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Dental Caries Screening for Food Insecure Children

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DENTAL CARIES SCREENING FOR FOOD INSECURE CHILDREN

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John Joseph Kane

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Abstract

Background. Dental caries is the most common childhood disease, disproportionately impacting minorities, and socio-economically disadvantaged children. Food insecurity impacts 23.6% of children in Texas; the majority being African American and Hispanic. Food insecurity screening rates are abysmal. Dental caries and food insecurity are significantly correlated and likely syndemic. **Purpose.** Implement oral examination and the “Hunger Vital Sign” screening tool in detecting dental caries and food insecurity at an urban pediatric urgent care center. **Evidence.** Food insecure children experience adverse health outcomes, impaired long-term health outcomes, developmental and cognitive delays, psychosocial delays, and oral health deficiencies including caries and malabsorption of nutrients. **Objectives.** Screen 75% of patients seen at a local urgent care center for food insecurity. 100% of patients screening positive received an oral examination. Written mitigation strategies would be provided for all patients screening positive. **Methods.** The validated Hunger Vital Sign was utilized to screen for food insecurity and an oral exam was performed by a licensed, board-certified Pediatric Nurse Practitioner for those patients screening positive. **Results.** Results revealed an 88.2% screening rate (135 out of 153 total patients), 31.8% positive food insecurity rate and 76.7% dental caries co-morbidity rate. Mitigation strategies were deployed for 100% of patients screening positive. **Implications.** Dental caries and food insecurity screening can be accomplished at any level of pediatric care. Mitigation strategies can improve oral health in children and provide food resources for families.

Key Words. Hunger Vital Sign, dental caries, food insecurity, pediatric urgent care, levels of pediatric care, dental caries resources, food insecurity resources.

Dental Caries Screening for Food Insecure Children

Food insecurity negatively impacts 23.6% of children in Texas with African American and Hispanic children comprising 70.4% of those impacted (Van den Berg & Jain, 2023). Nationally, the data for children adversely impacted by food insecurity ranged from 15.3 million (Barnidge et al., 2017) to 9 million (Feeding Hunger, 2023). In both cases, a disproportionate burden fell on minorities. Feeding Hunger (2023) further reported that 22 million children are adversely impacted in the summer because of the loss of school-based meals. In Texas there are 3 million children that are impacted in the summer by the loss of school-based meals and in nearly all cases these children's households would qualify for the Supplemental Nutritional Assistance Program, which is set at 130% of the national poverty level (Children at Risk, 2022).

Children who are food insecure experience adverse health outcomes (Bahadur et al., 2018), impaired long-term health outcomes (Thomas et al., 2019), delayed growth and development (Barnidge et al., 2017), and cognitive and behavioral maturation delays (Cain et al., 2022; Shankar et al., 2017). Additionally, dental caries as the most common chronic childhood disease has been syndemically linked to food insecurity because of pain, inflammation, and malabsorption of nutrients (Angelopoulou et al., 2019; Hill, 2020).

The American Academy of Pediatrics (2023) published a position statement for food insecurity screening. The basic tenants of the position statement were the screening and identification of children at risk for food insecurity, connecting the impacted families with community resources and the advocacy for adequate and healthy food for all children and their families. Unfortunately, primary care screening rates for children for food insecurity are abysmal ranging from 76% (Fort et al., 2022) to 15% (Barnidge et al., 2017). Providers expressed concerns with time constraints, reimbursement, and lack of knowledge of community resources.

In contrast, large tertiary care pediatric emergency departments and affiliated clinics have successfully implemented and sustained screening for food insecurity among children at-risk. Specifically, the programs were conducted at the Children's Hospital of Philadelphia (Cullen et al., 2019), Meharry Medical College (Knowles et al., 2018) and the University of Washington, Seattle (Valdez-Gonzales et al., 2021).

There is a gap in the literature reflecting food insecurity of at-risk children at urgent care centers, which is detrimental since 15% of patients utilizing pediatric urgent care centers do not have a primary care provider (Montalbano et al., 2017). Provista (2022) reports that urgent care centers will change the paradigm of overall health care as a \$45.9 billion enterprise, a system that is growing at a 7% rate since 2017 and a mechanism of care that is 88% less expensive than emergency departments.

Food Insecurity

The United States Department of Agriculture (2022) attempted to clarify the meaning of food insecurity. They proposed a continuum of food security that had four levels.

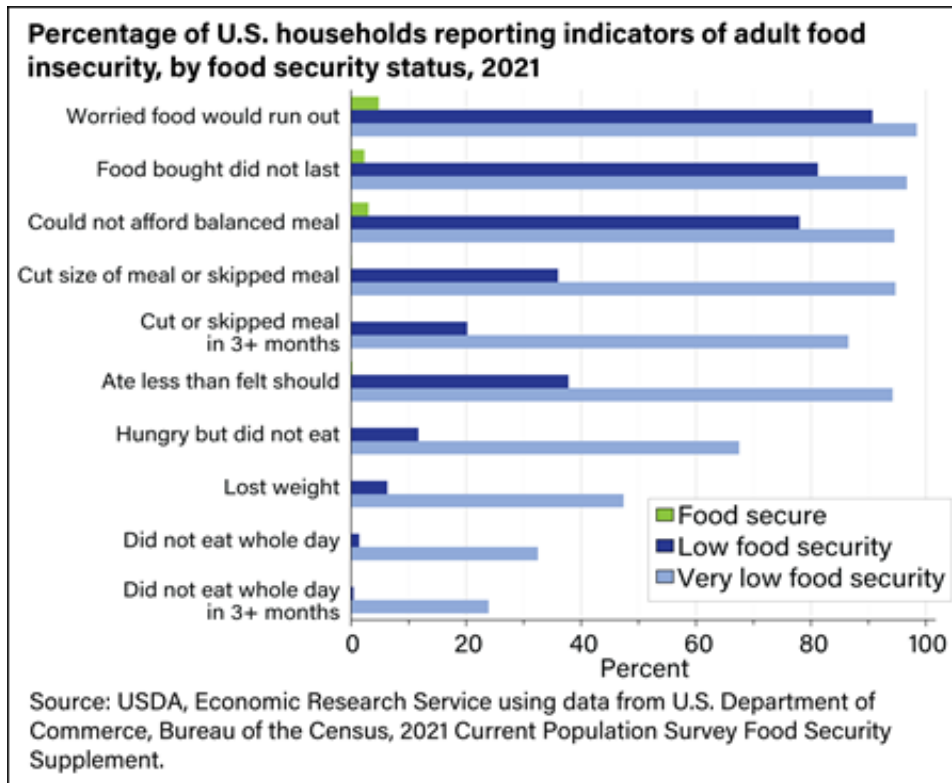
- High food security: Implies no limitations or difficulties with obtaining food.
- Marginal food security: Implies less than three indicators of a very-low food insecure household without decreasing food intake.
- Low food security: Implies impaired dietary practices with no reduction in the amount of food.
- Very-low food security: Implies impaired dietary practices with decreased food intake.

These last two categories on the continuum are considered food insecurity and public domain characteristics of households with very-low food security are presented (Figure

1) which apply equally to adults and children (United States Department of Agriculture, 2022).

Figure 1

Characteristics of Households With Very-Low Food Security



The Hunger Vital Sign

A seminal work by Hager et al. (2010), produced the two-item Hunger Vital Sign to be utilized for the detection of food insecurity in clinical environments. Based on the United States Department of Agriculture’s 18-item Household Food Security Survey, the Hunger Vital Sign achieved a sensitivity of 97% and a specificity of 83%. Three other research studies utilized the Hunger Vital Sign in detecting food insecurity and reported similar sensitivities and specificities (Table 1).

