

Predicting Acute Kidney Injury in Septic ICU Patients Using Mean Arterial Pressure

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Background: Sepsis

Sepsis:
overwhelming,
life-threatening
response to
infection

>1 million

Americans afflicted per year.

28–50%

Mortality rate.

\$14.2 billion

Estimated cost per year.

Sepsis is the leading precipitating factor of **AKI**.

Background: AKI

**Acute
Kidney Injury:**
rapid decrease
in kidney
function

36%

Of ICU patients affected.

37–50%

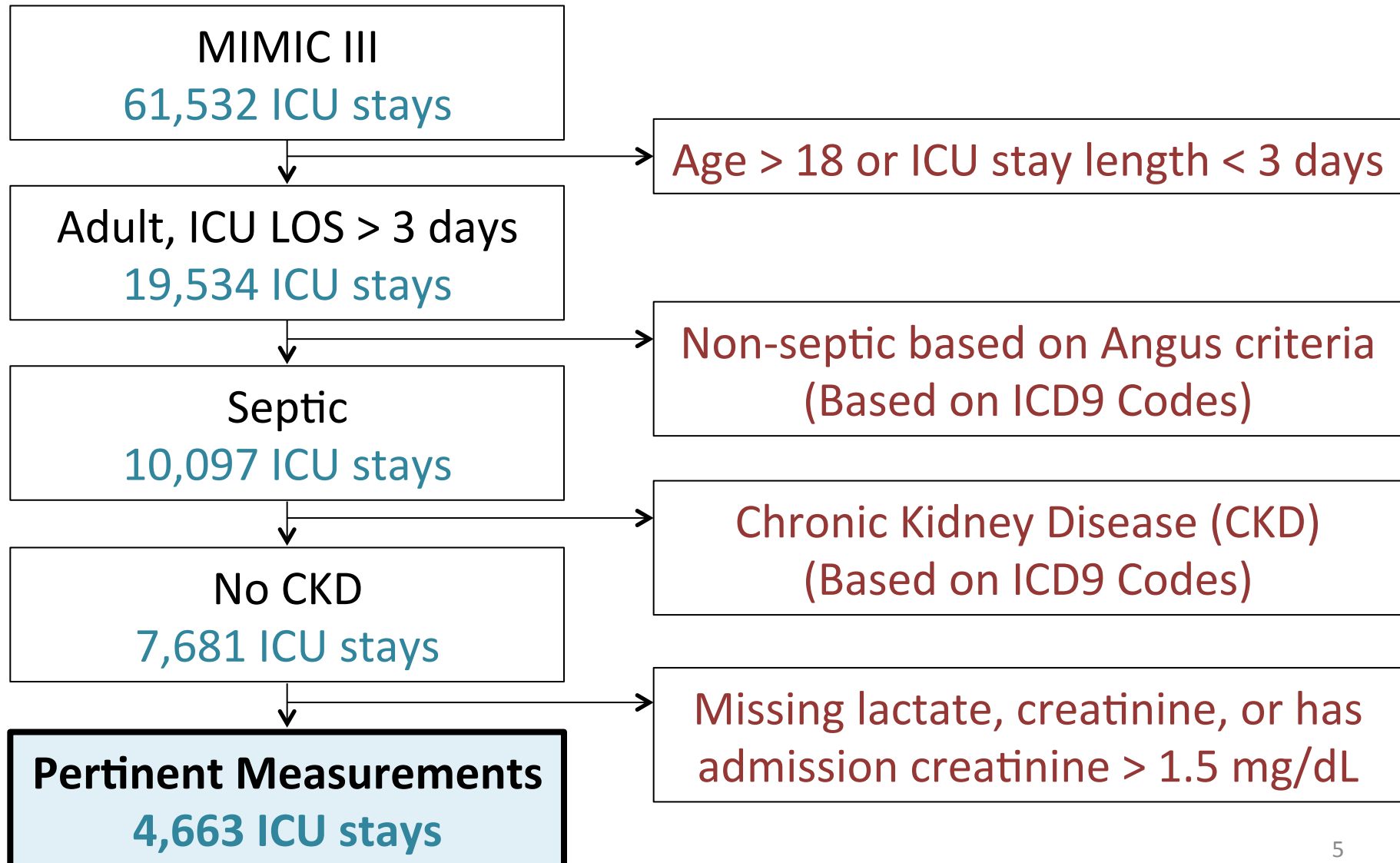
Mortality rate.

