

Hospitalized Heart Failure Incidence and Survival: the ARIC Cohort

Laura Loehr, MD MS
Postdoctoral Fellow
UNC-Chapel Hill

Co-authors

Wayne Rosamond, UNC-Chapel Hill

Patricia P. Chang, UNC-Chapel Hill

Paul Sorlie, NHLBI

Aaron R. Folsom, University of Minnesota

Lloyd Chambless, UNC-Chapel Hill

We have no disclosures

Background

- Heart failure (HF) increases with advancing age and has a poor prognosis.
- However, differences in incidence and survival of heart failure by race/gender groups have not been well defined.

Study Aims

- To determine incidence rates of hospitalized heart failure overall and stratified by race and gender groups
- To determine 30-day and one-year case fatality rates overall and stratified by race and gender groups

The Atherosclerosis Risk in Communities Study (ARIC)

- An ongoing population-based cohort from 4 U.S. communities (N=15,792)
 - Mean follow-up 13 yrs
- Prevalent heart failure (N=600) and race groups with limited representation were excluded (N=48)
- Sample for this study (N=15,144)
 - white women N=5,829
 - white men, N=5,332
 - black women, N=2,412
 - black men, N=1,571

Exclusion of Prevalent Heart Failure

- Those answering yes to:
 - “Were any of the medications you took during the last two weeks for heart failure?” (N = 83)
- OR those with 2 out of 3 HF symptoms (orthopnea, paroxysmal nocturnal dyspnea, or edema) AND taking either (digoxin or diuretics) were excluded (N=517)

Incident Heart Failure

- Cases were ascertained through annual contacts, review of medical records and death certificates
- Incident HF was defined as the first occurrence of either:
 - Hospital ICD-9 '428', N=1,247
 - Underlying cause of death (UCOD) of '428' or 'I50', N=7
 - If UCOD was missing then a '428'/'I50' listed as the principal diagnosis on death certificate, N= 22

Definition of Covariates

- CHD
 - MI by ECG or hx, or CABG or angioplasty
- HTN
 - DBP \geq 90 or SBP \geq 140 mm Hg or meds
- DM
 - History or meds, or blood glucose >126 mg/dl fasting or >200 mg/dl non-fasting
- LVH from ECG based on Cornell criteria
- BMI kg/m²
- Education and smoking - self-report

Statistical Analysis

- Adjusted rate ratios
 - Poisson regression
- Survival curves
 - plotted with Kaplan Meier method
- Age-adjusted case fatality rates
 - logistic regression

Characteristics of the study population at baseline according to heart failure status

Characteristics at baseline	Heart Failure (N = 1,276)	Non-cases (N = 13,868)
Age ≥55 years	68 %	45 %
Men	55 %	45 %
African-American	33 %	26 %
< HS Education	40 %	22 %
Never smoker	27 %	43 %
Hypertension	56 %	32 %
LVH by ECG	7 %	2 %
CHD	16 %	3 %
Diabetes	33 %	9 %
BMI >30 mg/kg ²	41 %	25 %

All comparisons significant at P <0.0001

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Incident Rates per 1,000 Person-Years by Race/Gender Groups and Age at Baseline

	Incident cases	Person-years	Incident rate (95%CI) per 1,000 PY
Overall	1,276	205,949	6.38 (6.04, 6.74)
Men			
Black	176	19,320	9.11 (7.86, 10.56)
White	526	69,648	7.55 (6.93, 8.23)
Women			
Black	245	31,254	7.84 (6.92, 8.88)
White	329	79,802	4.12 (3.70, 4.59)
< 55 yrs*	407	110,179	3.69 (3.35, 4.07)
≥ 55 yrs*	869	89,843	9.67 (9.05, 10.34)

