# Long-Term Mortality and Frailty Among Patients With Low MELD Cirrhosis, 2011-2021

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Background
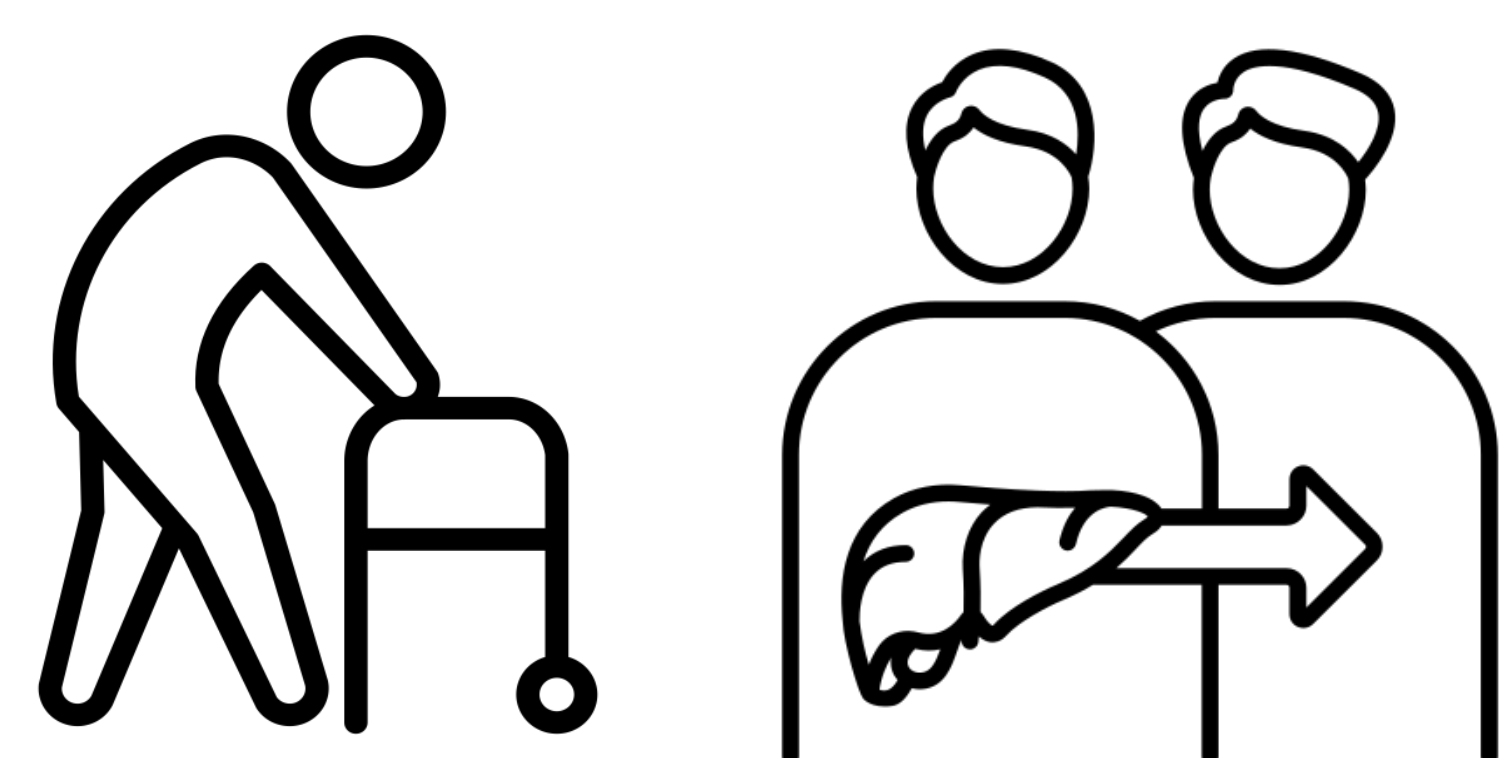
Patients with low MELD cirrhosis are still at high risk of mortality.
- ~50% die within one year.
- Disadvantaged by the liver transplant (LT) allocation policy.
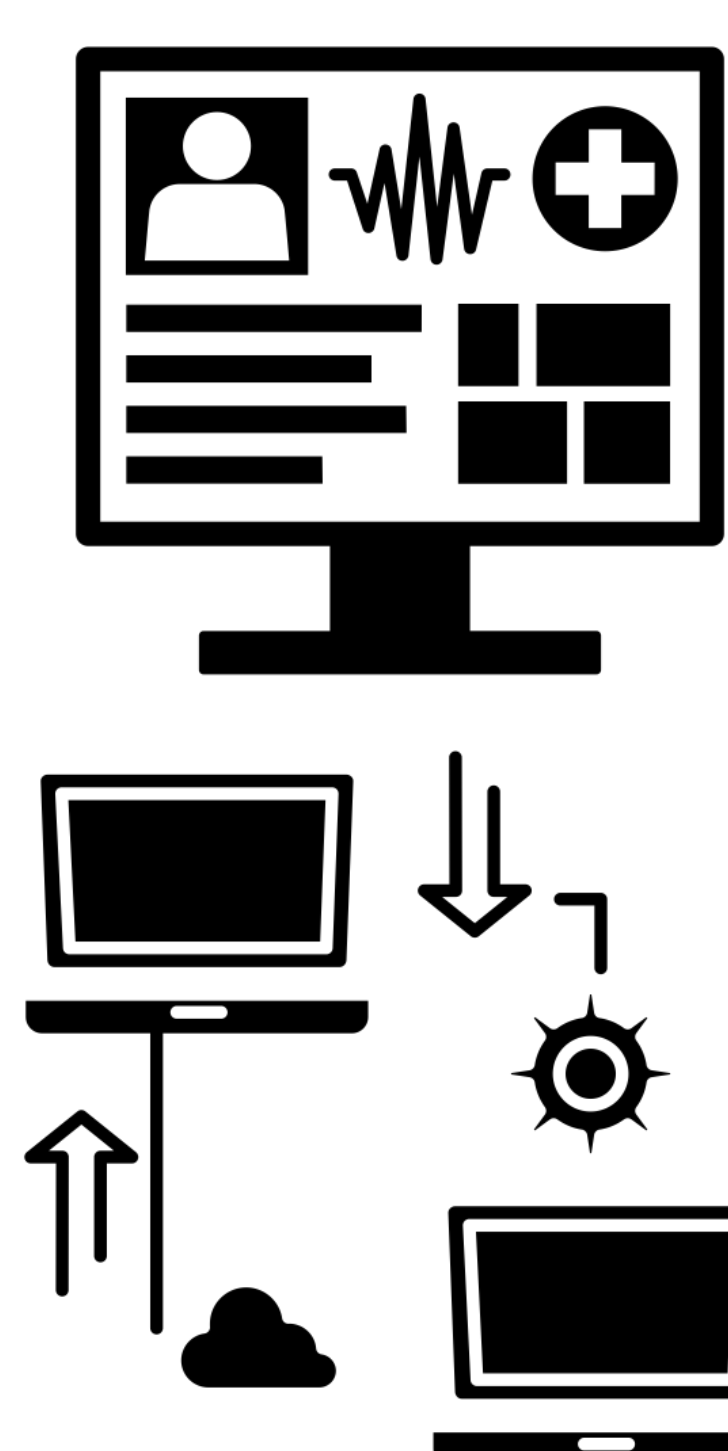
Frailty: powerful prognostic tool for poor outcomes.[1]
- Used for the LT evaluation process.[1]
- But in-person frailty assessments may not be practical.
- Hospital Frailty Risk Score (HFRS): claims-based frailty assessment, can leverage EHR to identify at risk population.[2,3]

