- Statistics has been used in medicine for centuries, ML is a new addition
- **Conventional Statistics:**
    - Hypothesis testing has been used in medicine for ages
        - Conclusion is made from data points using statistical methods like t-test, ANOVA
    - Regression is trying to estimate the relationship between a dependent variable and a set of independent variables
- **Machine Learning:**
    - Prediction: Get label/output from set of inputs
    - Representation Learning: Learn to group/organize data in certain ways
    - Reinforcement Learning: Learn certain behaviors by being in a simulated environment
    - Causal Inference: See if correlation truly does imply causation
- **Benefits and Drawbacks:**
    - ML can handle more complex data, but is a "black box"
        - Don't know what's happening under the hood
- **Types of ML Models Used in Medicine:**
    - Decision Tree
        - Tree structure in which every node is a true/false question, and final results can be found by traversing the tree to the very end
    - Random Forest
        - Multiple Decision Trees are created and trained simultaneously, and multiple are used to do final prediction. More widely used than decision trees
    - Extreme Gradient Boosting
        - Variation of Random Forest in which Decision Trees are assigned certain scores, and final prediction is made using multiple tree outputs with the scores factored in
    - Logistic Regression
        - Used for binary predictions, curve is predicted as boundary between two options
    - Support Vector Machine
        - Multi-dimensional data is separated via hyperplanes so that there is maximum separation between data points and dividing plane
    - Artificial Neural Network
        - Neural networks w/ backpropagation
- ML has its roots in conventional statistics, and is thus a positive for healthcare
- Normal physicians may rely on intuition to make decisions, which is not standardized across the field, ML can change this
- ML should be used to save physicians' time and make things more efficient, but should not entirely replace physicians
- Entire data → conclusion process can be automated w/ ML models