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SCHOOL-BASED ORAL HEALTH CARE IN RURAL AREAS OF CHARLESTON COUNTY: RECOMMENDATIONS FOR A BUSINESS PLAN FOR RURAL FEDERALLY QUALIFIED HEALTH CENTER INTERVENTION

BY

Aretha R. Polite-Powers

Medical University of South Carolina

A doctoral project submitted to the faculty of the Medical University of South Carolina
in partial fulfillment of the requirements for the degree
Doctor of Health Administration
in the College of Health Professions

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BY

Aretha R. Polite-Powers

Approved by:

Chair, Project Committee	Jillian Harvey, PhD	12/11/2020 Date
Member, Project Committee	Walter Jones, PhD	12/11/2020 Date
Member, Project Committee	Elizabeth A. Brown, PhD	12/11/2020 Date

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Abstract of Dissertation Presented to the
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Chairperson: Jillian Harvey, PhD
Committee: Walter Jones, PhD
Elizabeth A. Brown, PhD

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1 CHAPTER I INTRODUCTION

1.1 Background and Need

In 2019, the United States Department Agriculture Economic Research Service (USDA-ERS), reported the United States estimated population as 328,239,523 with 46,063,061 living in rural areas (United States Department Agriculture Economic Research Service [USDA-ERS], 2019). While approximately 15% of the population are rural homesteaders, 72% of the country's geographic area is classified as rural areas. Over the years, rural population trends have experienced increases and declines. In 2010, a decline in rural population was noted; however, in 2016-2017, rural counties showed an increase in population for the first time this decade. Increased rates of net migration were attributed to rural birth rates exceeding the annual mortality. The March 2018 census estimates Rural American populations increased by 33,000 people between July 2016 and July 2017 after six consecutive years of population decrease.

The population demographics in rural America do not always mirror those of urban areas. Comparatively, the United States has 19% rural population 65 years or older, versus 15% in urban areas. Rural population reflects marked racial/ethnicity and economic trends between 2012-13 and 2016-17. Urban areas are more diverse than rural areas. Rural areas demographic make-up shows 80% white population compared to urban population 58%; 9% Hispanic in rural and 20% in urban; 8% blacks in rural compared to 18%. American Indians are 2% rural versus 0.5% within urban areas (Table 1).

Table 1. Comparison of Rural and Urban Population Demographics (%)

Racial/Ethicality	Rural Population	Urban Population	Difference
Whites	80	58	+22
Hispanics	9	20	-11
Blacks	8	18	-10
Indian	0.5	2.0	-1.5
Asians and Pacific Islanders	0.6	1.0	-0.4
Other	1.9	1.0	-0.9

Reference: (USDA-ERS, 2019)

The differences between urban and rural populations are also noticeable when examining social determinants of health. The 2018 U.S. average per capita income was $54,446, yet in rural areas, the per capita income was $35,765 (U.S. Census, 2019). In addition, the 2018 U.S. poverty rate was 16.1% in rural areas, compared to 12.6% nationally. In rural areas, 14.0% of the population is without a high school degree, compared to 12.1% nationally. In 2019, the unemployment rates differed between rural and nationally at 4.1% and 3.6%, respectively. In addition, rural areas are often medically underserved, which contributes to the issues with access to care, health outcomes, and healthcare costs (U.S. Census, 2020). However, there are several types of healthcare organizations dedicated to the care of rural populations. The Health Resources and Services Administration (HRSA) reports 1,355 Critical Access Hospitals, 4,478 Rural Health Clinics, 3,905 Federally Qualified Health Centers, and 1,094 interim hospitals located in US rural areas (HRSA, 2020).

Access to health care in rural counties is often difficult and scarce. Citizens of rural communities are more likely to be uninsured and face uncertainty in meeting their healthcare needs due to living in an area with a shortage of healthcare professionals and the closure of local hospitals (Maxey, et al., 2016). Rural residents face a variety of difficulties in obtaining essential health services. Due to the scarcity of primary health providers, many residents may struggle to obtain access to local dental, mental and behavioral health care, long-term services choices for seniors, emergency, and other essential and specialty care and (Goodman & Tobler, 2016; Maxey et al., 2016). To increase access and care to rural residents, Federally Qualified Health Centers (FQHCs) often fill the void by providing care to underserved populations, including individuals with no or little health insurance and individuals with low incomes.

An FQHC is a comprehensive health care organization focusing on primary care. FQHCs receive federal funding under Section 330 of the Public Health Service Act to provide access to health care in medically underserved communities (U.S. Department of Health and Human Services [USDHHS], 2019). FQHCs serve as the dental safety net and are essential and intentional about eliminating barriers to comprehensive health care services, as well as preventative oral health services in underserved communities (USDHHA, 2019). These oral health services are provided to patients using strategies such as referral linkage programs, connecting patients to community dental services that coexist within primary care facilities (Maxey, et al., 2016).

1.2 Rural Disparities in Oral Healthcare

Rural inequalities in oral health and underuse of dental care have been reported in both developing and industrialized countries (Rural Health Information Hub [RHIhub], 2020). In many communities, accessible and affordable oral health care is not available. The most susceptible populations, such as the elderly, children, and people residing in rural regions, often experience problems accessing health care and oral health services. Residents in urban areas typically have more access and resources for health care services than those in rural areas resulting in a potentially problematic predicament for seeking services such as dental care due to limited providers and a growing population that meets the need (Sharifian, 2015).

In 2017, the National Advisory Committee on Rural Health and Human Services gave a Policy Brief on the social determinants of well-being in rural communities in the United States. The National Advisory Committee on Rural Health and Human Services issued a Policy Brief on the social determinants of health in rural America in 2017 (RHIhub, 2020). The report recognized that rural communities are often disadvantaged because of the geographically remote locations and lack of economies of scale (RHIhub, 2020). The report further explained that when examining health outcomes, an individual who resides in a rural zip code is an important factor to examine (RHIhub, 2020). The relationship between geographic location and health outcomes needs to be further explored. A person's zip code corresponds to what housing and jobs are available, healthy food choices, and safe locations for exercising (Warshaw, 2017). Often times, rural communities lack resources such as grocery stores, hospitals, and public transportation, therefore, making access to oral health services difficult

(Warshaw, 2017). With the absence of resources, rural communities are often described as human service deserts.

There are many factors involved when deciding to participate in private health insurance. Many adults living in rural communities are entrepreneurs, small business employees, part-time workers, or seasonal enterprises; many typically cannot afford the insurance premium (Warshaw, 2017). Individuals residing in rural communities are 20 percent more likely to be uninsured versus individuals in urban areas, and of the uninsured patients, 23 percent have unmet dental care needs (Sharifian, 2015).

The ability to access oral health is not easily attainable for everyone. Vulnerable populations often experience the greatest barriers to care. When barriers are present, it becomes more difficult to maintain dental care; therefore, the overall health of vulnerable populations could potentially suffer (Institute of Medicine, 2011). While many people regularly visit the dentist to ensure a beautiful smile, dental visits serve a purpose beyond an attractive smile. Studies show an increasing link between oral health and overall health. Individuals with chronic oral infections and bleeding gums have a higher risk for developing heart and lung disease, stroke, diabetes, neurological disorders, and women with gum disease have an increased threat for delivering pre-term, low birth weight infants (Allen, 2003).

The lack of access to healthcare services and providers for rural Americans are catalytic causes of teeth loss, higher cavity rates, and other dental issues in comparison to urban Americans. Some documented disparities in oral health for rural areas include general poor oral health, tooth decay, varied forms of periodontitis, and low survival rate for developed throat cancer (CDC, 2020). For example, in Michigan, the populations

with the worst oral health outcomes include non-Hispanic blacks, Hispanics, and American Indians and Alaska Natives (Michigan Department of Community Health, 2013, p. 2). Within these populations, tooth decay rates are nearly twice as high as non-Hispanic white populations (Michigan Department of Community Health, 2013, p. 4). Among Black men that develop oral pharyngeal (throat) cancers, the 5-year survival rate is 35% versus White counterparts 61%. Overall, Mexican American Children aged 3-5 and non-Hispanic black children aged 6-9 showed the greatest disparity in oral healthcare (CDC, 2020).

The relationship between lack of education and health education may contribute to the lack of access to dental care. Adults between the ages of 35–44 years who do not have a high school degree have untreated tooth decay rates nearly three times greater than those who have some college education (Michigan Department of Community Health, 2013, p. 2). Furthermore, adults aged 35–44 years who do not have a high school degree have detrimental periodontal (gum) disease rates that almost three times higher than those who have some college education (Michigan Department of Community Health, 2013, p. 2). Unfortunately, 42% of US adults experience periodontitis, and men tend to show a higher rate than women (CDC, 2020).

