Cancer care is longitudinal and interdisciplinary with much of the care delivered outside of hospitals. Focusing exclusively on surgeons or hospitals when seeking to identify high quality care may obscure the complex way that cancer care is delivered. Instead, we identify naturally occurring physician networks that may provide a more accurate representation of the decisions that patients and their referring physicians make about where to receive care. These physician-patient sharing networks, as derived from insurance claims data, reflect groups of physicians who provide cancer care for the same patients. We leverage physician-patient sharing networks to examine variation in treatment and outcomes for patients with prostate cancer, develop novel metrics that may reflect aspects of care coordination, and study the diffusion of innovation for breast cancer.