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Sarah Pylant Date

An Evaluation of Nurse Health Navigator Utilization within *Healthy Beginnings* System of Care in Atlanta, Georgia

By

Sarah Pylant
Master of Public Health

Epidemiology

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By

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Bachelor of Science in Public Health
University of South Carolina
2015

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An abstract of
A thesis submitted to the Faculty of the
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Abstract

An Evaluation of Nurse Health Navigator Utilization within *Healthy Beginnings* System of Care in Atlanta, Georgia

By: Sarah Pylant

Introduction: *Healthy Beginnings* System of Care program is located within Educare Sheltering Arms in Atlanta, Georgia and uses a Nurse Health Navigator (NHN) to provide health resources and education to children within this early learning center. To determine the program's impact, it is necessary to assess what participants are using the NHN and why they seek aid. This thesis aims to examine commonalities among the high utilizers of the NHN from 2011 to 2017. Further, this thesis will assess NHN utilization to obtain how many high utilizers were in each school year and for how many years a child was a high utilizer.

Methods: *Healthy Beginnings'* data was collecting on an ongoing basis by *Healthy Beginning's* staff members. Data is stored in a REDCap database, which contained the 648 observations used in this analysis. The NHN Visit Form tracked NHN visits and produced a count of number of visits per year for each child. A dichotomous variable was created from this count to distinguish high utilizers from regular utilizers. Logistic regression analyses were performed to assess the impact of child's chronic condition status on NHN utilization, controlling for other health and demographic factors.

Results: *Healthy Beginnings* participants with chronic conditions were more likely to be high utilizers of the NHN than children without any chronic conditions (aOR=2.29, 95% CI: (1.49, 3.52), $p<0.001$). Specifically, children with asthma or other respiratory conditions were expected to be high utilizers (aOR=3.06, 95% CI: (1.42, 6.61), p-value=0.0044). Child's parent's education status and insurance type tested significant for their effect on a child's NHN utilization status. Other variables used in this analysis were not significant on impacting NHN utilization.

Discussion: Children with chronic conditions, especially those with respiratory conditions, are more likely to seek aid from the NHN indicating these should be the children targeted in these programs. Children whose parents have earned at least a graduate degree were also likely to use the NHN more frequently than other enrolled children. Finally, insurance type impacted the relationship of interest indicating this variable should be used in future analyses of systems of care within early learning facilities.

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I. Introduction

A. Health Care Delivery Systems—Overview

In recent decades the United States has seen an evolution in health care delivery systems that resulted from factors such as changes in societal norms and technological advancements [1]. Systems are becoming more integrated, meaning private and public community resources are working together, to create a network of support for community members known as a system of care; and these systems are highly efficient and effective at delivering health care and meeting the needs of community members [2, 3]. However, despite these systems' great progress, research shows that gaps remain in health care services among certain populations of adults and children [4, 5]. These gaps are more prevalent among persons who are in lower-social classes and are more likely to experience high levels of health disparities [6]. These health disparities often arise from the lack of access to health resources and health education among these populations [6].

Moreover, evidence shows that these health disparities likely develop from racial disparities that are embedded in the United States culture [1, 6-9]. One example of this is seen by the gap in life expectancy between African-American and white citizens with African-Americans consistently experiencing shorter life expectancies than whites [7-10]. Many factors can explain why these disparities exist, but gaps in education between races, particularly among white persons versus African-American persons, tend to play a large role in why such drastic health disparities still exist in the United States [7]. For these reasons, there is a need to explore how to successfully deliver health care resources and health education to the underserved, lower-income populations [7].

B. Health Disparities in Children in the United States

Research found that African-American children experience the highest rates of chronic conditions and adverse health outcomes if living in poor areas with high concentrations of racial or ethnic minorities [7, 8, 11]. These chronic conditions and other health disparities include: asthma, malnutrition, low-birth weight, low vaccination coverage, and diabetes [9, 12-17]. These children also tend to have higher rates of inappropriate ambulatory use than white children of the same age in similar socioeconomic classes [18]. Furthermore, African American children living in low-income areas tend to experience more severe asthmatic symptoms, which causes these children to have higher rates of Emergency Room (ER) visits, hospitalizations, and missed school days due to asthma than non-Hispanic white counterparts [9, 14, 15, 19, 20].

Additionally, several studies have found that gaps between African American and white preschoolers' healthcare coverage continue to widen each year impacting other area of their health such as immunization coverage and chronic condition management [1, 9, 12, 14, 19]. The prevalence of chronic medical conditions is higher and the management of these conditions is worse among racial minorities living in low income areas, and because of this, there is a need for interventions that lead to better management of chronic conditions in these children [14, 21]. However, due to the complexity of the social constructs that are associated with these healthcare and chronic health conditions few interventions have been successful at reducing the health burdens experienced by this population [17].