1.3 Oral Health

Oral health and overall health have a well-established and essential connection, and therefore unmet oral needs can be very detrimental (Institute of Medicine , 2011). Oral health and dental care play an important role in patients' overall health status (Henshaw & Garcia, 2018). Dental encounters can shed light on whether patients are at

risk for chronic disease. Studies show that the condition of one's mouth emulates the condition of their entire body (Sharifian, 2015). For example, when your mouth is healthy, chances are your overall health is good, too. In contrast, if you have poor oral health, you may have other health problems (Northbridge et. al, 2020). Studies have shown that serious diseases can be prevented from proper oral health. Researchers have demonstrated a link between access to healthcare and improved outcomes (Northbridge et. al, 2020). For example, access to preventative and affordable, high-quality dental treatment at a lower cost can facilitate both prevention and treatment (Northbridge et. al, 2020).

In South Carolina, the Department of Health and Environmental Control (DHEC) Public Health Dental Prevention Program (PHDPP) is designed to provide a coordinated statewide effort to provide dental professionals comprehensive expectations for the mobile dental program (South Carolina Department of Health and Environmental Control, [SCDHEC] 2020). Participating dental professionals are required to sign a Memorandum of Understanding (MOU) The MOU outlines the program requirements and expectations. Participating providers with DHEC in accordance with S.C. Code Section 40-15-110 of the South Carolina Dental Practice Act (SCDHEC 2020) can provide care under the direction of DHEC's State Dental Coordinator or designee by dental hygienists and dental assistants working under general supervision with a DHEC MOA for the delivery of dental prevention services in public health settings. The SCDHEC mobile dental agreement allows dental hygienist the ability to provide "oral screenings using a DHEC approved screening system, oral prophylaxis, application of

topical fluoride including varnish, and the application of dental sealants" (SCDHEC, 2020, p.1),

1.4 Problem Statement

Residents of rural communities face significant access to oral health care due to a lack of oral health providers in their areas (RHIhub2020). "According to the Health Resources and Services Administration (HRSA), 4,297 (68%) of the country's 6,319 Dental Health Professional Shortage Areas (HPSAs) are located in rural areas" (South Carolina Office of Rural Health, 2017) (Health Resources & Services Administration, 2019). However, the goal of FQHCs' is to eliminate barriers to primary health care in underserved communities. FQHCs are often physically located in communities with high rates of uninsured and underinsured individuals. Therefore, the intentional location of FQHCs allows for greater access to underserved populations.

1.5 Research Objective

The consultant report will focus on opportunities to improve access to dental care for school-aged children of Charleston County citizens of rural South Carolina through a partnership with a FQHC. The target population will be school-aged children who attend schools located in rural communities in the same service area as the FQHC.

2 CHAPTER II SCOPING LITERATURE REVIEW

The literature review will focus on four key areas:

- Access to Rural Dental Programs
- Barriers to Rural Health Dental Programs
- Types of Dental Programs
- Federally Qualified Health Centers' Role in Rural Communities

2.1 Access to Rural Dental Programs

Numerous risk factors, such as life choices, death rates, disease prevalence, and overall health, determine a population's health outcomes (Allen, 2003). Some health measures show no rural–urban differences, but research does indicate that health disparities exist in oral health. Poor oral health has a significant impact on chronic diseases such as diabetes, obesity, and heart disease (Henshaw & Garcia, 2018).

Primary and secondary screenings and treatment services in medical, dental, and mental health care are included in access to vital health care services (USDHHS, 2019). Oral health services are vital to the general health and well-being of individuals and the population. "In the United States, the majority of the population has access to dental care. However, for substantial segments of the population in urban and rural areas, access to health and dental care is limited" (Biordi et.al, 2015, pg.27). The worldwide urban-rural disparity is significant, and that's in part due to the geographic challenges. Oral diseases are consistently identified as a global issue (Asimakopoulou

& Newton, 2014). Specifically, in more geographically isolated areas, the population experiences increased issues with periodontal disease and dental caries (Jones, et al., 2013).

According to research by Skillman, lower utilization of dental services and rates of insurance, along with higher rates of poverty, fewer dentists per population, and greater distances to travel to access health care are barriers for those individuals residing in rural areas (Skillman et. al, 2020; North Carolina Oral Health Collaborative, 2017). Approaches that are practical and provide flexibility are essential in improving and expanding the oral healthcare workforce (Henshaw & Garcia, 2018).

Inequalities exist between rural and urban areas and are apparent when looking at medical care, and oral health is no exception. Disparities exist in availability, usage, oral well-being information, and inclusion at a higher rate in rural territories (Peterson & Kwan, 2011). Studies reveal that people living in impoverished rural areas are more likely to experience limited education, income, and healthcare access (Northbridge, et al 2020). Individuals residing in urban communities often are in closer proximity to treatment facilities; however, because of lack of access, overdose-related deaths in rural communities are reported as 45% greater (CDC, 2020). The Carsey School of Public Policy reported, in 2015, prescription pain killers are more likely to be abused by adolescents of rural areas than adolescents in urban communities (Rural Health Information Hub [RHIhub], 2020). With the increased drug usage such as crystal methamphetamine in rural communities, rural residents are at greater risk for severe oral health problems. As a result, Dentists often provide the diagnosis of "meth mouth."

Meth mouth is the destruction of tooth enamel, rotten teeth, discoloration of teeth, tooth loss and severe oral health issues (American Dental Association [ADA], 2020). Typically, individuals in rural areas have inadequate and insufficient knowledge, attitude, and health behaviors regarding oral health practices, which results in limited economic resources (Shiqian Gao, et al., 2019).

The prioritization of oral health care is significantly decreased for rural, low-income families compared to those residing in more urban areas (Shiqian Gao, et al., 2019). A number of low-income individuals understand the importance of going to the dentist; however, they feel that other obligations keep them from maintaining a healthy oral regiment. Therefore, individuals in rural areas may have social determinants of health barriers or financial restraints, limiting affordable, conventional oral healthcare (Quandt, et al., 2009).

2.2 Barriers to Rural Health Dental Programs

Factors such as lack of knowledge can prevent individuals from receiving adequate oral health. Appropriate education and knowledge can help patients overcome barriers that deter access to routine dental care. Individuals are often prevented from accessing fundamental health services due to various inequalities and barriers such as accessibility and affordability (Northbridge et. al, 2020). "A 2000 report released by the Surgeon General, *Oral Health in America,* reported the importance of oral health to individuals' overall health and well-being" (National Institute of Dental and Craniofacial Research, 2020, p. 32). Many chronic conditions such as diabetes, heart disease, stroke, and cancer can impact oral health, which acts as a determinant or measure of

an individual's physical health (Akar et. al, 2011).

In 2004, the National Advisory Committee on Rural Health and Human Services recognized numerous issues that contributed to a lack of access to oral health rural America (RHIhub, 2020):

- Geographic Isolation
- Lack of adequate transportation
- Poverty rate
- Large older adult population
- Difficulty finding providers to treat Medicaid population
- Acute provider shortage
- Lack of dental insurance

Quite a few factors influence whether patients will access oral health services. Factors associated with access to oral health depend on the individual and related to the desires and/or needs for oral health services (Chavers, Gilbert, & Shelton, 2007). Lack of knowledge can impede individuals from having good oral health.

2.3 Types of Dental Programs

Standard oral cleanliness or mouth care is essential to prevent unwanted dental and oral medical conditions, for example, tooth deterioration and gum disease (Mona, 2018). Proper oral hygiene can foster healthy teeth and gums. Oral health services can be provided through various avenues such as fixed-site dental locations, mobile dental units (MDUs), or portable dental units (Mona, 2018).

A fixed-site dental space can be designed to optimize facility layout to enhance

efficiency and productivity (Doherty et al., 2018). Fixed office spaces are often more spacious with designated waiting rooms and storage rooms. A fixed clinic facility is the most efficient and effective delivery model for providing direct dental services to individuals who can travel to the facility (Doherty et al., 2018). The stationary clinics' mere existence provides a sense to recipients of care that services will be constant at that location. Fixed facilities are designed modular units, new construction, or renovation of a standing structure. This type of dental program is often the preference of patients and dental providers related to ease and proficiency.

Mobile dental units (MDU) provide a creative and innovative opportunity to deliver oral health services because the mobile units allow for greater coverage of remote locations (Doherty et al., 2018). MDUs are mobile vehicles such as motorized vans, recreational vehicles, or non-motorized mobile trailers outfitted with dental operatories, limited office spaces, and small waiting rooms (Doherty et al., 2018). Vulnerable populations have immediate access to dental services through mobile dental units. Mobile units can be driven and placed at a different location daily. Additionally, the dental equipment can be transported in portable trailers. Mobile dental programs offer basic services such as dental sealants and other prophylactic therapies to address individuals' needs in various environments (Doherty et al., 2018).

Portable dental equipment for a comprehensive community-based oral health program is relatively inexpensive, durable, and easy to transport (Doherty et al., 2018). Portable dental equipment folds down to large suitcases and can easily be transported in a conventional automobile. It is easy to set up and break down and is often moved daily from site to site. Patients are more likely to utilize services when they are provided

in the community where they reside, and portable equipment makes that possible (Doherty et al., 2018).

