

Dental Service Disparities in Canada: Saskatoon, SK Case Study

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Abstract

Oral health is an intrinsic component of systemic health and well-being. However, in Canada dental care (other than emergency, hospital based services) is not covered by the Canada Health Act and is delivered primarily on a fee for service basis. This study explores the urban arrangement of dental services in Saskatoon, Saskatchewan. We are particularly interested in three topics: 1. Establish a baseline representation of the arrangement of dental care and access to dental services; 2. Compare this arrangement with that of Primary Health Care (PHC) services, and 3. Visually explore the relationship between access to dental services and both socio-economic variables and indicators of dental health outcomes.

Keywords: automated geocoding, Primary Health Care, health geography, geocoding match-rate.

Background and Relevance

Despite improvements over time, dental disease remains one of the most common chronic conditions and directly impacts systemic health and well-being (National Institute of Dental and Craniofacial Research, 2000, World Health Organization 2003, Canadian Dental Association 2005). In Canada, vulnerable populations experience oral health disparities because they face economic, geographic or physical barriers in accessing timely dental care. These vulnerable populations include those with low income, young children living in low income families, young adults and others working without dental insurance, elderly people living in institutions or with low income, aboriginal peoples, refugees and immigrants, those with disabilities, and people living in rural and remote regions (Canadian Academy of Health Sciences 2014).

Unlike health care, access to publically financed dental care is not a universally mandated service in Canada. The Canada Health Act covers health care, but limits dental care to services provided within hospitals (i.e., cleft lip and palate, major trauma). Publically funded dental care is provided by the Federal Government (First Nations and Inuit beneficiaries) and to varying degrees by each province as an oral health social safety net for vulnerable populations (Canadian Academy of Health Sciences 2014). Nationally, 95% of the population is without publicly funded dental care (FPTDWG, 2014). Moreover, the burden of dental disease is experienced by vulnerable populations who face access to care barriers. In this study we examine the extent to which dental care access differs from that of Primary Health Care. Furthermore, we use cartographic and spatial analytic techniques to examine the relationship between access to Primary Health Care and dental care; we also explore the extent to which dental health outcomes among children are influenced by access, household status (lone parent), and household income (low income cut-off after tax).

Sound oral health is intrinsic to systemic health and well-being. If one of society's goals is to improve access to oral health services, then an examination of the multi-faceted nature of access is necessary. Access is complex and nuanced; it includes aspects of service provision and arrangement (availability), but is also affected by the likelihood of consumers' availing themselves of nearby services. Within Canada, access to dental care is mediated by the fee for service model of delivery and the varying availability of public programs, which reduce or eliminate this barrier. Provincially, dental programs range from the provision of urgent care (e.g., CINOT in Ontario) to those including more comprehensive care (e.g., Nova Scotia). Eligibility is often limited by age (i.e., under 10, under 14, under 16, and under 18) and the family's income status. This patchwork of programming focuses on low income children and those on social assistance with the remaining segments of the Canadian population relying on out of pocket payments or third party coverage (e.g., employment-based benefits). Contextually, the current provincial variability in programming has resulted from periods of fiscal constraint and pressure from the profession on the federal government to structure public dental programs around third-party insurance programs while delivering care in the private setting (Quiñonez, 2012).

The objective of this study is to examine the arrangement of dental services in a mid-size Canadian city (Saskatoon, Saskatchewan). The first comparison will be to Primary Health Care, as established and mapped in our earlier research (Bissonnette, Bell, & Wilson, 2009). Then this study will then compare the variable *percent caries-free* to the availability of dental services. Finally, the study will compare the arrangement of dental services to socio-economic and family status, using the independent variables Low Income Cut-off (LICO) and *lone parent households*.

Methods and Data

This study was conducted using data for Saskatoon, SK, Canada. Saskatoon is a mid-size Canadian city with a population of 220,000. It has been relatively well studied from a variety of health care perspectives. This research integrated geocoding publicly available dental practitioner addresses. We used a comprehensive geocoding method that combined both automated and manual processing (Bell, Wilson, Shah, Gersher, & Elliott, 2012; Shah, Bell, & Wilson, In-press). These addresses were then integrated with population data at the dissemination area (DA) level to calculate local (neighbourhood level) access to dental care values. We employed the 3 Step Floating Catchment Area method (Bell, Wilson, Bissonnette, & Shah, 2013; Harrington, Wilson, Bell, Muhajarine, & Ruthart, 2012). It's important to note that this method includes total population in the calculation and iteratively uses dental service locations (as points of contact) and the smallest census unit of analysis that also includes some demographic data; results are normalized by population, aggregated to neighbourhoods (larger than DAs), and show real potential access not just places where total population is higher or lower. This method has been applied to primary health care services, food availability, and access to physical therapy services (Engler-Stringer, Shah, Bell, & Muhajarine, 2014). As comparators we examined the arrangement and physical accessibility of dental services to that of primary healthcare services (from our previous research) as well as socio-economic variables we believe are related to diminished ability to pay for or access fee

