

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

Nalini Singh

Chen Xie

Juliann Corey, R.N., M.S.N.

Matthieu Komorowski, M.D.

Li-wei Lehman, Ph.D.

# 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%**

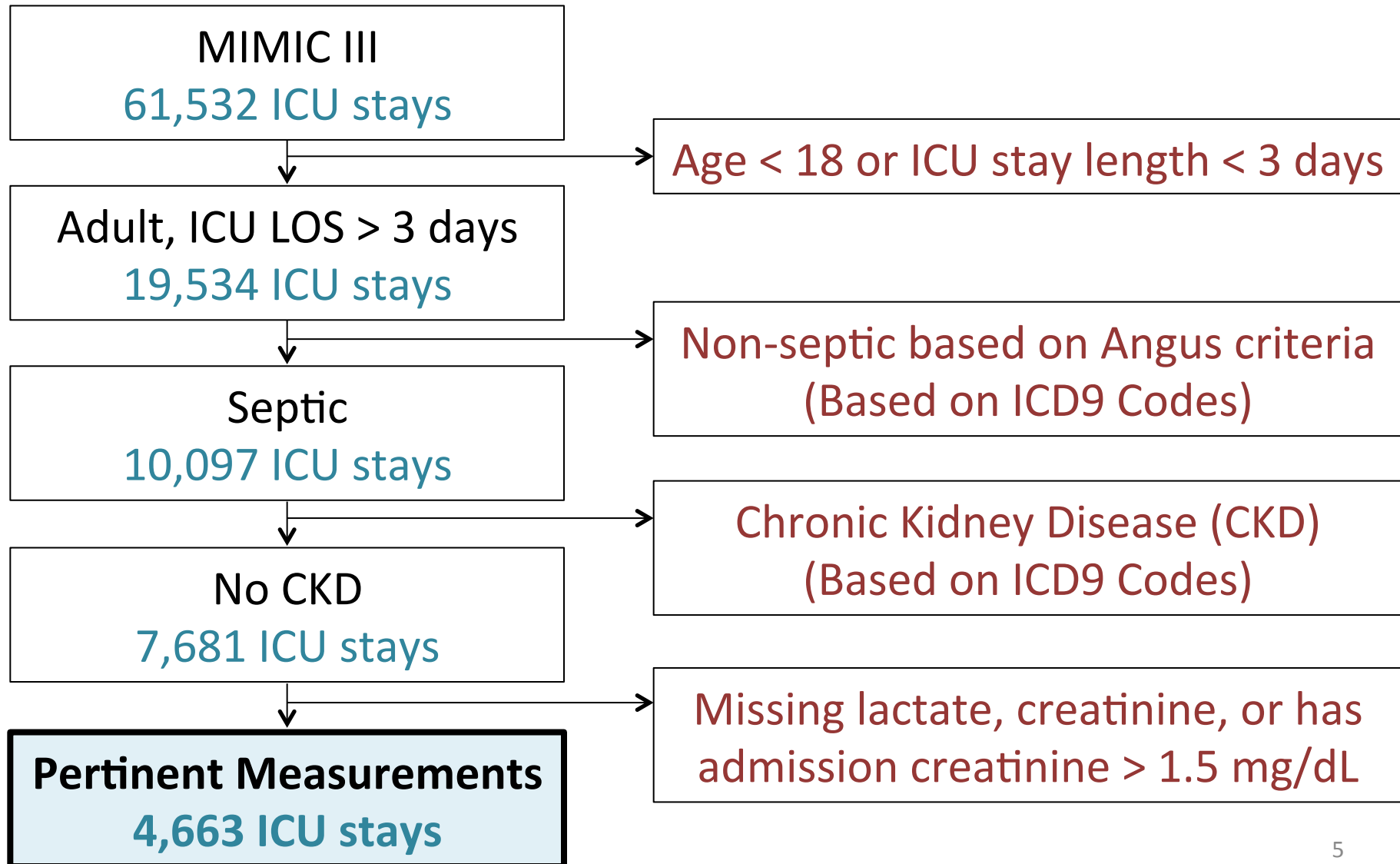
*Mortality rate.*

**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.

