Many clinical trials have been conducted to compare right-censored survival outcomes between interventions. Such comparisons are typically made on the basis of the entire group receiving one intervention versus the others. In order to identify subgroups for which the preferential treatment may differ from the overall group, we propose the Depth Importance in Precision Medicine (DIPM) method for such data within the precision medicine framework. The approach first modifies the split criteria of the traditional classification tree to fit the precision medicine setting. Then, a random forest of trees is constructed at each node. The forest is used to calculate depth variable importance scores for each candidate split variable. The variable with the highest score is identified as the best variable to split the node. The importance score is a flexible and simply constructed measure that makes use of the observation that more important variables tend to be selected closer to the root nodes of trees. The DIPM method is primarily designed for the analysis of clinical data with two treatment groups. We also present the extension to the case of more than two treatment groups. We use simulation studies to demonstrate the accuracy of our method and provide the results of applications to two real-world datasets. In the case of one dataset, the DIPM method outperforms an existing method, and a primary motivation of this paper is the ability of the DIPM method to address the shortcomings of this existing method. Altogether, the DIPM method yields promising results that demonstrate its capacity to guide personalized treatment decisions in cases with right-censored survival outcomes. This is a joint work with Victoria Chen.