Research Objectives

To investigate the overall survival and post-LT survival among different levels of frailty using the HFRS in patients with low MELD cirrhosis.

Methods

- Retrospective, cohort analysis 2011-2021
- CAPriCORN: EHR database from 6 health systems in the Chicago metropolitan area
- Patients with cirrhosis and MELD≤15 included
- Clinical covariates: ICD, CPT codes
- Frailty: Hospital Risk Frailty Score (HFRS)
  - Low Frailty: HFRS<5
  - Moderate Frailty: HFRS 5-15
  - Severe Frailty: HFRS>15
- Kaplan Meier method to estimate overall survival.
- Multivariable, Cox proportional hazard analysis to predict mortality.
  - Adjusted for age, race, gender, insurance status, cirrhosis etiology, decompensation event, HCC.
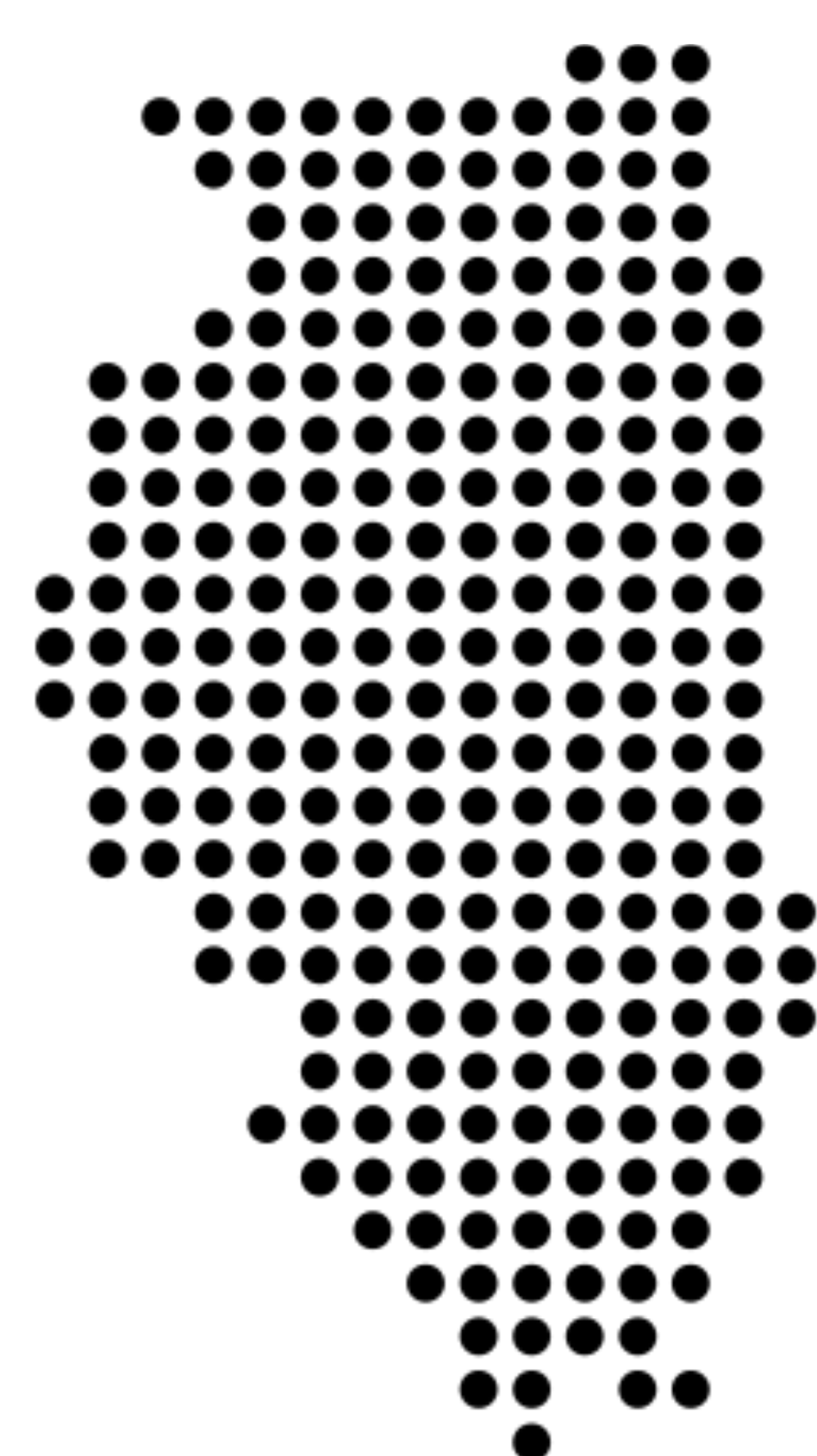
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Table 1. Demographics stratified by frailty.