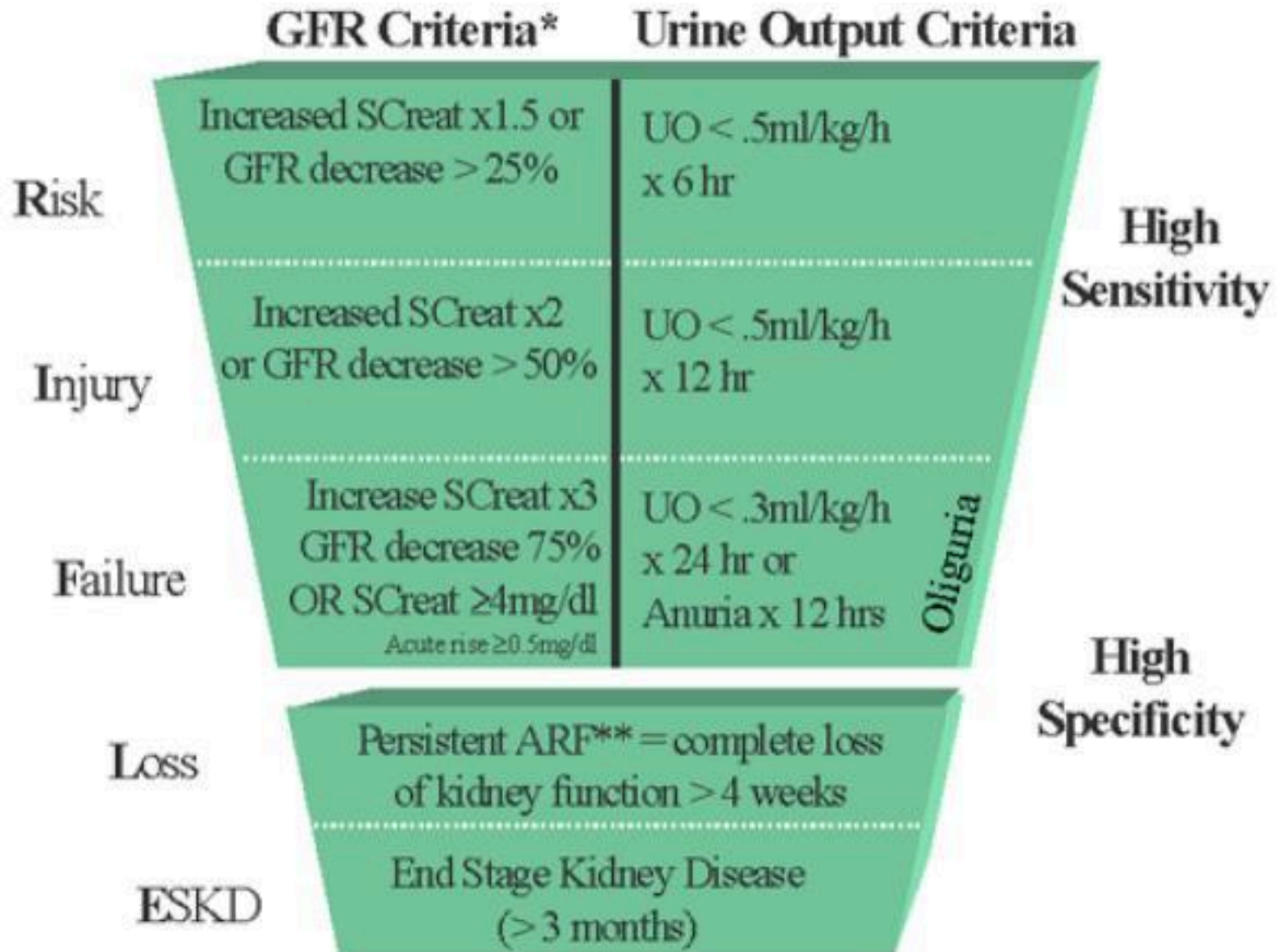
# Cohort



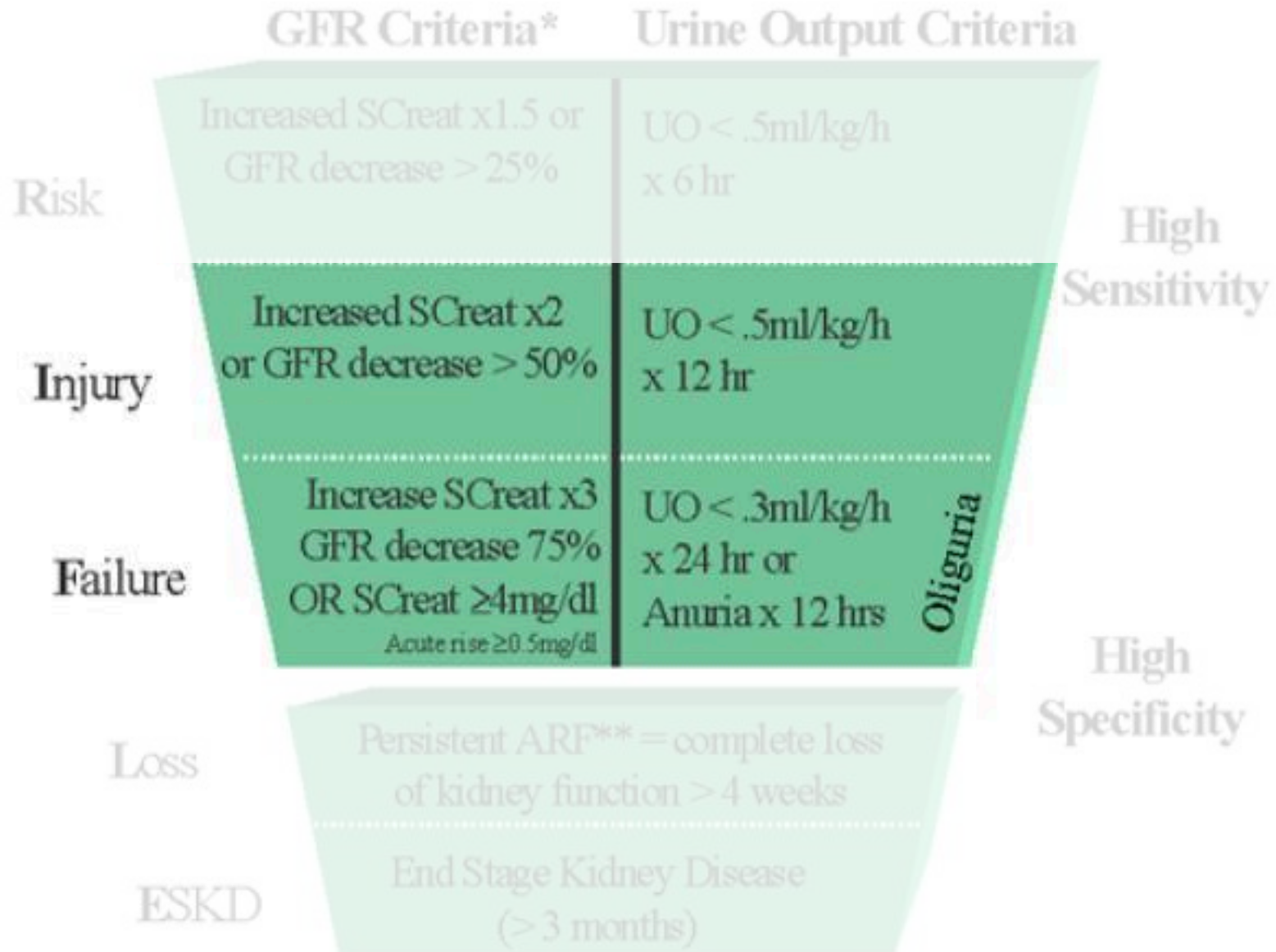
# Methodology: MAP Features

- 