Table 1*The Hunger Vital Sign Sensitivities and Specificities*

Researchers	Population	Sensitivity	Specificity
Hager et al., 2010	Families with Children	97%	83%
Baer et al., 2015	Youth and Adolescents	88.5%	84.1%
Gunderson et al., 2017	Adults	97%	74%
Radandt et al., 2018	Pediatric Dentistry	95.4%	83.5%

Another critical point of distinction made by the United States Department of Agriculture (2022) was that hunger is a potential consequence of food insecurity and not the equivalent term of food insecurity. Although the term Hunger Vital Sign is used as the title applied by Hager et al. (2010), the term is hermeneutically relational to food insecurity at best.

Problem and Background

Children who are food insecure experience adverse health outcomes (Bahadur et al., 2018), impaired long-term health outcomes (Moradi et al., 2019; Thomas et al., 2019), syndemic oral health deficiencies, including dental caries (Angelopoulou et al., 2019; Hill, 2020), developmental and cognitive delays (Barnidge et al., 2017), and delayed psychosocial maturation (Cain et al., 2022; Shankar et al., 2017). Pediatric primary care screening rates for food insecurity are abysmal and pediatric urgent care centers serve as a patient's "primary care provider" approximately 15% of the time (Montalbano et al., 2017). Based on the microsystem analysis of the urban pediatric urgent care center utilized for this quality improvement project, the rate of patients utilizing urgent care as primary care approached 20%.

Adverse Health Outcomes and Impaired Long-Term Outcomes

Bahadur et al. (2018), reported higher odds ratios for food insecure Hispanic children. Specifically, anemia was 10.4% v. 3.2%, hypercholesteremia was 10.4% v. 3.4% and any morbidity was 24.7% v. 9.3%. Thomas et al. (2019) stipulated that food insecure children had lifetime asthma and depression symptoms that were 19.1% and 27.9% higher than food secure children. Additionally, the rate of foregone medical care and emergency room usage were 179% and 25.9% higher for food insecure children (Thomas et al., 2019). The rate of breastfeeding for food insecure mothers was 24%, with the majority stopping when their child was 2 months of age (Frazier et al., 2023). Deleterious impacts on the child included impaired development of the intestinal microbiome, and increased incidence of infection and inflammation (Maaks et al., 2020). Maternally, there is potential impairment of infant-bonding and increased incidence of breast and ovarian cancer (Maaks et al., 2020).

Dental Caries and Oral Health

Dental caries is the most common chronic childhood disease with a prevalence rate of 45.8% among children aged 2-19 years (Hill, 2020). Dental caries is more insidious in minority and socio-economically disadvantaged groups, with an odds ratio of 2.9 times higher for dental caries among children who are food insecure (Hill, 2020). Radandt et al. (2018) reported that 31% of their pediatric dental population screened positive for food insecurity.

Angelopoulou et al. (2019) reported data from a largely Hispanic pediatric population and stated that pre-school children that were food insecure had higher levels of dental caries as assessed by the delayed, missing, filled teeth index. A systematic review and meta-analysis by Drumond et al. (2023) reported an overall significant relationship between increased dental caries among those with food insecurity. Maaks et al. (2020) discussed the issue of dental caries

and poor nutrition in children (higher intake of fat and sugar), in that dental caries render the teeth prone to infection, degradation and are painful for the child while chewing. Additionally, higher levels of childhood food insecurity were associated with higher consumption of fat and sugar with few vegetables, contributing to the malabsorption of nutrients (Fram et al., 2015).

Growth and Development

Barnidge et al. (2017) report that food insecurity is viewed as a health crisis in the United States affecting one in five households and children in food insecure households are more prone to cognitive and developmental delays. Barnidge et al. further reported a suspected food insecurity rate approaching 55% of households. Hager et al. (2010) caution providers of the insidious nature of food insecurity on growth and development. Specifically, they caution that a growth chart may not show the negative impact of food insecurity until a critical juncture is reached.

Delayed Psychosocial Maturation

Cain et al. (2022) conducted a systematic review of the association of food insecurity with mental health outcomes in parents and children. Findings from 108 studies revealed a significant association between food insecurity and parental depression, stress, and anxiety and between food insecurity and child hyperactivity, externalizing and internalizing behaviors and depression and depressive symptoms. The researchers advocated for public health and mental health measures to address food insecurity considering their findings. Shankar et al. (2017) conducted a systematic review focused on the developmental and behavioral impacts of food insecurity on children in Western industrialized countries. Findings included a food insecurity prevalence rate of 21% in examining 23 research articles. Additionally, the researchers postulated that even minimal food insecurity is associated with children's behavioral, academic,

and emotional problems from the newborn timeframe through adolescence. The researchers supported food insecurity screening as part of a developmental pediatric referral.

The Hunger Vital Sign

The Hunger Vital Sign was developed by the seminal work of Hager et al. (2010) and is a two-item assessment based on the United States Department of Agriculture's 18-item Household Food Security Survey. The Hunger Vital Sign was validated with a sample of over 30,000 families with children of which 21% were food insecure. Hager et al. (2010) reported a sensitivity of 97% and a specificity of 83%. Baer et al. (2015) studied 400 urban youth patients of which 31% screened positive for food insecurity. Sensitivity and specificity percentages for the Hunger Vital Sign for this study were 88.5% and 84.1% respectively. Gunderson et al. (2017) retrospectively evaluated the Hunger Vital Sign against a population of 60,000 adults from a 2013 Census Bureau Survey and found sensitivity of 97% and specificity of 74%; however, the researchers postulated that the closer the individuals were to the poverty line, the higher the specificity. Radandt et al. (2018) evaluated 141 surveys of parents or guardians of pediatric dental patients. They found a food insecurity prevalence rate of 31% and obtained a sensitivity of 95.4% and specificity of 83.5% for the Hunger Vital Sign compared to similar metrics for the United States Department of Agriculture Six-Item Short Form Food Security Survey.

Urban Pediatric Urgent Care Assessment

The pediatric urgent care center where the quality improvement project was implemented is one of two locations of this health care company. One location is located on a main avenue in a suburban area, the other is in a dense urban area. The urban location was chosen because the literature supports the need for dental caries and food insecurity screening in urban locations. The catchment areas for the two pediatric urgent care centers are based on the urban zip code of

78228 and the suburban zip code of 78238. Selected demographic data from the United States Census (2022) and World Population Review (2023) are reported (Table 2).

Table 2

Selected Pediatric Urgent Care Center Demographic Data by Catchment Area

Catchment Area	Population	Per-Capita Income	Percent Hispanic
Urban 78228	56,781	\$19,849	88.5%
Suburban 78238	25,737	\$25,737	44.7%
San Antonio City	1,452,000	\$28,579	65.7%

The pediatric urgent care centers were founded in 2021 and are overseen by a board-certified pediatrician. Administratively there is a full-time business manager and a full-time chief operating officer who is also a board-certified pediatric nurse practitioner. Each of the two sites is staffed by one to two board-certified pediatric nurse practitioners, 1 limited medical radiology technician and one to two medical assistants. The two centers serve approximately 1,000 patients per month during the school year and that number drops to approximately 400 patients per month during the summer months when school is not in session. Normal hours for the centers were 8 a.m. to 8 p.m. Monday through Saturday, and 8 a.m. to 4 p.m. on Sunday. During the summer months, the urban location limits hours to 8 a.m. to 3 p.m. Monday through Friday only while the suburban location maintained the normally scheduled hours. There had been provider turnover in the 4 months of observation, yet there was a critical core of expertise available as resources to new employees.

