Process in Statin-induced Myopathy: A Multistate Model
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Introduction
Patients who prescribed with statin therapy are at increased risk of developing muscular tissue related adverse effects. The main side effects related to statin therapy is myopathy, and they may lead to statin discontinuation. There are about 1% of patients reported with myopathy during statin monotherapy.

Method:
Electronic medical record (EHR) data were extracted from Indiana Network of Patient Care (INPC) database for patients took statins between 01/04/2004 and 31/10/13/2015. The total number of patients selected into our model is 40,000. Our focused health outcome of interest is myopathy, which include symptoms such as disorder of skeletal muscle (myopathy), muscle pain (myalgia and myositis), muscle weakness and polymyositis. A multistate transition model characterizes 12 transitions among four states: take statin no myopathy, take statin with myopathy, stop statin no myopathy, and stop statin without myopathy (Figure 1). Cumulative hazard for transition in our model is estimated using a non-parametric method, Nelson-Aalen estimator. A Markov transition state analytic approach was used to measure the probabilities of transitioning from one state to the other.

Results:
In Figure 2, the probability of myopathy after statin discontinuation is much higher than the statin induced myopathy ($p < 0.05$). The difference between two probabilities increases over time.

Conclusion:
For the first time, we have shown strong data and demonstrates that for those patients who discontinues statin therapies, they usually have a much higher risk of myopathy ($p < 0.05$).