*Age at visit 1

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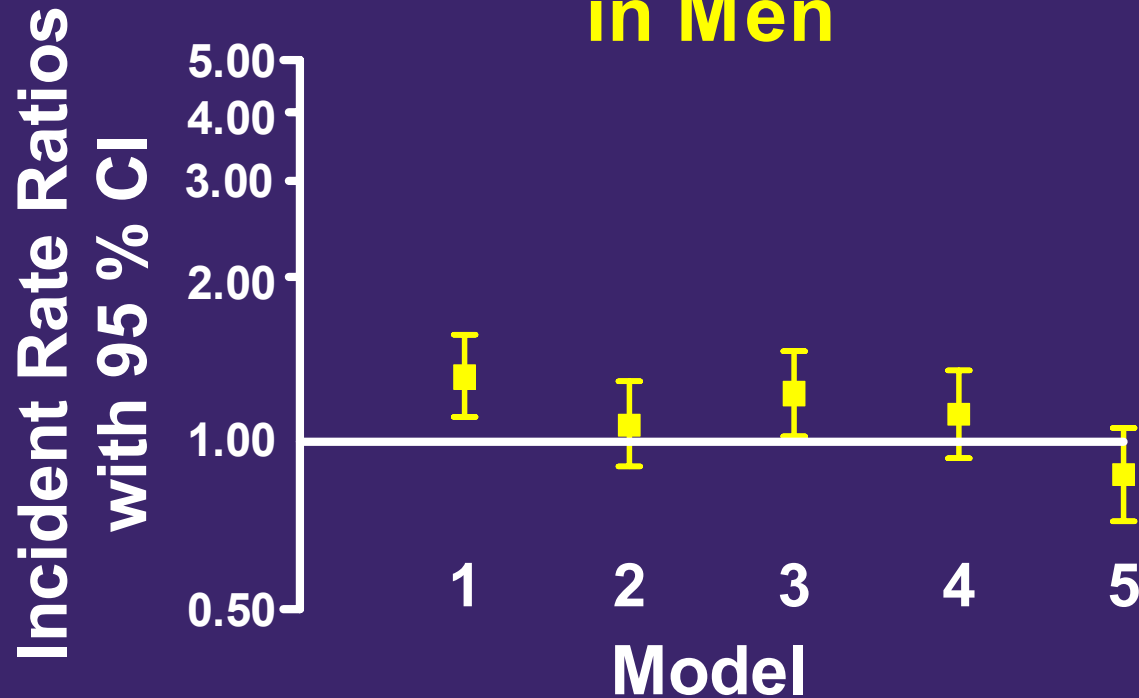
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Black-to-White Incident Rate Ratios for Heart Failure in Men