Each pediatric urgent care center was composed of a reception area and check-in desk, a triage area, four examination rooms, a procedure room, a radiology room, and a central provider

documentation center. There was a point-of-care testing room, a medication cart and refrigerator, a crash cart and two supply rooms.

Patient care is problem-focused with the goal of 15 to 20 min for the provider to assess, treat, discharge, and document on each encounter. Each patient (caregiver) had access to the patient's electronic health record, and several of the providers fax the medical record to the primary-care provider of record if any. The time proposed was usually adequate unless there were two or more siblings or relatives being seen at the same time. Typical medical conditions seen were upper respiratory infections, streptococcus infections, conjunctivitis, otitis media, and allergic rhinitis. If required the centers were equipped for suturing, staples, splinting, and x-rays. The main insurance was Medicaid, and for patients without insurance a cash payment of \$150 was required to be seen.

The chief operating officer, who was my mentor for the quality improvement project, did not have any specific policies or protocols that needed revision. Instead, I was encouraged to evaluate several courses of action and review the literature for each to help identify a suitable quality improvement project. The topics of antibiotic stewardship, intimate partner violence, test-reporting and follow-up, and food insecurity were evaluated and researched. After my evaluation and research, at a meeting with the chief operating officer, we agreed on a project focused on food insecurity screening. Later, the addition of dental caries and an oral exam were approved by the chief operating officer, faculty advisor, and the graduate faculty committee. A review by the university's Institutional Review Board was conducted and the quality improvement project was deemed "Not-Regulated Research." The quality improvement project encompassing food insecurity screening and evaluation of dental caries was not an absent standard of care or needed improvement from a standard of care or accreditation point of view. The project was extra work

for the center and while clinically justified by the literature and population served, it was dependent on the cooperation of the staff in completing the extra work that it became possible.

Change

Luciano et al. (2019) writing in the *Harvard Business Review*, proposed four ways to make evidence-based practice the norm in health care.

1. What is similar, what is different about the practice and why does it matter?
2. How can we implement the practice without compromising results?
3. How can we define the goals we want to achieve and how can they be met?
4. Identify your preferences: how can we make adoption more comfortable?

Similarities, Differences, Relevance

Similarities to established practice at the urban pediatric urgent care center were data collection by medical assistants at the check-in desk and in the triage area. Upon completion, the medical assistants were expected to give the providers a verbal report of findings of the patient(s), caregivers present and examination room location. The providers could also see electronic data entered into the medical record by the medical assistants. Differences were the administration of the Hunger Vital Sign screening tool to the caregivers and giving those screens that were positive for food insecurity to the provider. With a positive screen, the provider would conduct an oral examination for dental caries. By conducting processes in the order presented, relevance was achieved for the staff in incorporating tasks as appropriate into established routines. While some providers had concerns with electronic medical record documentation of food insecurity and the results of an oral examination, those concerns were allayed after intervention by the business manager and the chief operating officer.

Implementation Without Compromise

By stratifying tasks along familial routines for the staff, there was minimal delay in completion of the check-in process and patient triage by the medical assistants. The oral examination and resultant documentation of recommendation/referrals added 5 min to the visit, but most providers did not find the tasks compromising their routines or practices. One of the providers found that documentation of a z-code in the electronic medical records to be compromising to their individual practice; this situation was addressed. Another primary provider took the initiative to establish a relationship with a local Medicaid-accepting dental practice for patient referrals. The initial time investment led to positive outcomes for some of the patients who were not seeing a dentist.

Goal Definition and Achievement

The goals for the quality improvement project were refined academically over time. While there was a provider issue, the initial difficulties revolved around the medical assistants. The goals were seen as additional tasks, additional workload and they felt as a group that they had enough to do. This became evident at the startup of the project when most miss-screenings occurred at the triage level. It took re-introduction of the goals, outcomes, and severity of the problems being studied to establish a sense of purpose in this group related to the project. Once achieved, the medical assistants completed 100% of the screens and were fastidious in data documentation and completion. For limited occasions when only one medical assistant was on duty, I would complete non-patient care activities such as room turnover to support the paraprofessional staff as needed. This willingness on my part to pitch in was well-received.

Preferences and Adoption

Seeking the buy-in from the providers focused on respect for their clinical judgment. For example, the concepts of oral examination for dental caries and recommendations for dental treatment and dental referrals were deliberately left open for clinical interpretation. The results were mainly positive, with providers establishing relationships with outside facilities to achieve dental care and pointing out a gap in the researcher's understanding of dental care in children related to age when dental care is initiated. From the medical assistant point of view, having one medical assistant overseeing and coding the data collection was very effective.

Project Identification**Purpose**

The purpose of the quality improvement project was to provide dental caries screening for at-risk children who were food insecure at an urban pediatric urgent care center. The overall expected outcome was the improvement in dental health in children impacted syndemically by food insecurity as well as providing patient caregivers with written and electronic mitigation strategies for dental health and food insecurity. Specific objectives and projected outcomes are stated.

Objective and Projected Outcome: Staff Education

All urban pediatric urgent care center staff would be educated on the procedures for screening for dental caries and food insecurity. Measured by an attendance matrix, the projected outcomes were the completion of the education event, with education or reeducation as required during the project due to staff rotations.

Objective and Projected Outcome: Food Insecurity Screening

Of the patients seen at the urban pediatric urgent care center, 75% would be screened for food insecurity by the caretaker's completion of the Hunger Vital Sign. Measured by the total number of patients screened divided by the total number of patients seen, the expected outcome was a minimum screening rate of 75% with a goal of 85% or higher.

Objective and Projected Outcome: Triggered Dental Caries Screening

Of patients screening positive for food insecurity, 100% would receive an oral examination for the evaluation of dental caries. Measured by documentation of a positive food insecurity screen and subsequent oral examination for dental caries, the projected outcomes were that all positive food insecurity screens will trigger an oral examination by the provider for dental caries. Additionally, the positive food insecurity screens and the oral examination for dental caries would be documented in the electronic health record.

Objective and Projected Outcome: Written Mitigation Strategies

Of patients screened for dental caries based on positive food insecurity screening, 100% would receive written mitigation strategies for dental caries and food insecurity. Measured by written documentation of the dispersion in the electronic medical record, projected outcomes were the provision of written mitigation strategies related to oral health and dental caries in the form of recommendations or referrals and written mitigation strategies for food insecurity including the city-wide food bank and city-wide food pantries.

Summary and Strength of Evidence

A search of the Cumulative Index to Nursing and Allied Health Literature and the United States National Library of Medicine yielded 27 peer-reviewed journal articles of which 20 were

Level 4 or higher on the Melnyk Levels of Evidence. A synopsis of the Melnyk Levels of Evidence (Melnyk & Fineout-Overholt, 2015) is reported (Table 3).

Table 3

Melnyk Levels of Evidence

Level	Description
Level 1	Systematic Review & Meta-Analysis of Randomized Control Trial
Level 2	Single Randomized Control Trial
Level 3	Quasi-Experimental or Non-Randomized Control Trial
Level 4	Cohort or Case-Control Studies
Level 5	Systematic Review or Meta-Synthesis of Qualitative or Descriptive Studies
Level 6	Single Qualitative or Descriptive Study
Level 7	Expert Opinion

Evidence for the 27 peer-reviewed journal articles included three systematic reviews, one single randomized control study, 15 cohort or case-controlled studies, one qualitative meta-synthesis, five qualitative or description studies, and two expert opinions. Additional resources for the project included two health care textbooks, the *Harvard Business Review*, a webinar by the University of Texas—Houston School of Public Health, the United States Census, the United States Department of Agriculture, professional organizations, and web-based demographic and financial data.