Hypotension is a probable factor in development of AKI.

Study Hypothesis

High severity and long duration of hypotensive episodes are associated with increased risk of AKI in septic ICU patients.

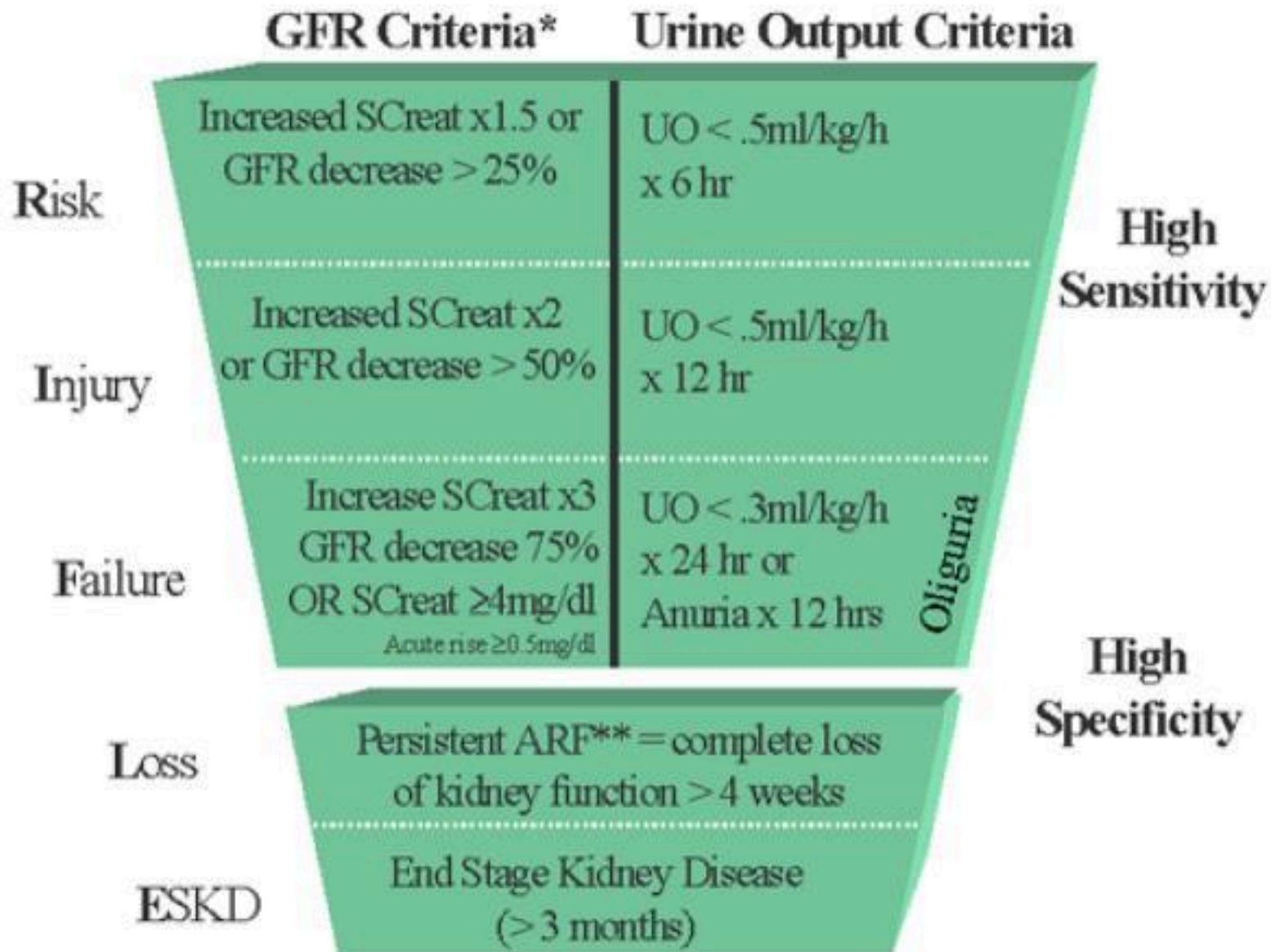
Cohort



