

Original Research Article

“PREVENTIVE FLUORIDE PROGRAMS IN PRICE COUNTY, WI: AN ONGOING INVESTIGATION OF ACCESSING CARE IN A RURAL COMMUNITY”

Abstract:

PROBLEM STATEMENT: Little research exists documenting Quality of Care (QoC) and Quality of Life (QoL) for individuals accessing preventive fluoride and dental services in the United States through public health departments when a consultative/referral model is used. Using a consultative/referral model is one way of addressing issues related to declining funding, access to care and workforce development. Improving oral health of families for those with economic disparities and cultural differences living in healthcare deserts can impact QoL through preventive services.

PURPOSE: The aim of this article was providing a review of the various preventive fluoride programs offered for children through the Price County public health department.

MATERIALS AND METHODS: A retrospective, longitudinal cohort group study was conducted. Data retrieved and analyzed was in the Centers for Disease Control (CDC) Secure Public Health Record Environment (SPHERE) database. Data are displayed descriptively using percentages and graphically representing trends and Chi Square was calculated with $p=.05$.

RESULTS: From 2005-2011, 3633 oral health education sessions were provided. Two thousand, two hundred and sixteen (2216) fluoride assessments were conducted; and 1734 (61%) children received systemic fluoride supplements. 1667 children were eligible for a weekly topical mouth rinse program, with 1258 (75%) participating. 1606 (71%) children received fluoride varnish. All results were statistically significant. Fifty-nine (59) minorities received care. 30-35% of clients were socioeconomically disadvantaged and were either Medicaid or Badger Care recipients.

CONCLUSIONS: Data describes how individuals with economic disparities & cultural differences living in a healthcare desert were able to receive preventive care in the community studied. Access trends were noted. This analysis documents positive impacts made using a consultative/referral model for access to care in a healthcare desert.

Keywords: Quality of Care, Prevention, Access, Public Health Services, Dental Hygiene Services, Federally Qualified Health Center, FQHC, Quality of Life

Preventive Fluoride Programs in Price County, WI: An Ongoing Investigation of Accessing Care in a Rural Community”

INTRODUCTION:

Public health programs have the unequivocal opportunity for making significant impacts on community populations served throughout a lifespan: whether children, adults, or senior citizens¹⁻⁸. Sharing outcomes achieved by various public health programs allows practitioners to both conceptualize and consider application within their own communities some simple measures that have the capacity for impacting and improving the Quality of Care (QoC) and ultimately, Quality of Life (QoL) for the individuals living there⁹⁻¹⁶. A dental hygiene public health program housed within and as part of a county public health program in a rural, northern Wisconsin community has documented successes in providing care for populations that are both rurally located, socioeconomically disadvantaged, and have low numbers of allied health care workers in the surrounding community to serve them¹⁷⁻²⁵. The care model used allows for a unique blend of holistic care meeting the public county health departments’ mission of ‘providing care, promoting health, preventing disease, while protecting the environment’²⁶. Clinical care services provided included education, prevention, consultation and referral for additional dental and/or medical services²⁷. Outcomes from sealant programs²⁸ and sealant retention²⁹⁻³⁰ have already been published. Survey results identifying patient perception of the quality of care received, and their families’ quality of life is forthcoming. Resultant outcomes can be achieved across the United States (US) and other countries by using interprofessional and public health programs for providing care. The purpose of these interrelated studies²⁸⁻³⁰ included documenting care as guided by the American Dental Hygiene Association National Dental Hygiene Research Agenda (NDHRA) area of Health Services: Investigation of how alternative models of dental hygiene care delivery can reduce health care inequities in the US³¹. The aim of this article was providing a review of the various preventive fluoride programs offered for children through the Price County public health department.