There will always be a place for fixed dental locations for activities such as oral surgeries, extensive dental procedures, and services requiring sedation (Vashishtha, et al., 2014). However, travel to fixed locations for residents of rural communities often is met with transportation challenges. In contrast, MDUs allow for access to dental care for at-risk populations in rural communities (Vashishtha, et al., 2014). MDUs and portable dental units help to address barriers in accessibility, affordability, and sustainability (Goa, et al., 2019). They can reach more people than fixed-site clinics.

The units address accessibility by their ability to travel to locations convenient to the at-risk populations in need of care. The mobile vehicle and portable dental units can go into neighbors and areas to provide on-site care, eliminating transportation and childcare barriers (Gupta, et al., 2019). "Services provided using portable dental units include screening, oral prophylaxis, simple tooth extractions, restoration of decayed teeth using Atraumatic Restorative Treatment (ART)/temporary fillings, access opening of deeply carious teeth, and impression making for removable partial dentures (RPD)/complete dentures (CD)" (Gupta, et al., 2019, p. 3). MDUs and portable equipment lend flexibility to operations that reduce geographic and cultural barriers to care.

2.4 Federally Qualified Health Centers role in rural communities

Nearly 20% of people who reside in rural areas receive services from the Health Center Program, according to the Health Resources and Services Administration

(HRSA) Bureau of Primary Health Care (BPHC). Those residents rely on the safety net of Federally Qualified Health Centers (FQHCs) for "essential" healthcare services, which would not be available elsewhere in the community (RHIhub, 2020; HRSA, 2020). Because most rural areas have limited access to health care, FQHCs are essential primary care providers.

"According to the Health Resources and Services Administration (HRSA), as of March 31, 2020, 4,297 of the nation's 6,319 Dental Health Professional Shortage Areas (HPSAs) were located in poor urban and remote areas" (RHIhub, 2020). Particularly in rural areas, there is a shortage of dental providers as well as dental health insurance coverage. Oral health disparities that contribute to the shortage include (RHIhub, 2020):

- Limited dental school slots
- Low demand for rural worksites
- Increased in dentist retiring
- Growing trend of specialization in oral care

FQHCs are nonprofit outpatient clinics that serve medically underserved populations or areas, such as urban and rural communities. FQHCs offer comprehensive primary care, preventive care, dental services, and behavioral health services. In 2019, there were 1,370 federally qualified health centers with 12,409 service sites (HRSA, 2019). Approximately 75% of those centers provided on-site dental services (USDHHSS, 2019). However, only 22.5% of agencies provide mobile or portable dental care (USDHHS, 2019).

FQHCs continue to experience exponential growth in patients' utilization of oral health services (Kaiser Foundation, 2012). FQHCs have an inadequate amount of sites

and capacity among existing sites to meet the greater patient need, particularly for uninsured and Medicaid populations (Edelstein, 2010). The 2019 HRSA uniformed data resource reported 10,714 dental provider shortages (USDHHS, 2019). "Building or expanding dental clinics within existing FQHCs is an important strategy to help close the gap between FQHCs' medical and dental primary care capacity" (Crall et al., 2016, p.5).

2.5 Conclusion

The geographic location of rural communities often is a limiting factor directly related to people accessing dental services. Lack of reliable transportation and cost of care are often barriers to care. While there will always be a place for fixed dental locations, mobile and portable dental clinics take oral health services to the community thereby increasing access to care (Goa, et al., 2019). FQHCs play a key role in oral health in eliminating disparities as it is an important part of comprehensive health care. In many counties, essential health care services are often limited in both capacity and resources, resulting in restricted access to fundamental services for individuals and populations (Vashishtha, et al., 2014). FQHCs are one possible resource that exists, maybe underutilized, but there is an infrastructure that can be built upon to increase access to care for rural communities.

3 Chapter III Methodology

Federally Qualified Health Center (FQHCs) are known as the safety net providers for the most vulnerable populations. FQHCs were established to meet the primary medical, dental, and behavioral health needs of low-income, uninsured, and underinsured populations. Oral healthcare at FQHCs includes the following services: preventive dental services including basic oral health assessments and recommendations for prophylactic intervention; dental health teaching and related oral health education such as prevention of oral trauma and oral cancer; oral prophylaxis, as necessary; topical application of fluorides including fluoride varnishes; application of sealants; and diagnostic screening for caries and periodontal disease through the use of dental x-rays (HRSA, 2020).

Collaboration with an FQHC to provide comprehensive, cost-effective, quality dental services to school-aged children in rural communities may allow for a better quality of life. The partnership could allow students to receive services with minimum disruption to their academics and family life. It would also allow students to get care in school versus parents/caregivers having to take time off from work to travel to get the care they need. If parents are paid hourly, taking time off for healthcare or dental appointments could negatively impact household income. To better understand the potential impact on rural residents' quality of life, more research is needed to examine the population's health outcomes.

3.1 Methods

The objective of this consultant report is to examine opportunities to improve access to dental care for students of rural South Carolina through a partnership with a FQHC. The consultant report will provide an abstract with a succinct summary of overarching findings and a list of recommendations needed to construct a business proposal. Additionally, the report will consist of the following items:

- An introduction about rural health services and identification of gaps in care and background information to support the negative implications of barriers to care.
- A scoping literature review that will focus on access to rural dental programs, barriers to rural health dental programs, types of dental programs and FQHCs' role in rural communities.
- Methodological approach aimed at analyzing quantitative and qualitative data pertaining to the problem.
- Environmental assessment to determine the current level of oral health services available in rural Charleston County, South Carolina.
- Discussion of recommendations for the FQHC to improve access to oral health services in rural Charleston County, South Carolina.

3.2 Study Design

The project involved examining quantitative and qualitative research information and deciphering the needs of the populations residing in rural communities. The consultant report explains the history of oral health services as it relates to rural communities. The report identifies the barriers related to transportation, financial cost, and geographic

position. The study is designed to explore the need for oral health care in rural communities, focusing on school aged children.

3.3 Population

The study population is residents in rural areas of Charleston County, South Carolina. The consultant report will discuss developing a school-based oral health program serving the rural schools located in the low country region of Charleston, South Carolina. The services will be provided by a FQHC that currently provides medical care in rural communities. The scope of services to be provided include potential strategies for expanding access to oral health care, especially for low-income school-aged children, attending schools in rural Charleston County. The U.S. Census Bureau has classified rural, urban and suburban communities based on various criteria defined in Table 2.

Table 2: Rural, Urban and Suburban Classification

Organization	Definitions
U.S. Census Bureau	*Urban areas* include a core county with at least one densely populated urban area of 50,000 or more people, plus surrounding counties where at least 25 percent of residents' work in the core county (United States Census Bureau, 2020).
U.S. Census Bureau	*Rural* is defined as "all population, housing, and territory not included within an urbanized area or urban cluster. It can also be defined as "any population, housing, or territory NOT in an urban area" (Economic Research Service United States Department of Agriculture, 2020).
U.S. Census Bureau	*High Poverty Rural*- areas where there is higher and more persistent poverty for individual within the area (United States Census Bureau, 2020)
U.S. Census Bureau	*Small Rural Areas*-consist of built up territory of properties with a population density of less than 500 people per square mile and places with fewer than 2,500 people (United States Census Bureau, 2020).
U.S. Census Bureau	*Large Rural Areas*-may or may not contain individual cities of 50,000 or more. Generally, there are a population density of 1,000 persons per square miles and may contain adjoining territory with at least 500 person per square mile (United States Census Bureau, 2020)
U.S. Census Bureau	*Suburban*- is a cluster of properties, primarily residential, that are located near an urban area (United States Census Bureau, 2020).

Reference: U.S Census Bureau, 2020

3.4 Date Sources

This consultant report will be used to identify barriers to oral health care, financial restrictions to obtaining dental services, and recommendation for improving access to oral health care in rural communities. The report will provide strategies to the FQHC regarding opportunities to partner with schools to make oral health care available to school-aged children. This report will summarize the anticipated benefits of bringing those services in the schools.

The Uniform Data System (UDS) reports are available annually to the public, and therefore the reports will be used as a data source. The UDS report is generated by the Health Resources and Services Administration (HRSA). The UDS report illustrates trends and performances using measures defined HRSA by for all FQHCs The utilization rates and oral health measures of the local FQHC will be used as comparison data to show a trend of very low utilization rates of oral health care in rural Charleston County compared to national rates.

The 2017 and 2018 Trident United Way (TUW) community needs assessment (CNA) for Charleston, Berkeley, and Dorchester counties will also be a data source. The CAN included data from focus groups, community stakeholder interviews, community member surveys, and secondary data sources. The TUW CNA indicated that the top health needs in the tri-county region are access to the following health services: clinical preventive services, mental health, dental health, obesity/nutrition/physical activity, and maternal, infant, and child health. The Trident United Way study also addressed social determinants of health (SDOH), including lack of transportation and lack of specialty

care services (2017 and 2018 Community Health Needs Assessment Report, Trident United Way).

