



# URINE GOOD HANDS

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Classifying acute kidney injury  
patients who receive delayed  
dialysis

# INTRODUCTION

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- AKI is prevalent and has a high mortality rate
- Dialysis can be life-saving, but carries risk
- When do we perform dialysis?





# PREVIOUS STUDIES

## Effect of Early vs Delayed Initiation of Renal Replacement Therapy on Mortality in Critically Ill Patients With Acute Kidney Injury

### The ELAIN Randomized Clinical Trial

Alexander Zarbock, MD<sup>1</sup>; John A. Kellum, MD<sup>2</sup>; Christoph Schmidt, MD<sup>1</sup>; [et al](#)

» [Author Affiliations](#) | [Article Information](#)

JAMA. 2016;315(20):2190-2199. doi:10.1001/jama.2016.5828

**Conclusions and Relevance** Among critically ill patients with AKI, early RRT compared with delayed initiation of RRT reduced mortality over the first 90 days. Further multicenter trials of this intervention are warranted.

ORIGINAL ARTICLE

## Timing of Initiation of Renal-Replacement Therapy in Acute Kidney Injury

The STARRT-AKI Investigators for the Canadian Critical Care Trials Group, the Australian and New Zealand Intensive Care Society Clinical Trials Group, the United Kingdom Critical Care Research Group, the Canadian Nephrology Trials Network, and the Irish Critical Care Trials Group\*

### CONCLUSIONS

Among critically ill patients with acute kidney injury, an accelerated renal-replacement strategy was not associated with a lower risk of death at 90 days than a standard strategy. (Funded by the Canadian Institutes of Health Research and others; STARRT-AKI ClinicalTrials.gov number, NCT02568722.)

# CLINICAL RELEVANCE

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- Reduce exposure to dialysis risk
- Resource allocation





A close-up photograph of a patient's arm, likely in an ICU setting. The arm is resting on a blue surface. A clear plastic IV line with a yellow connector is inserted into the arm. A white bandage is visible around the insertion site. A dialysis catheter with a white connector is also visible on the arm. The background is a blurred blue fabric.

# AIM

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Apply machine learning to classify AKI patients in ICU who receive delayed dialysis ( $>8\text{h}$ )

# DATA

The background of the slide is a dimly lit photograph of a medical ECG monitor. The monitor has a small screen and several control buttons. A long strip of ECG paper is being printed out, showing a grid with red and blue lines and a continuous waveform. The overall tone is dark and clinical.

Data extraction from MIMIC IV database  
Adults >18, AKI diagnosis, first ICU visit



Data cleaning/preprocessing  
Features dropped



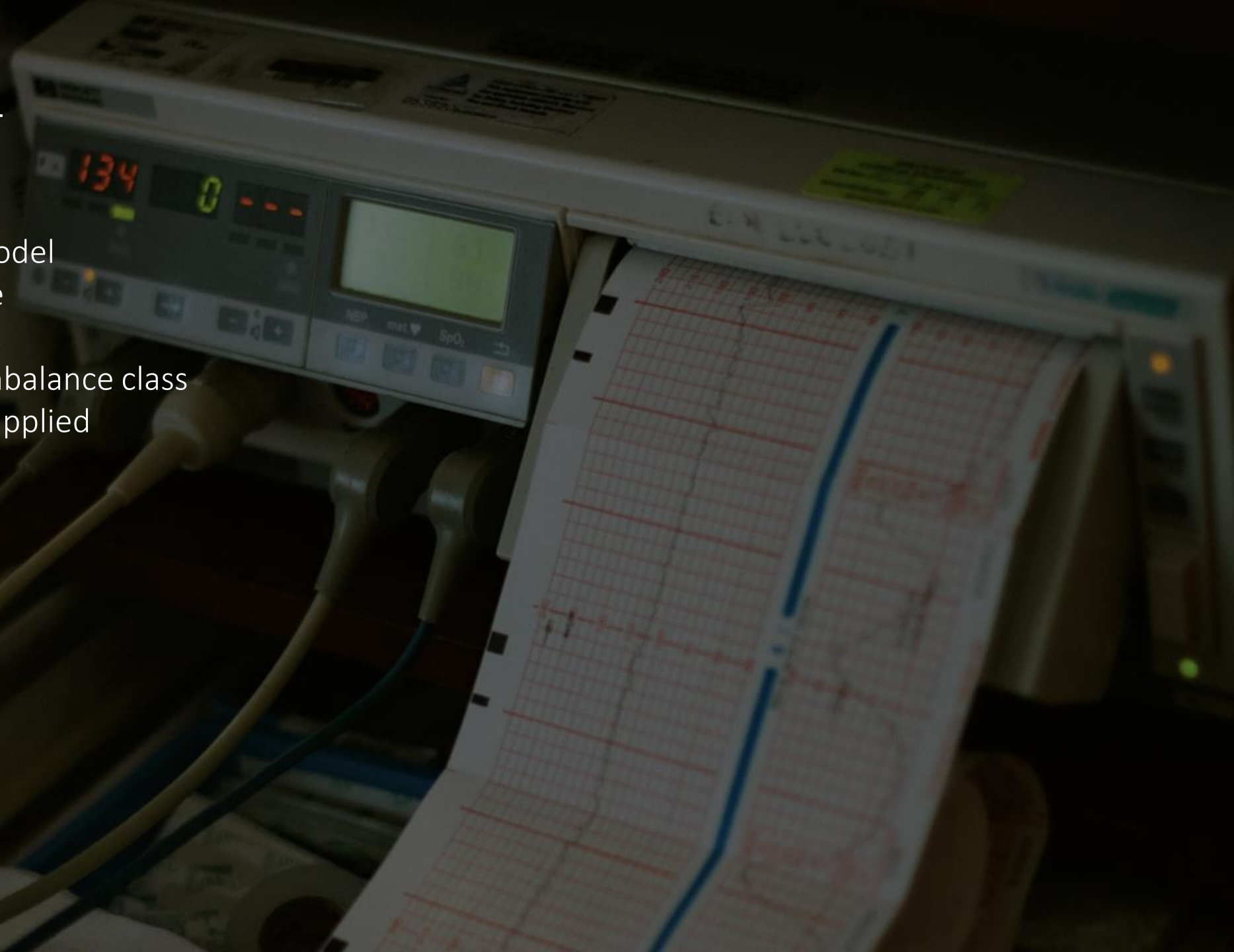
Explorative data analysis (EDA)



# MODEL

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- Logistic regression model
- Metric: roc\_auc score
- SMOTE applied for imbalance class
- Ridge regularisation applied
- Training set: 0.83
- Test set: 0.73



# FEATURES

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Feature	Coefficients
Min blood urea nitrogen	1.74
Max white blood cell count	1.07
Min bicarbonate	0.62
Mean temperature	0.56
Min hematocrit	0.55





# CONCLUSION AND RECOMMENDATION

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- Outcomes
- Interaction between variables
- Boosting models