Where the fact access to care is a complex, multifactorial issue, the findings in this study continues describing and analyzing care provision for a population located in a rural, diverse, and socioeconomically disadvantaged FQHC community in northern Wisconsin^{17-25, 28, 30}. This study described the impacts made upon the oral health of children in a community accessing care through a public health department. Public health care delivery is an alternative model for preventive dental and dental hygiene care in the US^{12, 14, 15, 18, 20, 33}. These models allow for reducing health care inequities while documenting preventive successes^{12, 14, 15, 18, 20, 33}. Interventions and activities used in various communities also need to be described, and results documented, in the scientific literature. Sharing “best practices” from the public health arena can aid interprofessional care providers in identifying and applying protocols and practices consistently^{17, 32}. Following clear protocols can result in consistency of care for individuals and communities^{17, 32}. The extent to which hygienists working collaboratively in alternative practice settings with other allied health professionals or organizations for improving health care outcomes should be documented and reported. Alternative care models for changing practice paradigms need to be documented in scientific literature. Public and community health departments are one avenue allowing for oral health care provision and could be overseen as part of a medical, rather than dental care model, allowing for improving access to care for individuals within communities⁵⁻¹⁶.

Public health dental hygienists, federally qualified health centers (FQHC’S), community health centers (CHC’S) and private practice dentists are leveraging systems for improving access for those without dental care, including those under 200% of the United States federal poverty level^{4-5, 7, 15, 18, 24}. Little research exists documenting public healthcare outcomes while using consultation and referral models³³ for providing care, and how the impact of these models affects both Quality of Care (QoC) and Quality of Life (QoL) for patients served²⁸⁻³⁰. A consultation and referral model³³ was used when patient care needs were beyond the scope of clinical practice of departmental employees or volunteers. Employing a consultative and referral model

provided a dental access “safety net” for individuals in the FQHC community needing restorative, rather than preventive, care^{1, 5,7,12,15,18,20,24,33}. The question raised was: Is accessing available preventive fluoride care services in this healthcare desert making a difference?

PURPOSE:

The aim of this article was reviewing the various preventive fluoride programs offered for children through the Price County public health department.

MATERIALS AND METHODS:

A longitudinal, retrospective cohort study was conducted. Exempt research status was granted by the Institutional Review Board (IRB) because existing, secondary data sets were used for analysis. Evidence based practices and statistical evidence gathered allowed for conducting a longitudinal analysis of these prevention programs. Indices was retrieved from the Secure Public Health Record Environment (SPHERE) database. Population for sample selection included millions of data points collected and stored nationally within SPHERE. Protocol for selection of the sample was inclusion of records from 2005-2011. More specifically, the sample was only for the Wisconsin public health department studied, Price County, stored in the SPHERE database. Additional information stored at the public health department, but not within the SPHERE database, was excluded. Sample size included 5162 patient records. Children eligible for care ranged from 6-14 years. Children could be enrolled within the community oral health programs once informed parental or guardian consent was provided, children and families participated in education sessions, and children were screened for decay. Participation fluctuation over time was noted for individuals received multiple care services. Selection bias was a result of participation fluctuations. Preventive programs associated with fluoride use following educational sessions were examined. Ongoing service indices continue being collected and reported to SPHERE. Descriptive and inferential data analysis was conducted using percentages and trend graphing. Inferentially, a Chi Square analysis with a $p=.05$ was completed. Limitations included variable service population, sample size and researcher bias.

RESULTS:

