

Frailty and Outcomes in 3429 Patients with Heart Failure from 27 High-, Middle- and Low-Income Countries

Darryl Leong, MBBS, MPH, M.Biostat, PhD

Population Health Research Institute, McMaster University

On behalf of the Global Congestive Heart Failure (G-CHF) Investigators

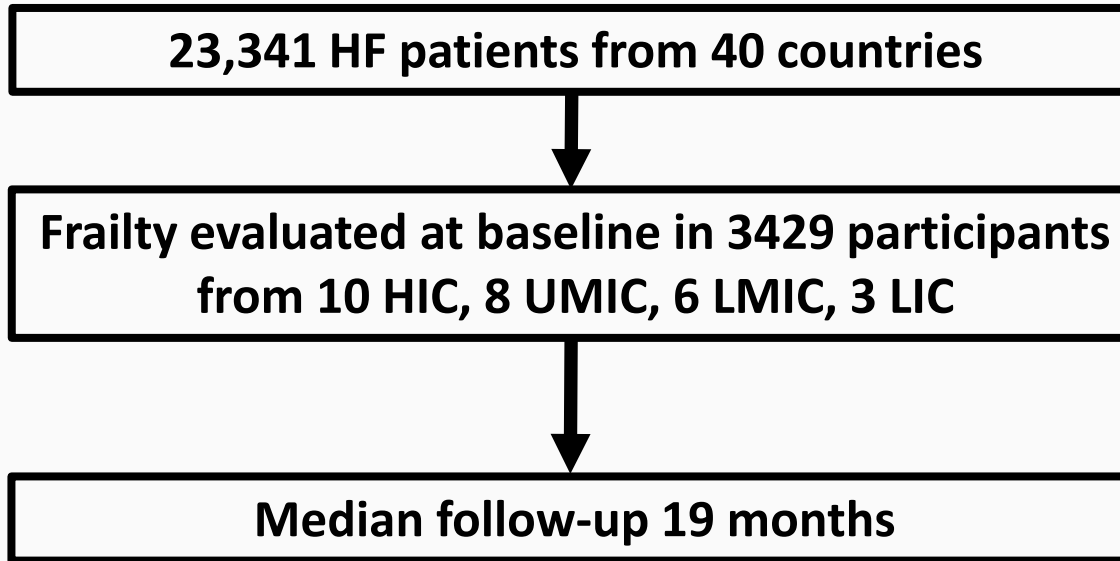
Background

- **Physical frailty is associated with an increased risk of death and heart failure (HF) hospitalization in HF patients**
- **1% of the data comes from countries accounting for most HF cases**
- **Incremental prognostic value of frailty over and above established HF risk scores not demonstrated**
- **Factors mitigating impact of frailty on outcomes unknown**

Objectives

- 1. Evaluate the association between frailty and death or HF hospitalization in HF patients from countries of all income levels**
- 2. Determine whether the strength of associations varies among regions**
- 3. Describe whether the association varies according to modifiable characteristics (alcohol, tobacco, NYHA functional class, LVEF, co-morbidities, HF treatments)**