Enrollment information and georgical locations of schools was obtained from the Charleston County annual report. The school district report identified all schools located in rural Charleston County and ensure that the FQHC could provide services in rural schools and school districts where students lack dental health care.

Additional data sources for the business plan involved a literature review of published resources and examination of current information. The literature review included information from published books, government publications, peer-reviewed journal articles, reference materials, conference papers, and the internet.

3.5 Analysis

The analysis will follow the Seven Step Model for conducting an oral health needs assessment (Kuthy, Siegal, & Phipps, 2003). A needs assessment is the first step in the creation of a community oral health plan. In a needs assessment, the current environment is examined and compared to the ideal state. This gap between the current and ideal states is then used to identify interventions and resources for the community. Kuthy, Siegal, & Phipps (2003) provide the following steps for the Seven Step Model:

1. Identification of partners, stakeholders, problems, and goals
2. Conduct self-assessment of FQHC to identify goals and resources
3. Review and analysis the community needs assessment
4. Data collection and review

5. Data analysis
6. Prioritization of issues, program planning for interventions, education and/or advocacy
7. Evaluation of program goals and methods

Descriptive statistics will be used to compare quantitative measures of oral health utilization and outcomes with established goals. Qualitative data will be assessed for indications and themes related to challenges and barriers to accessing oral health services. A root cause analysis will be utilized to identify program needs. Next, referencing the established literature, a business plan will be developed to outline intervention, education, and policy needs to best utilize FQHC resources for oral healthcare in rural Charleston County.

4 CHAPTER IV RESULTS

4.1 Sociodemographic Profile of South Carolina

South Carolina covers 30,109 square miles (USDA-ERS, 2019). The 2019 estimated population of South Carolina includes a total population of 5,148,714 people, which includes 743,306 persons who live in rural areas (USDA-ERS, 2019; RHIhub, 2020).

Table 3: Rural Characteristics of South Carolina

Demographics	N (%)
Children (under 18)	236,253 (21.8)
Seniors (over 65)	205,462 (19.0%)
Sex	
Female	51.5%
Male	48.5%
Race	
Asian	0.6%
Black/African American	37.6%
Native American/Alaskan Native	0.4%
Native Hawaiian/Pacific Islander	0%
White	58.1%
Ethnicity	
Hispanic/Latino	4.2%
Non-Hispanic/Latino	95.8%

Reference: (USDA-ERS, 2019; RHIhub, 2020)

In 2018, the average per capita income in South Carolina was $43,702 (USDA-ERS, 2019). This is nearly $8000 higher than the rural per capita income of $35,819 (RHIhub, 2020). Urban areas in South Carolina average a 14% poverty rate, compared to rural areas, with an average of 21.8% poverty rate (RHIhub, 2020). Within the rural population of South Carolina,18.1% have not completed high school, while in urban areas, 11.9% of the population lack a high school diploma (RHIhub, 2020). In 2019, the

unemployment rate in rural South Carolina was 3.6%, and 2.7% in urban South Carolina (USDA-ERS, 2019). Additionally, 11% of South Carolina residents lack health insurance, which may be attributed to poverty rates and lower income levels as reported by Kaiser, 2017 (RHIhub, 2020).

Dental Health in South Carolina

Dental health education, along with health service access, continues to be one of the most viable weapons against poor dental health and tooth loss. For South Carolina in 2017-2018, the percentage of students with caries experience (treated or untreated tooth decay) was 37.3% for kindergartners and 48.2% for 3rd graders (Centers for Disease Control and Prevention, 2020). The percentage of students with dental sealants on at least one permanent molar tooth in Third Grade was 24.9%. In South Carolina, the percentage of students with untreated tooth decay for Third Grade was 17.4% and 15.5% of Kindergarteners (CDC, 2020). Tooth decay or dental caries is one of the most common chronic diseases of children and can be prevented through education of the importance of good oral health habits, a healthy diet, and preventative dental services (Centers for Disease Control and Prevention, 2020).

The lack of healthcare services in rural areas results in higher rates of teeth loss in rural areas as opposed to urban areas. A 2013 report shows rural counties partial edentulism, or having several teeth pulled, at 38.4% in urban areas, 45% in rural areas, and 51.3% in poverty-stricken rural areas; thus, showing a higher percentage of individuals having teeth pulled in low-income rural areas (RHIhub, 2020). When examining full edentulism, or having all teeth pulled, urban rates are 4.3% compared to

other rural (8.2%) and high-poverty rural (10.5%) (RHIhub, 2020). Further, 2017 data from the South Carolina Rural Health Research Center shows children in rural area were less likely to receive preventive care, specifically 73% of children in large rural areas and 75% of children in small rural areas (RHIhub, 2020). South Carolinian, rural seniors are 56% less likely to have visited the dentist in the past year than urban or suburban seniors (RHIhub, 2020). Again, this may be due to service availability and low dental care visits increase the likelihood of teeth removal due to gum disease or decay (RHIhub, 2020).

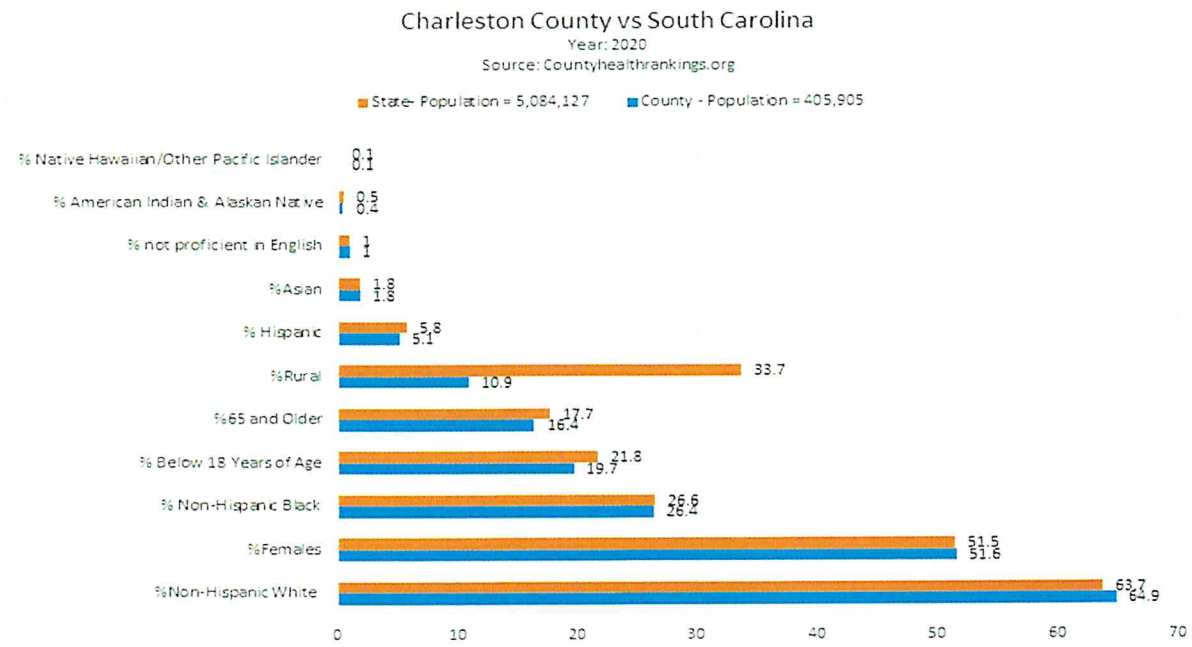
4.2 Sociodemographic Characteristics of Charleston County

The Charleston county population estimates as of July 2019 are reported as 411,406 (United States Census Bureau, 2020). The demographics of the state of SC are very similar to those found in Charleston county as represented in Table 4. However, there are significant differences in the SC rural community. There are 22% more individuals residing in the rural community across the state of SC compared to Charleston county. Approximately 33.7% of the population of SC reside in rural communities compared to only 10.9% in Charleston county (Table 4).

The healthcare coverage rates illustrate 87.7% of the Charleston County population has health coverage, with 49.8% on employee plans, 11.5% on Medicaid, 11.1% on Medicare, 13.3% on non-group plans, and 1.99% on military or VA plans (Data USA, 2020). Overall a marked increase in Medicaid and CHIP coverage and are reflected per the June 2020 enrollment of 1,048,276 individuals in Medicaid and CHIP — a net increase of 17.82% since the first Marketplace Open Enrollment Period and related Medicaid program changes in October 2013 (Medicaid.gov, 2020; Data

USA,2020). For populations of the state of South Carolina and Charleston county are very similar.