Model 1-age

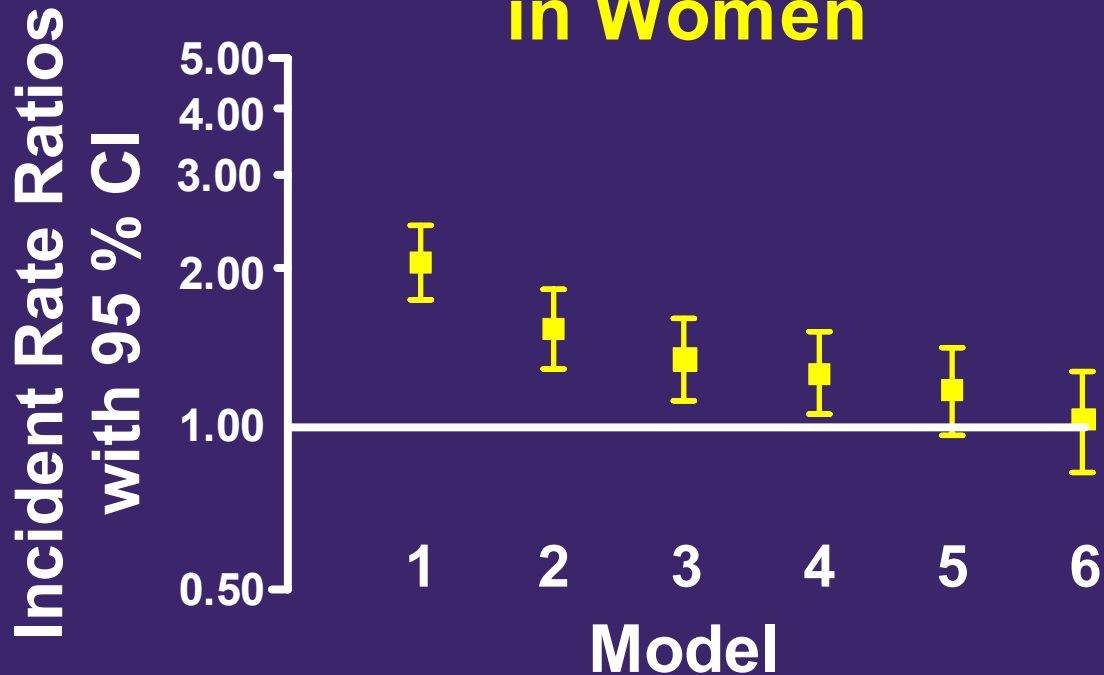
Model 2-age, hypertension

Model 3-age, hypertension, CHD

Model 4-M3+diabetes

Model 5-M4+LVH, smoke, educ., BMI

Black-to-White Incident Rate Ratios for Heart Failure in Women



Model 1-age

Model 2-age, diabetes

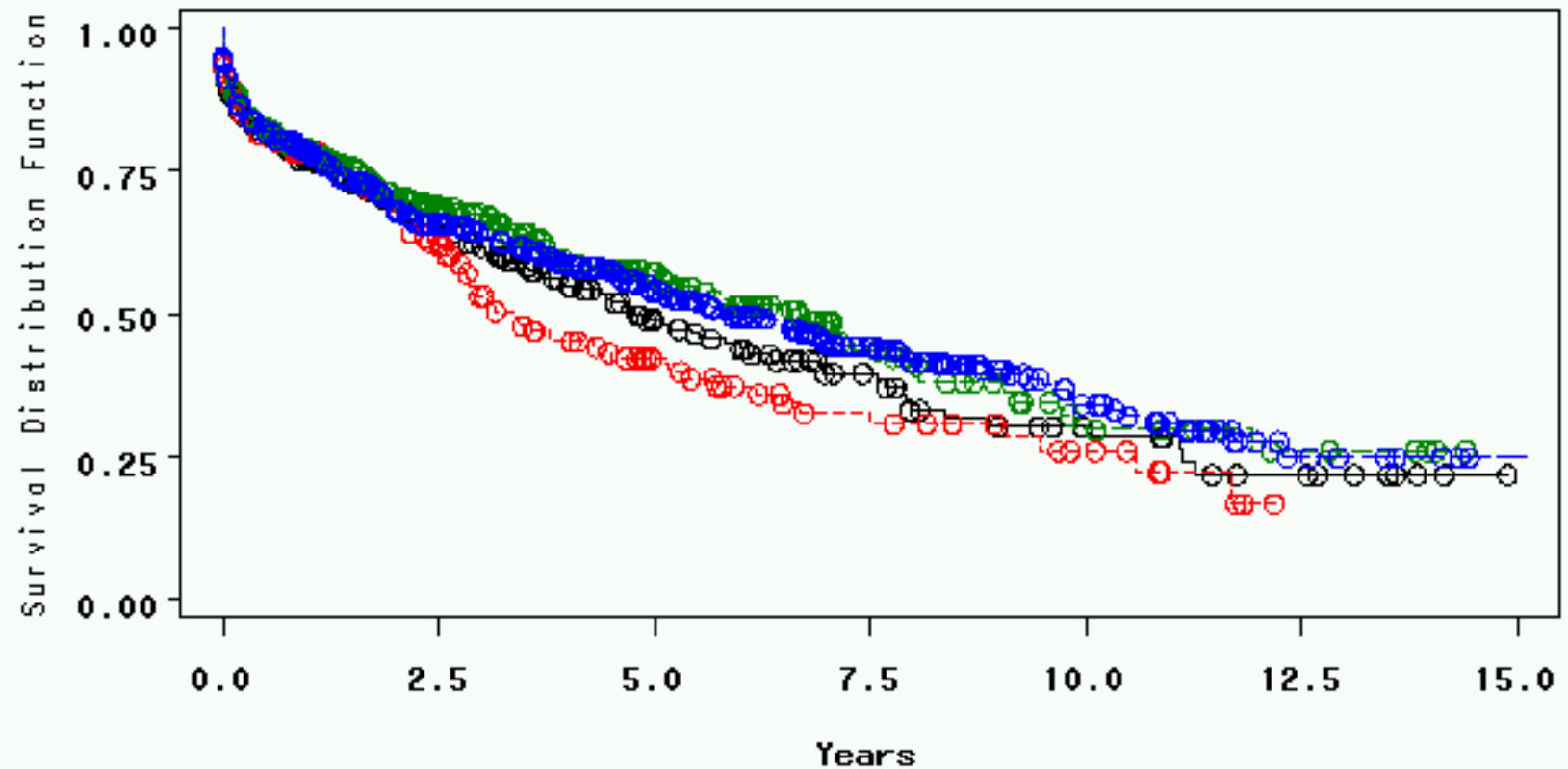
Model 3-age, diabetes, hypertension

Model 4-M3+ LVH

Model 5-M4+ BMI

Model 6-M5+ CHD, smoke, educ

Kaplan Meier Survival Curves for Incident Heart Failure Cases



STRATA:

- sex_race=BF
- - sex_race=BM
- - sex_race=WF
- - sex_race=WM

○ ○ ○ Censored sex_race=BF
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30-day and One-year Case Fatality for Hospitalized Incident Heart Failure

	30-day case fatality	One-year case fatality
Overall	10 % (130/1247)	21 % (265/1247)
Men		
Black*	11 % (17/166)	23 % (35/166)
White *	10 % (53/518)	21 % (110/518)
Women		
Black*	11 % (26/237)	23 % (53/237)
White*	10 % (34/326)	20 % (67/326)
< 65 yrst†	9 % (49/574)	17 % (99/574)
≥ 65 yrst†	12 % (81/673)‡	25 % (166/673)‡

*Race/gender stratified estimates are age-adjusted

† Age at event

‡ P < 0.05 for the comparison of the older group with the younger group

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Strengths and Limitations

- Strengths include:
 - Large well-characterized biracial cohort
 - Long period of follow-up
- However limitations include:
 - Definition of prevalent HF at baseline
 - Definition of HF by diagnostic codes rather than committee validation

Conclusions

- Incident rates were much lower for white women compared to all other race-gender groups. Therefore, rates for black women were closer in range to the men.
- However, the lessening of these gaps after adjustment suggests that the racial disparity in HF incident rates is due to differences in CVD risk factors.

Conclusions

- Despite these observed differences in incident rates by race and gender, the case fatality rates after the development of HF was similar between these same groups

Acknowledgments

- ARIC study participants, participating institutions, and staff
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