The Utilization of
GIS to Enhance Health Status Data Communication

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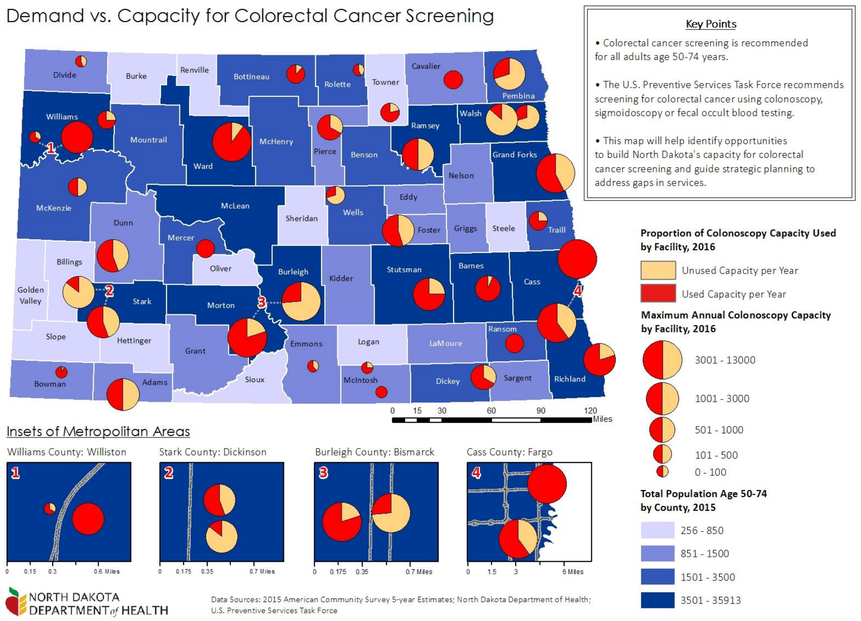
Applications of geographic information systems (GIS) in chronic disease and cancer fields is relatively new, compared to its use in environmental health, infectious disease and public health emergencies.

Current evidence suggests that applying GIS to public health has primarily addressed four important themes: disease surveillance, risk analysis, health access and planning and community health profiling[1].

[1] Nykiforuk, C., & Flaman, L. (2011). Geographic information systems (GIS) for Health Promotion and Public Health: a review. *Health Promotion Practice*, *12*(1), 63-73.

The objectives are to convey methods for enhancing communication of chronic disease-related data through use of mapping tools and illustrate three of the four major themes around how GIS is traditionally applied in public health.

A Community Health Profiling: Cancer screening

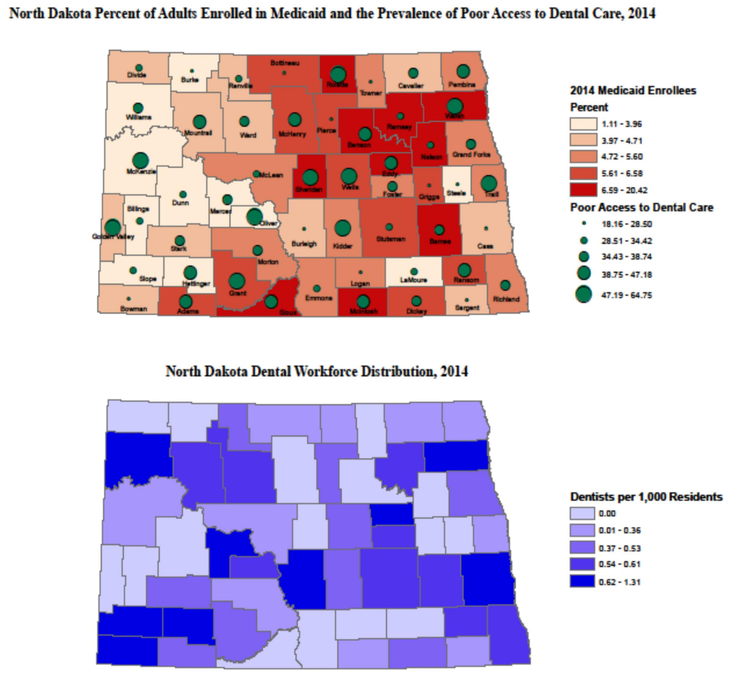


Objectives
- Convey existing capacity for colorectal cancer screening.
- Highlight the need for additional colorectal cancer screening services, particularly in areas with high demand, low capacity and/or limited access to current services.

