Lung cancer is the leading cause of cancer-related deaths responsible for over 130,000 deaths each year in the US. Early diagnosis and prompt treatment are crucial for prolonging survival. Most research is focused on ranking patients according to their expected survival time, which has proven to be a difficult task. Instead of ranking patients according to survival time, we propose to predict whether a patient falls into a long- or short-term survival group. We show that this approach outperforms regression-based approaches when predicting precise survival time is not necessary. In addition to that, we show that it is possible to predict short-term and long-term survival from lung cancer histopathology images without ROI annotations. We have obtained an 0.81 AUC when predicting whether a patient would fall into the short-term survival group (less than 12 months) or long-term survival group (greater than 60 months). Furthermore, we show that our model is capable of classifying patients into long- and short-term survival even when their survival time falls outside of our chosen ranges.