Supplementary Table 1. UCSF Functional Assessment in Liver Transplantation (FrAILT) Study Protocol

Study overview: Subjects will undergo assessment of frailty and physical function at baseline and every pre-transplant clinic visit.

Eligibility Criteria. Patients meeting the following characteristics are eligible for enrollment:

- Adult (≥18 years old)
- Underlying cirrhosis
- Listed for liver transplantation
- Are seen in the outpatient clinic setting

Exclusion criteria. Eligible subjects will be excluded if they:

- Do not speak English and do not have a certified interpreter present
- Have severe hepatic encephalopathy at enrollment (defined by the time to complete the Numbers Connection Test (NCT) > 120 seconds, which is the first test that the participants complete upon enrollment) as this may impair the patient's ability to give informed consent.

Study procedures**.** The following tests should be administered to the patient in the specified order:

Order	Test	General components
1	Numbers Connection Test[6]	This test requires the patient to connect numbers in sequence that are scattered at random on a piece of paper to assess degree of hepatic encephalopathy.
2	Activities of Daily Living[32]	This consists of 6 questions about need for assistance with basic activities necessary for daily functioning: bathing, feeding, dressing, toileting, continence, and transferring.
3	Instrumental Activities of Daily Living[33]	This consists of 8 questions about need for assistance with activities necessary for
4	Fried Frailty Instrument[3]	This consists of measurements of exhaustion, physical activity, grip strength using a dynamometer, and walking speed in a 13-foot walk.
5	Short Physical Performance Battery[16]	This consists of chair stands and balance testing.

Testing interval: At every pre-transplant clinic visit.

Data collection. Descriptions of the data are as follows:

Demographics. Data should be ascertained from the electronic health record. Record "1" for hypertension, diabetes mellitus, coronary artery disease, and/or stroke if listed under the past medical history or included as a problem in the Assessment and Plan.

Ascites. Presence of ascites on day of data collection as ascertained from the progress note for that visit or provided directly by the hepatologist.

- "Absent" ascites = not present
- "Mild to Moderate" ascites = any ascites is present (as detected via physical exam or imaging studies), however patient is not undergoing serial large volume paracenteses
- "Severe" ascites = ascites is present and patient is undergoing serial large volume paracenteses

Laboratories. Must be ± 3 months of assessment date. Choose the most recent collection date and time that has a complete set of labs. If more than one lab value exists for the same time and date, choose the first value listed.

Dialysis. Whether patients are receiving hemodialysis for end-stage renal disease should be obtained from the patient.

Subjective clinician assessment of patient's health. The following question should be asked of the hepatologist who saw the patient on the same day as the frailty assessment:

> *"We are interested in your general impression about your patient's overall health, as compared to other patients with underlying liver disease. How would you rate this patient's overall health today?"*
>
> Excellent (0), very good (1), good (2), fair (3), poor (4), or very poor (5)

Outcomes. Outcomes are ascertained on a quarterly basis from the electronic health record as recorded in UNet℠, the official online database system for the United Network for Organ Sharing. Outcomes should be categorized as still waiting, died on the waitlist, delisted for clinical deterioriation, transplanted, or removed from the waitlist for other reasons.

Supplemental Table 2. Estimates of waitlist mortality at 3-, 6-, and 12-months using Kaplan-Meier and cumulative incidence methods accounting for competing risks.

Time (months)	Kaplan-Meier Failure	Cumulative Incidence
3	0.046 (0.030-0.068)	0.044 (0.029-0.064)
6	0.087 (0.065-0.119)	0.082 (0.060-0.109)
12	0.154 (0.122-0.193)	0.138 (0.108-0.172)

Supplementary Table 3. Checklist of items to include when reporting a study developing or validating a multivariable prediction model for diagnosis or prognosis: From the Transparent Reporting of a multivariable prediction model for Individual Prognosis or Diagnosis (TRIPOD) Statement.[14]

Section/ Topic	Checklist Item for Multivariable Prediction Model Development	Page
Title	Identify the study as developing and/or validating a multivariable prediction model, the target population, and the outcome to be predicted.	1
Abstract	Provide a summary of objectives, study design, setting, participants, sample size, predictors, outcome, statistical analysis, results, and conclusions.	3
Background/Objectives	Explain the medical context and rationale for developing the multivariable prediction model, including references to existing models. Specify the objectives, including whether the study describes the development or validation of the model, or both.	4-5
Source of data	Describe the study design or source of data. Specify the key study dates, including start of accrual; end of accrual; and, if applicable, end of follow-up.	5-7
Participants	Specify key elements of the study setting including number and location of centers. Describe eligibility criteria for participants. Give details of treatments received, if relevant.	5
Outcome	Clearly define the outcome that is predicted by the prediction model, including how and when assessed.	7, 6
Predictors	Clearly define all predictors used in developing the multivariable prediction model, including how and when they were measured. Report any actions to blind assessment of predictors for the outcome and other predictors.	5, Table 1
Sample size	Explain how the study size was arrived at.	5
Missing data	Describe how missing data were handled with details of any imputation method.	5
Statistical analysis methods	Describe how predictors were handled in the analyses. Specify type of model, all model-building procedures, and method for internal validation. Specify all measures used to assess model performance and, if relevant, to compare multiple models.	8-9
Risk groups	Provide details on how risk groups were created if done.	12
Participants	Describe the flow of participants through the study, including the number of participants with and without the outcomes and, if applicable, a summary of follow-up time. Describe the characteristics of the participants including number of participants with missing data for predictors and outcome.	11, Table 2
Model development	Specify the number of participants and outcome events in each analysis. If done, report the unadjusted association between each candidate predictor and outcome.	Tables 2 & 3
Model specification	Present the full prediction model to allow predictions for individuals. Explain how to use the prediction model.	11
Model performance	Report performance measures for the prediction model.	12-13
Limitations	Discuss any limitations of the study.	15-16

Interpretation	For validation, discuss the results with reference to performance in the development data, and any other validation data.	13
Implications	Discuss the potential clinical use of the model and implications for future research	14-15
Supplementary information	Provide information about the availability of supplementary resources.	14
Funding	Give the source of funding and the role of the funders for the present study.	1