Will's Meld Calculator

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Our Team

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Data Scientist with five years of experience in digital health

The Goal

Beth Israel Deaconess Medical Center is looking to improve on their outcomes for patients with end stage liver disease.

MELD

- Model for end stage liver disease
- Used to prioritize liver transplant patients
- Widely validated and accepted

2001

A model is developed to predict survival, is proved to generalize well

2008

Score is improved by including Sodium

2021

Model is improved by including patient gender

11,000

Patients were included in this study including lab results and patient information

MELD Baseline: 0.76% C-stat

Cohort Identification

Cirrhosis

Patients with explicit cirrhosis or liver disease

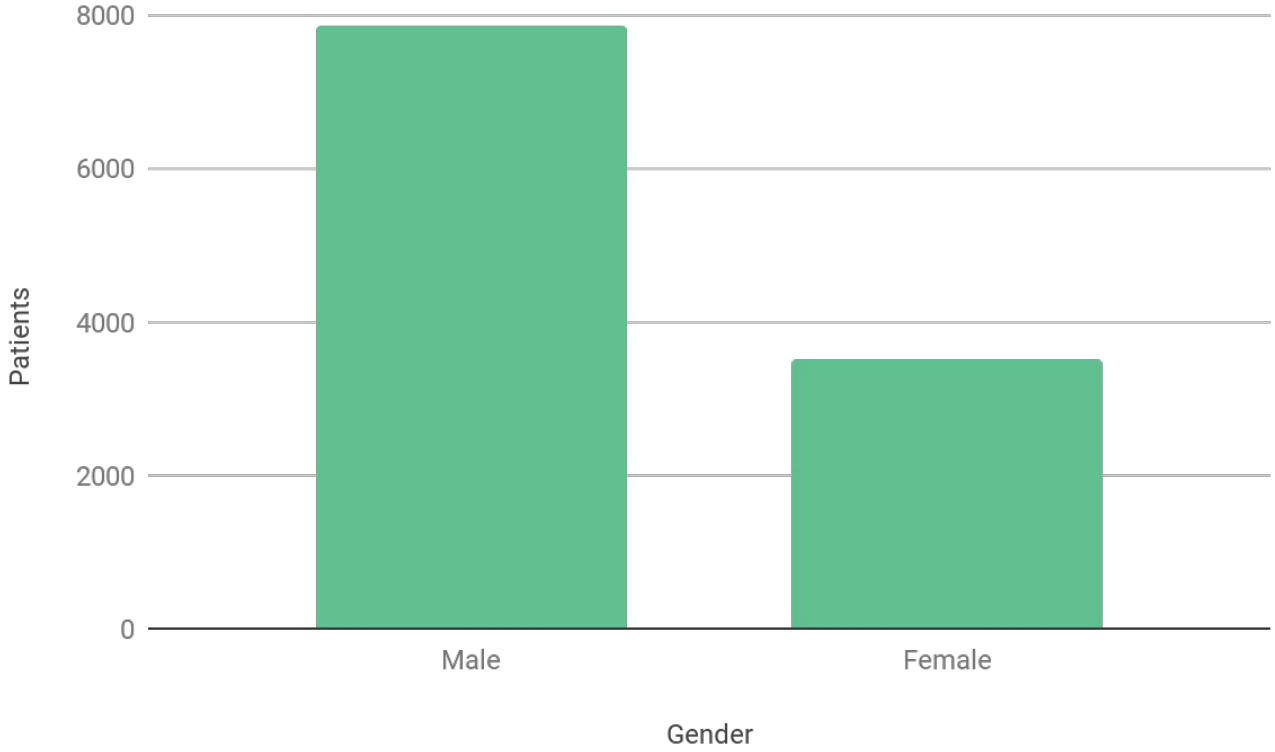
Alcohol Abuse

Patients admitted to the ICU with alcohol-related diagnosis

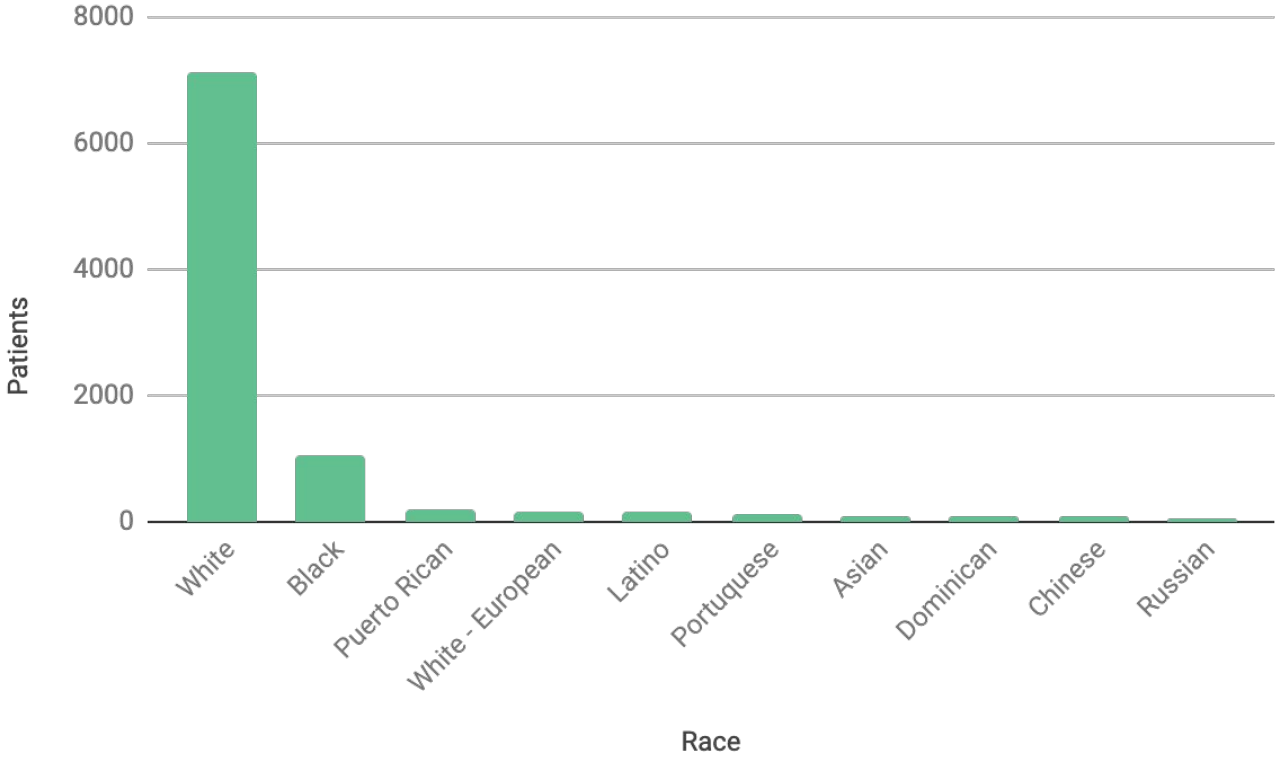
PSG/HEP

Related diseases including PSC (primary sclerosing cholangitis), Autoimmune hepatitis, & Chronic viral hepatitis