Characteristics	Low Frailty (N=6,310)	Moderate Frailty (N=2,615)	Severe Frailty (N=1,218)	P-value
Age, N (%)				
<65 years	4,434 (71.2%)	1,669 (64.0%)	668 (55.1%)	<0.001
65-75 years	1,349 (21.7%)	624 (23.9%)	306 (25.3%)	
≥75 years	444 (7.1%)	313 (12.0%)	238 (19.6%)	
Follow-up, years; mean (SD)	2.3 (2.2)	2.0 (2.1)	1.6 (1.9)	<0.001
Female, N (%)	2,591 (41.1%)	1,151 (44.0%)	559 (45.9%)	0.001
Race/ethnicity, N (%)				
NHW	2,908 (46.1%)	1,174 (44.9%)	576 (47.3%)	<0.001
NHB	1,223 (19.4%)	665 (25.4%)	371 (30.5%)	
Hispanic	1,375 (21.8%)	587 (22.5%)	200 (16.4%)	
Asian	304 (4.8%)	62 (2.4%)	24 (2.0%)	
Other	500 (7.9%)	127 (4.9%)	47 (3.9%)	
Insurance, N (%)				
Medicaid/Medicare	2,602 (41.2%)	1,346 (51.5%)	747 (61.3%)	<0.001
Private	1,890 (30.0%)	679 (26.0%)	255 (20.9%)	
Other	698 (11.1%)	228 (8.7%)	60 (4.9%)	
Unknown	1,120 (17.8%)	362 (13.8%)	156 (12.8%)	
HCC, N (%)	650 (10.3%)	106 (4.1%)	42 (3.5%)	
Cirrhosis Etiology, N (%)				
MASH	1,704 (27.0%)	821 (31.4%)	416 (34.2%)	
ALD	2,371 (37.6%)	1,155 (44.2%)	566 (46.5%)	
HCV	2,134 (33.8%)	699 (26.7%)	293 (24.1%)	
HBV	543 (8.6%)	198 (7.6%)	83 (6.8%)	
Biliary/Cholestatic	576 (9.1%)	180 (6.9%)	68 (5.6%)	
Other	5,760 (91.3%)	2,328 (89.0%)	1,045 (85.8%)	
MELD, mean (SD)	10.0 (2.8)	10.4 (2.9)	10.8 (2.8)	<0.001
Liver Transplant, N (%)	413 (6.6%)	98 (3.8%)	30 (2.5%)	<0.001

