



Main Line Health[®]

Well ahead.[®]

Addressing Social Determinants of Health in Patients with Heart Failure: The Role of the Clinician

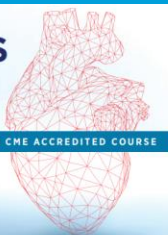
Jonathan Arend, MD

Medical Director for Primary Care and Population Health
Main Line HealthCare Physician Network

**CARDIOLOGY UPDATES
FOR THE CLINICIAN**

FRIDAY, MARCH 17, 2023 | 6:45 AM-5:30 PM

ALLOY HOTEL
301 WEST DEKALB PIKE | KING OF PRUSSIA, PA 19406



A CME ACCREDITED COURSE

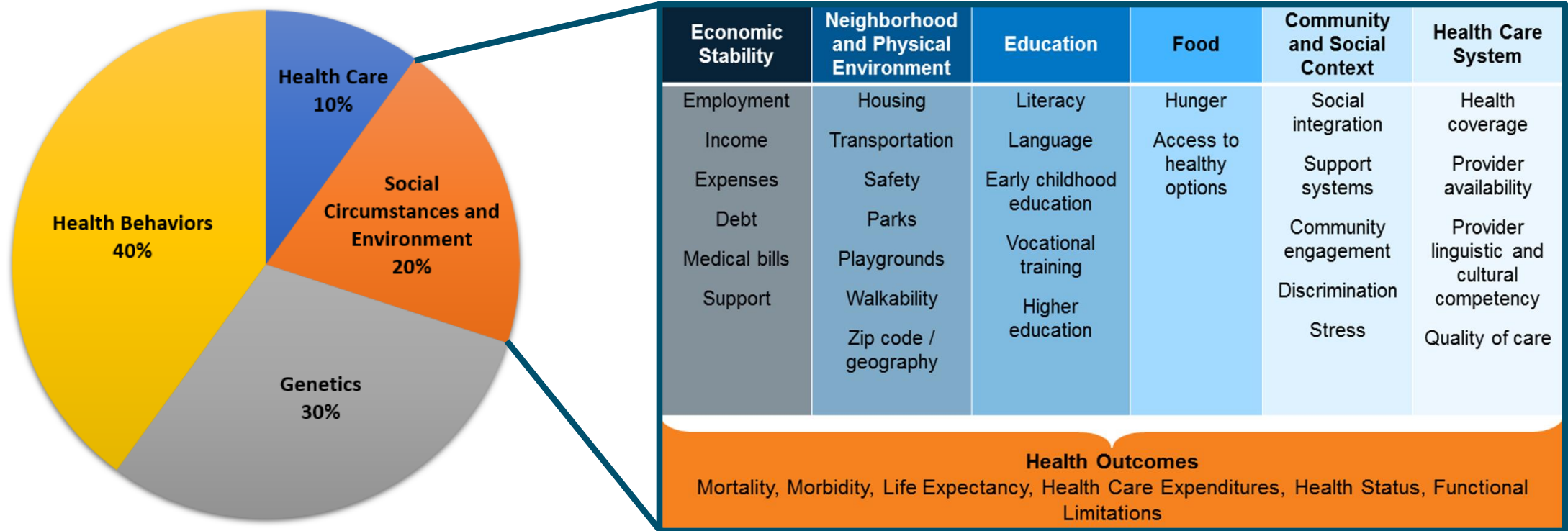
Educational Objectives

- Review the literature on social determinants of health in patients with heart failure
- Identify evidence-based interventions to mitigate the impact of social determinants of health on clinical outcomes in patients with heart failure

