



## Purpose

The purpose of this research study was to help determine the level of food insecurity at dental clinics affiliated with St. Barnabas Hospital, to help individuals who may benefit from support towards food security, and to utilize gathered information as a predictor for future dental caries incidence.

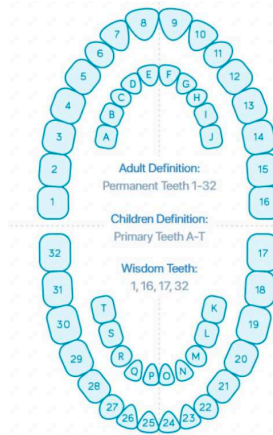
## Background

According to the National Health and Nutrition Examination Survey (NHANES) 2013/2014 data analysis, a significant association exists between food insecurity and dental caries in children (1). A case study in the Journal of Agriculture, Food Systems, and Community Development in 2021 employed syndemic theory to propose an effective response to the existing conditions within the Bronx, NY. Syndemic theory is defined as diseases which are hypothesized to co-occur within specific temporal and/or geographic contexts due to harmful social conditions and to intensify the adverse consequences. This study analyzed the "COVID-Food Syndemic," and the collective effects of food insecurity, diet-related diseases (DRD), and COVID-19 in the Bronx, NY. One approach included increasing affordability, quality, and access to comprehensive primary care, because effective primary care can identify food insecurity through screening (2). This newly proposed study can be included in this approach, as the questionnaire can identify patients within the population at risk for increased incidence of food insecurity. The January 2021 Pediatric Survey Findings from the American Academy of Pediatrics (AAP) showed that 100.0 percent of surveyed pediatricians agree or strongly agree that food insecurity contributes to poor oral health outcomes among children. Additionally, 96.0 percent of surveyed pediatricians agree or strongly agree that patients should be screened for insecurity in a clinical pediatric setting (3). This proposed study can allow the introduction of food insecurity screening to pediatric dentistry. A 2012 article from BMC Pediatrics concluded that child-reported food insecurity situations could serve as a screen for nutrition problems in Mexican-origin children aged 6-11 years old. Their results showed 64% of children studied reported low or very low food security, and that very low food security was associated with greater intakes of total energy, calcium, and percentage of calories from fat and added sugar (4). The newly proposed study can determine the levels of food security within pediatric dentistry patients at SBH and affiliated dental clinics. "Oral health and nutrition have a synergistic bidirectional relationship," according to the 2007 Position of the American Dietetic Association (ADA). Also, the ADA supports the combination of nutrition services, education, and research to improve the intervention and prevention of oral diseases, to ultimately improve oral health. The ADA Position Report supports Dietetic internship/ coordinated program competencies for predoctoral dental education, and thus, supports the integration of oral health screening in conjunction with diet counseling and education by designing nutrition care plans for patients having compromised oral health. Furthermore, the ADA encourages continuing professional education collaboration between dietetics and dental professions in presentations, meetings, conferences, and publications (5). This new study will help determine the level of food insecurity at St. Barnabas Hospital and affiliated dental clinics to help individuals who will benefit from support.

## Methods

Children ages 7 to 17 years old and their guardians were screened and given questionnaires provided at a dental appointment. Information gathered was used to determine a potential relationship between level of food security to dental caries incidence and elevated BMI. Pediatric dentistry patients and their families identified as experiencing food insecurity were supported by being given information about local food resources (food banks near St. Barnabas Hospital). Body mass index (BMI) was calculated from height and weight via BMI calculator online at cdc.gov.