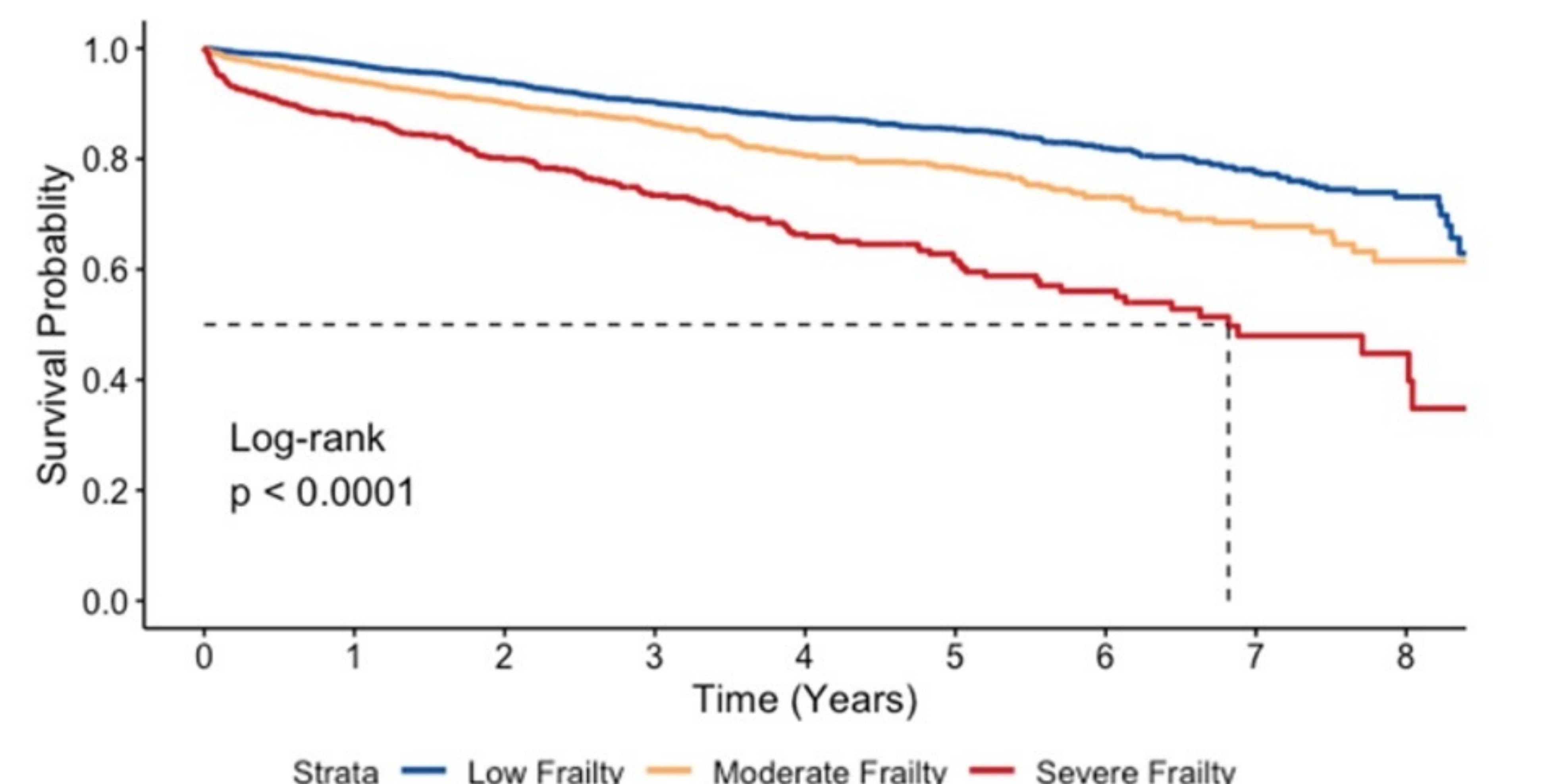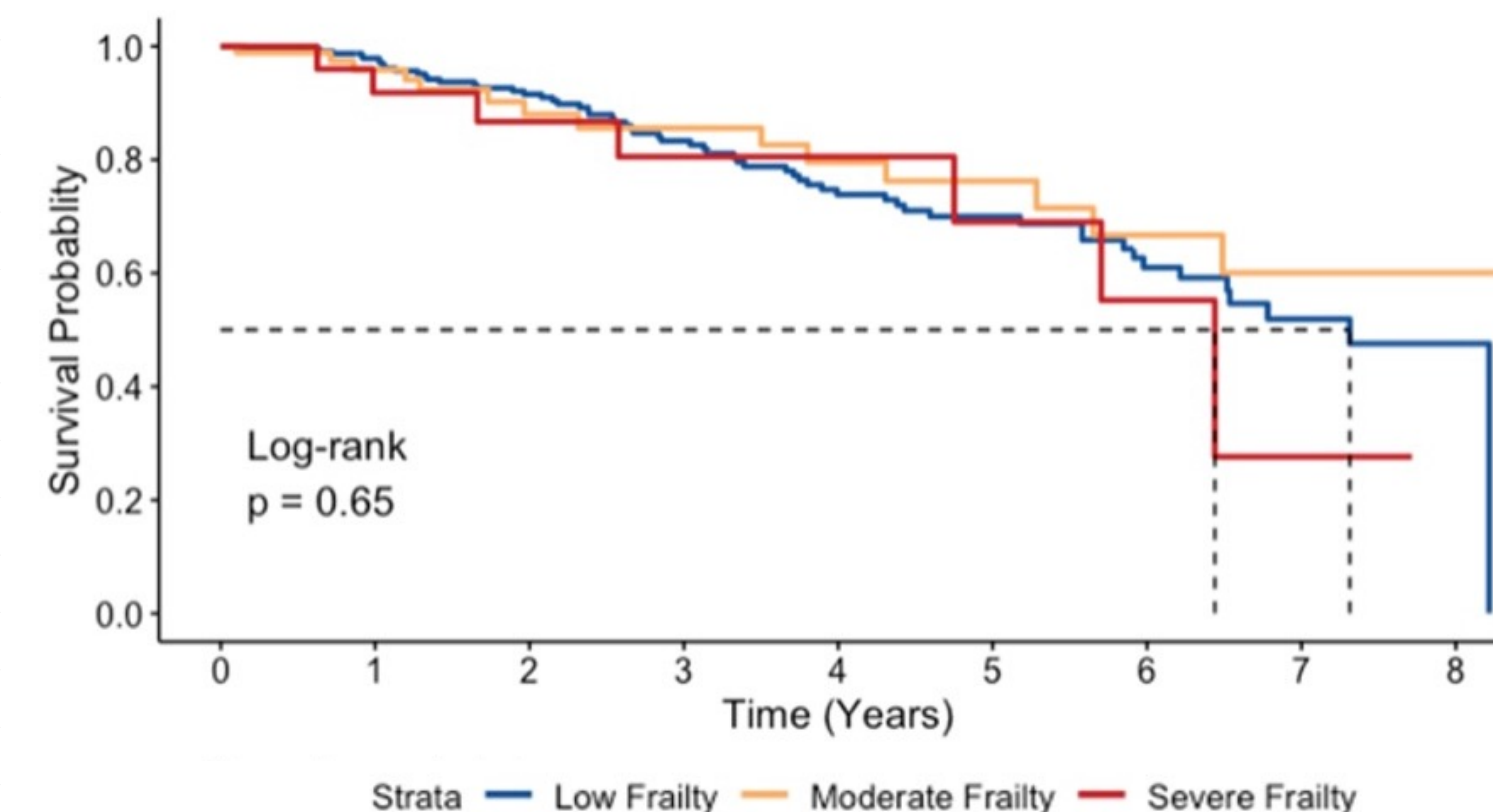## Figure 1. Overall survival of patients with low MELD cirrhosis stratified by frailty.