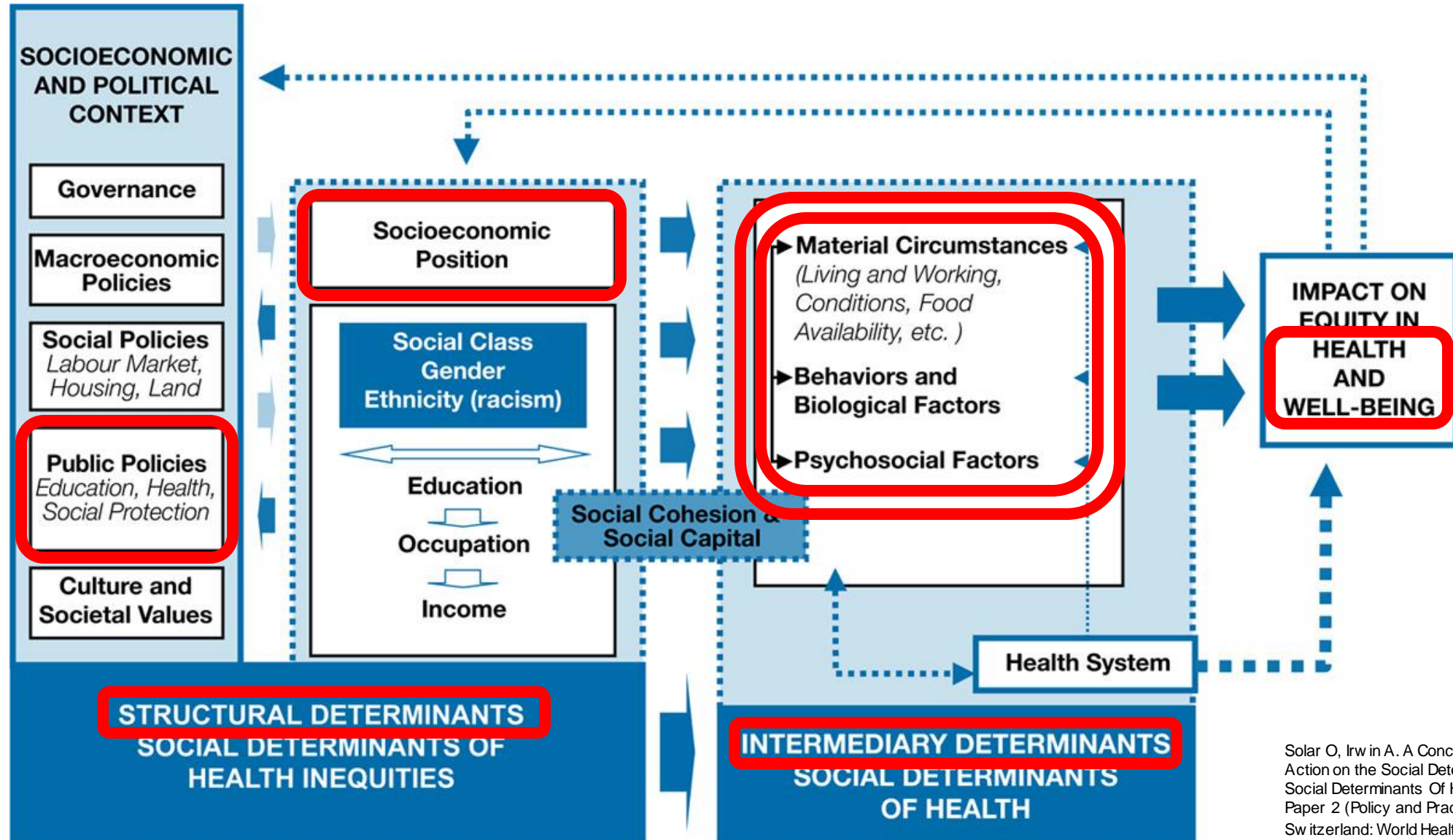
Challenges

- 68 year-old man living in West Philadelphia who has frequent hospital admissions for heart failure due to poor adherence to his medical regimen and diet
 - **Afraid to leave his home to go to the grocery store and pharmacy due to fear of gun violence**
- 79 year-old woman followed by a heart failure specialist who experiences recurrent volume overload despite a low-salt diet and prescription of optimal medical therapy
 - **Haitian immigrant with limited health literacy; provider and staff communication practices poorly tailored to her educational / English proficiency level**
- 84 year-old woman with deteriorating heart failure since the death of her husband 9 months ago
 - **Relied on her husband for transportation to doctors' offices; self-care impacted by loneliness**

Determinants of Health



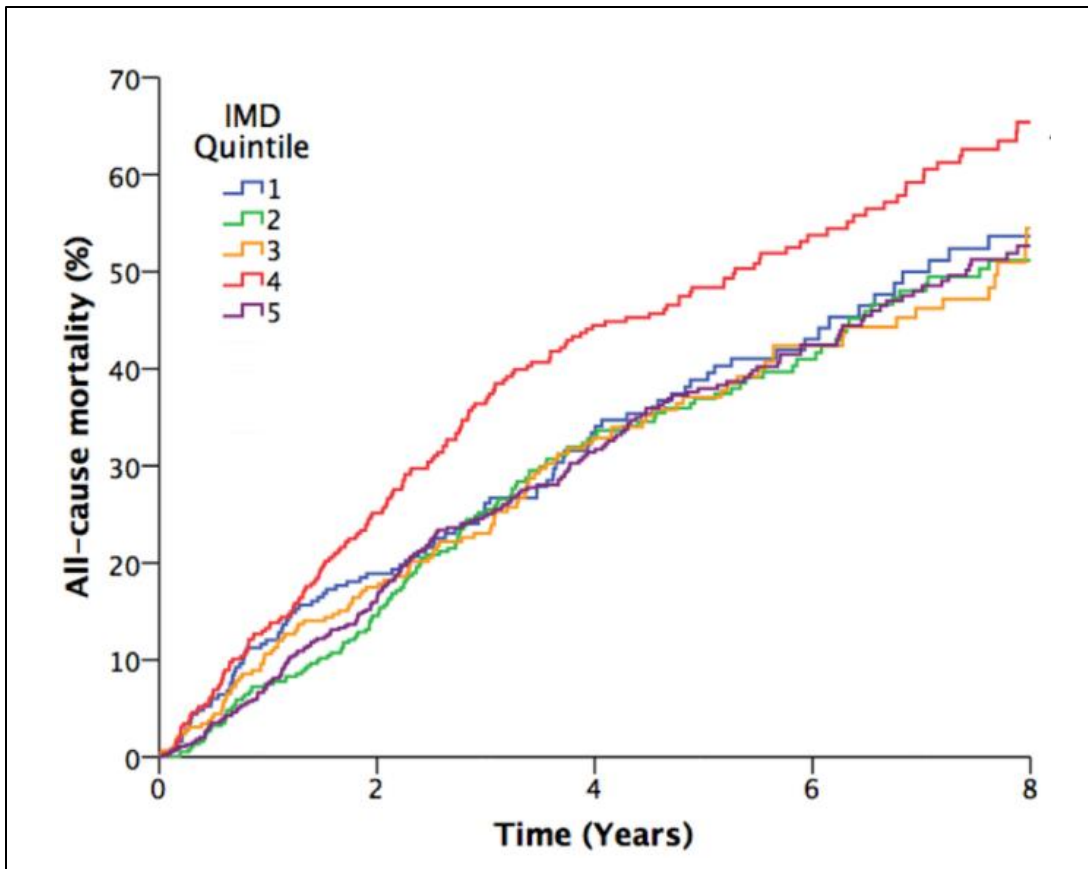
World Health Organization Social Determinants of Health Framework



Solar O, Irwin A. A Conceptual Framework for Action on the Social Determinants of Health: Social Determinants of Health Discussion Paper 2 (Policy and Practice). Geneva, Switzerland: World Health Organization; 2010.

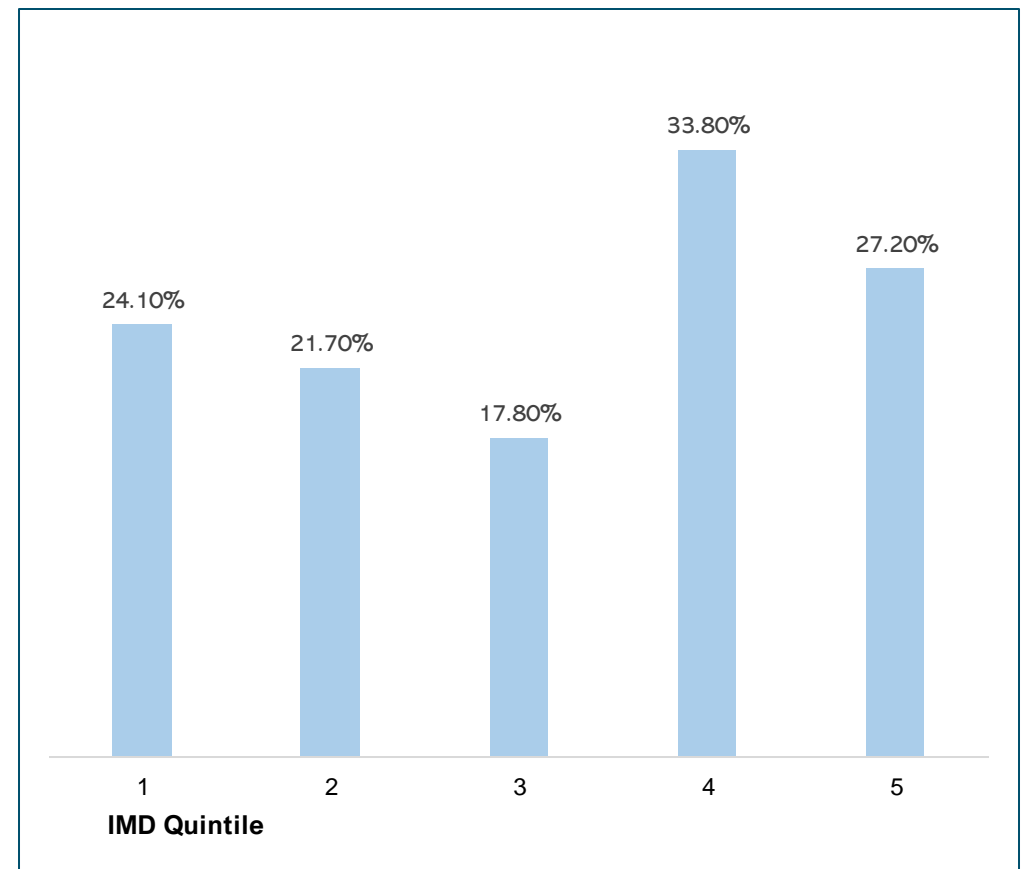
Socioeconomic Status (SES) and Heart Failure