Methods: Subanalysis of the G-CHF Study

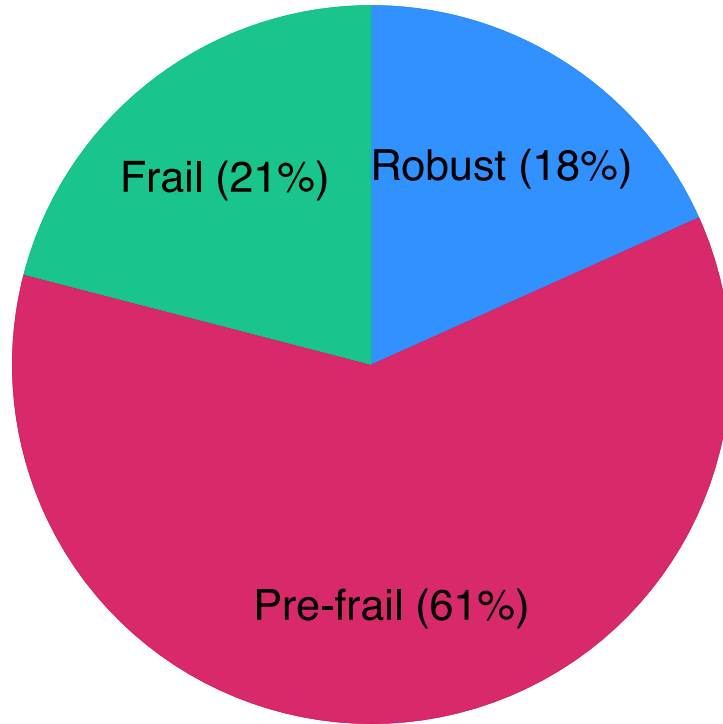


Baseline Assessment of Frailty

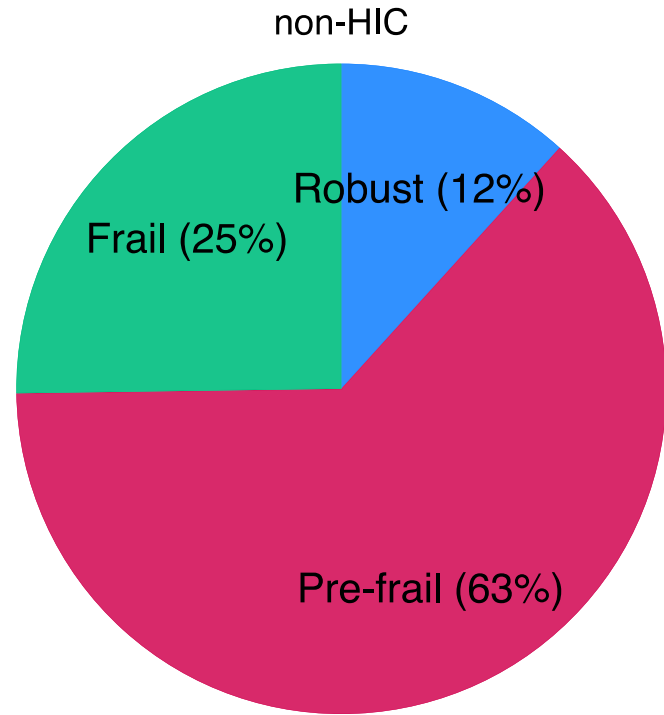
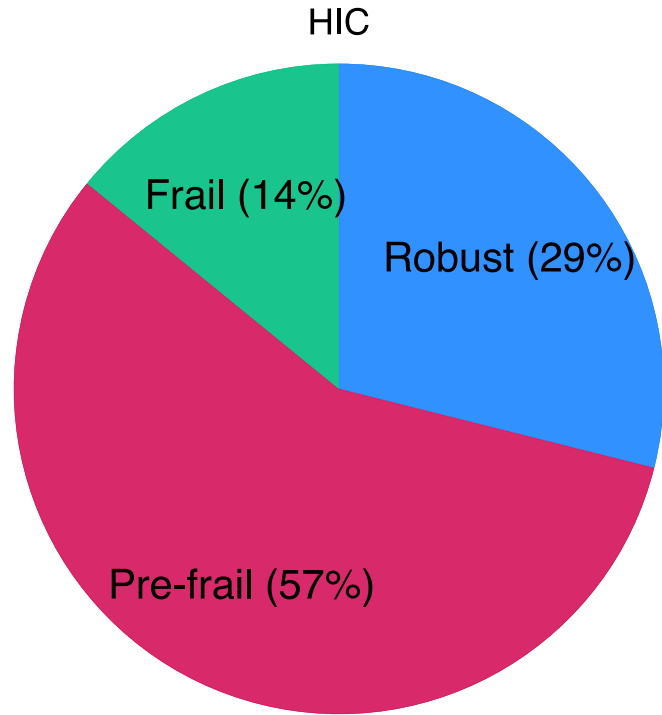
- Low handgrip strength (dynamometer)
- Slow gait speed (timed get-up-and-go test)
- Physical inactivity (International Physical Activity Questionnaire)
- Unanticipated weight loss >3kg in 6 months
- Self-reported exhaustion ≥ 3 days in the last week

