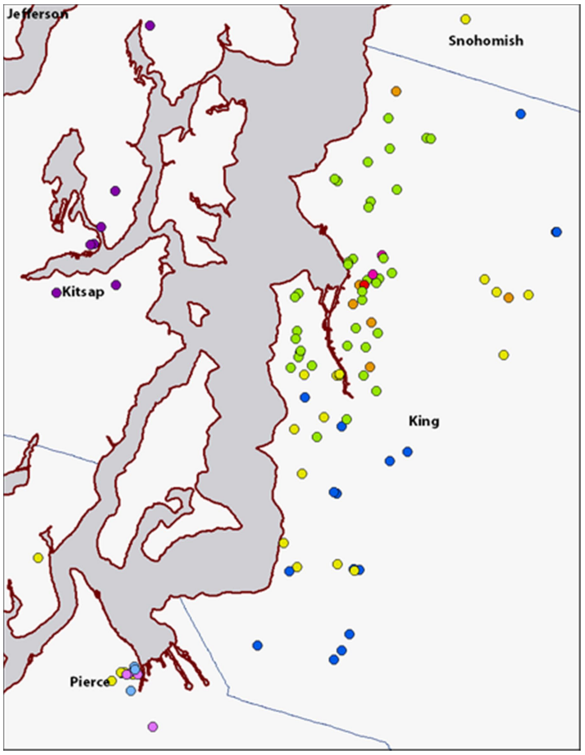
Exploring Competition and Proximity: A Comparison of Basic Methods

When planning for the expansion of services and determining areas of need, estimating people's ability to reach health care services is an important issue. In order to accurately identify the areas in need of additional health care providers, while avoiding service area overlap, it is necessary to understand the practical accessibility of other nearby providers. While there is a wealth of literature exploring definitions and measures of potential access (Apparicio et al, 2008, Topmiller, 2013), this brief illustrates the importance of local context in choosing the right measure by exploring the relationship between potential health care access and utilization. Specifically, we examine Health Center Program (HCP) Grantees and their associated health care delivery sites in the Seattle, Washington, area (see Figure 1) to compare two common ways of defining proximity to care – Euclidean Distance and Network Distance - with their actual service area footprint as reported by the UDS Mapper.

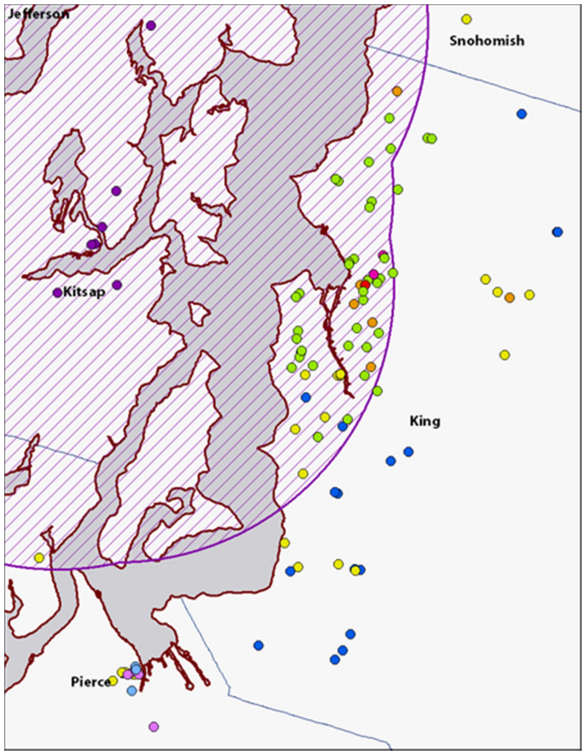
The Euclidean Distance method is the simplest method of analyzing proximity, calculated by measuring the straight-line distance between two points. Peninsula Community Health Services (PCHS), with seven delivery sites located just west of Seattle in Kitsap County, is the focus of the example presented here. Grantee delivery sites within 15 miles of a PCHS location would be flagged as "competitors," identified by creating 15-mile Euclidean buffer zones around each of the Peninsula delivery sites (see Figure 2). Grantees that have sites falling within these buffer zones would theoretically be competing for the same patient population that PCHS serves.

Figure 1. Seattle-Tacoma Area HCP Grantees



HCP Grantee Delivery Sites

Figure 2. PCHS 15-Mile Buffer Zone



PCHS Buffer Zone

This analysis would suggest that there are six Grantees who are direct competitors of PCHS. However, the topography of the Seattle area, specifically the presence of Puget Sound, which separates Kitsap County from Seattle city, clearly shows the limitations of using Euclidean distance. While 15 miles, as the crow flies, seems to be a reasonable distance to travel between two points, the body of water separating Kitsap County from Seattle city is a significant barrier to access.