All-cause mortality among patients with heart failure, by SES



Kaplan-Meier curves illustrating all-cause mortality according to Index of Multiple Deprivation (IMD) quintiles ($P=0.002$ by log-rank test)

All-cause admission rate among patients with heart failure, by SES



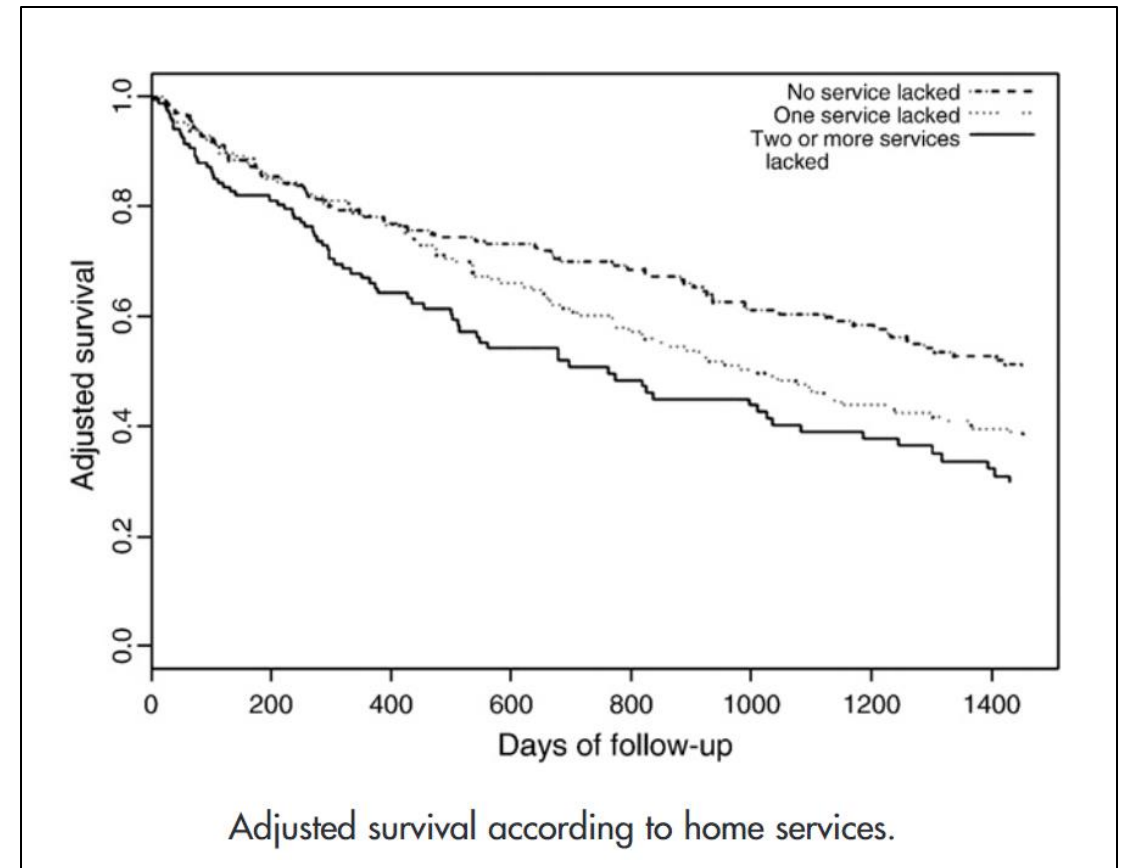
All-cause admission was most common in the most deprived patients

Housing Conditions and Heart Failure

Association between home services and mortality among older patients hospitalized with heart failure

	Crude HR (95% CI)	Adjusted HR* (95% CI)	
Services in the home			
No elevator (in an apartment house)	1.32 (1.03-1.68) [†]	1.39 (1.07-1.80) [†]	
No hot running water	1.49 (0.54-2.05)	1.11 (0.55-2.24)	
No heating	1.23 (0.92-1.64)	1.30 (0.95-1.78)	
No indoor bathroom	0.72 (0.26-1.97)	0.70 (0.24-2.00)	
No bathtub or shower	1.08 (0.47-2.46)	1.00 (0.41-2.32)	
No individual bedroom	1.42 (0.90-2.24)	1.60 (1.00-2.60)	
No automatic washing machine	1.32 (0.67-2.6)	1.09 (0.52-2.27)	
No telephone	1.29 (0.70-2.37)	1.37 (0.71-2.64)	
Frequently feeling cold	1.56 (1.15-2.13) [†]	1.39 (1.01-1.92) [†]	
No. of services in the home			
All services	1 (reference)	1 (reference)	[†] P < .05.
Lacking 1 service	1.35 (1.01-1.81) [†]	1.42 (1.10-1.93) [†]	[‡] P < .01.
Lacking ≥2 services	1.83 (1.33-2.52) [§]	1.94 (1.37-2.74) [§]	[§] P < .001.

Excess mortality associated with lacking 1 service increased to 93% after 1 year. Excess mortality associated with lacking ≥ 2 services was observed at the beginning of follow-up.