Robust = 0; Pre-frail = 1 or 2; Frail ≥ 3

Frailty rates overall



Frailty rates by country income level



Baseline Characteristics

	Robust N=627 (18%)	Pre-frail N=2083 (61%)	Frail N=719 (21%)	P-value
Age, years	60±13	61±14	63±14	0.0002
Female	26%	34%	38%	<0.0001
HF duration, years	4.0±1.4	3.9±1.4	4.0±1.4	0.27
LVEF, %	40±14	39±14	39±14	0.72
Etiology				<0.0001
Ischemia	39%	39%	35%	
Hypertension	13%	18%	22%	
Idiopathic	22%	17%	18%	
Valve/rheumatic	7%	7%	8%	

Baseline Characteristics

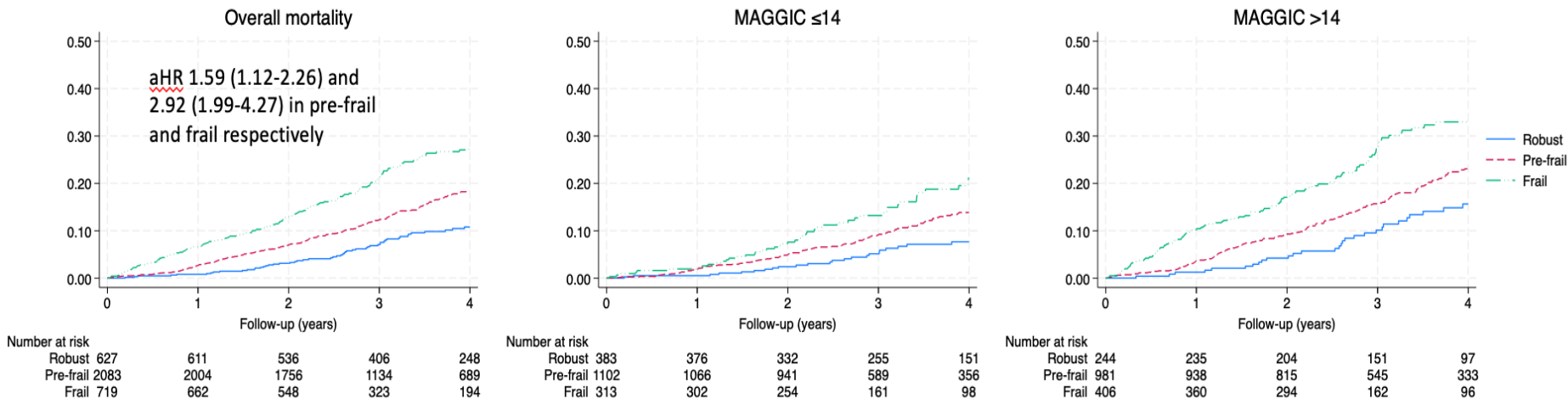
	Robust N=627 (18%)	Pre-frail N=2083 (61%)	Frail N=719 (21%)	P-value
ACE-I/ARB use	77%	73%	71%	0.092
Beta-blocker use	85%	84%	83%	0.77
Systolic BP, mmHg	124±19	123±20	122±20	0.16
Serum Na, mmol/L	140±3.8	139±4.1	139±4.0	0.16
Hemoglobin, g/L	139±19	134±19	129±21	<0.0001
MAGGIC risk score	12±7	14±7	15±8	<0.0001

MAGGIC score: LVEF, age, BMI, creatinine, NYHA class, sex, smoking, diabetes, COPD, HF duration, beta-blocker and ACE-I/ARB use.