From 2005-2011, 5162 total children had some sort of oral health activity within the population studied. Of those, 3633 (70%) had oral health education sessions including brushing, flossing, sugar reduction as part of dietary intake and information about various forms of fluoride use for preventing decay. Families provided informed consent for their children or wards to participate in the various oral care programs prior to any services. All children whose families accessed care had to first participate in oral health educational sessions. Once children and families completed oral health education sessions data was collected and reported. Data reflect during 2005 was noted as families participating in care may have been in one education session covering multiple children. Educational sessions were counted by family rather than individual child after 2005. Results reported were related to use of systemic or topical, intraoral fluoride mouth rinses or varnishes. Two thousand two hundred sixteen (2216) fluoride assessments were completed, resulting in 1783 (80%) children receiving systemic fluoride supplements. Families of children eligible for topical fluoride use resulted in 1667 children participating in a weekly topical mouth rinse program, with 1258 children (75%) actively participating. One thousand, six hundred and six (71%) children also received fluoride varnish. Summary data can be noted in Table 1. Table 1 also illustrates percentile of participation yearly. Fluctuations were noted when families with children/wards were enrolled in multiple services, moving into or out of service locations, or accessing programs multiple years. Chi Square analysis identified statistical significance for all services measured
 $**p=0.000 = p<0.001$

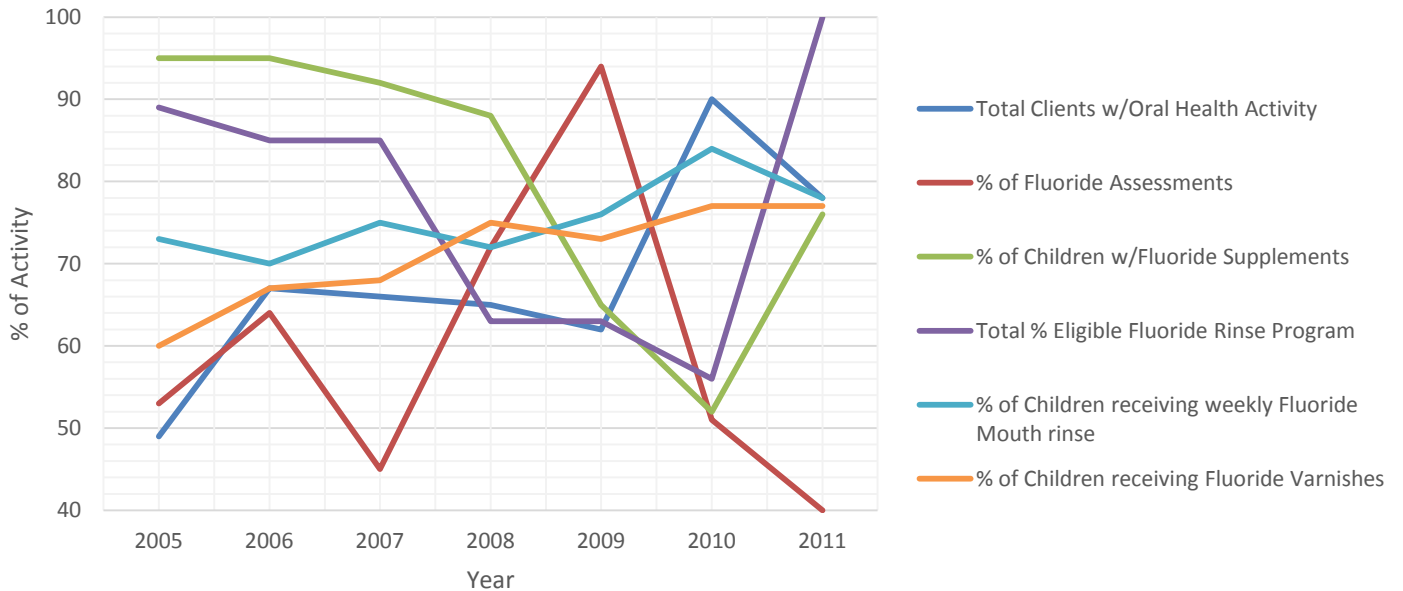
Table 1: Summary of Secure Public Health Record Environment (SPHERE) Screenings and Services

