**USE OF U.S. CENSUS & SURVEY MICRO-DATA TO EXAMINE GEOGRAPHICAL VARIATION
IN ORAL HEALTH OUTCOMES**

Susan McKernan, DMD, MS, PhD
Assistant Professor, Community and Preventive Dentistry
University of Iowa College of Dentistry

The aim of this project is to investigate the availability of relevant data and the potential for linking restricted-use micro-data with CMS Medicaid data. I will explore whether restricted-use microdata from the CPRDC can be linked with CMS Medicaid data via geocoding, which permits merging of disparate datasets based on geographical relationships. If feasible, I will then develop testable hypotheses and research methods to use these data in a project that explores geographical variation in relationships between social determinants of health and oral health outcomes.

Social determinants of health encompass the "structural conditions in which people are born, grow, live, work, and age" (Marmot, 2008). These factors are increasingly recognized as affecting the health of individuals and communities. Although studies in this area are increasingly common in medicine and public health, little research has explored the contribution of social determinants to oral health outcomes. My goal is to investigate the mediating influence of social determinants on utilization of preventive dental services, including topical fluoride and dental sealants, among low income children. Low income children are at high risk for developing tooth decay; despite having Medicaid dental coverage, they are less likely than higher income children to receive the services that can largely prevent tooth decay.

My previous research has developed methods of small area analysis to identify dental service areas using Iowa Medicaid administrative data (i.e., claims and enrollment data). These methods are adapted from the pioneering work of Wennberg and Gittelsohn (1982) to define local health market areas based on patterns of utilization. My application of these methods to explore geographical variation in utilization of dental services were the first use of these methods in oral health services research (McKernan, et al. 2013; McKernan, et al. 2015). I propose to use these methods to identify U.S. dental service areas for Medicaid-enrolled children and adolescents. These methods to delineate dental service areas require data with fine spatial resolution. Typically, geocoding is performed at the ZIP code or census tract level for these types of studies. Publicly available data from national surveys and the U.S. census do not include micro-data. Restricted use micro-data will be required in order to identify U.S. dental service areas and create service area-level variables for research purposes.

Funding Agency & Program
My near-term research goal is to use this seed grant to prepare an application for an NIH NIDCR R03 award (Small Grant Program for New Investigators, PAR-16-409) to submit for the Cycle III due date (October 16, 2018). This funding opportunity supports basic and clinical research for investigators "who are in the early stages of establishing an independent research career in oral, dental, and craniofacial research". Awards support developmental research projects for early state investigators with the intention of submitting a subsequent R01 application. My tentative specific aims for the R03 proposal are to:

1. Use small area analysis to identify dental service areas for low income children across a broad geographic scale (e.g., multi-state or nationally)
2. Examine geographical variation of dental workforce supply and utilization of preventive dental services among low income children
3. Explore the mediating influence of social determinants of health on oral health outcomes in dentally underserved areas

Seed Grant Objectives

1) Explore CPRDC and CMS Medicaid datasets to identify geographical variables that can be used to create a GIS that links national Census and survey data with CMS data.
2) Develop research hypotheses and specific aims based on available demographic, economic, and health data.
3) Develop methods for the R03 proposal, including methods for assembling a GIS of merged data, small area analysis to delineate service areas, and statistical analysis to test for associations with oral health outcomes.
4) Prepare and submit NIDCR R03 proposal

U.S. Census Bureau Benefit Statement

This project addresses <u>Criterion 6</u> (*Leading to new or improved methodology to collect, measure, or tabulate a Title 13, Chapter 5 survey, census or estimate*) and <u>Criterion 7</u> (*Enhancing the data collected in a Title 13, Chapter 5 survey or census. For example: (a) Improving imputations for nonresponse; (b) Developing links across time or entities for data gathered in census and surveys authorized by Title 13, Chapter 5*).

This project proposes to analyze data related to population demographics and economic indicators (e.g., employment status, SNAP benefits, health insurance coverage). It will explore linkages between national Medicaid datasets (e.g., T-MSIS and MAX Provider Characteristics), national census, and survey data. Data will be linked via geocoding within a geographic information system (GIS) such as ArcGIS. Small area analysis of Medicaid and dentist workforce data will be used to delineate dental service areas. Census and survey data will be geocoded and aggregated to the service area level. Aggregated values of these variables will then be used to explore associations between social determinants of health and oral health outcomes. Analysis of existing data may show that information should be collected at a different level, for example, from dentists rather than dental practices. Additionally, linking external data to Census Bureau data enhances the Census Bureau data. Future researchers can design more effective policy related to healthcare and workforce using these linked data.

References

Marmot M, Friel S, Bell R, et al. 2008. Closing the gap in a generation: health equity through action on the social determinants of health. *Lancet*. 372:1661-69.

McKernan SC, Kuthy RA, Hanley PF, et al. 2015. Geographic variation of dental utilization among low income children. *Health & Place*. 34:150-156.

McKernan SC, Kuthy RA, Momany ET, et al. 2013. Geographic accessibility and utilization of orthodontic services among Medicaid children and adolescents. *Journal of Public Health Dentistry*. 73(1):56-64.

Wennberg JE, Gittelsohn A. 1982. Variations in medical care among small areas. *Scientific American*. 246(4):120-134.