIVE IN POVERTY AS URBAN RESIDENTS WHO WORK FULL TIME.

Source: Minnesota Compass

Home ownership

THREE TIMES AS MANY WHITE MINNESOTANS OWN HOMES AS AFRICAN-AMERICAN MINNESOTANS.

WHITE MINNESOTANS 77%

AFRICAN-AMERICAN MINNESOTANS 25%

Source: Minnesota Compass
### Connecting income, housing and health

<table>
<thead>
<tr>
<th>Financial stress about housing, adults 18-64 only</th>
<th>Usually or always</th>
<th>Sometimes</th>
<th>Rarely or never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ever had cancer (other than skin cancer)</td>
<td>8%</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>Ever had COPD1</td>
<td>10%</td>
<td>4%</td>
<td>2%</td>
</tr>
<tr>
<td>Ever had arthritis</td>
<td>29%</td>
<td>16%</td>
<td>14%</td>
</tr>
<tr>
<td>Ever had a depressive disorder</td>
<td>49%</td>
<td>24%</td>
<td>15%</td>
</tr>
<tr>
<td>Ever had diabetes</td>
<td>9%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Currently have asthma</td>
<td>14%</td>
<td>9%</td>
<td>6%</td>
</tr>
<tr>
<td>Currently smoke cigarettes</td>
<td>39%</td>
<td>23%</td>
<td>14%</td>
</tr>
<tr>
<td>Report binge drinking in past 30 days</td>
<td>25%</td>
<td>24%</td>
<td>22%</td>
</tr>
<tr>
<td>Are obese</td>
<td>35%</td>
<td>30%</td>
<td>24%</td>
</tr>
</tbody>
</table>

### Inequities in recreational opportunity

*White Minnesotans are twice as likely to use regional parks and rarely note safety concerns. Populations of color are more likely to note safety concerns about being in regional parks.*

*Source: Metropolitan Council*
Connecting to health

**Obesity by Population**

<table>
<thead>
<tr>
<th>Group</th>
<th>Obesity Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian</td>
<td>11%</td>
</tr>
<tr>
<td>Black</td>
<td>25%</td>
</tr>
<tr>
<td>White</td>
<td>27%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>29%</td>
</tr>
<tr>
<td>American Indian</td>
<td>41%</td>
</tr>
<tr>
<td>HS Grad or Less</td>
<td>29%</td>
</tr>
<tr>
<td>Income &lt; $35k</td>
<td>32%</td>
</tr>
<tr>
<td>Out of Work</td>
<td>31%</td>
</tr>
<tr>
<td>LGBTQ</td>
<td>30%</td>
</tr>
</tbody>
</table>

Source: Minnesota Department of Health, Behavioral Risk Factor Surveillance System

Connecting belonging and health

**Racial and Ethnic Disparities in Prisons and Jail in Minnesota**

<table>
<thead>
<tr>
<th>Race</th>
<th>Prison/Jail Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>53%</td>
</tr>
<tr>
<td>Black</td>
<td>34%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>6%</td>
</tr>
<tr>
<td>American Indian</td>
<td>10%</td>
</tr>
</tbody>
</table>

Source: Minnesota Department of Corrections

Black, Hispanic and American Indian Minnesotans are overrepresented among those incarcerated.
Consistency in opportunity inequities

- Populations of color and American Indians in Minnesota experience consistently lower opportunities in education, employment, income, housing, transportation, paid leave, health insurance, health care

Minnesota Maternal Mortality Review Committee

Work on behalf of the Commissioner of Health to review all pregnancy-associated deaths of Minnesota residents.

**Purpose:** The Minnesota Maternal Mortality Review Committee (MMMRC) is tasked with addressing maternal mortality in Minnesota. The MMMRC works to identify factors contributing to maternal deaths and the health inequities impacting maternal health in the state. Leads the charge of disseminating recommendations to improve maternal outcomes for our Minnesota mothers.

