Data Abstraction for Hepatorenal Syndrome Risk Prediction Model Validation

This research was supported by grant T15LM011271
About Me

- Upcoming 4th Year UCSD Undergraduate
- Biology with specialization in Bioinformatics
- Neuroscience Lab
- Interests in law, photography
Clinical Background

- Cirrhosis
- Hepatorenal Syndrome (HRS)
- Current Diagnosis Method
  - Exclusion
  - Time period of 48 hours
- Treatment Options
  - Why not just jump into treatment?
  - Temporizing measures
- Faster alternative to accurately diagnose HRS?

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The Model

- **Risk Prediction Model**
  - 10 Variables
  - Identification of HRS patients
  - Clinical decision-making

- **Motivation:**
  - Faster diagnosis for faster treatment

### HRS Risk Prediction Model: 10 Variables

<table>
<thead>
<tr>
<th>Lab Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Sodium, mmol/L</td>
</tr>
<tr>
<td>- Serum Bicarbonate, mmol/L</td>
</tr>
<tr>
<td>- Blood Urea Nitrogen, mg/dL</td>
</tr>
<tr>
<td>- Mean Corpuscular Hemoglobin Concentration, g/dL</td>
</tr>
<tr>
<td>- Serum Albumin, g/dL</td>
</tr>
<tr>
<td>- Total Bilirubin, mg/dL</td>
</tr>
<tr>
<td>- Urine Sodium, mmol/L</td>
</tr>
</tbody>
</table>

### Score-based Value

- Model for End-Stage Liver Disease Score (MELD)

### Diagnosis

- Spontaneous Bacterial Peritonitis on Admit (SBP)

### Procedure

- # Paracenteses in past 90 days

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Project Goal

- **Model Performance**
  - US Department of Veterans Affairs patient data
  - Area Under Curve of 0.87
  - Brier Score of 0.05 (0 is perfect performance)
  - Slope of 1.10
  - Intercept of 0.04

- **Need for further validation**
  - UCSD patient data

- **Tools to collect data essential to the model**

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Data Abstraction

- Five Instruments on REDCap
- Patient Identification
- Cohort selection criteria:
  - Must have cirrhosis
  - Must have acute kidney injury (AKI)
- Hepatorenal Syndrome Diagnosis
- Hepatorenal Syndrome 10 Variables
- Patient Data from EPIC
  - Lab tests
  - Physical Observations
  - Dates

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Instrument 1

- **Patient Identification**
  - Medical Record Number
  - Contact Serial Number
  - Admission
  - Discharge

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Instrument 2

- Cohort Selection: Must have cirrhosis
- Cirrhosis Diagnosis
  - Medical History
  - Physical Examination
  - Laboratory Testing
  - Radiology
  - Calculated Scores
    - Fib-4
    - APRI
    - REDCap Branching Logic

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Instrument 3

- Cohort Selection: Must have Acute Kidney Injury
- Acute Kidney Injury (AKI)
  - Kidney Disease Improving Global Outcomes (KDIGO) guidelines
  - New initiation of dialysis
  - Significant rise in creatinine values

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**Instrument 4**

- **Hepatorenal Syndrome Diagnosis**
  - Diagnosis based on:
    - Presence of Cirrhosis
    - Lab values
    - Exclusion of other kidney injury
  - Date of Diagnosis

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Instrument 5

- Hepatorenal Syndrome Variables
  - Laboratory Values
  - Spontaneous Bacterial Peritonitis on Admit
  - Number of Paracenteses
  - MELD Score Calculation

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Next Steps

- Collect patient data and enter data into model
- Test with other patient data
  - Strength of REDCap
- Thinking long-term:
  - Clinical Trial
  - Prospective Study

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What I learned

- What is Hepatorenal Syndrome?
- Challenges in Diagnosis
- Risk Prediction
- Flow of a research study
- Responsibility with Data
Questions?

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