Health Literacy and Heart Failure

Low literacy is associated with a 31% increased risk of all-cause admissions or death and a 46% increased risk of heart failure admissions among patients with heart failure

	Low literacy (<i>n</i> = 220)				
	N	Incidence rate/year	Adjusted for site incidence rate ratio	Partially adjusted incidence rate ratio [†]	Fully adjusted incidence rate ratio ^{††}
All-cause hospitalizations or death	59	1.43	1.39	1.31 ^{**}	1.31 [*]
	5	(1.00–2.05)	(0.99,1.94)	(1.11, 1.53)	(1.06,1.63)
HF-related hospitalizations	59	1.42	1.36 ^{**}	1.44 ^{**}	1.46 ^{***}
	5	(1.11–1.83)	(1.11,1.66)	(1.15, 1.82)	(1.20,1.78)

1.*Significant at 5 %

2.**Significant at 1 %

3.***Significant at 0.1 %

4.†Adjusted for site, age, gender, ethnicity, education level, subjective socioeconomic status, insurance, systolic blood pressure, systolic dysfunction, New York Heart Association (NYHA), diabetes, hypertension, atrial fibrillation, history of CVD [myocardial infarction (MI) or angina], beta-blocker use, and HF symptoms

5.††Adjusted for site, age, gender, ethnicity, education level, subjective socioeconomic status, insurance, systolic blood pressure, systolic dysfunction, NYHA, diabetes, hypertension, atrial fibrillation, history of CVD (MI or angina), beta-blocker use, and HF symptoms, HF general knowledge, salt knowledge, self-efficacy, and self-care behaviors

Food Insecurity and Heart Failure

Food insecurity is associated with a 21% increased risk of hypertension and a 48% increased risk of diabetes

TABLE 2 Prevalence and crude and adjusted odds ratios for the association between food security and chronic disease among low-income NHANES participants

Assessment of diagnosis	Hypertension		Hyperlipidemia		Diabetes	
	Self-report, <i>n</i> = 4957	Clinical, ¹ <i>n</i> = 4627	Self-report, <i>n</i> = 1930	Clinical, ² <i>n</i> = 4559	Self-report, <i>n</i> = 5089	Clinical, ³ <i>n</i> = 2239
Food secure						
Unadjusted prevalence, %	20.2	18.6	33.3	19.8	6.8	7.4
Food insecure						
Unadjusted prevalence, %	24.6	22.4	43.3	21.7	8.3	10.2
CRR (95% CI) ⁴	1.20 (1.05–1.38)	1.21 (1.03–1.42)	1.31 (1.10–1.56)	1.09 (0.90–1.33)	1.21 (0.92–1.59)	1.51 (1.04–2.19)
ARR (95% CI) ⁴	1.20 (1.04–1.38)	1.21 (1.04–1.41)	1.30 (1.09–1.55)	1.09 (0.90–1.33)	1.19 (0.89–1.58)	1.48 (0.94–2.32)

¹ Clinical hypertension is defined as SBP >140 mm Hg, DBP >90 mm Hg, or taking antihypertensive medication.

² Clinical hyperlipidemia is defined as a total cholesterol ≥240 mg/dL (6.22 mmol/L), LDL cholesterol ≥160 mg/dL (4.14 mmol/L), or taking cholesterol-lowering medication.

³ Clinical diabetes is defined as a fasting plasma glucose ≥126 mg/dL (6.99 mmol/L) or taking insulin and/or a hypoglycemic medication.

⁴ Relative risk is for food-insecure adults compared with food-secure adults. CRR is adjusted for age, gender, and race/ethnicity. ARR is adjusted for age, gender, race/ethnicity, educational attainment, and income as both a continuous and an ordinal variable.

Food Insecurity and Heart Failure

- Even among those who adhere to a low-sodium diet, patients with heart failure do not consume a balanced diet with an adequate intake of protein, grains, and other micronutrients¹
- This undernutrition is a prominent feature in the development of frailty and the deterioration of heart failure²
- Multiple factors limit the ability of some patients to shop for healthy food
 - Activity limitations
 - Neighborhood safety concerns
- Home delivery may be cost-prohibitive or unavailable in unsafe neighborhoods

1. Frediani JK, Reilly CM, Higgins M, Clark PC, Gary RA, Dunbar SB. Quality and adequacy of dietary intake in a southern urban heart failure population. *J Cardiovasc Nurs.* 2013;28:119–128.
2. Vitale C, Spoletini I, Rosano GM. Frailty in heart failure: implications for management. *Card Fail Rev.* 2018;4:104–106.

Social Support and Heart Failure

Patients with low levels of social support are less likely to limit their fluid intake, contact their care team for weight gain, or adhere to their medication regimen

Self-care Behaviors, ^a Mean (SD)	Low Support (No Partner)	Medium Support (≤9 on Index)	High Support (>9 on Index)	P
I weigh myself every day	3.46 (1.4)	3.1 (1.41)	3.2 (1.46)	.13
If I get SOB, I take it easy	1.67 (0.78)	1.69 (0.63)	1.54 (0.63)	.19
If SOB increases, I contact my doctor or nurse	1.93 (0.97)	2.02 (1.0)	2.0 (1.08)	.85
If leg/feet more swollen, I contact my doctor or nurse	1.99 (0.91)	2.01 (1.02)	1.87 (0.9)	.42
If I gain weight, I contact my doctor or nurse	2.45 (1.19)	2.09 (1.01)	2.08 (1.1) ^b	.022
I limit the amount of fluids	2.17 (1.15)	2.2 (1.07) ^c	1.84 (0.95) ^b	.022
I take a rest during the day	1.84 (0.97)	1.85 (0.78)	1.74 (0.89)	.36
If I experience fatigue, I contact my doctor or nurse	2.47 (1.14)	2.48 (1.12)	2.38 (1.22)	.59
I eat a low-salt diet	2.11 (1.16)	2 (1.01)	2 (1.02)	.85
I take my medication as prescribed	1.64 (0.9)	1.55 (0.7)	1.34 (0.48) ^b	.038
I get a flu shot every year	1.91 (1.21)	1.69 (1.07)	1.43 (0.73) ^b	.007
I exercise regularly	2.95 (1.28)	2.81 (1.27)	2.41 (1.29) ^b	.007

Abbreviation: SOB, shortness of breath.
^aHigher scores indicate worse self-management; analysis of variance/Kruskal-Wallis tests were used.
^b $P < .02$, high support versus low support.
^c $P < .05$, moderate support versus high support.