This summation will include a more detailed review of the evidence and Melnyk Levels of Evidence for peer-reviewed journal articles are cited. For example, [L1] is indicative of Melnyk Levels of Evidence, Level 1: Systematic Review & Meta Analysis of Randomized Control Trial. Level 4: Cohort or Case-Controlled Studies would be represented by [L4].

Formatting of the evidence will be displayed by categories of subject matter for easier interpretation.

Summation Overview

Pediatric urgent care centers are part of a \$45.9 billion industry that is growing 7% annually and has fee schedules 88% less expensive than emergency departments (Provista, 2022). Montalbano et al. (2017) [L4], reported that urgent care centers are utilized by 10% to 15% of children on Medicaid secondary to inaccessibility of the primary care provider, poor phone communication, and limited after-hours access, if any. These findings, along with same-day walk-in capacity, were cited in the utilization of urgent care centers (Mudd et al., 2020) [L6]. Micro-system assessment of the pediatric urgent care center utilized in the quality improvement project yielded a near-20% rate of children without a primary care provider or difficulties with access to their primary care provider.

The American Academy of Pediatrics (2023) recommends screening for dental caries and food insecurity by primary care providers. There is no report of screening for either of these conditions at urgent care centers found in the literature. As previously stated, rates of urgent care utilization in lieu of primary care providers approach 15% to 20% of the population. Prevalence rates of childhood dental caries in the United States is 45.6% (Hill, 2019) [L4], and the predominance of children effected are socioeconomically disadvantaged. Prevalence rates for childhood food insecurity range from 21% (Hager et al., 2010) [L4] to 31% (Radandt et al., 2018) [L4], with socioeconomically disadvantaged children being the most at-risk. Higher rates of food insecurity of 55% (Barnidge et al., 2019) [L6], to 60% (Fram et al., 2015) [L4] have been postulated. The City of San Antonio (SA2020, 2023) reports a prevalence rate of 11% to 16%.

The American Academy of Pediatrics (2023) states that primary care providers can screen for dental caries and food insecurity. While there is scant evidence of a prevalence rate of dental caries screening by primary care providers in the United States, prevalence rates for food insecurity have been reported. Ranging from 76% (Fort et al., 2022) [L4] to 15% (Barnidge et al., 2019) [L6], the rates were abysmal for the severity of the underlying condition. Providers reported that there were concerns with the time required, billing, and their lack of awareness of community food resources as barriers to primary care screening (Barnidge et al., 2019) [L6].

In consideration of the evidence presented, a quality improvement project was undertaken at an urban pediatric urgent care center whereby all patients would be screened for food insecurity and a positive screen would serve as a trigger for an oral examination for dental caries. Angelopoulou et al. (2019) [L4] reported the significant comorbidity between dental caries and food insecurity; the relationship may indeed be syndemic. The urgent care center was in a socioeconomically disadvantaged area, having the sixth lowest per-capita income in the City of San Antonio. Additionally, the catchment area included a Hispanic ethnicity rate of 88%, and a high utilization of Medicaid for services.

Dental Caries

A discussion of dental caries in the context of this quality improvement project is intertwined with food insecurity. Hill (2019) [L4], retrospectively reviewed the results of the 2013-2014 National Health and Nutrition Survey which encompassed 5,000 children. The results were an overall dental caries prevalence of 45.6% with minority and socioeconomically children being more severely impacted. The negative impact of these children was reported because of food insecurity, whereby families prioritized quantity of food over quality and the result was a diet higher in carbohydrates, processed foods, and sugar-sweetened beverages (Hill, 2019) [L4].

These dietary complications were supported by Fram et al. (2015) [L4], and Maaks et al. (2020). Maaks et al. (2020) further reported that the negative impact of diet high in carbohydrates and fats in children led to erosion, inflammation, and decay of a child's teeth, making chewing difficult, painful, and impairing the absorption of nutrients. A qualitative meta-synthesis by Drumond et al. (2023) [L5] comprised the review of 514 references and the ultimate selection of 14 articles for qualitative meta-synthesis. Findings included a significant association between dental caries and food insecurity (OR = 1.62, 95%CI, 1.01-2.60), although the highest odds ratio was found with very low food insecurity. Odds ratios reported by Hill (2020) [L4] for the prevalence of dental caries were 2.9 times higher for food insecure children at the very-low level of food insecurity. Age stratified odds ratios for children aged 6 to 11 years were 2.60, 2.90 for children 12 to 15 years, and 4.20 for children 1 year to 19 years of age.

Angelopoulou et al. (2019) [L4] evaluated 82 children and their caregivers to determine the relationship between oral health as measured by the decayed, missing, filled teeth index, dental caries, and food insecurity. The study was conducted at an urban dental clinic serving a socioeconomically disadvantaged population with 65% of the participants identifying as Hispanic, the overall minority composition of 91.5%, and 90% of the patients had Medicaid dental coverage. The researchers reported a statistically significant correlation between the filled teeth index and food insecurity ($p = .002$) and that children with high levels of food insecurity had higher levels of dental caries. For the population studied, Angelopoulou et al. (2019) [L4] reported 58.5% of participants fully food secure, 11% were marginally food secure, 24.4% possessed low food security and 6.1% had very-low food security. The United States Department of Agriculture (2022) defines the two lowest levels of food security as food insecurity, therefore in the study by Angelopoulou et al. (2019) [L4], 30.5% of the participants would be classified as

food insecure. This finding aligns with a prevalence of 31% for food insecurity at an urban dental clinic by Radandt et al. (2018) [L4] in a different geographical area of the country. Neither Angelopoulou et al. (2019) [L4] nor Radandt et al. (2018) [L4] espoused causality or generalizability with their perspective studies.

Food Insecurity: Scope

Nationally, the number of children impacted by food insecurity varies from 9 million (Feeding Hunger, 2023) to 11.2 million (Hartline-Grafton & Hassink, 2020) [L7] to 15.3 million (Barnidge et al., 2017) [L6]. Drenner et al. (2019) [L4], in a study of 28,000 children, found a food insecurity prevalence rate impacting 27% of households. Hager et al. (2010) [L4] studied 30,000 families with children and reported a food insecurity prevalence rate of 21%. Van den Berg and Jain (2023) report that the State of Texas has the fourth highest rate nationally for food insecurity in children at 23.6%. They report an urban prevalence rate of food insecurity as 29.3%. Texas Health & Human Services (2023) reports 4.3 million children enrolled in Medicaid and the Children's Health Insurance Program, and Children at Risk (2022) report that 3 million students in Texas rely on the school meal programs for basic nutrition and that these children are more at-risk over the summer months when school is not in session. Finally, the webinar by Van den Berg and Jain (2023) emphasized that the only way to accurately detect food insecurity was to directly ask and screen for food insecurity.

Food Insecurity: Syndemic Factors

The co-morbidity of dental caries and food insecurity has been discussed and established. Bahadur et al. (2018) [L4] evaluated the short-term health effects of food insecurity in children. The study conducted at a federally qualified health center evaluated food insecurity based on the Hunger Vital Sign for 486 children. The researchers found higher odds ratios for anemia (10.4%

v. 3.2%, $p < .005$), hypercholesterolemia (10.4% v. 3.4%, $p < .01$) and any morbidity (24.7% v. 9.3%, $p < .02$). Age stratified, the odds ratios were highest for infants/toddlers and adolescents.