	Year							Total	Chi-sq (df), p-value
	2005	2006	2007	2008	2009	2010	2011		
Clients with Oral Health Activity	531	667	784	657	681	992	850	5162	
Oral Health Education Sessions	261 * (49)	448 (67)	517 (66)	428 (65)	424 (62)	896 (90)	659 (78)	3633 (70)	366.1883506 (6) 0.0000**
Fluoride Assessments	282 * (53)	288 (64)	231 (45)	310 (72)	398 (94)	461 (51)	266 (40)	2236 (61)	410.9034792 (6) 0.0000**
Fluoride Supplement	269/282 (95)	274/288 (95)	213/231 (92)	274/310 (88)	259/398 (65)	242/461 (52)	203/266 (76)	1734/2236 (78)	354.1741555 (6) 0.0000**
Eligible for Fluoride Rinse Program	250/282 (89)	244/288 (85)	197/231 (85)	194/310 (63)	259/398 (63)	257/461 (56)	266/266 (100)	1667/2236 (75)	278.2474504 (6) 0.0000**
Received Weekly Fluoride Mouth Rinse	182/250 (73)	170/244 (70)	147/197 (75)	139/194 (72)	198/259 (76)	215/257 (84)	207/266 (78)	1258/1667 (75)	17.50793629 (6) 0.0008**
Received Fluoride Varnishes	169/282 (60)	193/288 (67)	159/231 (68)	234/310 (75)	289/398 (73)	357/461 (77)	205/266 (77)	1606/2236 (71)	37.00585087 (6) 0.0000**

* Year One: 261 families with MULTIPLE children: families needed only attend one health session for entire family, not each child 288 children from 261 families were screened in 2005. Screening mechanism modified in 2006 to families rather than individual children. **p=0.000 = p<0.001

Trend data related to assessment and services can also be seen visually in Graph 1.

Graph 1 Summary: Secure Public Health Record Environment (SPHERE) Screenings & Services



As the families of many individuals in the service area were socioeconomically disadvantaged, it was also determined approximately one third, or 30~35%, of clients served were either Medicaid or Badger Care recipients. See Table 2.

Table 2: Summary: Minority & Socioeconomic Status in Service Area

Year	Minorities Served	# of Participating School Districts	# served with Medicare or Badgercare
2005	19	9	26.5%
2006	4	8	34.45%
2007	6	6	31.08%
2008	13	6	34.81%
2009	9	7	45.24%
2010	4	9	36.8%
2011	4	9	30.7%
Average Totals:	59	7.7	30-34%

Fifty-nine (59) minorities received care. Population and minority data describe the diversity of the community. The service area lies within the midst of multiple indigenous sovereign nations. Families have also immigrated to the region for work in various industries including fishing, forestry, and agriculture. Data document less than ten percent of sample accessing care were from these groups. Data are reflected in Table 3.

Ethnicity	Numbers
Native American	25
Black	10
Hispanic	10
Pacific Islander	8
Other	4
Asian	0
Non-reporting	2
TOTAL:	59

Findings in tables 2 and 3 indicate nearly one third of the sample accessing care were socioeconomically disadvantaged, and there were diverse minority groups within the rural community accessing care. It is also of note families served may have been part of the community one year, while leaving the area the next. Data simply provide a representation of cultural groups beyond Caucasians receiving care. See Table 3.

Outcomes related to sealant programs^{28, 30} and sealant retention²⁸⁻³⁰ as measures associated with quality of care, in this community have previously been published. If program participants required advanced care, including restorative services, a consultative-referral model was used as a funnel to Federally Qualified Health Clinics (FQHCs), Community Health Centers (CHCs) or private practices for these services³³. Similarly, the program dental hygienist worked in an interprofessional alliance to assure patients needing services were able to access them^{17,33}.

DISCUSSION:

Evidence based practices and, statistical evidence gathered allowed for conducting a, longitudinal analysis of other programs applying a conceptual model such as this one³²⁻³³. If a medical, rather than dental care model, allowing for improving access to care for individuals across a lifespan⁹⁻¹⁶.