Table 4. State & County Population Demographics



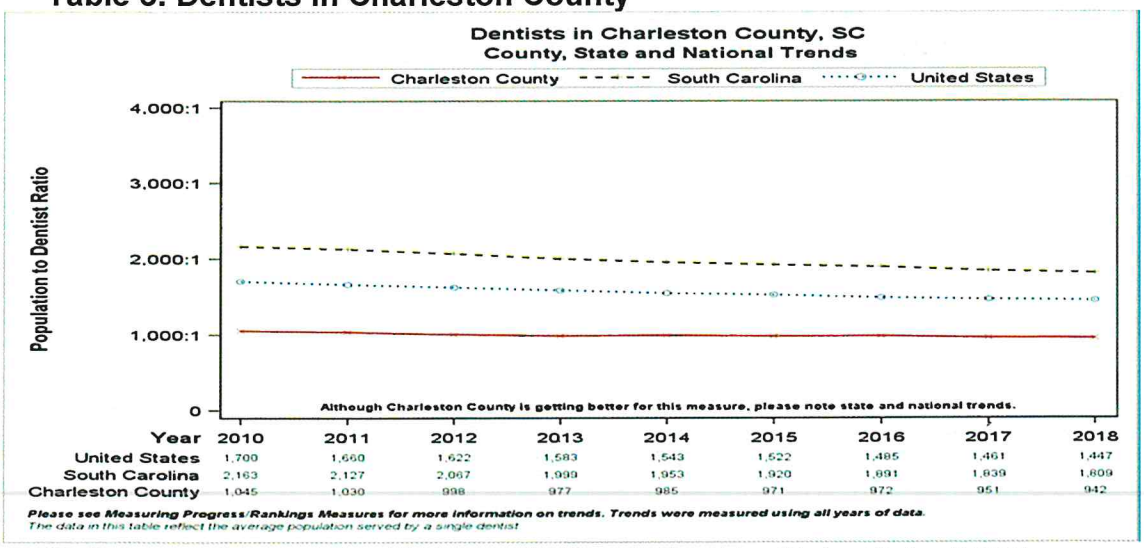
Reference: (Univeristy of Wisconsin Population Health Institute, 2020)

4.3 Dental Professionals of Charleston County

Assuming equal access for all residents, the overall supply of dentists in Charleston county is sufficient to meet the current demand however, geographic access to oral health services is not equal across rural and urban areas. A study in the *County Health Rankings and Road Maps* report identified that urban access to dentists is nearly double that of rural access, and that inequalities exist between areas of higher socioeconomic status and those of lower socioeconomic status (County Health Ranking, 2020). In reviewing the county health rankings, Charleston County has one of the highest dentist rates per 100,000 residents; 942 dentists:1 resident in Charleston

County compared to 1809 dentists :1 resident for South Carolina. Charleston County numbers exceed the national population to dentist benchmark of 1,447:1 (Table 5). These numbers are aided by the Medical University of South Carolina Dental School located within Charleston city limits. Even though there appears to be an optimal dentist to population ratio, the number of dentists willing to accept patients with Medicaid in Charleston County is significantly low (Table 3).

Table 5. Dentists in Charleston County



Reference: (Univeristy of Wisconsin Population Health Institute, 2020)

Charleston County is noted as having shortages of dentists and is designated a Dental Health Professional Shortage Area (Dental HPSAs) by the Health Resources and Services Administration Bureau of Health Workforce (BHW) (HRSA, 2020). The designation identifies areas of greatest need to prioritize limited resources. Of note, Charleston County also identifies as a Medically Underserved Areas (MUAs) and Medically Underserved Populations (MUPs) (HRSA, 2020). These designations identify

geographic areas and populations that do not have access to primary care services (HRSA, 2020).

4.4 Demographics of Children Enrolled in Charleston County's Public Schools

There are 79 public schools (includes public chartered schools) within eight constituent school districts are in Charleston County with a total enrollment of over 48,641 students (Table 6). The rural schools have a higher percentage of minority populations compared to suburban schools, but a lower percentage compared to Urban Schools.

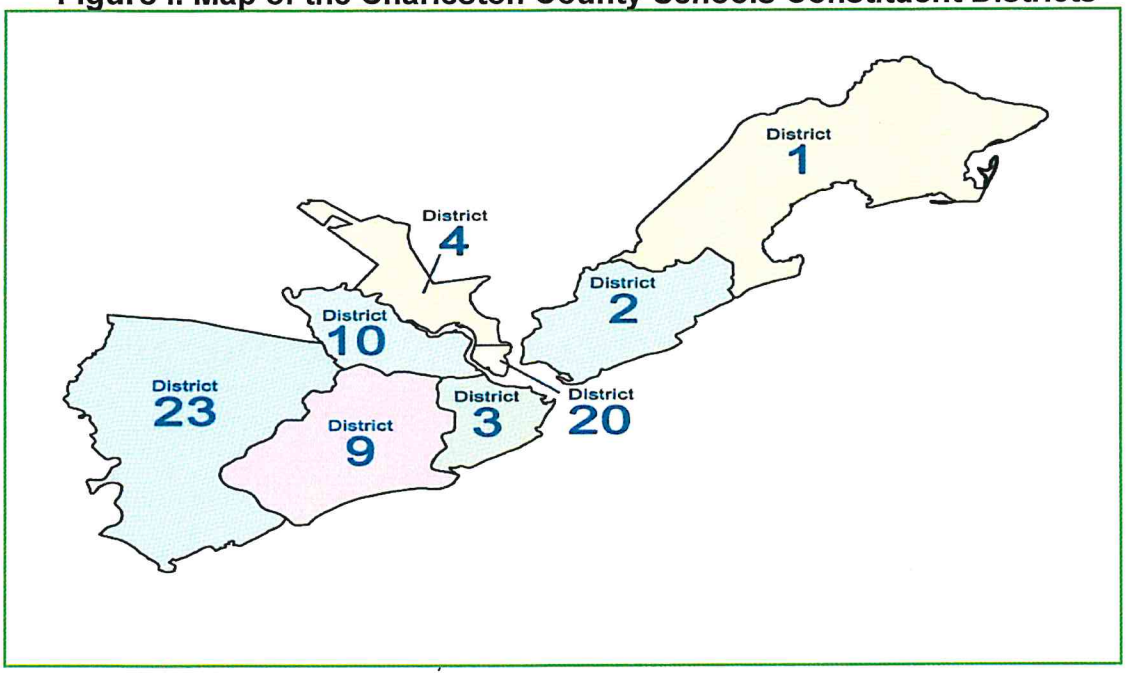
Table 6. Student Demographics of Charleston County Schools Constituent Districts

Demographic	Asian	Black/ African American	Hispanic/ Latino	American Indian or Alaska Native	Two or More Races	Native Hawaiian	White	Unclassified	Total
Demographic of Student Population	781 (1.6%	16,837 (34.6%)	5,539 (11.4%)	53 (0.1%)	1,383 (2.8%)	80 (0.2%)	23,921 (49.2%)	47 (0.1%)	48,641
Demographics of Suburban Students (Suburb: Large)	292 (2.4%)	1,657 (13.5%)	687 (5.6%)	13 (0.1%)	349 (2.8%)	6 (0%)	9,289 (75.6%)	0 (0%)	12,293
Demographics of Urban Students (City: Medium)	409 (1.36%)	13513 (44.88%)	4453 (14.79%)	31 (0.10%)	888 (2.95%)	70 (0.23%)	10706 (35.56%)	41 (0.14%)	30,111
Demographics of Rural Students (Rural: Distant & Rural: Fringe)	80 (1.50%)	1667 (31.23%)	399 (7.48%)	9 (0.17%)	146 (2.74%)	4 (0.07%)	3026 (56.70%)	6 (0.11%)	5537

Reference: PowerSchool SIS, on 10/16/2020

There are 17 suburban, 52 urban, and 10 rural distant & rural fringe schools in Charleston County. The constituent districts are classified as: Rural Schools -District 1-Awendaw, District 9 -Johns Island, District 23-Hollywood; Urban Schools- District 20-Peninsula, District 4 -North Charleston; and Suburban Schools -District 2- Mt. Pleasant, District 10 -West Ashley, District 3-James Island (Figure I).

Figure I. Map of the Charleston County Schools Constituent Districts



In Charleston County, there are over 71,050 children under the age of 19. There are 79 public schools within eight separate school districts in the county with a total enrollment of over 48,000 students. Slightly over half of these students (25,909) are enrolled in the free/reduced lunch program, which serves as a proxy for low-income status and thus potential eligibility for Medicaid coverage. In addition, 46 of the county's 79 schools are considered Title I schools, which provides financial assistance to educational agencies in provided education to children of low-income families (Table 7).