Thomas et al. (2019) [L4], studied a sample of 29,341 children retrospectively from the 2013-2016 National Health Interview Study. Focused on ages 2 to 17 years, the researchers reported more acute and chronic health problems and general declining health in food insecure children. Specifically, children from food insecure households had lifetime rates of asthma and depression that were 19.1% and 27.9% higher than food secure children. Rates for foregone medical care and emergency department utilization were 179.8% and 25.9% higher than food secure children. Another potential impact on the short-term and long-term health impact of food insecure children was presented by Frazier et al. (2023) [L4] in a study of 92 breast-feeding mothers in a food insecure environment. Findings showed that at 2 months of age, the breastfeeding rate was 24% and that breastfeeding mothers who were food insecure were less likely to continue ($B = -1.51$, $p = .024$).

Literature linking food insecurity and delays in growth and development has been reported nationally and internationally. Barnidge et al. (2019) [L4] posited that food insecurity impacted one in five United States households and it had a negative impact on a child's growth and development. Hager et al. (2010) [L4], in the seminal work on the development of Hunger Vital Sign, studied 30,000 families with children and issued a warning that reliance on a traditional growth chart to detect nutritional status or food insecurity in children was folly. Children with food insecurity may appear to be progressing normally on a traditional growth chart only to fall off the chart at some critical juncture when interventions are lagging.

Fram et al. (2015) [L4] studied over 3,600 fourth and fifth graders and found that poor diets or nutrition associated with food insecurity led to decreased physical activity, poor grades,

and long-term developmental consequences. Moradi et al. (2019) [L1] conducted a systematic review and meta-analysis comprising 55,000 individuals from 12 different countries, evaluating stunting, underweight and wasting in children with food insecurity. In children older than 5 years of age, food insecurity was associated with a higher risk of stunting (OR = 1.04; 95% CI: 1.02-1.39) and underweight (OR = 1.34; 95% CI: 1.02-1.77). For children under the age of 5 years old, only stunting was found to be significant (OR = 1.14; 95% CI: 1.05-1.23). Food insecurity and its impact on stunting was more pronounced in developing countries and must be considered in the data analysis.

Baer et al. (2015) [L4] evaluated 400 youth and adolescents for food insecurity by the Hunger Vital Sign. They found a food insecurity prevalence rate of 32.5%. Consolidated under the title of social problems, food insecurity was associated with decreased health care access (aOR = 2.6, 95%CI: 1.7-4.1), poorer education outcomes (aOR = 2.8; 95% CI: 1.2-4.5), housing deficit (aOR = 2.8, 95% CI: 1.8-4.4), decreased income (aOR = 2.3; 95% CI: 1.2-4.5) and substance abuse (aOR = 2.5; 95% CI: 1.5-4.3). A systematic review by Shankar et al. (2017) [L1] evaluated the effects of food insecurity on behavioral issues including coping, emotional difficulties, and academic performance. The researchers found that food insecurity impacted different age levels, beginning with infancy, and potentially culminating in adolescence with the manifestations of substance abuse, depression, suicidal ideation, and suicide attempts. The most salient point of the study was that once a child was diagnosed as food insecure, they should be referred to a pediatric developmental specialist for interventions and treatment. Cain et al. (2022) [L1] conducted a systematic review assessing 108 studies and over 450,000 parents and children from food insecure households. The parents presented with mental health symptoms for stress,

anxiety, and depression while the children's mental health difficulties were manifested as hyperactivity, externalizing behaviors, and depression.

Food insecurity screening by the Hunger Vital Sign was addressed earlier in detail with the reporting of sensitivity and specificity over time and with different populations studied (Table 1). It is remarkable that the four cited studies, with different populations over 8 years yielded an average sensitivity of 94.5% and an average specificity of 81.2%.

Synopsis

Pediatric urgent care centers provide access not found at pediatric primary care clinics. These centers also serve *de facto* as primary care providers for 15% to 20% of the population. The American Academy of Pediatrics (2023) recommends screening for dental caries and food security at all wellness visits; however, screening rates are either not reported in the literature or are abysmal. Screening for dental caries and food insecurity can be accomplished in an urgent care milieu without impacting workflow or productivity. There is strong evidence supporting the need to screen for dental caries and food insecurity and the syndemic relationship between dental caries and food insecurity has been established.

Methods

Project Interventions

Detailed project interventions started with education of staff at the urban pediatric urgent care center prior to the start of the project. The educational intervention was based on the approved objectives for the quality improvement project and on the micro-system assessment of the facility to obtain logical flow patterns to optimize the project outcomes without interrupting normal daily workflow. The educational intervention would be repeated and reinforced as necessary.

The staff have a delineation of their duties based on their training, licensure, and expertise. Medical assistants check patients into the facility, conduct patient triage along with a caretaker interview, report the results of triage to the provider and assist the provider in the direct patient care as ordered. At the end of the patient's visit, the medical assistant participates in the patient's discharge. The providers, upon getting the triage report from the medical assistants, conduct a patient visit, assess, diagnose, and treat the patient. Upon completion of the visit, the providers enter patient visit data into the electronic medical record. For the purposes of this project the interventions beyond the educational offering were broken down into three phases. The first phase encompassed patient admission and check-in, to the provider receiving report from the medical assistant. The second phase encompassed the provider conducting the office visit through to discharge. The third phase was electronic medical records documentation by the provider and coded data collection by the medical assistants.

The first phase comprised the intake and triage of the patient, for food insecurity through the caretaker completing the Hunger Vital Sign survey. Specific steps in the process by the medical assistants were:

1. Greet the patient
2. Patient check-in
3. Triage the patient
4. Give the Hunger Vital Sign to the patient's caregiver for completion
5. Place the patient and patient's caretaker in an examining room
6. Inform the provider as to the patient's chief complaint and results of triage
7. Hand the Hunger Vital Sign survey to the provider

The second phase comprised the provider clinical visit through patient discharge. Specific steps in this process by the provider and medical assistants were:

1. Provider conducted clinical visits, addressed chief complaints, and was assisted by medical assistants in medication administration, treatments such as a nebulizer treatment or medical tests such as x-ray or throat swab for strep.
2. If the Hunger Vital Sign was positive for food insecurity, the provider conducted an oral examination to assess for dental caries.
3. Along with discharge instructions for the chief complaint, the provider advised the patient's caretaker on recommendations/referrals for dental caries and mitigation strategies for food insecurity.
4. The patient and caregiver checked out at the front desk and received written information on accessing the San Antonio Food Bank and local faith-based and secular food pantries from the medical assistants.

The third phase comprises electronic medical record documentation by the provider to coding/de-identifying patient data for entry on the data collection sheet by the medical assistants. Specific steps in this process by the provider and medical assistants are:

1. For patient's screening positive for food insecurity the provider entered Z59.41 into the problem list as the ICD-10 for food insecurity.
2. For patient's screening positive for food insecurity, documentation of recommendations and/or referrals for follow up of dental caries and mitigation of food insecurity were completed.
3. The medical assistant at the front desk reviewed the electronic medical record data and placed it on the data collection sheet in coded/de-identified form.

Special Considerations

The Hunger Vital Sign (Hager et al., 2010) is a two-item food insecurity survey with each item having three choices (see Appendix A). The three choices are often true, sometimes true, and never true. A positive screen was obtained by an answer of often true or sometimes true to either of the two items. For this quality improvement project as included in the data instructions and collection sheet (see Appendix B), a score of 2 was applied to an answer of often true and a score of 1 was applied to a score of sometimes true.