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Gender and Heart Failure

- Women with heart failure have a higher likelihood of survival, compared to men, but fare worse on other indices
 - Higher risk of hospital admission¹
 - Greater degree of functional impairment²
 - Higher risk of depression³
 - Lower quality of life²
- Potential underlying reasons for increased morbidity in women with heart failure:
 - Older women are more likely to live in poverty, compared to older men⁴
 - Older women are more likely to live alone, compared to older men, and therefore receive less social support⁴
 - Women with heart failure report lack of psychological support⁵

1. Galvao M, Kalman J, DeMarco T, et al. Gender differences in in-hospital management and outcomes in patients with decompensated heart failure: analysis from the Acute Decompensated Heart Failure National Registry (ADHERE). *J Card Fail* 2006;12:100 –7

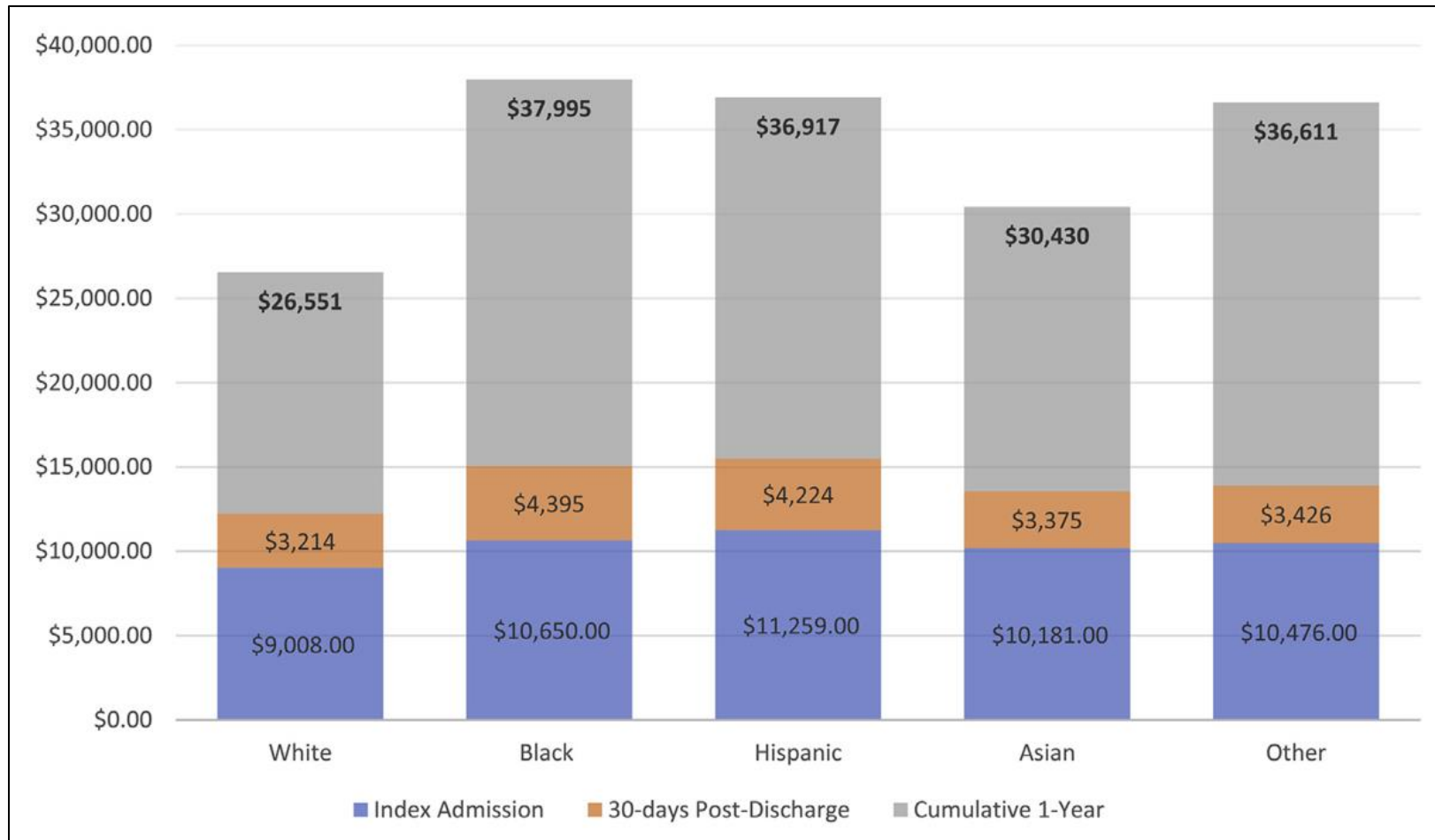
2. Deswal A, Bozkurt B. Comparison of morbidity in women versus men with heart failure and preserved ejection fraction. *Am J Cardiol*. 2006;97:1228 –31.

3. Gottlieb SS, Khatta M, Friedmann E, et al. The influence of age, gender, and race on the prevalence of depression in heart failure patients. *J Am Coll Cardiol* 2004;43:1542–9

4. McSweeney J, Petty C, Lefler LL, HeoS. Disparities in heart failure and other cardiovascular diseases among women. *Womens Health (Lond Engl)*2012;8:473–485

5. Thomas JR, Clark AM. Women with heart failure are at high psychosocial risk: a systematic review of how sex and gender influence heart failure self-care. *Cardiol Res Pract*. 2011;2011:918973

Race/Ethnicity and Heart Failure

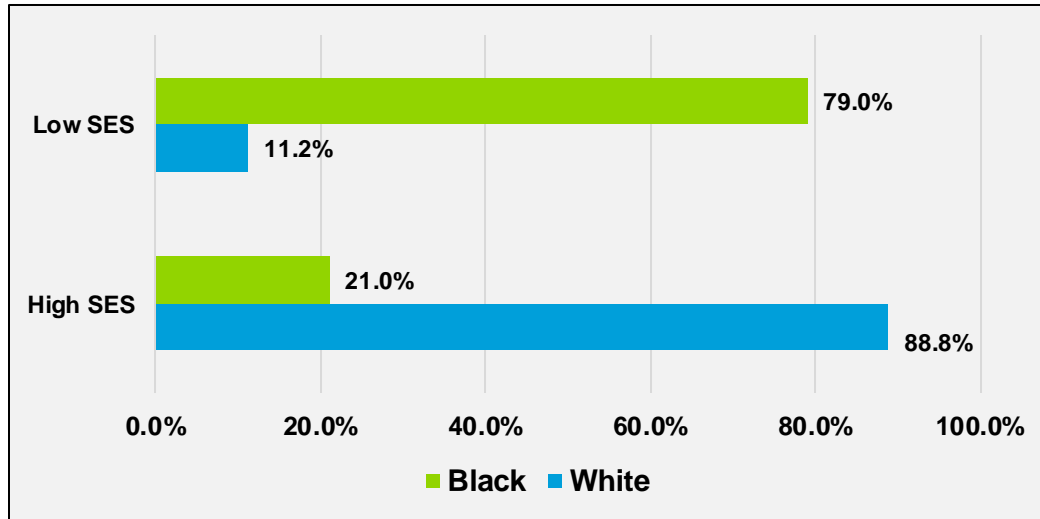


Black and Hispanic patients incur higher cumulative acute care expenditures after admission for heart failure, compared to other racial/ethnic groups