Pocock, *et al.* *Eur Heart J* 2013; 34: 1404

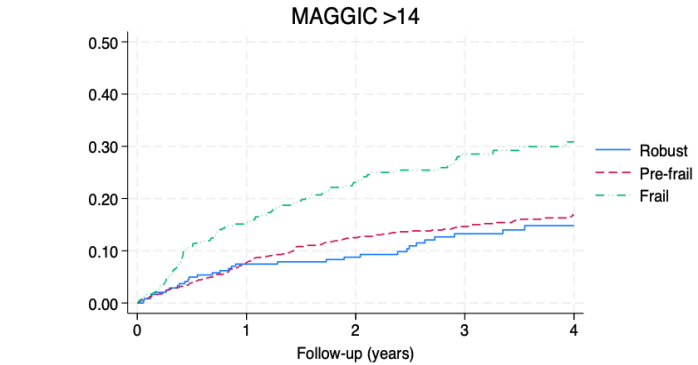
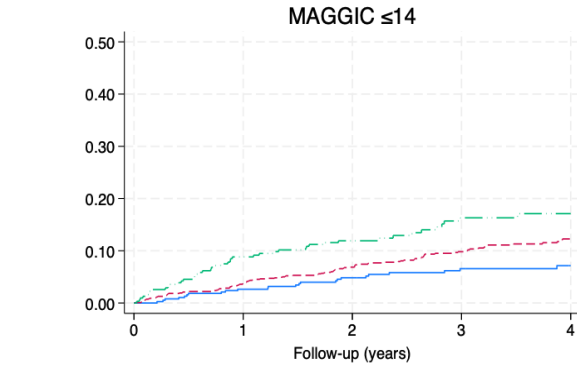
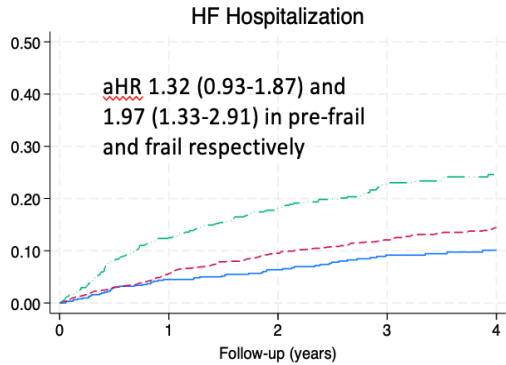


Mortality Overall and Stratified by Median MAGGIC Score



Frailty-MAGGIC Interaction p=0.051

HF Hospitalization Overall and Stratified by Median MAGGIC Score



Number at risk

Follow-up (years)	0	1	2	3	4
Robust	627	585	509	378	226
Pre-frail	2083	1892	1609	1032	620
Frail	719	585	466	267	162

Number at risk

Follow-up (years)	0	1	2	3	4
Robust	383	366	319	243	141
Pre-frail	1102	1026	888	551	334
Frail	313	276	230	139	87

Number at risk

Follow-up (years)	0	1	2	3	4
Robust	244	219	190	135	85
Pre-frail	981	866	721	481	286
Frail	406	309	236	128	75

Frailty-MAGGIC Interaction p=0.22

Hazard Ratios for Mortality and HF Hospitalization

Outcome	Group	Unadjusted Model	Adjusted Model*
Mortality	Robust	1	1
	Pre-frail	1.45 (1.09-1.93)	1.59 (1.12-2.26)
	Frail	1.92 (1.41-2.61)	2.92 (1.99-4.27)
HF Hospitalization	Robust	1	1
	Pre-frail	1.50 (1.12-2.02)	1.32 (0.93-1.87)
	Frail	2.65 (1.93-3.65)	1.97 (1.33-2.91)

***Adjusted for country income level, age, sex, education, HF etiology, NYHA functional class, diabetes, tobacco and alcohol use, ACE-I/ARB use, beta-blocker use, systolic BP, baseline LVEF, creatinine, sodium, hemoglobin**