**Vision:** The vision of the Minnesota Maternal Mortality Review Committee is to eliminate preventable maternal deaths, reduce maternal morbidities, and improve population health and health equity for women of reproductive age in Minnesota.
Identifying Racism and Discrimination as Contributing Factors

- Women of color report more experiences of discrimination, food insecurity, and depression
- Women of color experience higher levels of chronic stress during pregnancy - results in compromised endocrine and immune function
- Burden remains higher across all income and education levels
- Results in greater rates of hypertensive disorder, preterm birth, low birth weight neonates and perinatal mortality among Black women

NEW* Contributing Factors

- **DISCRIMINATION** Treating someone less or more favorably based on the group, class or category they belong to resulting from biases, prejudices, and stereotyping. It can manifest as differences in care, clinical communication and shared decision-making. (Smedley et al, 2003 and Dr. Rachel Hardeman)

- **INTERPERSONAL RACISM** Discriminatory interactions between individuals based on differential assumptions about the abilities, motives, and intentions of others and resulting in differential actions toward others based on their race. It can be conscious as well as unconscious, and it includes acts of commission and acts of omission. It manifests as lack of respect, suspicion, devaluation, scapegoating, and dehumanization. (Jones, CP, 2000 and Dr. Cornelia Graves)

- **STRUCTURAL RACISM** The systems of power based on historical injustices and contemporary social factors that systematically disadvantage people of color and advantage white people through inequities in housing, education, employment, earnings, benefits, credit, media, health care, criminal justice, etc. – (Adapted from Bailey ZD. Lancet. 2017 and Dr. Carla Ortique)
MHI/MHIF Unique Role to Play

Research
Community Education
Clinical Outcomes

The Insight Health Equity Action Lab, is an action-oriented think tank working in partnership with communities and organizations across sectors, to develop and implement sustainable and measurable strategies that advance health equity. iHEAL will amplify evidence-based and transformative work that builds and supports healthy communities and puts people/community at the center of the process.
The Insight2Health Fitness Challenge (I2H) inspires lifestyle changes in participants through fitness, yoga and nutrition and life coaching.

I2H introduces lifestyle changes that are sustainable. To date, we have hosted 14 I2H sessions with more than 300 participants who have lost more than 1,100 pounds and 430 inches.

A few factors that have supported the program’s success: 1) providing solid programming led by experienced personnel, 2) sharing participant success stories through Insight News and 3) receiving technical and financial support from organizations such as NorthPoint Health & Wellness.

The interventions from the physical activity portion of the program appear to have had an overall positive effect. Participants became more physically active than they were at baseline and more motivated to continue physical activity as part of lifestyle changes.
"Based on the identified health concerns, our team would recommend emphasizing the importance of living a healthy lifestyle and control of risk factors for heart disease prevention especially in the African American community. Utilizing the medical community for any educational tools on these topics could be a way to better inform the participants of these diseases."

Demonstrated Past Success

- Level 1 STEMI program
- HONU
- Creating strong relationships in the community
- National reputation in research
Heart Failure is More Prevalent in African-Americans

- More than 6.5 million people with heart failure in the U.S.
- Risk of heart failure increases with age for both sexes and all races
- Risk of heart failure is highest in African-Americans
- Black men age 55-64: 3 times the risk of heart failure compared to white men

Heart Failure Mortality is Higher in African Americans

Age Adjusted Heart Failure Mortality

- Heart failure mortality is 50% at 5 years
- Heart failure mortality is 2.6 times higher in young Black men than White men
- Disparities are more pronounced among younger adults
- Heart failure mortality among African Americans is increasing since 2011

African Americans are Poorly Represented In Heart Failure Clinical Trials

- In a review of 25 randomized clinical trials for heart failure
  - 19 for pharmacotherapies
  - 6 for implantable cardioverter defibrillators
- Among these studies
  - 78,816 patients
  - 4,640 Black patients (5.9%)
  - Median Black participation per trial was 162 patients
- Overall patient enrollment among the 25 trials increased while percentage of black patients decreased over time
- Black patients are poorly represented among pivotal trials
- Inclusion is necessary to ensure that study findings can be generalized to all patients with Heart Failure
### Black Individuals are Poorly Represented Among Trials for Chronic Heart Failure