Log-rank p < 0.0001

Strata — Low Frailty — Moderate Frailty — Severe Frailty

Figure 2. Post-LT survival of patients with low MELD cirrhosis stratified by frailty.

Log-rank p = 0.65

Strata — Low Frailty — Moderate Frailty — Severe Frailty

Results

- Patients with Moderate (HR:1.46, 95%CI:1.26-1.70, P<0.001) and Severe (HR:2.71, 95%CI:2.30-3.20, P<0.001) Frailty had increased hazards of mortality compared to Low Frailty.
- LT patients with Moderate and Severe Frailty had no difference in post-LT survival compared to Low Frailty (P=0.65).

Conclusions

Compared to patients with Low Frailty:
- Moderate frailty: ↑46% risk of mortality
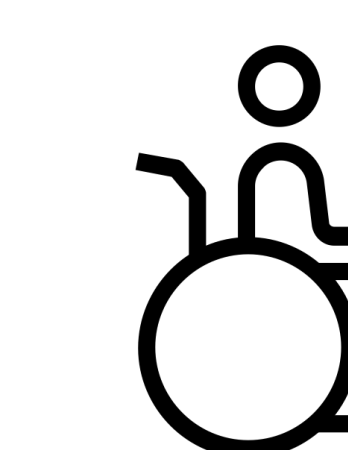- Severe frailty: ↑271% risk of mortality

Frail patients who received LT may observe similar survival benefits compared to those who were not frail.

The HFRS is a valuable tool that uses the EHR to identify patients with low MELD cirrhosis who are at risk for mortality.

These patients may benefit from early referral for rehabilitation or LT.

References

1. Lai, Jennifer C., et al. "Changes in frailty are associated with waitlist mortality in patients with cirrhosis." Journal of hepatology 73.3 (2020): 575-581.
2. Louissaint, Jeremy, et al. "Applying administrative data-based coding algorithms for frailty in patients with cirrhosis." Liver Transplantation 27.10 (2021): 1401-1411.
3. Louissaint, Jeremy, and Elliot B. Tapper. "A Claims-Based Frailty Risk Score Is Associated With Hospitalization for Acute-on-Chronic Liver Failure: But Is It Frailty?." Liver transplantation: official publication of the American Association for the Study of Liver Diseases and the International Liver Transplantation Society 27.1 (2021): 9.

Acknowledgements

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