Data collection consisted of de-identified patient data and included patient age, ethnicity, caregiver language preference, food insecurity screen/scoring, oral examination for dental caries, dental referrals/recommendations, Z59.41 entry, and food resources handouts (see Appendix C).

Order of Interventions and Desired Outcomes

The order of interventions mimicked the existing patient-care order at the pediatric urgent care center both for the medical assistants and the providers. As such, patient flow, timeliness of the visits, and required patient documentation were not altered dramatically. It was hoped that screening for dental caries and food insecurity in this streamlined manner would benefit the patients and their caregivers, especially those who utilize the urgent care center as a primary care provider. Screening of dental caries and food insecurity is recommended at any level of care and the urgent care model will continue to evolve as an access-friendly point of health care.

Setting/Population

The setting for this quality improvement project was an urban pediatric urgent care center located in a population dense, socioeconomically disadvantaged neighborhood (Table 1). The catchment area included the sixth lowest per-capita income data for the City of San Antonio and over 90% of residents identify as Hispanic or minority. The urban pediatric urgent care center

had a sister location in a suburban location 4 miles from the urban location. The suburban location had a 20% higher per-capita income, less than half of the population density, and less than 50% of the residents identifying as Hispanic or minority.

Organizational Barriers

Barriers within the organization of the pediatric urban care center revolve around distinct staff roles whereby there was a set of expectations between the professional and para-professional team members. Introducing new concepts that appeared to disrupt established routines were not well-received. Specifically, one of the providers who was thoroughly briefed on the process was filling in due to a vacation by the primary staff member. No objections were noted; however, there was objection to documentation of findings related to food insecurity in the medical record, specifically entering the Z59.41 code in the problem list. The situation was remedied, and the data entered retrospectively after involvement of the chief operating officer and the business manager. Another example was dividing the data-collection protocol among the medical assistants so that the “work” was evenly distributed. This occurred during the 1st week of implementation and was remedied by my further explanation of the need for a consistent individual tasked with pulling the data from the medical record and coding it. The outcome was an initial screening loss of 18 patients, with no subsequent screening losses during the project.

My lack of access to the medical record system was another barrier that was known during the planning process of the quality improvement project. I deliberately avoided the medical record screens and informed the medical assistants that they did much of the same tasks with data entry (triaging), that would be required for the project and that they were trusted to follow the protocol.

Finally, the urgent care center transitioned to limited summer hours 2 weeks before project implementation. The volume of patients was lower than projected but the main consideration was the staffing during the mornings before 10 a.m. of one provider and one medical assistant. During times when several patients were waiting or being seen, the student investigator would complete non-patient care tasks such as monitoring the waiting room or conducting examination room turnover and cleaning. My willingness to collaborate in this way helped with staff buy-in to the project.

Organizational Facilitators

The primary provider present during much of the project was a relatively new nurse practitioner who was interested in the topics of dental caries and food insecurity. This provider helped to ensure that the protocol was followed and took the initiative to network with a pediatric dental clinic near the urgent care center that would accept new dental patients. They established a relationship of referring patients to each other depending on the needs of the patient.

The lead medical assistant who entered and coded the data from the medical records took ownership of the process and was fastidious in making sure all patients entering the facility were captured and included in the data sets. By far the most experienced of the medical assistants, the lead's relationship within the clinic were reminiscent of senior enlisted military leaders, who could be counted on to make things run efficiently.

Ethical Considerations

From an ethical perspective, my lack of access to the electronic health record and the collection of de-identifying patient data helped to ensure patient and caretaker privacy. The data sheets with the coded information were stored in locked drawers at the urgent care center and the

completed sheets, after they were given to me, were kept in a locked file cabinet in a locked room in my home.

Results

Objective and Projected Outcome: Staff Education

All urban pediatric urgent care center staff were educated on the procedures for screening for dental caries and food insecurity. Measured by an attendance matrix, the projected outcomes were the completion of the education event, with education/reeducation as required during the project due to staff rotations.

The staff of the urban pediatric urgent care center included three providers and four medical assistants who were trained on the protocol for the quality improvement project. Retraining occurred for one provider and one medical assistant. This objective of all staff trained was met, .

Objective and Projected Outcome: Food Insecurity Screening

Of the patients seen at the urban pediatric urgent care center, 75% would be screened for food insecurity by the caretaker's completion of the Hunger Vital Sign. Measured by the total number of patients screened divided by the total number of patients seen, the expected outcome was a minimum screening rate of 75% with a goal of 85% or higher.

135 patients were screened for food insecurity out of 153 patients seen during the length of the quality improvement project for a rate of 88.24%, which indicated that this objective and goal was met

Objective and Projected Outcome: Triggered Dental Caries Screening

Of patients screening positive for food insecurity, 100% would receive an oral examination for the evaluation of dental caries. Measured by documentation of a positive food

insecurity screen and subsequent oral examination for dental caries, the projected outcomes were that all positive food insecurity screens would trigger an oral examination by the provider for dental caries. Forty-three patients were screened positive for food insecurity and of the 40 eligible for an oral examination for dental caries, all 40 received an oral examination for dental caries for a rate of 100%, which indicated that the objective was met.

Objective and Projected Outcome: Written Mitigation Strategies

Of patients screened for dental caries based on positive food insecurity screening, 100% would receive written mitigation strategies for dental caries and food insecurity. Measured by written documentation of the dispersion in the electronic medical record, projected outcomes were the provision of written mitigation strategies related to oral health and dental caries in the form of recommendations and referrals and written mitigation strategies for food insecurity including the citywide food bank and citywide food pantries.

All 40 patients screened for dental caries received written mitigation strategies, documented in the medical record for a rate of “100%: Objective Met” and all patients screening positive for food insecurity (43/43) received mitigation strategies such as written information on the San Antonio Food Bank and citywide, faith-based, and secular food pantries for a rate of 100%: Objective Met.

Demographic, Prevalence, and Hunger Vital Sign Data

135 patients were screened over the course of the quality improvement project and demographically, 130 identified as Hispanic for a rate of 96.3%. This rate approximated the 78228 urban catchment area, which is 88.5% Hispanic. The average patient age was 4 years and 6 months, likely affected by the summer-months’ time period. While the Hunger Vital Sign was offered in Spanish or English, only 3.7% of caregivers opted to conduct the survey in Spanish.

Prevalence rates for the co-occurrence of dental caries and food insecurity were 76.7% (33/43 patients) and these data were higher than projected in the literature; however, researchers cautioned that impaired socioeconomic status was adversely additive. Food insecurity presented in 43 out of 135 children with a prevalence rate of 31.9%. Prevalence rates in the literature were from 21% to 60% and while data from this quality improvement project are not generalizable, the salient point is that the achieved rate is triple the rate forecasted for the City of San Antonio.

Hunger Vital Sign data were collected based on positive screening responses of “sometimes” or “often.” Of the 43 positive screens, 27 or 62.8% answered “sometimes” and 16 or 37.2% answered “often.” While these results are not generalizable, systematic reviews have documented that even less-severe levels of food insecurity are deleterious to the child affected.