Caries Charting Scoring System:  
Caries Presence: Indicated with red line on designated surface  
1 point each - non-smooth surface (occlusal) caries presence  
2 points each - smooth surface (buccal/facial or lingual/palatal) caries presence  
Incipient Caries Presence: Indicated with red line on designated surface 1 point each - any tooth surface (MID/FIB/L) incipient caries presence



Patient Questionnaire (borrowed from reference (4) and slightly modified to better suit patients):

1. Did you worry that food at home would run out before your family got money to buy more?  
\_Yes  
\_No  
\_No answer

2. Did the food that your family bought run out and your family did not have money to get more?  
\_Yes  
\_No  
\_No answer

3. Were you not able to eat a variety of healthy foods at a meal because your family didn't have enough money?  
\_Yes  
\_No  
\_No answer

Examples:  
Non-prepackaged meats/cheeses ("cold cuts")  
Fresh fruits/vegetables  
Whole grain breads/pastas

4. Did your meals only include a few kinds of cheap foods because your family was running out of money to buy food?  
\_Yes  
\_No  
\_No answer

Examples:  
Spiced macaroni and cheese/frozen meals  
Canned soup  
Beverages of juice

5. Was the size of your meals cut because your family didn't have enough money for food?  
\_Yes  
\_No  
\_No answer

Examples:  
Snacks only (potato chips/cheese puffs/crackers)  
Cereal and/or toast  
Side dishes only (rice/mashed potatoes/french fries)

Parent Questionnaire (1-2. Borrowed from Reference 6 and currently being utilized by SBH Pediatric Medicine); (3-5. Based on Household Food Security Survey Module):

1. Within the past 12 months has your family worried whether food would run out before you got money to buy more?  
\_Yes  
\_No

2. Within the past 12 months has the food your family bought not lasted, and did your family not have money to buy more?  
\_Yes  
\_No

3. "(U)we couldn't afford to eat balanced meals." Was that often, sometimes, or never true for (you/your household) in the last 12 months?  
\_Often true  
\_Sometimes true  
\_Never true  
\_No answer

4. Since the COVID-19 pandemic, did you or other adults in your household ever cut the size of your meals or skip meals because there wasn't enough money for food?  
\_Yes  
\_No  
\_No answer

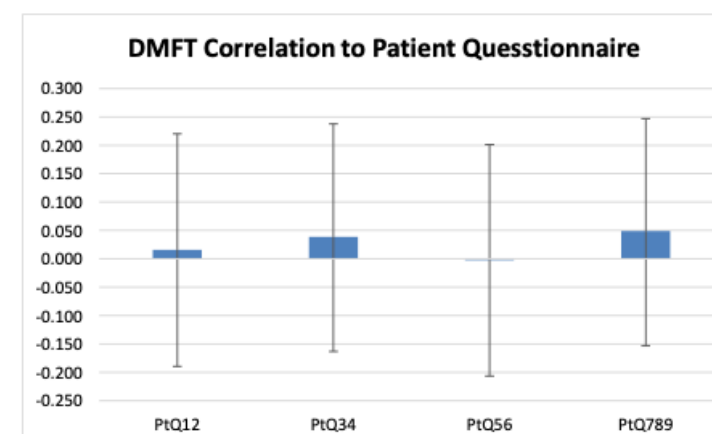
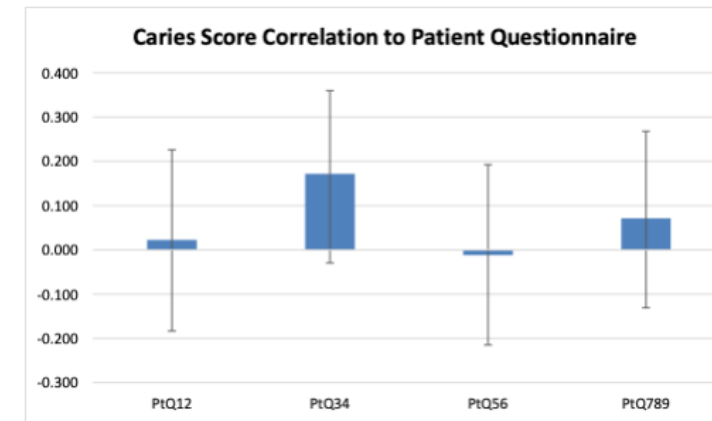
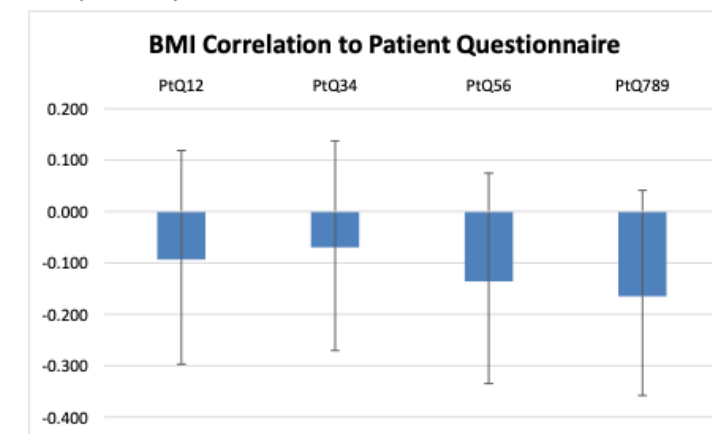
5. were you every hungry but didn't eat because there wasn't enough money for food?  
\_Yes  
\_No  
\_No answer