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

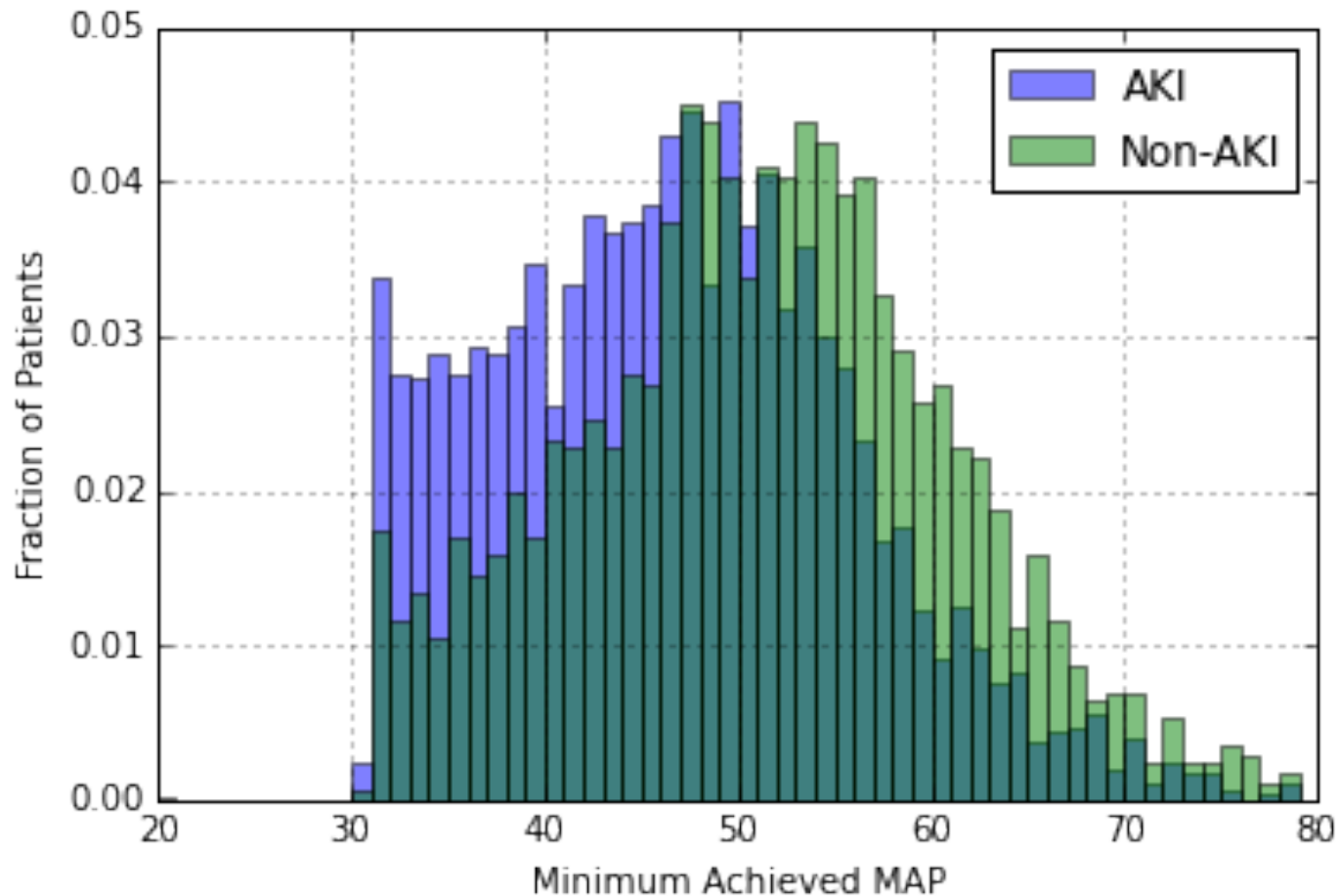


# Methodology: AKI Criteria





# Results: MAP Distributions



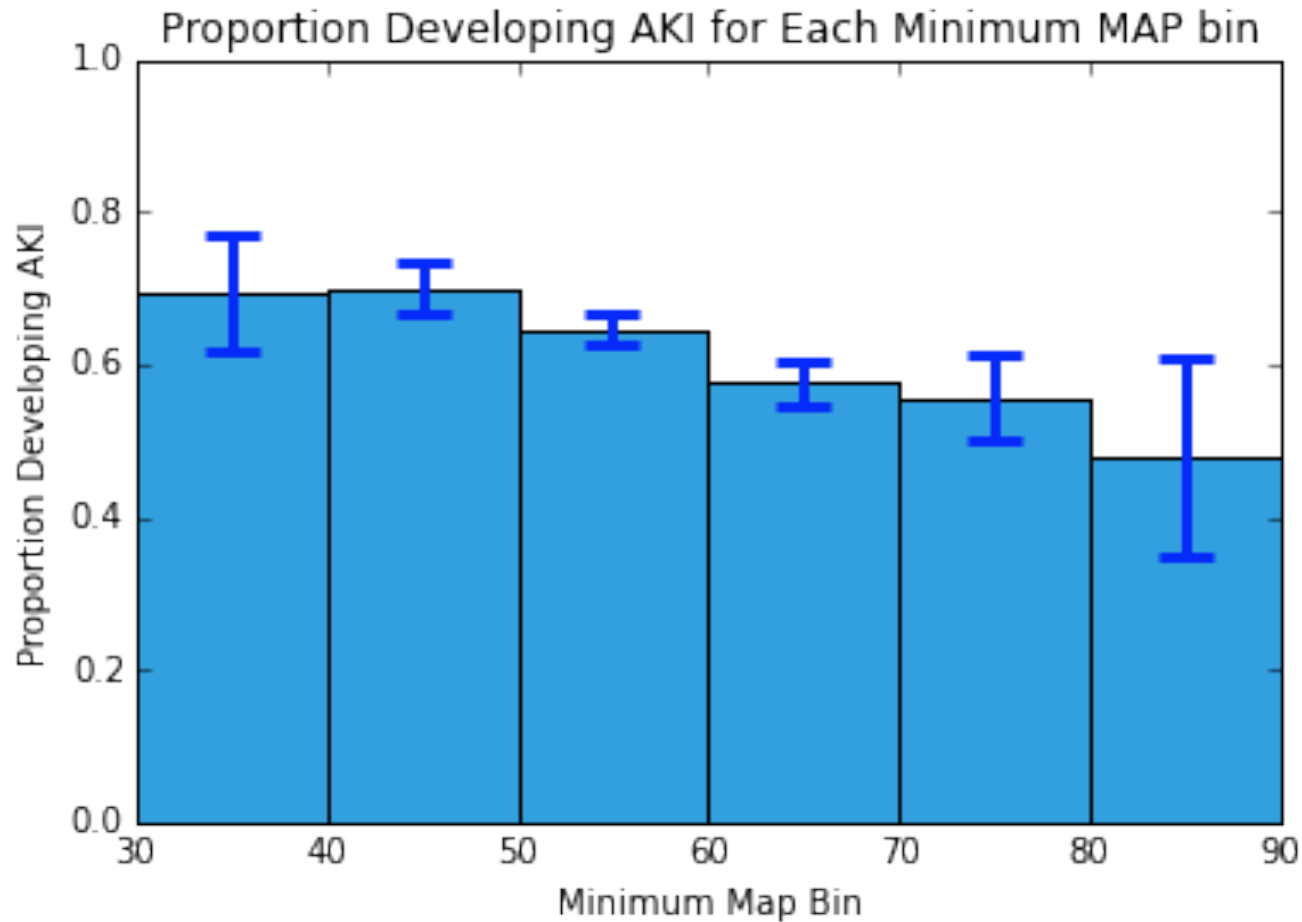
# Results: Logistic Regression

<b>Covariate</b>	<b>P-value</b>	<b>Odds Ratio</b>
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