for service dental care (lone parent household and percent below Low Income Cut-off after tax) (Bissonette et al., 2009; Shah, Aspen, & Bell, 2014). Results of a province wide dental health screening program were also integrated. This allows a comparison of access and socio-economic patterns with oral health outcomes. While several variables were available, we focus on children and the variable *caries free*; caries free expresses population dental health as the percent of the population with no cavities. Higher caries-free values indicate better oral health.

Results

A map of Saskatoon's population distribution (as of 2006) is shown with an overlay of the location of dental practices (along with the number of dentists) at each location in figure 1. Dental health services are more highly concentrated than Primary Health Care services, as shown by figures 2a and 2b. This is not unexpected, given the fee for service model that dominates dental care delivery. Both services show strong spatial autocorrelation (Access to Primary Care: .63 (Moran's I); Dental Care: .42) with service concentrations in the urban core extending along an important commercial corridor on the east side of the city. There are other, similar commercial corridors on the city's west side; a distinguishing demographic characteristic of the city is the greater concentration of socio-economic advantage anchoring the far eastern limit of this commercial corridor. This arrangement for dentists suggests that location decisions are being made from a business perspective, which negatively impacts access to care in lower income and subsequently underserved areas. It is important to remember that financial means to pay for service is a persistent barrier to accessing dental care from a patient's perspective, therefore it is not surprising that dental services would be oriented towards populations with the ability to pay for care either out-of-pocket or through private dental insurance.