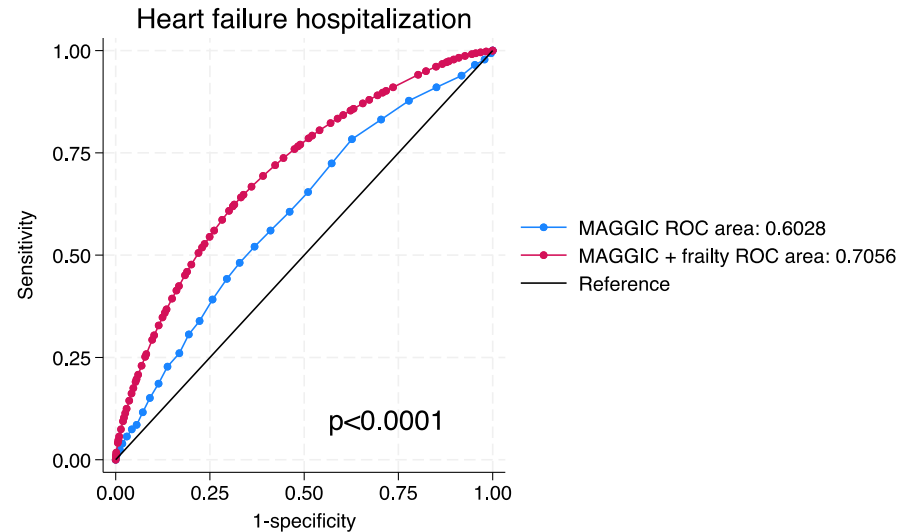
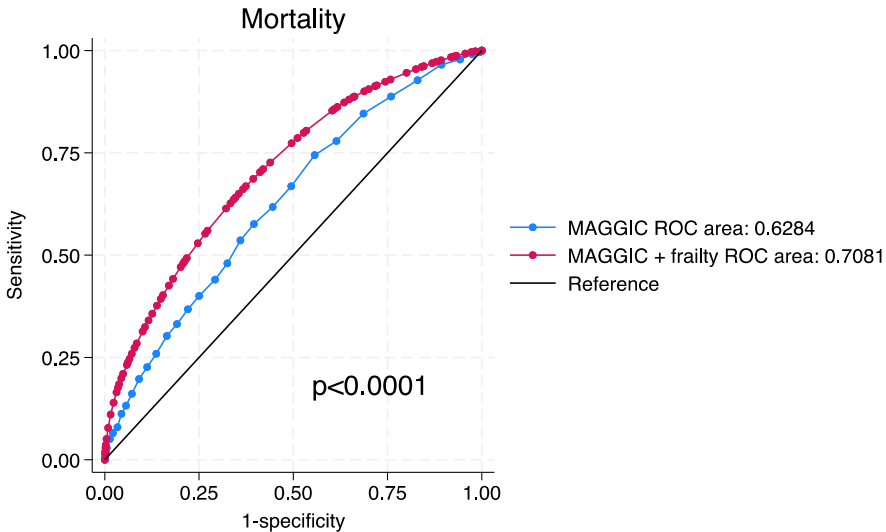
Subgroup Analyses

Associations between frailty and outcomes were consistent across most subgroups

Mortality	HF Hospitalization
Country income level	Country income level
Smoking	Smoking
NYHA functional class	Alcohol use
Diabetes	NYHA functional class
Anemia	Anemia
ACE-I/ARB use	ACE-I/ARB use
Beta-blocker use	Beta-blocker use
LVEF	LVEF



Frailty adds discriminatory value (area-under-ROC curve) to the MAGGIC score



Conclusions

- **Frailty is an important predictor of death and HF hospitalization in HF patients**
- **Evaluation of frailty adds prognostic value to the MAGGIC risk score**
- **Association between frailty and death or HF hospitalization is unaffected by several modifiable characteristics**

Implications

- **Further research into determinants and prevention/reversal of frailty is needed to improve outcomes for patients with HF**

Acknowledgements

- Study participants
- G-CHF Investigators
- Alex Grinvalds
- Tara McCready
- Bayer

Manuscript published in full today in the
European Heart Journal