Abstract: Treatment adherence among tuberculosis patients is not only critical for the cure of the individual patients but also for public health, as it minimizes the risk of transmission and the development of drug resistant strains of the disease. Many studies have examined the impact of various treatment adherence support (TAS) programs on patient outcomes and completion rates, with very mixed results. We use data from a completed randomized-controlled trial, which evaluated the impact of a TAS program that requires daily patient engagement, to develop personalized enrollment and outreach strategies. First, we generate personalized pre-enrollment predictions of the impact of a TAS program on treatment outcomes. We then develop an enrollment strategy as a function of the relative cost of providing the service and the established benefits of individual treatment completion. Second, we generate a personalized risk prediction algorithm for patients already enrolled. Specifically, we consider (A) the long-term risk of incomplete treatment and (B) the short-term risk of reduced engagement with the platform. Our analysis demonstrates the value of patient engagement information for prioritizing treatment adherence support.