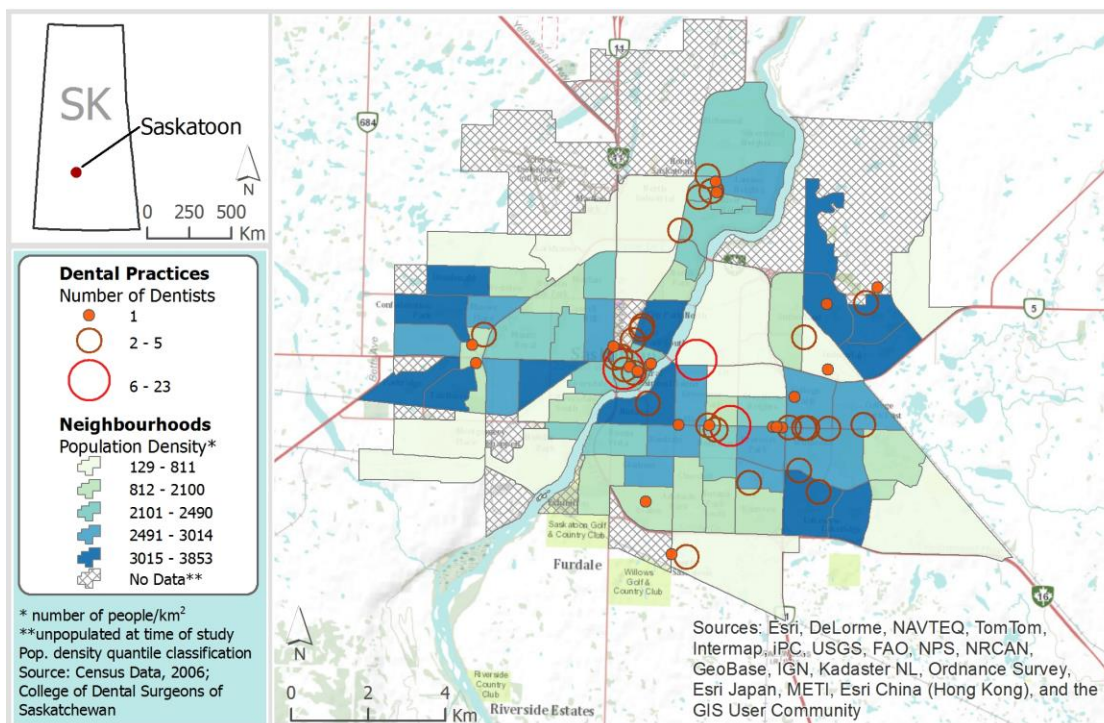


Fig. 1. Study area, Arrangement of Dentists, and Saskatoon Population Density

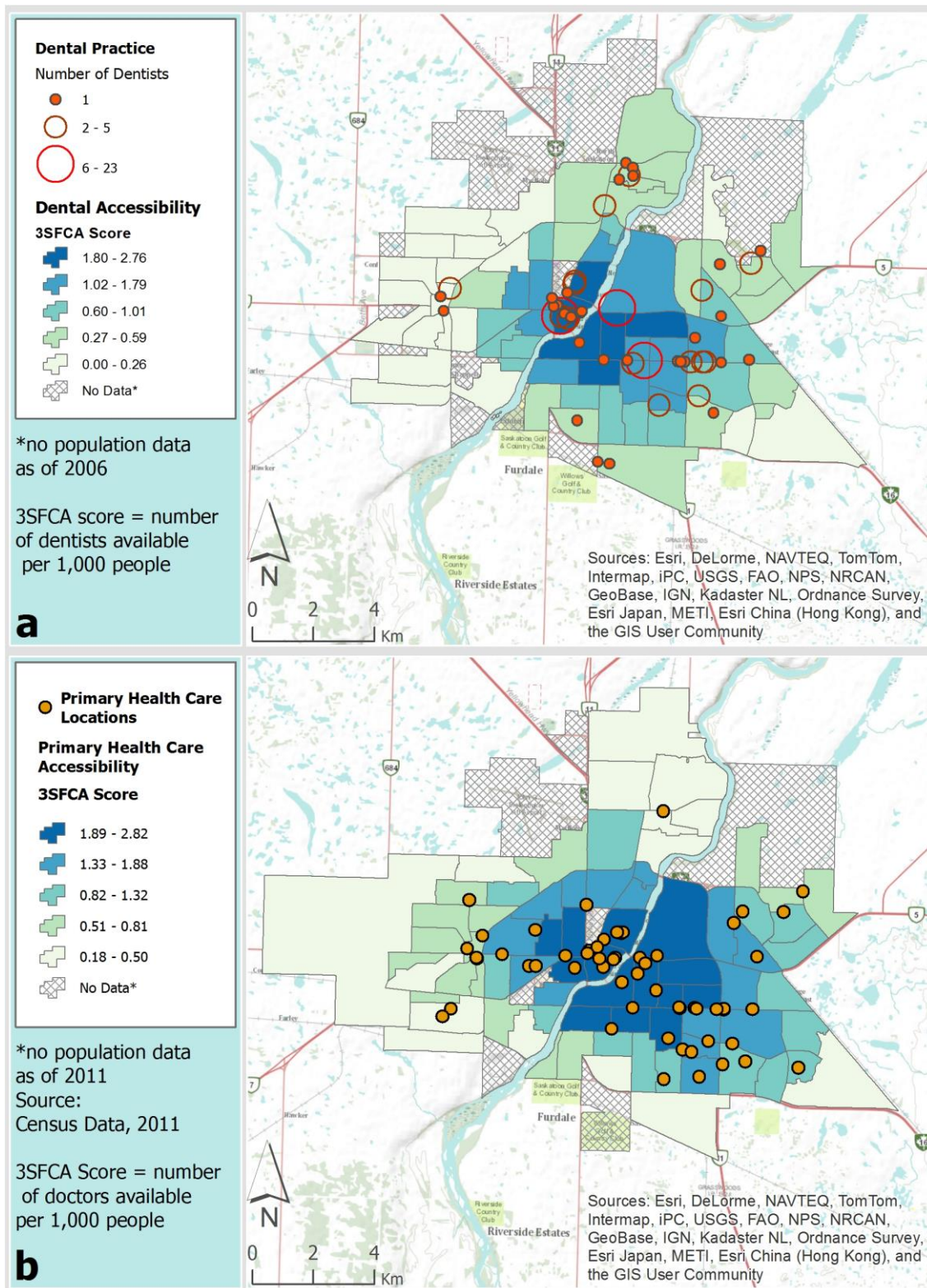


Fig. 2a. Dental Accessibility; Fig. 2b. Primary Health Care Accessibility

Looking more closely at the relationship between dental health outcomes, socio-economic and family status, and access, there is a clear disconnect between where services are delivered and acute need (fig. 3). Saskatoon's most disadvantaged neighbourhoods are in the city's west, with the eastern border of disadvantage contiguous to the downtown core (a mixed commercial and civic neighbourhood) that contains many medical offices (Harrington et al., 2012; Muhajarine, Vu, & Labonte, 2006). As one moves west, disadvantage increases, as does the paucity of dental services. The association of disadvantage and negative health outcomes, even in the face of other variables that might confound this direct relationship, is well known (Vivier et al., 2011)