Discussion

The most important successes achieved by the interventions were the predicted validations of the severity of dental caries and food insecurity in a pediatric socio-economically disadvantaged population. The staff said that the project interventions brought to light known difficulties, but upon completion they understood the magnitude of the problem(s). To reinforce their understanding, they engaged in a comparison between the patients seen in the suburban location versus the urban location of the urgent care centers and based on microsystem assessment data they gained a further appreciation for the syndemic phenomenon seen at the urban location. The most important difficulties related to the interventions were driving beyond the mindset of added work with the project and that urgent care centers do not screen for dental caries and food insecurity. Their worldview of this fact was based on the problem-focused method of care, their work experiences, and that additional workload will impact the clinic flow and make their jobs more onerous. As the project progressed, the interventions became

embedded in the workflow and inclusivity was not found to be onerous. Cooperation between and among the professional and para-professional staff members was a work in progress which seemed to gel within 10 days of implementation. I found that my availability, reinforcement of the interventions, and re-education to be effective in ameliorating some of these difficulties.

The main changes observed included provider discussions with the caregivers about the deleterious effects of food insecurity and resources related to food insecurity in terms of the local food bank and citywide food pantries being made available to the patient's caregivers. For the Medical Assistants who handed out the resources on discharge they observed first-hand the gratitude and relief expressed by the caregivers that there were community resources available. These changes are qualitative in nature, but they certainly had a positive impact on the art of healthcare. The other main change observed was the provider's initiative in establishing a referral network for dental referrals by a face-to-face meeting with a local, Medicaid-accepting dental clinic. In turn the dental clinic can refer patients needing to be seen to the urgent care clinic.

The project's strengths were its simplicity, its scientific foundations, and the ability of the protocol to be tailored to the needs of the staff and the flow of the clinic. Occam's Razor (Merriam-Webster, n.d.) posits the simplest explanation may be preferable or be the most eloquent. Applied to this project, dental caries and food insecurity in children have been syndemically linked in the literature. Screening for both conditions lends itself to an urgent care environment both because of the high volume of primary care patients seen and because said screening can be easily incorporated into the urgent care center workflow. While there were numerous syndemic indices found, dental caries and food insecurity could be applied to the urgent care center utilized in this project as well as not impacting the patient flow, timewise or in

terms of complexity. By linking the administration of the Hunger Vital Sign to the patient intake/triage aspect of care by the Medical Assistants and linking positive screens for food insecurity with oral examinations, recommendations and referrals by the providers, all aspects of the project could be seamlessly integrated into established patient workflow.

The project results included a co-morbidity rate of 76.7% between dental caries and food insecurity, which is higher than the 58% reported by Angelopoulou et al. (2019) or the overall dental caries prevalence in children of 45.6% (Hill, 2020). Both Angelopoulou et al. and Hill (2020) projected that the prevalence of dental caries in socio-economically challenged children may be higher than reported. Of note, and an incidental finding of the project, of the 40 children old enough for dental caries assessment, only five children were not being seen by a dental provider. Food insecurity rates in socio-economically disadvantaged populations have been projected as high as 55% (Barnidge et al., 2019) to 60% (Fram et al., 2015). Lower rates of 21% were reported by Hager et al. (2010) and Shankar et al. (2017). Studies that had populations like that of the project in terms of ethnicity and socio-economic status (Angelopoulou et al., 2019; Baer et al., 2015; Radandt et al., 2018) had food insecurity prevalence rates of 31%. The food insecurity prevalence rate for the quality improvement project was 31.8%. As stated previously, the results of the project are not generalizable, and the comparisons are included for informational purposes only.

Limitations

The results of a quality improvement project are not generalizable beyond the scope of the urgent care center studied. Additionally, the results are not generalizable to the suburban location of the sister facility studied. The course of the study was 9 weeks long and accounted for 153 total patients, of whom 135 were screened for food insecurity. This stated patient volume

was impacted by the summer-hours schedule implemented 2 weeks before the start of the project. Summer-hours comprised 44% of the hours of the suburban location; however the urban location was chosen based on the literature and demographic data. Because of summer-hours, a single provider was assigned to the urban location. During the study the provider was replaced by another provider for 2 weeks of the period. This required educating the alternate provider and resulted in one provider not being comfortable with the protocol, which was eventually resolved by the business manager and chief operating officer, with no loss of data from the quality improvement project.

Due to my not having access to the electronic medical records, the data integrity relied on the lead Medical Assistant and after the first week of the project, all data pertaining to the quality improvement project were captured. To further ensure patient/caregiver privacy, all data were de-identified and results were entered as codes. As such, post-hoc data audits were not possible.

Another limitation of the project was the failure of the student investigator to convince the clinic staff that they were both urgent care and primary care caregivers. The staff were very comfortable in their roles as urgent care caregivers, but much less comfortable taking responsibilities for what they perceived as primary care caregivers. These tenets are ripe for qualitative examination but are well-beyond the scope of this quality improvement project.

Finally, three of the patients who screened positive for food insecurity were not eligible for oral examination for dental caries due to age restrictions (less than 6 months of age). This was an oversight on the part of the student investigator and lowered the number of patients who received an oral examination for dental caries from 43 to 40.

Recommendations

Based on the results of the quality improvement project, dental caries exhibited a very high co-morbidity with food insecurity; however, of the 40 children who were age-appropriate for dental caries screening, only five children were not seeing a dentist. As a covered service by Medicaid, the high amount of dental care reported was very encouraging. As such, the student investigator recommended that a dental provider or dental clinic be added to the patient intake interview or triage in preparation for seeing the provider. Currently the clinic lists primary care providers or clinic if applicable and preferred pharmacy as part of the intake interview reviewed on each occasion of care. I recommend that screening for dental caries be continued not only in relation to food insecurity, but for overall oral health.

With 31.8% of the patients screening positive for food insecurity, the recommendation would be the continuation of the Hunger Vital Sign as part of the intake/triage assessment completed by the Medical Assistants. The pan-health syndemic indices related to food insecure children necessitate this screening and the patient caregivers were grateful to receive information on community food resources. While data collection was no longer needed, tracking a few indicators several times a year would lead to continuance of the program.

Sustainability

The chief operating officer, upon being informed of the results, wanted to implement the distribution of food insecurity community resources for both the suburban and urban location of the pediatric urgent care centers. These resources are public domain and readily available for electronic or hard copy viewing. It is unknown whether there was a willingness to continue use of the Hunger Vital Sign or dental caries screening beyond the timeframe of the project. At a

minimum, screening for dental caries and food insecurity was viable, not time-intensive, and easily incorporated into clinic workflow.

Another aspect from a business perspective that may facilitate project continuation is that food insecurity screening is billable under Medicaid with the z-code of 59.41 and had the business officer's support. Despite business reasons, proven efficiency, and proof of need, it is doubtful that the urgent care center staff will continue the interventions of the project, beyond distributing community food resources handouts. While not ideal, a longer project timeline and project implementation before summer hours would have aided in the sustainment process both in terms of a much higher patient population but also with many different providers over time.

Implications for Practice

The American Academy of Pediatrics (2023) recommends screening for dental caries and food insecurity at all primary care appointments. Compliance with these recommendations is dubious at best. The academy's three-pronged approach was identification, distribution of resources, and advocacy. Identification and the distribution of resources can be done from the comfort of a clinical practice while advocacy requires risk, time, and an unwillingness to accept the status quo. Taken in the context of this quality improvement project, advocacy could be the utilization of the project interventions at both urgent care centers instead of one location. This could be the start, but what if a known group of 10 pediatric urgent care centers were included so that a group of 12 pediatric urgent care centers screened for dental caries and food insecurity? Which is more valuable, 31% of 135 patients or 31% of 12,000 patients? These 12 pediatric urgent care centers should market dental caries and food insecurity screenings for all patients as these interventions border on advocacy.