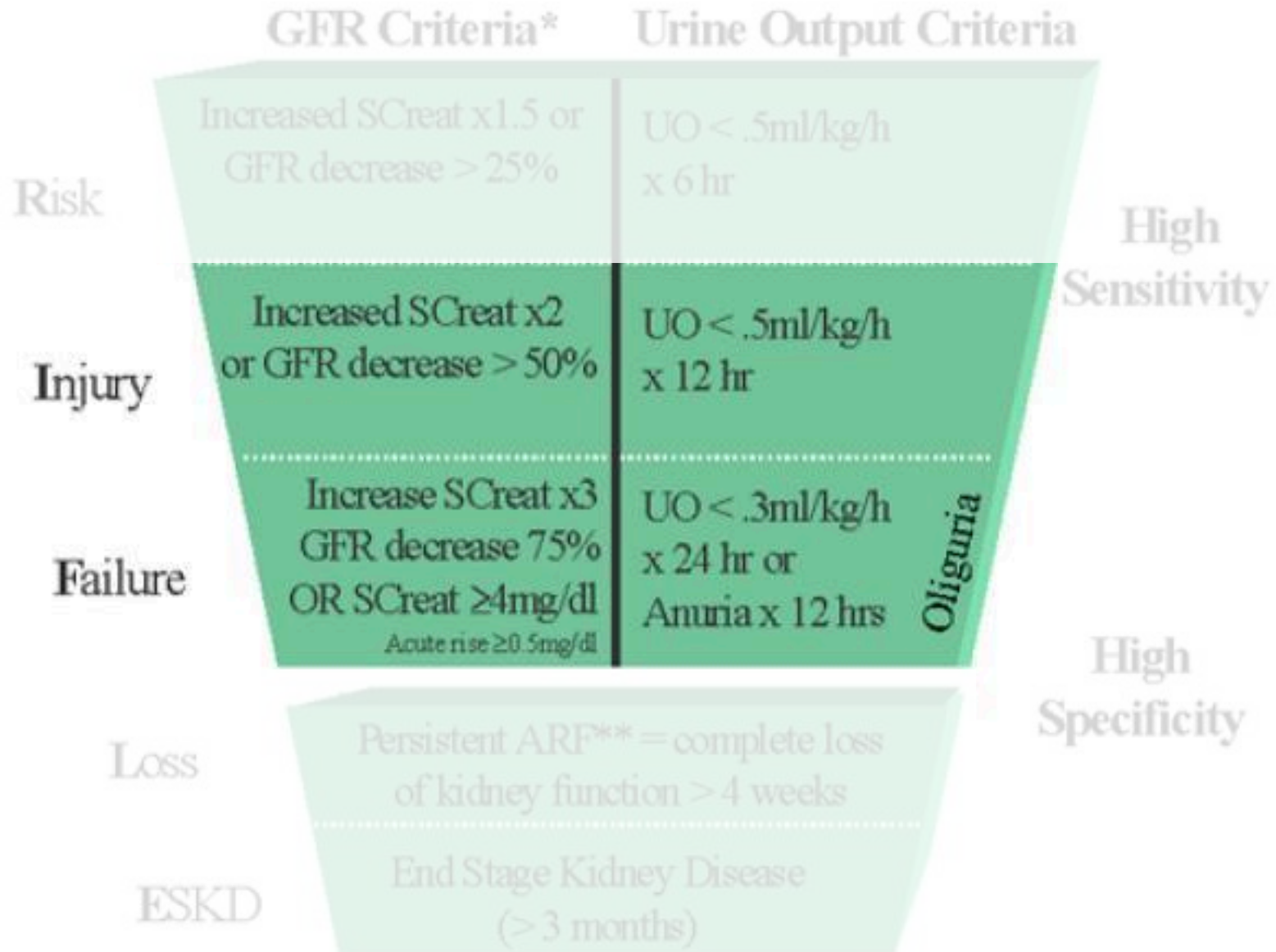
Methodology: MAP Features

- Minimum MAP over entire ICU stay
- Percent of ICU stay spent with average hourly MAP within the following bins:
 - 30-40 mmHg
 - 40-50 mmHg
 - 50-60 mmHg
 - 60-70 mmHg
 - 70-80 mmHg
 - 80-90 mmHg
 - 90+ mmHg

