In conventional inverse planning, one usually prescribes a rigid dose to the target and a tolerance to a sensitive structure and obtains the optimal solution under the guidance of an objective function. The information of permissible dose variation range and/or dose-volume is achieved by introducing DVH constraints. Here we present a completely different approach for incorporating the prior knowledge into dose optimization. In this algorithm, both the permissible dose variation range and the acceptance level of a dose different from the most preferable dose D_0 (D_0 is the prescribed dose for the target and zero for a sensitive structure) are quantified by introducing a preference function (PF), $P(D;D_0)$. Obviously, the PF should be chosen in such a way that it peaks at D_0 and diminishes when the dose is away from D_0. By replacing the rigid dose prescription by a PF, it is now possible to more effectively include our prior preference information to better steer the dose optimization process by using statistical interference theory. The technique has been applied to study a few special cases in a phantom and a clinical head and neck patient. We found that the new planning algorithm makes it easier for the system to balance competing requirements and lead to the optimal solution with less trial-and-errors. A comparison with IMRT plans obtained using a quadratic objective function with DVH constraints shows that, for similar target coverage, the new planning scheme is capable of improving the sparing of sensitive structures.