# Evaluating bias and variance across different validation methods for disease simulation models

# Optimism

- Prediction models are targeted to new patients
- SAMPLE from POPULATION of interest
- Fit model in SAMPLE
- Optimism = AUC – AUC

# Optimism correction | Split sample

- Split TRAIN and TEST
- Fit model in TRAIN
- Calculate optimism-corrected AUC from TEST

# Optimism correction | Cross-validation

- Split TRAIN and TEST
- Fit model in TRAIN
- Calculate AUC from TEST
- Reverse and repeat
- Calculate optimism-corrected AUC as the average performance on the different TEST sets

# Optimism correction | Bootstrap

## Test

- Draw BOOTSTRAP SAMPLE from SAMPLE
- Fit model in BOOTSTRAP SAMPLE

## Test 4

- Apply model on SAMPLE
- Optimism = AUC – AUC