## Results

Amongst 96 patients, nearly half (40) reported food insecurity. Of those reporting, 36 respondents accepted help and 4 refused assistance. 58% of those who accepted informational assistance reported improved food security. Correlation values and their p-values indicate no statistical significance between food insecurity and dental caries incidence, DMFT(decayed missing filled teeth), or patient BMI.

Statistical Analysis of Patient Questionnaire Data <sup>b</sup>	Pearson Correlation	Sig. (2-tailed p-value)	95% Confidence Intervals (2-tailed) <sup>a</sup>	
			Lower	Upper
PIQ12 - Pt BMI	-0.093	0.388	-0.297	0.119
PIQ12 - Pt Caries Score Total Points	0.022	0.832	-0.183	0.226
PIQ12 - DMFT	0.016	0.880	-0.190	0.220
PIQ34 - Pt BMI	-0.069	0.510	-0.270	0.137
PIQ34 - Pt Caries Score Total Points	0.172	0.094	-0.030	0.360
PIQ34 - DMFT	0.039	0.708	-0.163	0.237
PIQ56 - Pt BMI	-0.136	0.204	-0.335	0.075
PIQ56 - Pt Caries Score Total Points	-0.012	0.909	-0.215	0.192
PIQ56 - DMFT	-0.003	0.981	-0.206	0.201
PIQ789 - Pt BMI	-0.165	0.116	-0.358	0.041
PIQ789 - Pt Caries Score Total Points	0.071	0.489	-0.131	0.268
PIQ789 - DMFT	0.049	0.637	-0.153	0.247

a. Estimation is based on Fisher's r-to-z transformation.  
b. Stats analysis courtesy of Dr. Yens



## Discussion

The data analysis was inconclusive potentially due to a combination of reasons. There is a social stigma associated with admitting food insecurity. Also, many patients may feel uncomfortable discussing this with their dental providers. As dental professionals, we are equipped with knowledge and expertise concerning dental caries/BMI/and overall dental health and its connection to poor dietary habits, including carbohydrate-rich meals and sweetened beverages. We can better help our patients with dental caries by discussing their diets in relation to their caries incidence. By doing so, we create a safer space for them to openly discuss their food security level. If patients better understand the connection between their diets, caries incidence, and food security level, then they can potentially have a better experience in the dental setting. Another potential reason for inconclusive data may be attributed to patients answering questions in a way they believe the researcher was expecting them to, or in a way that would more positively represent them as a group (being dishonestly food secure). Many parents and patients answered in ways implying they were not food insecure (by answering "No," to many of the survey questions). By doing so, they may have been distorting the true data and causing it to be skewed/inconclusive for correlation between level of food security and dental caries incidence. Meanwhile, a smaller number of patients honestly admitted they were struggling to obtain healthy food items and gratefully accepted information for themselves and their loved ones.

## Conclusions

There was a reported incidence of food insecurity amongst pediatric dentistry patients and their guardians within dental clinics affiliated with St. Barnabas Hospital. Assistance given to them provided benefits for >1/2 of respondents stating food insecurity. The collected data did not support a relationship between level of food security and dental caries incidence or elevated BMI. Further research may help determine if future food insecurity or future dental caries are related to each other.

## References

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