Exploring Competition and Proximity: A Comparison of Basic Methods

The Network Analysis Distance method is a useful tool in that it generates more detailed information on the practical access to facilities by using road networks to calculate network distance buffers. In this example, we use the network drive-time analysis tool, which uses road network speed limits to estimate drive-time buffers. For example, PCHS has a clinic in Poulsbo, Wash. Neighborcare Health has a clinic directly across the sound in Seattle, 14 miles away. Based on the Euclidean Distance method, these sites would be identified as having a competitive relationship. However, a closer look at these two points would show that, due to the large body of water separating them, the practical travel time is closer to 90 minutes, with a trip on the Washington State Ferry, or 90 miles, without. Figure 3 shows the area covered by 30-, 60-, and 90-minute drive times from any of the Peninsula clinic locations. Only one non-PCHS Grantee has a delivery site that falls within a 30-minute drive, and many are more than an hour away.

Finally, we can compare the results from these two analysis methods to the actual UDS-based service area for each Grantee. The service area footprint shown in Figure 4 shows the areas where 90% of each Grantee's patients live. Mapping these data confirms that the Network Distance approach is more suitable for this area as there is little appreciable service area overlap between Peninsula Community Health Services and the surrounding HCP Grantees in Pierce and King Counties.

Figure 3. Drive Time Coverage from PCHS Sites

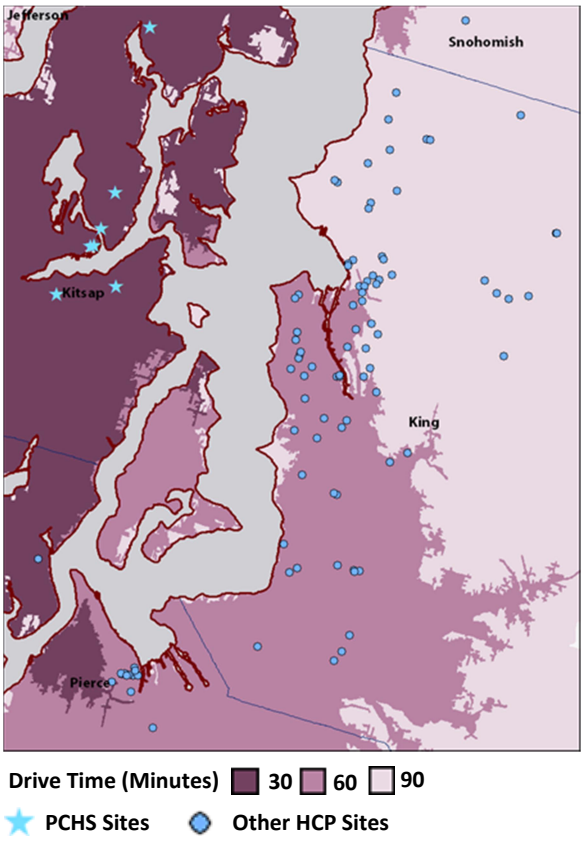
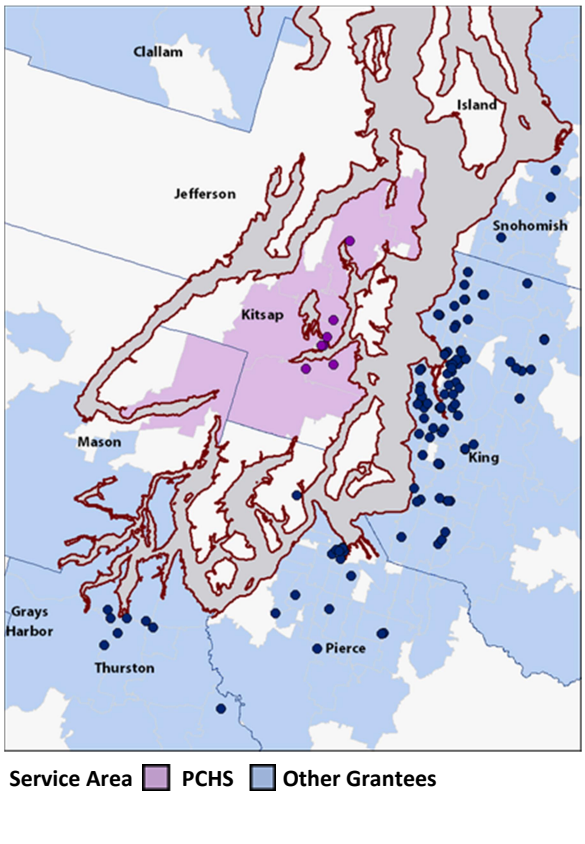


Figure 4. ZCTAs Served by Grantees (90% of Patients)



There are many different ways to explore access to health care and issues of competition between care providers. This brief used actual service area data to demonstrate the importance of detailed local knowledge when determining the most valid access methodology to use.

Jené Grandmont, MA
Senior Manager, Application Development & Data Services

References

Apparicio, A., Mohamed Abdelmajid, Mylène Riva, and Richard Shearmur (2008). Comparing alternative approaches to measuring the geographical accessibility of urban health services: Distance types and aggregation-error issues. *International Journal of Health Geographics,* 7(7). doi: 10.1186/1476-072x-7-7

Topmiller, M. (2013). *Access, Neighborhood Walkability, & an Urban Greenway: A Qualitative GIS Approach*. (Electronic Thesis or Dissertation). Retrieved from https://etd.ohiolink.edu/

UDS Mapper, 2016. Explore Service Area Tool. Accessed at http://www.udsmapper.org