Table 7. Sociodemographic of Charleston County Schools Constituent Districts

Category	n (%)
Number of students enrolled in Charleston County	48,641
Number attending suburban schools	12,293 (25.2%)
Number attending urban schools	30,111 (61.9%)
Number attending rural schools	6,237 (12.8%)
Number of schools are in Charleston County	79
Suburban Schools	17 (21.5%)
Urban Schools	52 (65.8%)
Rural Schools	10 (12.7%)
Number of students receiving free/reduced lunch	25,909
Suburban students receive free/reduced	2,741 (10.6%)
Urban students receive free/reduced lunch	20,696 (79.9%)
Rural students receive free/reduced lunch	2,472 (9.5%)
Number of Title I schools	46
Title I schools in the suburbs	3 (6.5%)
Title I schools in urban areas	37 (80.4%)
Title I schools in the rural communities	7 (15.2%)

Reference: PowerSchool SIS, on 10/16/2020.

The Center for Disease Prevention (CDC) School Based Dental Programs (SBDP), focuses children ranging from kindergarten to the eighth grade. The program specifically targets schools with 50% or more of students receiving free and reduced lunches and aims to address unmet dental needs in underserve populations (CDC, 2020). South Carolina Mobile School Dental Program states that dental needs include services such

as “comprehensive oral health exams, dental screenings or exams, dental x-rays, dental cleanings, fluoride treatment, and, if needed, sealants (which are thin plastic coatings painted on the back permanent molars) to help prevent and stop cavities” (South Carolina Dental Screening Associate, 2017,p.1).

Healthy People 2030 aims to “increase the proportion of children ages 3 to 19 who have received dental sealants on one or more of their primary or permanent molar teeth from 37.0% to 42.5%” (Office of Disease Prevention and Health Promotion [OPDPHP], 2020, p.1). School sealant programs are an effective way to reach millions of children with dental sealants to prevent cavities. School sealant programs can also be cost saving to programs including Medicaid, when sealants are placed within two years to children at high risk for cavities (CDC, 2020; Griffin et al, 2016).

Connecting children who are at increased risk developing cavities and limited access to dentist, should be priority to receive sealants through school based dental programs. Students receiving enrolled in free or reduced school food programs is the target population for school-based sealant programs. When making the comparison of children from high-income families, children from low-income families are more likely to have untreated tooth decay, fewer or no dental sealants and no yearly dental visits (CDC 2020; Griffin et al., 2017).

The objective of Healthy People 2030 is to “reduce the proportion of children and adolescents with active and currently untreated tooth decay in their primary or permanent teeth from 13.4% to 10.2%” (OPDPH, 2020, p.1). For children younger than eight years old, fluoride strengthens the adult (permanent) teeth that are developing under the gums. Fluoride treatments decrease the number of cavities, aid in the need

for less fillings and removal of teeth and a reduction of pain related to tooth decay (CDC, 2020). Additionally, studies have shown that fluoride varnish, when applied twice a year in addition to regular fluoride toothpaste, provides additional protection to teeth against decay (CDC, 2020).

4.5 Comparison of Dental Service Delivery Models

The ability to offer dental care in three distinct models allows dental providers more opportunity to serve more patients. The traditional fixed facilities are utilized by patients near the site or those who has reliable transportation (Safety Net Dental Clinic Manual, 2020). Fixed facilities often have more space and onsite lab and x-ray machine. However, fixed units are more expensive to operate. In comparison, mobile dental units or MDUs offer providers the ability to go where patients reside, work, or go to school. MDUs are high visibility and are designed as a marketing tool. MDUs are often a more cost-efficient model to providing oral health care in communities where it is geographically challenging to provide dental services (Safety Net Dental Clinic Manual, 2020).

Lastly, the portable dental option is the most cost-effective model. Portable units have the ability to move equipment quickly and relocate in a new setting (Safety Net Dental Clinic Manual, 2020). Portable models can partner with mobile and fixed modes to expand services. However, appropriate space in the community is required to deliver care (Table 7). With the constant changes in healthcare, administrators are often faced with developing and implementing services that will benefit everyone. It is important in the assessment phase to consider the needs of communities that often have barriers to

care. Another factor that must be considered is the financial impact of implementation the apparent financial risk that are associated with new business ventures.

4.6 Financial Impact and Start-up Cost

Startup costs are the initial expenditures incurred to begin dental business (Safety Net Dental Clinic Manual, 2020). The startup cost is required regardless of the dental program communication. IT equipment and initial inventory of supplies and instruments must be purchased to start the business. Before the first patient can be seen, the unit needs to be setup with connections to the E.H.R. system so patients can be registered, treated and billed for services. In addition, all the supplies and instruments needed by the dentist and hygienist to perform dental procedures on the unit needs to be available so that they can treat the first patient. The breakdown of start-up costs are the cost of the facility, mobile dental unit or portable equipment, IT Equipment-laptop, printer, cell Phones, IT firewall appliance, electronic health records providers' license, other supplies (marketing brochures, signs, office, cleaning, etc.) and assortment of clinical supplies (drill bits, instruments, gauzes, etc.) to equip two dental exam rooms. The startup cost can vary based on the physical design of the dental project. It is estimated that the startup cost for a fixed facility is $590,000, MDU $441, 700 and portable dental equipment is $60,000 (Table 7).

4.7 Annual Operating Cost

In determining the dental service delivery model, it is important to determine the annual estimated operating expenses. The estimated operating expense is cost

associated with the daily functioning and management of an organization. The operating expense is calculated by dividing the operating expenses by gross income(Safety Net Dental Clinic Manual, 2020). In comparing the three models it was determined that the annual operating expenses are $360,000.00 for a fixed building, $219,033 for a mobile unit, and $215,000.00 for portable equipment (Table 7).

4.8 Proforma (Profit and Loss)

Proforma is a forecast of profit and loss over a period of time. The proforma shows the company's ability to repay the loan and support the proposed business strategy (Safety Net Dental Clinic Manual, 2020). It is good business practice to utilize the proforma to project out five years utilizing estimated existing dental financial data and reasonable assumptions.

The profit and lost (proforma), must be created before making the final decision to start a new program or open a company. The proforma is utilized to forecast the profit and loss of the agency over a period of time. The proforma will show the company's ability to repay potential loans and/or other debts and support the proposed business strategy. It is good business practice to utilize the proforma to project out five years utilizing estimated existing dental financial data and reasonable assumptions. The proforma includes the total first year cost and investment needed to start the business for the dental service delivery models are follows: fixed facility- $950,000.00, mobile dental unit-$660,733.00 and portable dental equipment-$275,000.00 (Table 8).

Table 7. Comparison of Dental Service Delivery Models

Service Delivery Models	Portable Dental Unit	Mobile Dental Unit	Fixed Dental Facility
Pros	• Startup cost substantiality lower compared to other delivery modes • Ability to move equipment quickly and relocation in a new setting • Allows for great flexibility with space allowance • Can partner with mobile and fixed modes to expand services. • Can take the services to the people	• Startup cost lower compared to fixed dental • Onsite ability to take x-rays • Onsite lab is available • Can partner with portable and fixed modes to expand services • Can relocate unit swiftly and easily • Can take the services to the people-unit moves to different locations • High visibility-unit is often designed as a marketing tool	• Patient operatories are typically larger • Lobby, restrooms and storage spaces are built to meet the needs of the practice • Perceived more as a dental home when compared to other delivery modes • Lab and x-ray services are available at the location • Space is designed to be more efficient and allow for greater patient capacity
Cons	• No ability to take onsite x-ray • No onsite lab • Extensive time packing and unpacking equipment • Must transport supplies to every location • Requires access to waterline or the purchase of water • Equipment is typically louder because of generator • Requires access to indoor facility • Must transport waste for proper disposal	• Dental operatory, lobby and restrooms are very compact • Space limitations for staff and supplies • Requires State and County operating permits • Maintenance cost of MDU can be expensive • Dimensions of unit can cause issues with driving on narrow streets or limited parking spaces	• Startup cost is greater compared to mobile and portable • Limited to one geographic location • Can be perceived as perceived as private practices, i.e., will not accept Medicaid or offer s sliding fee program
Amount of Operatories	Two chairs	Two chairs	Three chairs
Estimated of Start-up Expense	$60,000.00	$441,700.00	$590,000.00
Estimated Annual Operating Expense	$215,000.00	$219,033.00	$360,000.00
Total First -Year Cost	$275,000.00	660,733.00	$950,000.00

Reference: Safety Net Dental Clinic Manual, 2020

4.9 Provider Expanded Role Capacity

Several states have found that expanding the role of a dental hygienist would be a beneficial strategy in addressing barriers to oral health access in underserved and vulnerable populations (National Governors Association, 2019). Hygienists are responsible for providing preventive oral health services, including fluoride and sealant applications and prophylaxis. However, in most states, the work of a hygienist requires supervision, which can be a barrier to offering services. The ADHA states the "scope of practice of dental hygienists are established by state law and includes the procedures hygienists can perform, supervision levels, and locations in which dental hygienists can provide services" (ADHA, 2020, p.2). However, many state officials have realized the importance of possibly altering supervision or reimbursement rules for existing dental hygienists.