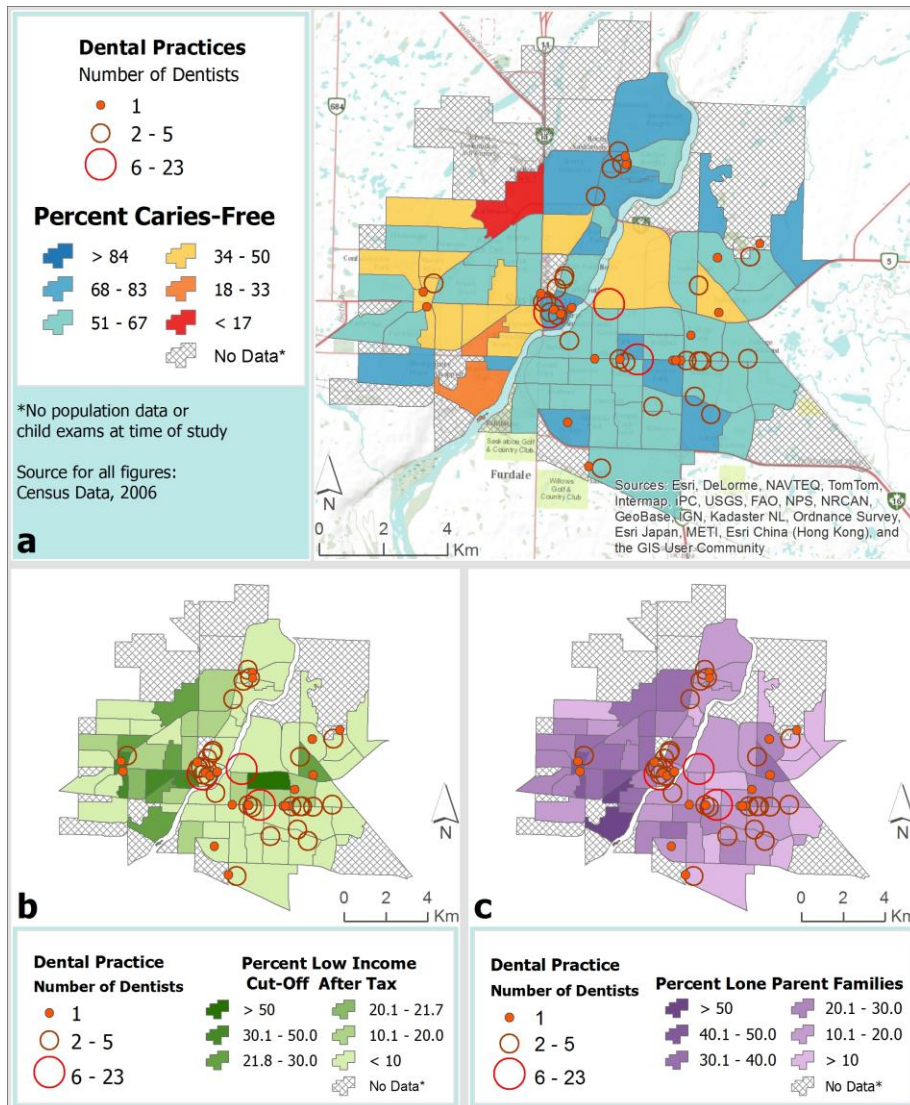


Fig. 3a. Caries-free and Access, blue areas exceed 50% caries free, brown/red are below 50%. Fig 3b. and c. socio-economic arrangement, note similarity with caries free

Conclusions

Oral health is an important component of overall systemic health and well-being. The arrangement of dental care services indicate that while consistent with the arrangement of access to PHC there are subtle differences in access to dental care. Greater clustering of dental services in the urban core and along commercial corridors is consistent with a fee for service model that requires the ability to pay in order to avail oneself of dental services. This study demonstrates the power of looking beyond the simple arrangement of service and acknowledging the complex relationships inherent in a service that supports public health but is missing key elements that might ensure more equitable access and by extension greater public good.

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