Doctorally-prepared Nurse Practitioners are educated and have the tools for advocacy, yet how many advocate? One avenue for advocacy is research. Of the 27 peer-reviewed articles, the article by Valdez-Gonzales et al. (2021) was the only one with a nurse as the first author or any author. The literature on dental caries and food insecurity is dominated by physicians, dentists, nutritionists, psychologists, and social workers. Where are the nurses? Where is the vision?

As a cogent example of the need for research and vision take the point expressed by Shankar et al. (2017) who stated that any level of food insecurity detrimentally affects a child of any age and that referral to a developmental specialist is paramount for amelioration. According to M. Tagle (personal communication, April 6, 2023), a guest lecturer for pediatric content at a doctoral nursing program, the city of 2 million has three developmental pediatricians, one who works exclusively with the military, and the wait time for evaluation is up to a year. Is this a niche that Nurse Practitioners can fill? With education, curriculum development and clinical training, the answer is yes. It awaits advocates and an unwillingness to accept the status quo.

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Appendix A

Hunger Vital sign

STEP 1. Identify patients who are at risk for food insecurity. Place date and age on this form.

Date: Age:

Preface questions with “I ask all my patients about access to food. There are many community resources available, often free of charge for individuals. For each statement, please tell me if it was often true, sometimes true, or never true.”			
	Often True	Sometimes True	Never True
Within the past 12 months I/we were worried whether our food would run out before we got money to buy more.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Within the past 12 months the food I/we bought just didn’t last and I/we didn’t have the money to get more.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
“Often true” or “sometimes true” to any statement indicates the patient is at risk for food insecurity.			

Step 2. If Hunger Vital Sign is positive for food insecurity, give it to provider for assessment and further disposition.

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Appendix B

Data Collection Instructions and Data Sheet

Data Sheet Instructions: Front Desk Personnel Hopscotch Health – Data from eHR. FI = Food Insecurity

Column 1: P1 = patient number one seen Pn = last patient to have data collected.

Column 2: Age: Age in years

Column 3: Ethnicity: Hispanic = 2 non-Hispanic = 1

Column 4: Language: Spanish = 2 English = 1

Column 5: FI Screen: Positive = 1 Negative = 0 Positive screen is answer of sometimes or often to either question. Score for often on either question is 2 score for sometimes on either question is 1.

Column 6: Oral Exam for dental caries if FI positive: Performed = 1 Not performed = 0

Column 7: FI ICD-10 code of Z59.41: Entered in problem list = 1 Not entered in problem list = 0

Column 8: FI Handout: Given to patient caregiver = 1 Not given to patient caregiver = 0

Column 9: Dental Referral/Recommendation(s): Given to patient caregiver = 1 Not given to patient caregiver = 0

At the end of the day, the data sheet which is de-identified is given to the investigator. If 10 patients were entered on this page, the next day starts a new page with P11. Each consecutive day starts a new sheet with a running total.

Appendix C**Food Resources Handout**

San Antonio Food Bank – multiple other resources
5200 Historic, Old Highway 90 West
San Antonio, Texas 78227
210-337-3663 <https://safoodbank.org>

Societies of St. Vincent DePaul
P.O. Box 831074
San Antonio, Texas 78283
210-225-7837 <https://svdpsa.org>

Outcry in the Barrio
P.O. Box 37387
San Antonio, Texas 78237
210-434-2774 <http://www.outcryinthebarrio.org>

Mission Espada - St. Vincent DePaul
10040 Espada Road
San Antonio, Texas 78214
210-973-1035 www.info@svdpsa.org

Antioch Baptist Church
1001 North Walters Street
San Antonio, Texas 78202
210-2252453 <http://www.antiochsa.org>

St. Paul's Episcopal Church
1018 East Grayson Street
San Antonio, Texas 78208
210-226-0345 <https://www.stpauls-satx.org>

St, Matthew's Catholic Church - St. Vincent DePaul
10703 Wurzbach Road
San Antonio, Texas 78230
210-478-5020 <https://stmatts.org>

St. Peter Prince of the Apostles Catholic Church - St. Vincent DePaul
111 Barilla Place
San Antonio, Texas 78209
210-822-3367 <https://stpeterprinceoftheapostles.org>

Principe de Paz United Methodist Church – Jireh House
3220 South Laredo Street
San Antonio, Texas 78207
210-436-7113 <http://www.jirehhouse.org>

Agape Ministry Emergency Assistance Program
127 Lanark Drive
San Antonio, Texas 78218
210-590-6655 <http://theagapeministryinc.org>

Blessing of Hands Ministries
301 Fredericksburg Road
San Antonio, Texas 78201
210-612-2281 <https://www.sacrd.org/directory/program/5831/>

St. Paul United Methodist Church – Feed My Lambs
508 North Center Street
San Antonio, Texas 78202
210-227-2525 <https://www.stpaulofsanantonio.com>

Get Up Community Center Food Pantry
6227 Krempen Road
San Antonio, Texas 78233
210-313-7758 https://www.freefood.org/li/tx_get-up-community-center-food-pantry

Resurrection of the Lord Catholic Church Food Pantry
7990 Military Drive, West
San Antonio, Texas 78227
210-675-1470 <https://www.resurrectionsatx.org>

Summit Christian Center - Summit Pantry
2575 Marshall Road
San Antonio, Texas 78259
210-402-0565 <https://sacrd.org/directory/program/2510>

BWC Basileia Worship Center – 357 Food Pantry
489 Lincolnshire Drive
San Antonio, Texas 78220
210-719-5546 <https://www.foodpantries.org/li/3-5-7-food-pantry>

Metropolitan Community Church
611 East Myrtle Street
San Antonio, Texas 78212
210-472-3597 <https://www.mccofsanantonio.com>

Blessed Angels Community Center
14078 Nacogdoches Road
San Antonio, Texas 78247
210-284-4391 <https://blessedangelscc.org>

Emmanuel Presbyterian Church
713 Division Avenue
San Antonio, Texas 78225
210-922-7153 <https://www.epcsanantonio.org>

Ella Austin Community Support
1023 North Pine Street
San Antonio, Texas 78202
210-224-2351 <https://www.ellaaustin.org>

Inner City Development – Clothing & Food
1300 Chihuahua Street
San Antonio, Texas 78207
210-224-7239 <https://www.innercitydevelopment.org>

House of Neighborly Service
407 North Calaveras Street
San Antonio, Texas 78207
210-434-2301 <https://hnstoday.org>

San Antonio Rescue Mission
907 East Quincy Street
San Antonio, Texas 78215
210-222-9736 <https://sarescuemission.org>

Northern Hills United Methodist Church – Food Pantry
3703 North Loop 1604 East
San Antonio, Texas 78217
210-654-0881 <https://nhumc.org>

West Avenue Compassion
10715 West Avenue
San Antonio, Texas 78213
210-573-2847 <https://westavenuecompassion.org>

Oxford United Methodist Church – Food Pantry
9739 Huebner Road
San Antonio, Texas 78240
210-696-0192 <http://oxfordumc.org>

Bethany Congregational Church – Dellview Pantry
500 Pilgrim Drive
San Antonio, Texas 78213
210-342-6034 https://www.freefood.org/l/tx_78213_dellview-pantry-bethany-congregational-church

St. Francis Episcopal Church
4242 Bluemel Road
San Antonio, Texas 78240
210-218-0962 <https://www.sfch.org>

Beyond the Light Outreach Project
607 Piedmont Avenue
San Antonio, Texas 78203
210-487-8268 <https://www.btop.org>

Holy Redeemer Catholic Church – Food Pantry
1819 Nevada Street
San Antonio, Texas 78203
210-532-5358 <https://www.holyredeemersa.com>