Men outnumber women

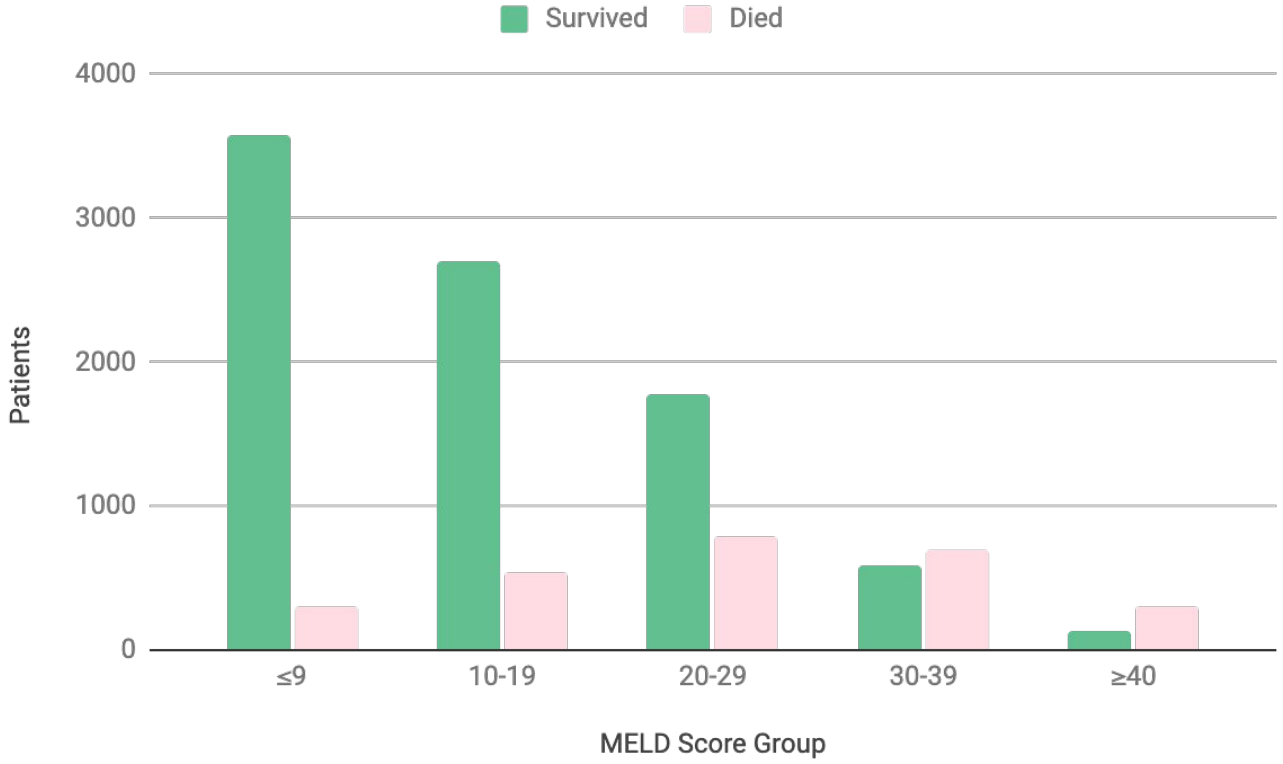


Most of the patients are white



There is a good variety of MELD Scores

MELD Score	Mortality
≤9	1.9%
10–19	6.0%
20–29	19.6%
30–39	52.6%
≥40	71.3%

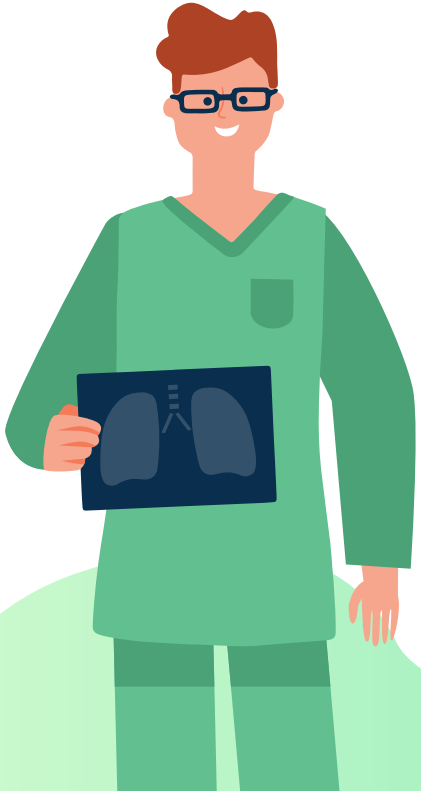


Two Approaches

Integrated ML

Use all laboratory data and patient information and output a prediction.

0.85%
C-stat



Calculator

A simple calculator (inspired by MDCalc) is useful for clinicians to quickly input data and output a prediction.

0.82%
C-stat

Calculator demo

International Normalised Ratio (INR) Min

Anion Gap

Blood urea nitrogen (BUN) Min

Total Bilirubin Min

Age

Gender

Race

Will's Modified MELD Calculator

Actual outcome:

- Survived
- Perished

Patient Data:

INR Min	Anion Gap Min	BUN Min
2.3	13.0	16.0

Bilirubin Total Min	Age	Gender
11.1	76	Female

Race

HISPANIC/LATINO - PUERTO RICAN

Model predicts person will die within 90 days:

YES

Likelihood to Die Within 90 Days

78.7 %

Recommendations

01 Implement simplified model in MELD calculator for a quick win

02 Investigate adding race to MELD calculator

03 Build out internal machine learning capabilities to implement integrated solution with more features to improve accuracy

Next Steps

Work with medical professional to improve Cohort selection and model interpretation

Clinician Partnership

Investigate performance of model for different races to evaluate model bias

Investigate Racial Bias

Use OPTN data to investigate if model could replace MELD for liver transplant prioritization

Utilize OPTN

Thanks

Do you have any questions?

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