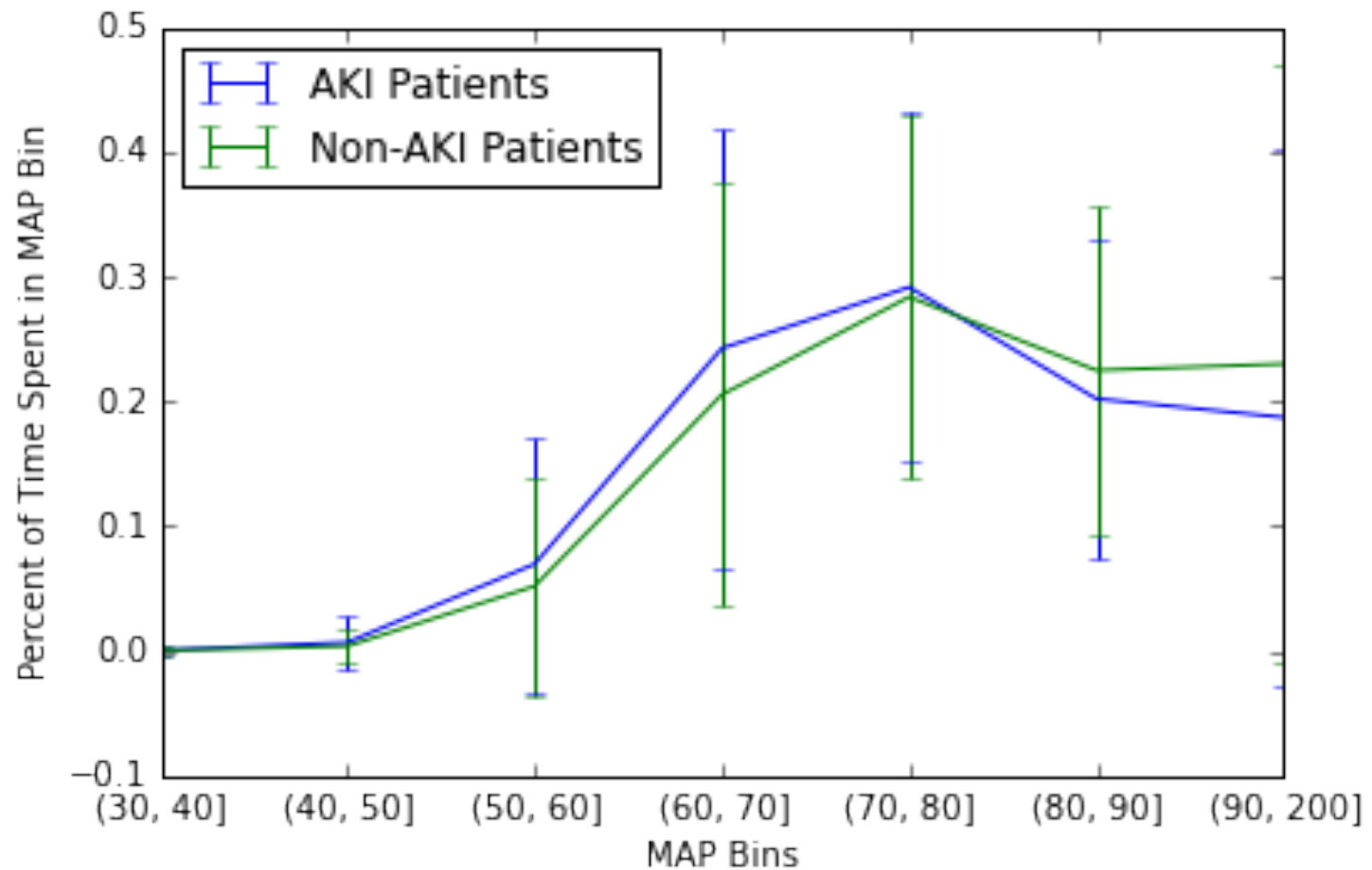
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# Results: Hypotension Severities



# 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