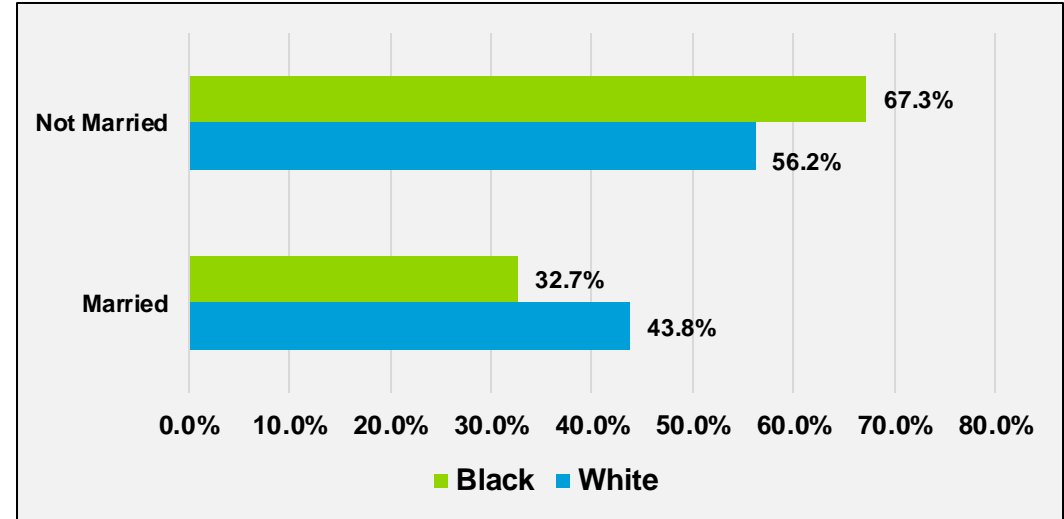
Race and Heart Failure: Main Line HealthCare¹

1. MLHC patients with heart failure and any MLH hospital admission 2/2018-5/2022

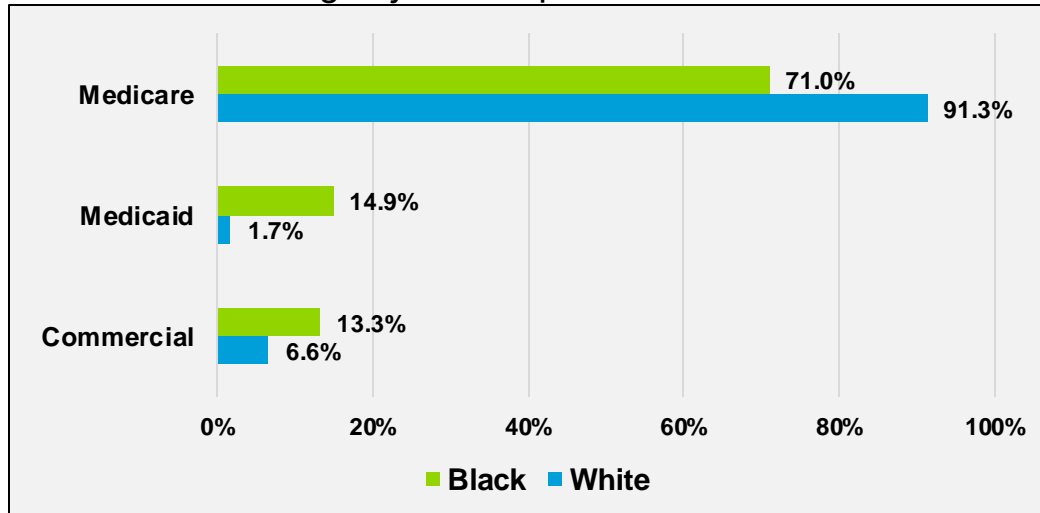
SES by race in patients with heart failure



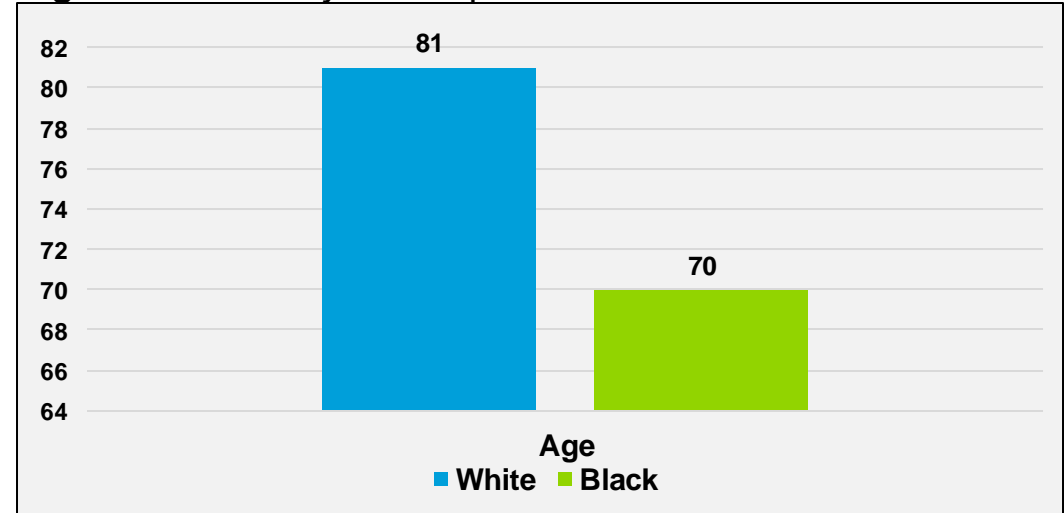
Marital status by race in patients with heart failure



Insurance coverage by race in patients with heart failure

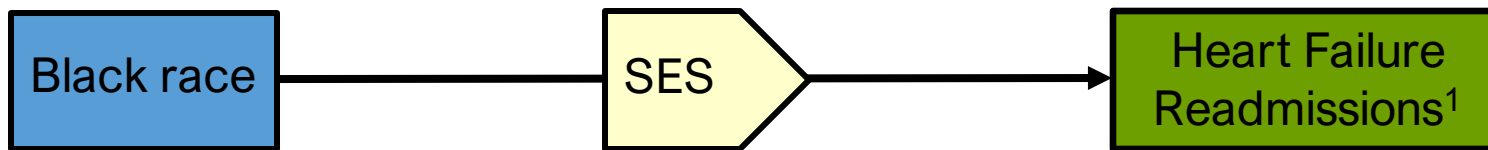


Age distribution by race in patients with heart failure



Race and Heart Failure: Main Line HealthCare

Black patients had a 20% increased risk of all-cause readmission after index admission for heart failure, compared to white patients.