There are three supervision levels for dental hygienists: direct supervision, general supervision, and direct access (Kracher, 2014). For direct supervision, the dentist must be physically present. In general supervision, the hygienist must receive authorization from the dentist to perform services for specific patients, although the dentist may not be physically present. Direct access allows the hygienist to initiate treatment based on their assessment of a patient's needs without a dentist authorization. "The South Carolina Dental Practice Act 2003 established the South Carolina Department of Health and Environmental Control's (SCDHEC) role in coordination of a public health dental prevention program using public-private partnerships to deliver preventive dental services in public health settings including schools that address the needs of priority populations identified by

DHEC using standard public health principles. Section 40-15-110 of the Dental Practice Act refers to DHEC and the delivery of preventive dental services through a public heath dental prevention program" (South Carolina Department of Health and Environmental Control, 2020, p.1).

In 2016, the HRSA updated the Dental Hygiene Professional Practice Index (DHPPI): "Scopes of practice which allow dental hygienists to provide services to patients in public health settings without burdensome supervision or prescriptive requirements which appear to increase access to educational and preventive care" (HRSA, 2020, p. 3). Expanding the role of a dental hygienist will help fulfill unmet oral health care needs for underserved populations. While all 50 states allow for some expanded scope of practice by the dental hygienist, the range types of services performed without the supervision of a dentist vary by state. Each state has different requirements that are outlined through collaborative practice agreements, competency checks, memorandum of understating or mandatory minimal clinical experiences (HRSA, 2020).

4.10 NHSC Loan Repayment Program

An additional incentive to The National Health Service Corps (NHSC) Loan Repayment Program is administered by the HRSA that offers scholarships and loans for medical primary care, dental, mental and behavioral health care providers working in selected health professional shortage (HRSA, 2020). Two levels of funding are offered based on the need of the community in which the provider will work as defined by a Health Professional Shortage Area (HPSA) score.

The maximum repayment during the required initial two-year contract for a provider who works full time (40-hour work week, 45 weeks/year) is up to $25,000 each year. For a provider who works part-time (20-hour work week, 45 weeks/year) is up to $15,000 each year.

Individuals who qualify for the program must practice in one of the following disciplines (HRSA, 2020):

- Primary Care Physician (MD or DO)
- Dentist (DDS or DMD)
- Primary Care Certified Nurse Practitioner (NP)
- Certified Nurse-Midwife (CNM)
- Primary Care Physician Assistant (PA)
- Registered Dental Hygienist (RDH)
- Health Service Psychologist (HSP)
- Licensed Clinical Social Worker (LCSW)
- Psychiatric Nurse Specialist (PNS)
- Marriage and Family Therapist (MFT)
- Licensed Professional Counselor (LPC)

To qualify as a participant for the program the provider must be a U.S. Citizen or U.S national who works at an NHSC approved site in a HPSA. HPSA's are generally located in outpatient facilities around the country in rural and urban communities. Eligibility for the HSPA designation depends on "the number of health professionals relative to the population with consideration of high need" (Health Resources & Services Administration, 2020, p. 5). HPSA designation is based on health disciplines that are experiencing a shortage in the following areas: primary care, dental care, and mental

health care. HPSAs are designated by HRSA as a part of a cooperative agreement with the State Primary Care Offices (PCOs). The PCOs determine which areas are eligible for designation based on a need assessment in their respective state. The completed application is sent to HRSA for review and approval to determine if the statutory and regulatory designation eligibility criteria are met to be designated as a HPSA. HRSA scores HPSAs on a scale of 0-25 for primary and mental health care and 0-26 for dental health to elect their designation (HRSA, 2020). The higher the score, the greater the need. Fortunately, the FQHC that would provide services to the schools in the rural communities of Charleston County is classified as an approved HHSC agency with HPSA designation scores of 21 for dental health 19 in primary care and 22 in mental health (HRSA, 2020).

The NHSC was established due to the health care crisis in the U.S. in the 1950s and 1960s. During this time rural and inner-city areas lacked resources to provide the services and technology that many physicians required. Authorized by the Emergency Health Personnel Act of 1970 and enacted by Public Law 91-623, the program was created to "improve the delivery of health services to persons living in communities and areas of the United States where health personnel and services are inadequate" (American Psychological Association, 2020, p. 1).

4.11 Benefits for FQHC: Federal Payment and Funding Programs

Community Health Centers (CHC) in the United States are the leading model for providing integrated primary care for the low-income and uninsured, and represents one use of federal grant funding as part of the country's health care safety net (NACHC,

2020). The majority of health center patients at or below the federal poverty level. Additionally, a quarter of patients are treated in a language other than English, and the majority of health center patients are racial or ethnic minorities (HRSA, 2020). "When the CHC was first established, it accounted for less than half (40%) of Section 330 funding; however, between FY2011 and FY2019, lawmakers increased funding through the CHC while holding the annually appropriated amount relatively constant. By fiscal year 2018, the CHC accounted for 72% of Section 330 grant funding" (RHIhub, 2020, p1; Rosenbaum, et. al, 2019, p.1).

Federal and rural resources work to strengthen the health and economic deprived areas and enhance the quality of life for residents. Leveraging multiple funding sources can assist rural communities in advancing their overall quality of life. The programs also assist FQHCs with recruitment of medical, dental, and behavioral health providers. FQHCs have become an essential provider of care for approximately 20 million medically underserved people in both urban and rural areas (Wright & Ricketts, 2013). All individuals are seen regardless of their ability to pay based on a sliding fee scale for payment. FQHCs qualify for specific reimbursement under Medicare and Medicaid.

In South Carolina, the reimbursement for dental care allows for payments and are based on Fee for Service. Dental does not follow the Prospective Payment System (PPS) rate for Medicaid. However, FQHC's do receive a quarterly wrap payment based on the cost report for the difference up to the AMP/PPS rate for Medicaid. The cost reports are completed and submitted annually, which consider the overall operational cost comparative to clinical (HRSA, 2020). Medicare does not reimburse for routine

dental procedures. However, Medicare Advantage does reimburse for dental procedures. Patients must opt into the specific advantage plan to receive the benefits. Commercial Insurances usually have a specific third-party dental plan which the patient is enrolled in. Sliding Fee Scale is determined by the FQHC and is approved by the Board of Directors annually. Lastly, complex & denature procedures require additional reimbursement for lab cost.

Pediatric dental procedures are covered in South Carolina by Medicaid and commercial insurance. The FQHC has case management staff available to assist patients with the Medicaid Enrollment Application and Affordable Care Insurance Portal. The services are available to all patients at no cost. FQHCs are typically paid below $100 for pediatric dental procedures in SC. Moreover, for pediatric dental services, Medicaid typically pays dental providers at a lower rate compared to commercial insurance. For example, Medicaid pays $14.00 less for periodic oral health exams. Additionally, Medicaid pays $19.91 less than BCBS for panoramic film x-rays and Medicaid pays $5.00 less than BCBS for sealants (Table 8).

Table 8: Code on Dental Procedures and Nomenclature (CDT Code)

CDT Codes	Name of Procedures	Medicaid Payment	Blue Cross Blue Shield Payment	Difference
D0120	PERIODIC ORAL EXAM - Established Patient	$23.00	$37.00	-$14.00
D0150	COMPREHENSIVE ORAL EVALUATION - New or Est Patient	$40.53	$64.00	-$23.47
D0272	BITE WINGS - TWO FILMS	$18.94	$24.00	-$5.06
D0330	PANORAMIC FILM	$50.09	$70.00	-$19.91
D1120	PROPHYLAXIS - CHILD	$34.80	$43.00	-$8.02
D1206	TOPICAL FLUORIDE VARNISH	$16.20	$24.00	-$7.80
D1351	SEALANTS	$30.00	$35.00	-$5.00

References: South Carolina Healthy Connection Medicaid and Blue Cross Shield Commercial Insurance

5 CHAPTER V DISCUSSION

This consultant report explored the lack of accessibility and affordability of oral health services available to residents residing in rural communities. In addition, the report examined the potential partnership with an FQHC to deliver a comprehensive, and economical dental program to children who attend rural schools in the constituent districts of Charleston County South Carolina. Recommendations are based on quantitative and qualitative research, information from HRSA's Uniform Data System (UDS) reports, feedback from Trident United Way's community needs assessment data from Charleston County School District and The Center for Disease Prevention (CDC) School Based Dental Programs (SBDP).

Delivery Care Options for Mobile School Based Health Model

To better serve priority populations within the surrounding area, the FQHC should consider developing a "Hub and Spokes" model of school based dental care. Additionally, the FQHC should purchase an MDU to provide services in the rural schools. The MDU initial startup cost is substantially greater compared to the portable dental unit, however the annual operating cost is for the two programs is relatively the same. With that being said, the MDU allows for onsite labs, x-ray, and restroom and these are things not available with portable dental. Lastly the MDU does not require the employees to physical transport and dump biohazard materials and therefore make the MDU more sanitary for staff. The FQHC that is located in the same service area as the

rural schools, currently operates a fixed dental facility in the urban Charleston County. The "Hub" would be the fixed dental center that is co-located in the medical center, and the "Spokes" would be a dental team utilizing a mobile medical unit that would travel to each of the schools as warranted to deliver on-site care. Based on the findings, the recommendation to the FQHC is, to provide school-based dental services utilizing the hub and spokes model through the purchase of a MDU and should consider the two options deemed most appropriate for the Board of Directors.

