We define a notion of a fractal dimension for a subset $X$ of $\mathbb{R}^d$ – $\dim_{\text{PH}}(X)$ – in terms of the persistent homology of finite point samples of $X$. This differs from our previous definition of a persistent homology dimension, which was based on the persistent homology of $X$ itself and bounds $\dim_{\text{PH}}(X)$ from below. We exhibit hypotheses on $i$, $d$, and $X$ under which $\dim_{\text{PH}}(X) = \dim_{\text{box}}(X)$, the box-counting dimension of $X$. (Received September 25, 2017)