Methods
- Conduct a structured phone survey of North Dakota hospitals and ambulatory surgery centers regarding colonoscopy services in 2016.
- Collect total population data for colorectal cancer screening demographic using American Community Survey estimates for 2015.
- Use ArcGIS to create layers displaying population data and healthcare facility colonoscopy capacity.

Discussion & Outcomes
- In 2014, 62 percent of adults age 50-74 have had recommended screening for colorectal cancer.
- This map was presented to the North Dakota Colorectal Cancer Roundtable to inform strategic efforts to increase colorectal cancer screening in the state.

B Health Access and Planning: Access to dental care



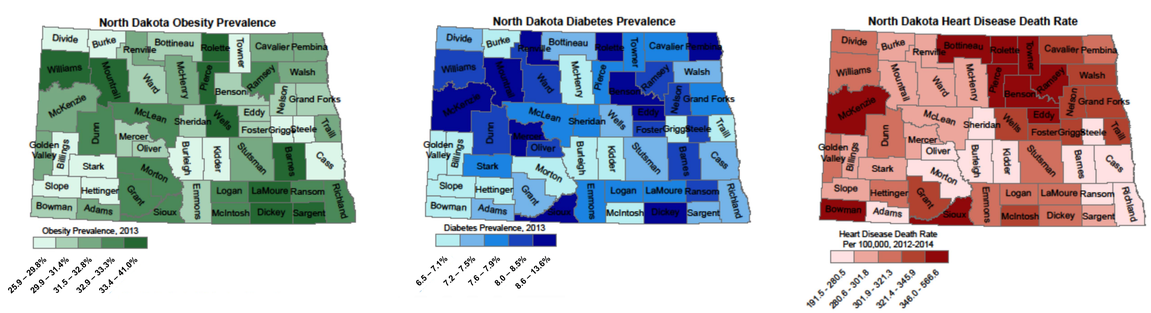
Dental care map and information courtesy of Grace Njau, North Dakota Department of Health, Epidemiologist.

Objectives
- Illustrate maldistribution of dental workforce and poor overall access to oral healthcare.
- Highlight access to oral healthcare disparities in counties with greater numbers of Medicaid recipients.

Methods
- Collect Medicaid enrollment data, Behavioral Risk Factor Surveillance System data, dental workforce data and U.S. Census population counts from 2014.
- Use ArcGIS to associate datasets with each other by displaying Medicaid enrollment data with dental access data in a single map by county.
- Relate dental workforce data to first map by displaying workforce data by county.

Discussion & Outcomes
- GIS was an effective tool for associating four distinct datasets with each other, providing an integrated look at factors influencing the underutilization of dental services among Medicaid enrollees.

C Disease Surveillance: Obesity, diabetes and heart disease



Obesity, diabetes and heart disease maps and information courtesy of Clint Boots, North Dakota Department of Health, Chronic Disease Epidemiologist.

Objectives
- Monitor obesity, diabetes and heart disease prevalence and mortality across North Dakota.

Methods
- Collect Behavioral Risk Factor Surveillance System and Vital Statistics data from 2012 to 2014.
- Use ArcGIS to generate three distinct maps showing prevalence or mortality rates by county.

Discussion & Outcomes
- Heart disease was the leading cause of death in North Dakota from 2012 to 2014. In 2013, diabetes prevalence in North Dakota was 8.9 percent, while obesity prevalence was 31 percent.
- According to the American Heart Association, obesity is a major risk factor for cardiovascular disease and has been strongly associated with diabetes. According to the National Institute of Diabetes and Digestive and Kidney Diseases, those with diabetes are at least twice as likely (compared to those without diabetes) to have heart disease or stroke.
- The burden of these three diseases and their associations with each other necessitate continuous awareness and surveillance.