Race ceases to predict readmission risk after adjustment for SES

→ *SES is a mediator between race and risk of readmissions*

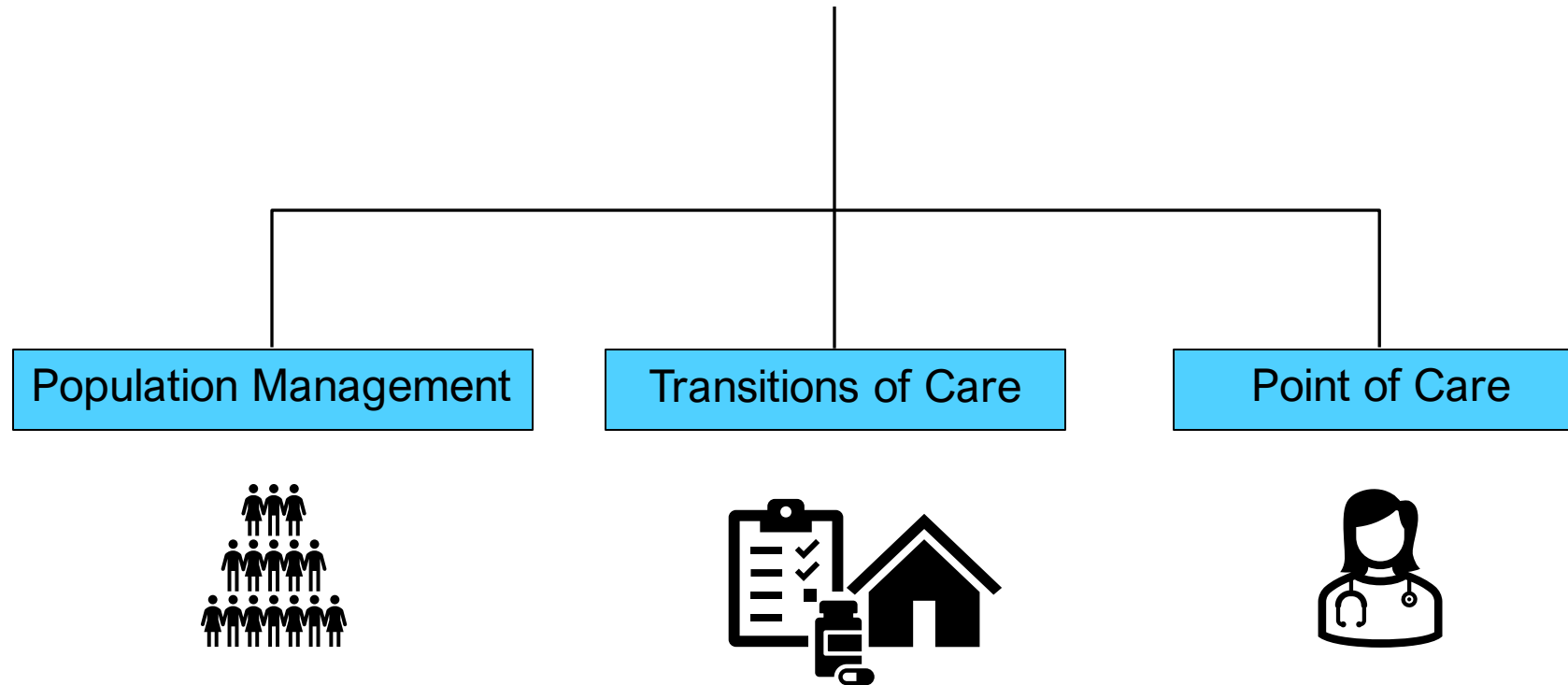
Evidence-based Interventions to Address Social Determinants of Health in Patients with Heart Failure

Source	Study Design	Social Determinant	Intervention	Outcome
Kangovi et al, 2018 ¹	RCT	Socioeconomic status	Community Health Worker Support	1. Reduced hospital admissions 2. Improved quality of life
Jonkman et al, 2016 ²	Meta-analysis, 20 RCTs	Health literacy	Self-management support	1. Reduced time to heart failure-related hospitalization 2. Reduced time to combined end-point of heart failure-related hospitalization or all-cause death
Dunbar et al, 2013 ³	RCT	Social support	1. Patient-family member education 2. Family training in supportive communication	Reduced dietary sodium intake