#### Table 1: Descriptions of the 26 identified randomized clinical trials for CHF

<table>
<thead>
<tr>
<th>Study Area</th>
<th>Journal</th>
<th>Study population</th>
<th>Treatment groups</th>
<th>Total patient enrollment</th>
<th>Total black patient enrollment (%)</th>
<th>Outcome by race, reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>V-HeFT (2000)</td>
<td>NEJM</td>
<td>Veterans &gt; 75 yo or age Greater than 65%</td>
<td>ISDN/Hydralazine vs placebo</td>
<td>1864</td>
<td>196 (10.6%)</td>
<td>Yes</td>
</tr>
<tr>
<td>A-HeFT (2004)</td>
<td>NEJM</td>
<td>All black patients &lt; 50 yo</td>
<td>ISDN/Hydralazine vs placebo</td>
<td>722</td>
<td>34 (4.7%)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

#### African-American Heart Failure Trial (A-HeFT)
- Subgroup analysis of earlier V-HeFT trial suggested combination therapy with isosorbide dinitrate plus hydralazine was beneficial in black patients
- **A-HeFT**: compare isosorbide dinitrate/hydralazine with placebo among black patients with advanced heart failure
- 1050 patients, EF 24% NYHA Class III, 18 months follow up
- Mortality was lower in the combination therapy group
- Survival differences at six months after randomization

Lessons Learned From the A-HeFT Trial

- Among black patients with advanced heart failure, treatment with isosorbide dinitrate plus hydralazine improves survival and reduces hospitalizations

- Inclusion of a group historically under represented in clinical trials ultimately led to the approval of a therapy with a specific survival benefit

- Current guidelines recommend the addition of nitrates and hydralazine for African American heart failure patients that are on optimal medical therapy

Disparity in Access to Heart Failure Care

- Black Patients with Heart Failure are less likely to receive care by a cardiologist in the ICU

- ICU Care by a cardiologist is associated with better in-hospital survival
Clinical Bias in Heart Failure

- A 2019 Study: 400 heart failure health care professionals
- Randomized to a patient vignette about either an African-American or White man with identical profiles
- Participants rated the appropriateness for heart transplant or LVAD
- The most important factors contributing to the decision to recommend heart transplant LVAD were social support and adherence
- African-American patient with the same profile: less trustworthy, less social support, worse adherence
- Heart transplant was recommended more often for the White patient

Disparities in Heart Failure Care at MHI?

- Black patients at Minneapolis Heart Institute:
  - 11% of heart failure hospitalizations
  - 14% of advanced heart failure hospital consults
  - 5% of clinic visits for heart failure
  - 8% of advanced Heart Failure clinic visits
- Questions to consider:
  - Is there equity in access to cardiology and advanced heart failure care?
  - Are Black patients represented in clinical trials at MHIF?
  - Is there clinical bias in consideration for Heart Transplants and VAD?
What Are The Factors That Drive Disparities in Heart Failure?

• **Social determinants of health**: insurance, education, nutrition, housing, income transportation

• **Healthcare provider discrimination and bias**: reduced delivery of evidence based heart failure treatments to racial/ethnic minorities and women

• Disparities in **participation in clinical trials**: Racial minorities are underrepresented in heart failure research studies

• Lack of preventive care: **modifiable diseases** that increase the risk of developing heart failure, such as hypertension, diabetes, obesity, and atherosclerosis

A Multi-Faceted Approach to Achieve Health Equity

• **Increase awareness**. Recognize that disparities and bias exist

• **Promote favorable lifestyle changes** that are associated with reduced risk of developing heart failure, particularly among African-Americans

• Address **structural inequalities** in education, income, and health insurance coverage

• **Change policy** in order to expand access to care and the distribution of health services

• **Educate and train** in bias reduction, anti-racism, and cultural competency

• Encourage informed **involvement in clinical research**
Dr. Mario Goessl, MD, PhD

HEALING HEARTS IS OUR MISSION.
WE'RE IN THIS TOGETHER.
A TALE OF TWO ZIP CODES

MEET DEB & MARIA
Deb & Maria live one mile apart, but Deb will live 18 years longer than Maria.
Watch to find out why!

with GEORGE TAKEI