Option 1: As an FQHC program in South Carolina, the organization is required to register the mobile program with the state. This would allow the FQHC to operate independently of the SCDHEC. However, with this operation, the hygienist will be under the supervision of the dentist. As such, the dentist is required to complete an examination and evaluation prior to or on the same date the hygienist would be administering preventive care. The hygienist is then allowed to see those patients for 364 days after the examination without having the dentist on the premises, providing that the patients are considered healthy and not medically compromised. In utilizing the hub and spokes model, this option provides the greatest cost to the FQHC. The FQHC would be required to have a dentist onsite at the fixed and mobile dental locations. Therefore, the FQHC would be required to hire two dentists, hence increasing the cost of operations.

Option 2: The FQHC could enter into a mobile care agreement with SCDHEC as part of their school-based sealant program. This would allow a hygienist to independently see patients within contracted schools as long as a dentist is providing oversight care and evaluation. Part of the agreement with SCDHEC includes the line

item that the FQHC could provide regular reports to SCDHEC of children seen, caries information, and sealant placement numbers. The FQHC would also be required to attend regular meetings and provide yearly updates of the program to SCDHEC. In utilizing the hub and spokes model, this option provides the greatest cost savings to the FQHC. The FQHC could operate both the fixed and mobile dental programs with one dentist. Staff would have to ensure the appropriate time is scheduled to allow the dentist and dental hygienist an opportunity to clinically review cases together. The financial advantage to this option would be a reduction in cost of personnel and return reduces the annual operating cost.

Recommendations for Mobile Dental School Based Program

It is estimated that the startup cost for a fixed facility is $590,000, MDU $441, 700, and portable dental equipment is $60,000. It has been determined that the estimated annual operating expenses for a fixed building is $360,000.00, for a mobile unit is $219,033 and for portable equipment is $215,000.00. Additionally, the total first-year cost and investment needed to start the business for the fixed dental facility is $950,000.00, mobile dental unit is $660,733.00 and portable dental equipment is $275,000.00 (Table 7). Although the startup cost can vary based on the physical design of the dental project, the recommendation is for the FQHC to purchase a Mobile Dental Unit to provide sealants, fluoride varnish, preventative care and oral health education to students attending schools in rural communities in collaboration of the mobile care agreement with SCDHEC as part of their school-based sealant program(option 2).

The FQHC has an opportunity to have a sustainable and outcomes-oriented dental program utilizing a mobile dental unit and the existing fixed dental clinic. This "Hub and Spokes" model can be extremely effective at reaching children in a school-based setting. The mobile dental unit can provide onsite care in the school environment and create a referral pathway for students in need of additional services to the fixed dental clinic. For maximum impact, the FQHC should invest in a dental program manager to ensure that individuals with existing disease referrals follow up on and appointments are scheduled in the fixed clinic as well as provide direct leadership and oversight to the school-based care clinic.

It is recommended that the FQHC invest in a mobile dental unit that has the capability to provide comprehensive dentistry in case expansion beyond prevention is warranted. For maximum success, the local FQHC should also invest in a full-time staff person to coordinate the mobile program and manage referrals of patients from the school based dental program to the fixed dental clinic. To start, the mobile dental team could consist of an independent hygienist, dental assistant, and front office personnel, who would provide oral health screenings, preventive care, oral hygiene education and referrals back to the fixed clinic of patients with identified dental disease or other dental issues. As the program matures, the mobile dental unit could expand to include a dentist, who could provide on-site restorative care and other dental services.

Based on the information provided in the Consultant Report, a Business Plan should be developed and presented to the Board of Directors of the FQHC. The proposal should include recommendations on purchasing a Mobile Dental Unit (MDU) to provide oral health services and dental care to school-aged students attending rural

schools in the Charleston Constituent District. The Business Plan must include the information identified in the consultant report as well as solidify the strategic partnerships, program goals, marketing strategies, and five year- financial projections.

Strategic partnerships lead to community empowerment, increased willingness to participate or enroll in services. The FQHC should continue to collaborate with the local school systems, community-based organizations, hospitals, medical centers/clinics, or local government agencies. It will be vital in continuing to leverage existing partners in rural communities. Stakeholders in the rural communities consist of local and state officials, community-based organizations, religious institutions, staff of the schools, policemen/women, rural healthcare, and service providers (RHIhub, 2020). Community engagement of rural residents and buy-in will be key to the success of the program.

Program goals and objectives must be communicated to the administration, staff, parents, and students affiliated with the targeted rural health schools. The recommended goals are 1) to encourage the utilization of onsite dental services, 2) to increase quality of life, and 3) to eliminate oral health disparities. The objectives of the program should duplicate the Center for Disease Prevention School Based Dental Programs that target children ranging from kindergarten to the eighth grade. The program should be evaluated based on the two objectives below:

1. Health People 2030 aims to "increase the proportion of children ages 3 to 19 who have received dental sealants on one or more of their primary or permanent molar teeth from 37.0% to 42.5%" (Office of Disease Prevention and Health Promotion [OPDPHP], 2020, p.1).

2. Healthy People 2030, objective is to "reduce the proportion of children and adolescents with active and currently untreated tooth decay in their primary or permanent teeth from 13.4% to 10.2%" (OPDPH, 2020, p.1).

To address the objectives set by Health People 2030, the staff of the FQHC should provide sealant, fluoride, and preventive dental services on the mobile dental unit, which would include dental assessments and recommendations for preventive intervention. Services should include oral hygiene education such as prevention of oral trauma and oral cancer; oral prophylaxis, fluoride varnishes; application of sealants; and diagnostic screening for caries and periodontal disease through the use of dental x-rays (HRSA, 2020).

The current Marketing Strategies must specifically target the new populations. The FQHC should include a plan for programs to improve access and develop consistent and compelling messages. It will be important to create and distribute program materials, such as flyers and pamphlets and host health promotion events, health fairs and attend school functions. Prior to launching the mobile dental program, the FQHC should disseminate the information through social media and on the agency's website.

Also, the FQHC should develop a reporting template to share the school based mobile dental program's outcome information with the school, stakeholders (include parents), the Rural Health Information Hub's Rural Health Models and Innovations and the South Carolina Department of Health and Environmental Control (SCDHEC).

Projecting financial projections are imperative in determining the startup cost, breakeven point, and potential financial viability of the program. For financial

sustainability and for maximum impact the FQHC must diversify funding streams. However, the FQHC must ensure that the program will be supported by more than one funding source. Funding sources can include revenue or reimbursement from Commercial Insurance, Medicaid and State Federal and State Grants, and fundraising.

The FQHC can also generate income utilizing the sliding fee scale discount schedule (SFDS) based on patient's income levels up to 200% of the Federal Poverty Guideline (FPG). FQHCs utilize written policies and procedures to implement the SFDS. These policies and procedures define income and family size, specify documentation or verification requirements for determining and recording family size and income. They also detail the specific structure for the SFDS itself, establish the frequency for re-evaluation of patient eligibility, and address provisions for waiving fees and nominal charges for specific patient circumstances.

Limitations

There were several limitations to the development of the consultant report. Due to data limitation, we were unable to further explore the racial differences in oral health disparities of Charleston county residents. Future studies could specifically target students residing and being educated in rural Charleston County. Furthermore, a needs assessment of the targeted schools and community will provide more depth data to better support the FQHC.

Conclusions

In summary, the development of a business proposal will provide the details needed to allow the Board of Directors to make an informed decision. Additionally, the information can be utilized to develop a timeline for project planning. The material can be applied as a guide for the program implementation of a rural community mobile school-based program.

Programs that do not make this investment may not achieve the same level of health outcomes for children reached through the mobile dental unit as many children are lost to follow-up care due to lack of parental involvement. The FQHC will need to invest in a mobile dental unit with the necessary materials and supplies to initiate and maintain the school-based clinic.

In order to transform the oral health status of students attending rural schools in Charleston County South Carolina service area, the organization should consider future expansion plans on how to accomplish the following: 1) expanding community-based preventive and comprehensive oral health services; 2) maximizing existing provider capacity; 3) creating public-private partnerships to strengthen, enhance and expand the dental care delivery system; 4) executing evidence-based strategies for increasing the oral health literacy of area residents; 5) fostering medical-dental collaborations to enhance oral health education, screening, referral and care; and 6) developing, tracking and reporting meaningful and measurable indicators to evaluate the impact of activities on improved access and oral health outcomes.

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