Abstract. Let (M^m, g) be a compact Riemannian manifold isometrically immersed in a simply connected space form (euclidean space, sphere or hyperbolic space). The purpose of this paper is to give optimal upper bounds for the first nonzero eigenvalue of the Laplacian of (M^m, g) in terms of r-th mean curvatures and scalar curvature. As consequences, we obtain some rigidity results. In particular, we prove that if (M^n, g) is a compact hypersurface of positive scalar curvature immersed in $\mathbb{R}^{n+1}$ and if g is a Yamabe metric, then (M^n, g) is a standard sphere.