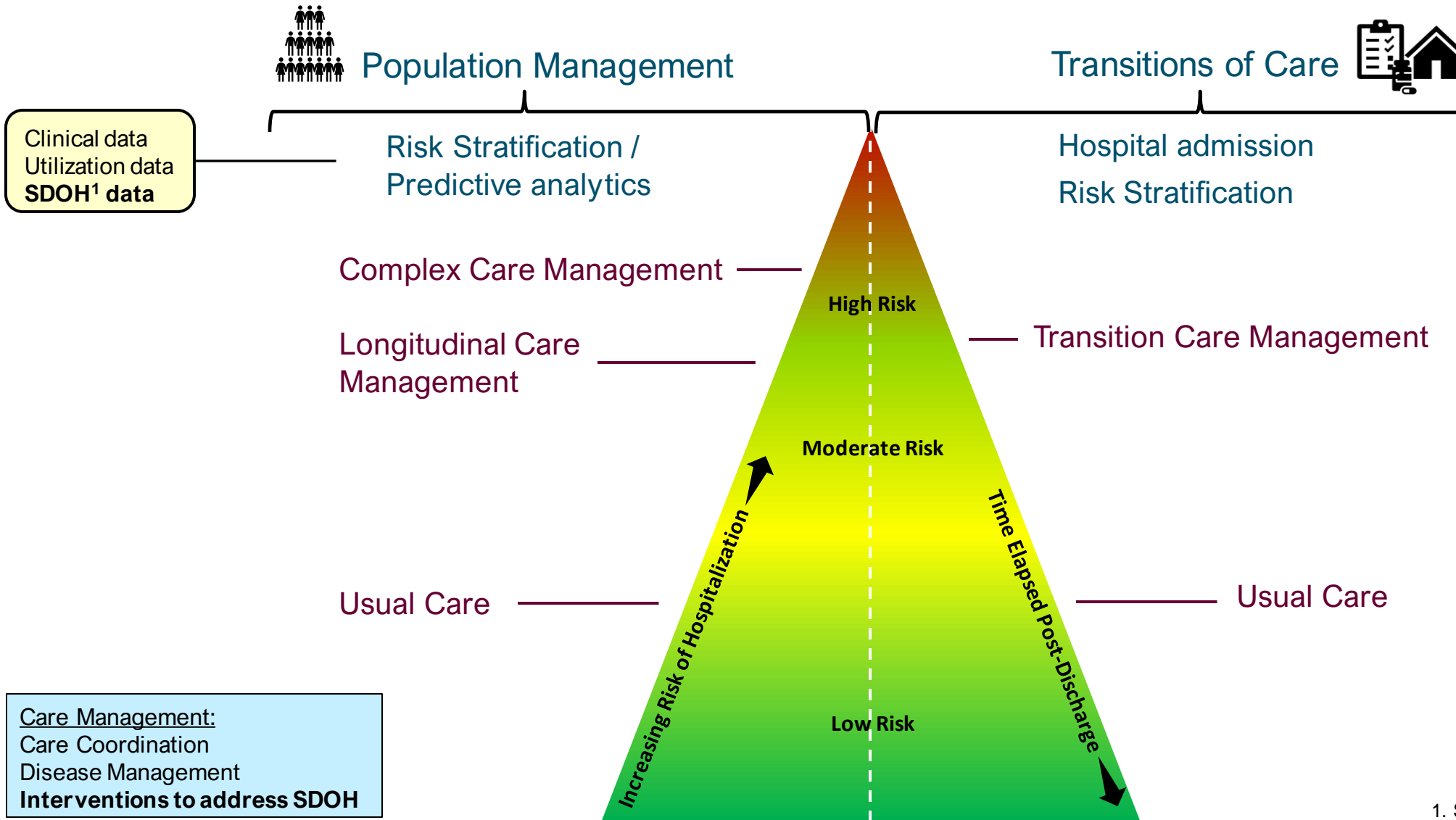
1. Kangovi S, Mitra N, Norton L, Harte R, Zhao X, Carter T, Grande D, Long JA. Effect of Community Health Worker Support on Clinical Outcomes of Low-Income Patients Across Primary Care Facilities: A Randomized Clinical Trial. *JAMA Intern Med.* 2018 Dec 1;178(12):1635-1643.
2. Jonkman NH, Westland H, Groenwold RH, Ågren S, Atienza F, Blue L, Bruggink-André de la Porte PW, DeWalt DA, Hebert PL, Heisler M, Jaarsma T, Kempen GI, Leventhal ME, Lok DJ, Mårtensson J, Muñoz J, Otsu H, Peters-Klimm F, Rich MW, Riegel B, Strömberg A, Tsuyuki RT, van Veldhuisen DJ, Trappenburg JC, Schuurmans MJ, Hoes AW. Do Self-Management Interventions Work in Patients With Heart Failure? An Individual Patient Data Meta-Analysis. *Circulation.* 2016 Mar 22;133(12):1189-98.
3. Dunbar SB, Clark PC, Reilly CM, Gary RA, Smith A, McCarty F, Higgins M, Grossniklaus D, Kaslow N, Frediani J, Dashiff C, Ryan R. A trial of family partnership and education interventions in heart failure. *J Card Fail.* 2013 Dec;19(12):829-41.

Addressing Social Determinants of Health in Patients with Heart Failure

Main Line HealthCare



Main Line HealthCare Heart Failure Strategy



1. SDOH = social determinants of health

Addressing Social Determinants of Health: The Role of the Clinician



Actions that Clinicians can Take to Address Social Determinants of Health

- Recognize unconscious bias
- Consider the influence of age, race, gender, sexual orientation, and gender identity on the health of your patients, while avoiding assumptions based on these attributes alone
- Maintain a high index of suspicion for the role of social determinants in patients' "nonadherence" to treatment plans and follow-up
- Remain sensitive to patients' out-of-pocket health care costs
- Consider telemedicine if transportation is a barrier to care
- Note and adjust to health literacy needs
- Engage family members and encourage social connection
- Leverage EHR tools to detect social needs and barriers to care
- Refer to social work, care management, and behavioral health services as needed
- Learn about community resources that can address common social needs
- Identify available data sources for measuring disparities in care in your patient population
- Engage in advocacy for policy changes that favorably impact social determinants of health

SDOH Screening at Main Line HealthCare



Primary Cvg: Medicare/Medicare...

Allergies (2)

Patient Implants: Present

Social Determinants: ⚠️ **Concerns present: 5**

Risk Scores:
79% Admission or ED Risk
30.6% ASCVD Risk

Registries (12)
 KX Modifiers Needed: None

Wt: 69.4 kg (153 lb) >7 days
 BP: 137/80 >1 day

SINCE LAST PRIMARY CARE VISIT

⚠️ **Admission (Discharged)**

👤 Cardiothorac (2), Cardiovascular, Unknown

⚠️ Lab (3)

📺 Imaging (1)

📄 Other (2)

CARE GAPS

⬇️ 5

RISKS/CARE CONCERNS (2)

Homelessness

Housing problems

Other problems (24)

03/08/2023	📄	Travel	
03/07/2023	📄	Patient Outreach	Nagel, Mary Ann, LSW Social Work
03/07/2023	📄	Patient Outreach	Nagel, Mary Ann, LSW Social Work

♥️ Social Determinants of Health

🌿 **Tobacco Use** ↗️
Mar 8, 2023: Low Risk

🏠 **Financial Resource Strain** ↗️
Mar 9, 2023: High Risk

🚗 **Transportation Needs** ↗️
Mar 9, 2023: No Transportation Needs

⚡ **Stress** ↗️
Mar 8, 2023: Stress Concern Present

👤 **Intimate Partner Violence** ↗️
Not on file

🏠? **Housing Stability** ↗️
Mar 9, 2023: High Risk

🍷 **Alcohol Use** ↗️
Mar 8, 2023: Not At Risk

🍴 **Food Insecurity** ↗️
Mar 8, 2023: Food Insecurity Present

🏃 **Physical Activity** ↗️
Not on file

👤 **Social Connections** ↗️
Mar 8, 2023: Socially Isolated

☁️ **Depression** ↗️
Mar 8, 2023: Not at risk

02/20/2023	📄	Travel	
02/20/2023	📄	Patient Outreach	Keammerer, Lorrie E, RN Transitional Care M
02/20/2023	📄	Patient Outreach	Nagel, Mary Ann, LSW Social Work
02/16/2023	📄	Patient Outreach	Nagel, Mary Ann, LSW Social Work
02/14/2023	📄	Anesthesia Event	Patel, Shalin, MD OP CAB MID/THOR
02/14/2023	📄	Surgery	Torregrossa, Gianluca OP CAB MID/THOR

Addressing Social Determinants of Health in Patients with Heart Failure: *Key Points*

- ~90% of what determines the health of our patients occurs outside of the health care system
- Social determinants of health have a profound impact on morbidity, mortality, and health care costs
- Structural determinants of health (e.g. public policy, patient demographics) influence intermediary determinants of health (e.g., living conditions and social connections), many of which are impactable by health system interventions
- Clinicians play a critical role in recognizing social determinants of health, tailoring their treatment plan accordingly, and bringing these issues to the attention of other members of the care team who can provide targeted interventions to address them