

Data Studio

1:30–3:00pm, Wednesday, 1 June 2022

Conference Room X393, Medical School Office Building, 1265 Welch Road, Stanford, CA

Videoconference: <https://stanford.zoom.us/j/92154339367?pwd=T2ZpSX1GdWxFTHNKZ1ptclf1ZFErUT09>

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Title: **Updating Surgical Risk Prediction Models Using Length of Stay**

Summary:

The Data Studio Workshop brings together a biomedical investigator with a group of experts for an in-depth session to solicit advice about statistical and study design issues that arise while planning or conducting a research project. This week, the investigator(s) will discuss the following project with the group.

Periprocedural prediction models typically estimate risk prior to performing a procedure. However, if a procedure goes poorly, clinicians lack prediction tools to update patients and their families on what to expect. For example, consider a patient who undergoes a surgery that usually has a one-week hospital stay, but one month later the patient is still in the hospital. An updated risk prediction model that incorporates the patient's length of stay or complications that occurred postoperatively would be incredibly useful for counseling patients, particularly palliative care consultation.

Most databases used to build periprocedural prediction models contain preoperative data such as demographic variables and comorbidities. Typically, these data are used to estimate the risk of morbidity and mortality. We are interested in discussing methods for building risk models that incorporate both preoperative variables as well as length of stay and known complications to update risk of (1) mortality, (2) further complications, or (3) subsequent length of stay.

Datasets that we are considering using include NSQIP (National Surgical Quality Improvement Project), STS ACSD (Society of Thoracic Surgeons Adult Cardiac Surgery Database), ELSO (Extracorporeal Life Support Organization), or UNOS (United Network for Organ Sharing). These datasets typically utilize between 20 and 40 preoperative variables to generate predictions and contain between 10 and 20 outcomes of interest. Data on *time to outcome* is often but not always available. For this Data Studio Workshop, we will discuss ELSO.

Questions:

1. How do we account for the possibility that as a patient remains in the hospital, the associated risk may change in a nonlinear fashion? In other words, day 10–30 may be associated with risk level A, but days 30–60 are associated with risk level B?
2. Are there issues related to using current length of stay to predict subsequent length of stay?
3. When considering using postoperative complications to predict subsequent complications, subsequent length of stay, or mortality, how do we deal with the fact that time to complication data may or may not be available?
 - (a) If time to complication data is not available, is it ok to put known complications in the model as predictors to see if additional complications can be predicted, even though the training data does not provide information about whether the complication occurred before or after a given time point?
 - (b) If time to complication data is available for the training data set, how do we leverage this information to make more accurate predictions?

4. Concepts such as (and results associated with) time-varying covariates can be complicated to explain. What suggestions does the group have for how to keep this approach simple to execute and explain while maintaining rigor?

Zoom Meeting Information

Join from PC, Mac, Linux, iOS or Android:

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For more information about Data Studio:

<http://med.stanford.edu/dbds/resources/data-studio.html>