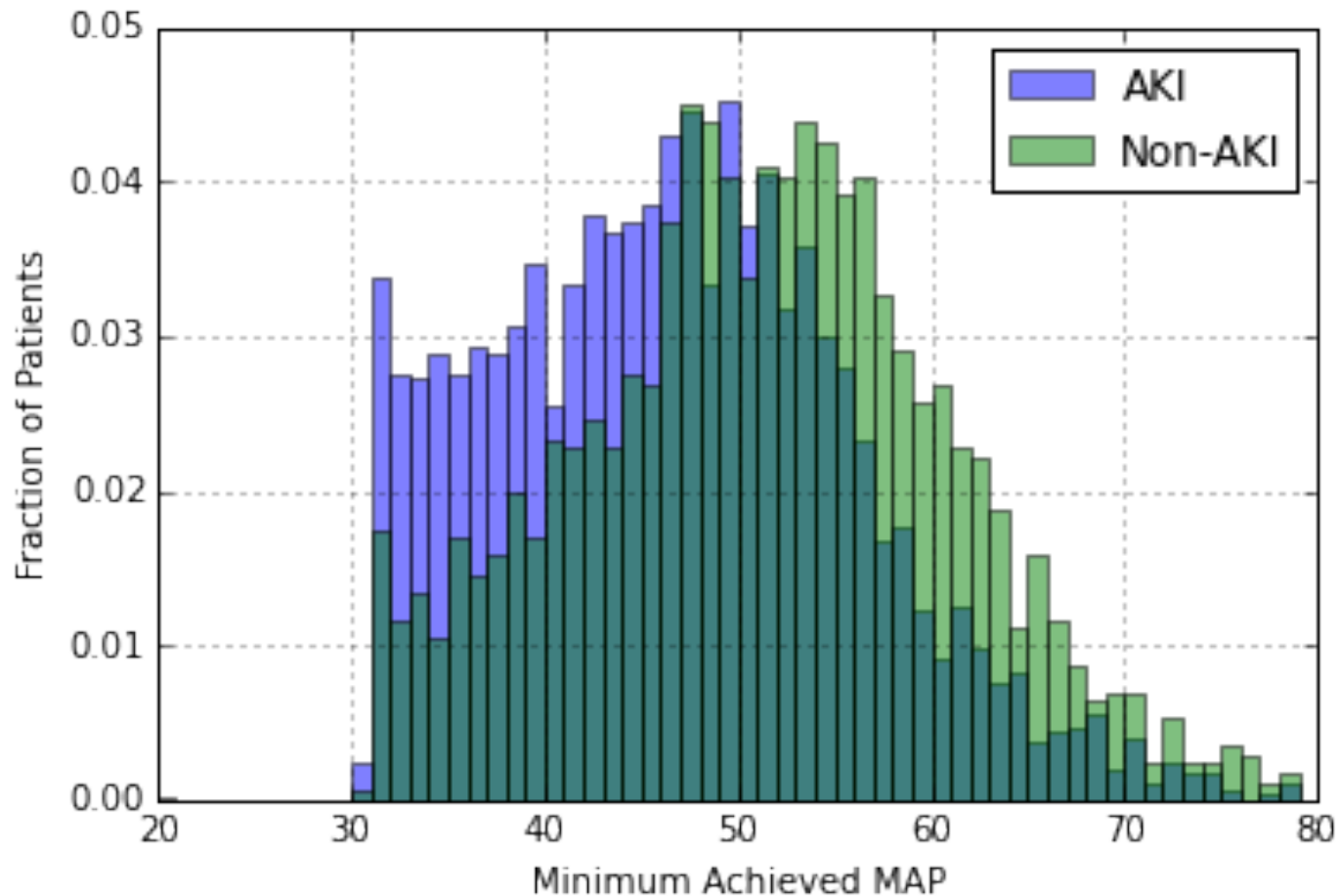
Methodology: AKI Criteria



Methodology: AKI Criteria



Results: MAP Distributions



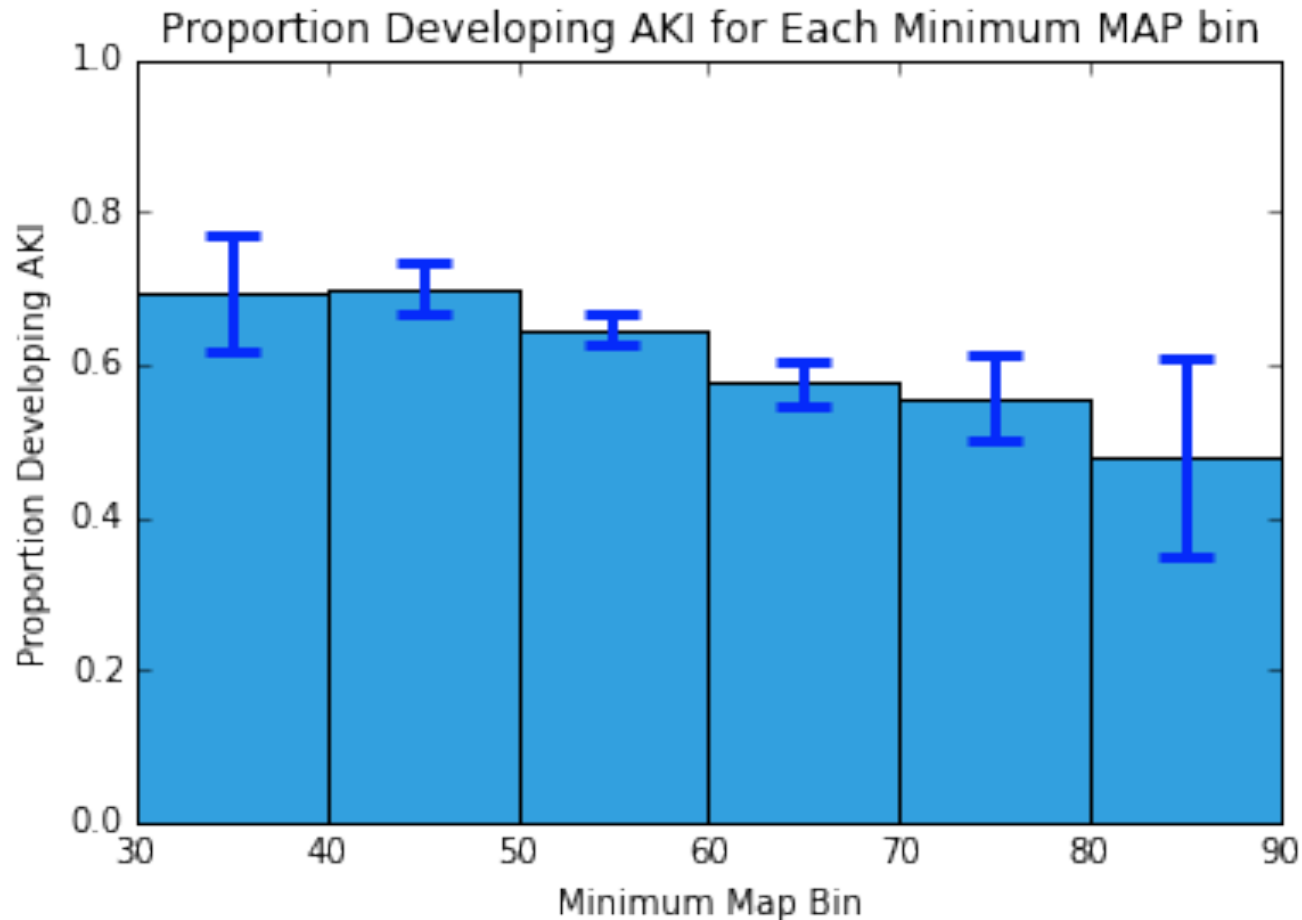
Results: Logistic Regression

Covariate	P-value	Odds Ratio
Age	<0.001	1.00
Gender: Female	<0.001	1.03
Ethnicity (ref: White)		
American Indian/Alaska Native	0.686	0.55
Asian	<0.001	0.38
Black/African American	0.841	0.97
Hispanic/Latino	0.037	0.69
Multi/Other	0.152	0.75
Unknown	0.502	0.93
Length of Stay	<0.001	1.05
Maximum Lactate	<0.001	1.05
% Time on Vasopressors	0.125	1.29
Minimum MAP	<0.001	0.97