Results documented in Table 1 and Graph 1 identified access to preventive care services over time. Numbers of participants fluctuated yearly based on program awareness, economic influences, and societal factors. Using preventive services offered through the public health program was one means of offsetting impacts of the US economic recession of 2008-2010. Use of fluoride rinses and varnishes increased over time even though preventing systemic fluoride tablet use declined. Chi-square results verified statistical significance for all service categories at ****p=0.000 = p<0.001**. A significant point to note in the success of these programs included they were either at no or reduced cost²⁷, provided ease of access for children and families, and the ability to access additional care, if necessary, through a consultative-referral model³³. Trend data in Graph 1 illustrate these results as do percentages in Table 1. High percentages of participation in a variety of programs have yielded results that could be replicated in communities with similar population characteristics^{28,30}.

Another future consideration includes the declining number of allied health care providers located in rural population centers^{1,7,9,15}. The northern one third of the state studied is sparsely populated, with small towns located significant distances from each other. This type of geographic representation exists not only across the US, but in various other countries as well^{9, 13-16,20}. Health care providers are not necessarily willing to relocate to smaller isolated, rural communities far from a variety of services and activities. This lack of mobility creates an access problem as older clinicians are retiring and closing their practices and there are not enough new care providers to replace them^{9, 13-16}. A provider deficit in the service community already existed. Using an interprofessional model with medical supervision for a variety of services using a consultative-referral model within a public health department may be one of the solutions for accessing care in the future^{12-15, 17, 24, 33}. Adaptation of these models can be applied globally in communities.

Quality care services can impact the quality of life within a community. Services discussed here document how preventive services can be offered through an alternative service model allowing for acceptable

epidemiological population results¹⁸⁻²³. Quality of life is another consideration. The state used to gather and report quality of life measures, and these were then incorporated into state reported epidemiologic rankings. Data documenting Quality of Life (QoL) was analyzed for described communities. Quality of Life (QoL) measures were being re-normed annually statewide, and the research team believed this required further study in the service community. When this cohort analysis began, the initial QoL data results were always ranked in the bottom half of the state, while 70% of original determinant data was also ranked in the bottom half of reported metrics²⁸⁻³⁰. The research team subsequently identified the need to conduct a satisfaction survey specifically drawn from the service area, asking what the perceptions of care children and families received impacted their quality of life. The last paper within this research addressed those findings.

Data in Tables 2 and 3 demonstrate needs associated with socioeconomic status and ethnicity. Cost and access to care as major service drivers are apparent in this rural community. It is of note that marginalized groups, including those of varying ethnicities and socioeconomic status, below established USA government poverty lines, received care^{1-8, 18-20, 28-30}. It is often these individuals within communities whos' health suffers when needing to choose between food, shelter, clothing or receiving health care services. Less school and productivity workdays are lost if people can access and receive care services^{1-8, 18-20, 28-30}. Another driver was communicating availability of services within the service location. Communication was conveyed through participating school systems. The rural service area also had multiple school districts that did not participate in these programs, primarily due to communication or rural access issues. People living in school districts not participating in these programs lost opportunities to access safe, free, or reduced-cost care^{27,33}. It should be noted these data demonstrate successes associated with using a consultative/referral model, interprofessional collaboration between dental offices and public health departments^{27-30,32-33}. Barriers continue to include access to locations providing services, communication, mobility of disadvantaged families, and declining public health program funding. These barriers require future research.

CONCLUSION:

Data provided describes how Quality of Care and Quality of Life measures for individuals with economic disparities & cultural differences are affected in the service communities studied. This analysis describes positive impacts made, and efficacy of using a consultative/referral model when care required is outside the scope of dental hygiene practice.

Ethical Approval:

As per international standard or university standard ethical approval has been collected and preserved by the authors.

Consent

Families provided informed consent for their children or wards to participate in the various oral care programs prior to any services.

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COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

UNDER PEER REVIEW

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