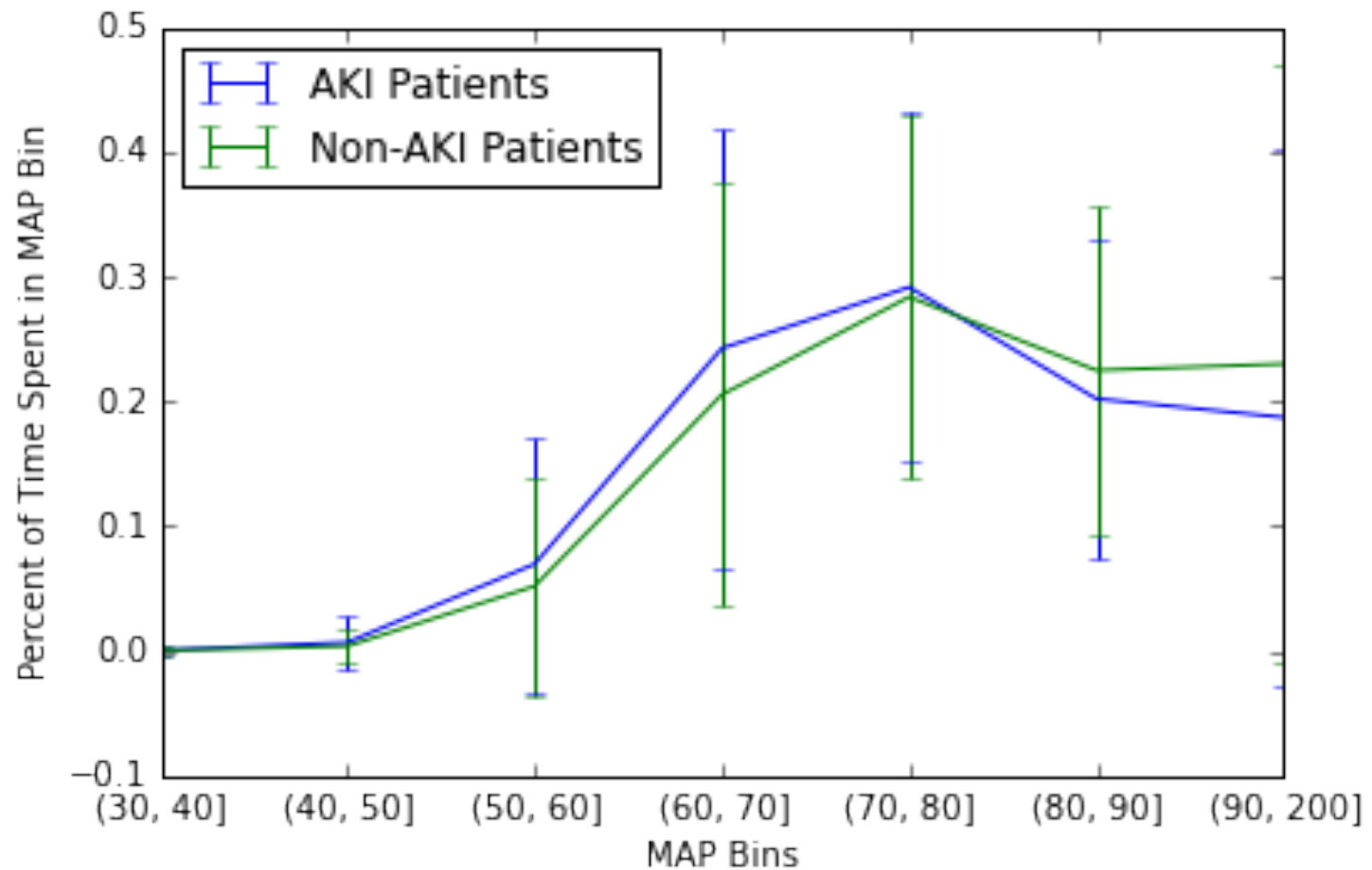
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Results: Hypotension Severities



Results: Hypotension Durations



Summary and Next Steps

Summary

- AKI associated with lower minimum MAP than non-AKI patients
- No clear MAP cutoff for predicting AKI
- Inconclusive regarding effect of hypotension duration on AKI likelihood

Next Steps

- Investigate additional MAP duration features
- Analyze results of hypertension