Poor management of health conditions among children living in low income communities is also association with missing more days of school, which increases a child's likelihood of being chronically absent [8, 20, 22]. This is an important factor because it leads to widening the gap in academic achievement that persists in poorer populations [2, 7, 20, 23]. One report

determined that up to one-third of U.S. students, inclusive of elementary school through high school, are chronically absent, defined as missing 10% or more school days [24, 25]. This would mean over five million students in the United States are classified as chronically absent each year [25].

Further, a correlation was found between a child's chronic absenteeism and their family's socioeconomic status with poorer children consistently have a higher risk of being chronically absent than their peers from more affluent families, regardless of race/ethnicity [21, 25]. This is an important finding because children in these poorer populations who are chronically absent typically lack the necessary resources to be able to make up the missed work [21, 25]. Thus, reducing their chance of succeeding academically, and affecting the success of class as whole if the recurring absences disrupt the learning environment [21, 25]. Research has also indicated that missing school days as early as kindergarten establishes a trend of poor attendance that can be seen through high school, which impacts a child's ability to succeed in school and later in life [21, 26].

The success of the child in the classroom shares a commonality with the child's success in managing their health in the fact that they are both multifactorial [27]. Variables such as family priorities and public policy impact both the child's health and academic achievement; while other factors such as family's understanding of health, availability and quality of resources, intrapersonal violence in environment, and public policies are factors that can determine whether a child's chronic health conditions can be well managed [12, 16, 17].

This brings to light the importance of creating an easily accessible system of care that can not only aid with chronic condition management among these children but also educate and support their families. Improving the management of a child's chronic health condition(s) could

lessen the stress for the child and family which could be a step towards improving the overall home environment. Improvement in the child's health will also allow the child to have higher rates of attendance in school which increases the child's likelihood of succeeding academically and later in life [21, 26]. For these reasons, managing children's chronic health conditions is a logical first step to take to address these health disparities because improving the health status of these children allows for the children to be healthy enough to attend school to achieve academic success [21, 28].

C. School Based Health Centers

The ideal health care delivery system is difficult to develop since different cultures and environments have varying perceptions and standards of health [29, 30]. However, evidence indicates that many schools and early care learning centers in poorer neighborhoods throughout the United States have similarities in the demographics and health statuses of the children and families served at these centers [31]. Furthermore, research shows that school nurses could easily assume the role as providers for the health care delivery systems since they are already vital in identifying health concerns in children, especially for children who lack consistent primary care providers, insurance, and other health care resources [34, 36, 37]. These characteristics make schools an ideal location to incorporate health care delivery systems that use school nurses as integral components. School based programs not only allow for children to visit a provider without requiring parents to take off work, proving to be cost-effective interventions, but also utilize the relationships already built in to the community, among teachers, school staff, and children, creating a natural support system to help manage any health concerns the child faces [9, 33, 35].

For these reasons the number of school-based health centers (SBHC) has been increasing over the past decade, with the national number of SBHC growing by more than 20% from 2011 to 2014 [32, 33, 34]. In fact, the state of Georgia reported having 20 SBHCs in the 2016-2017 National School-Based Health Care Census with four programs located in the city of Atlanta [32]. This growth has encouraged researchers to further improve these school-based health care delivery systems using a school nurse as the health navigator of these SBHC [2, 9, 23, 27, 29, 45, 46].

Future programs can be improved by being implemented among younger school-aged children. Most SBHC interventions are being implemented in elementary through high school levels despite the recent evidence that proves that earlier interventions tend to have longer positive results than interventions that occur in older school-aged children [47, 48]. This indicates interventions targeting younger school-aged children can have long-term impact in these populations. One strength of these SBHC is that they easily allow for program coordinators to analyze of the short-term and long-term usage of the program; thus, the program coordinator can determine who is using the SBHC, why they are using the SBHC, and if they are seeing positive impacts from the SBHC.

Knowing who is using the SBHC not only allows for program coordinators to assess if the program is successful, but also allows for SBHC to be refined to improve the quality of support provided. For instance, one study found there were differences in the enrollment and utilization patterns of SBHC located in middle and high schools among urban and rural schools; urban school populations typically had higher rates of enrollment in the SBHC (62.8% vs. 51.1%) and urban school populations were more likely to use the SBHC at least once (OR = 1.12) [23]. However, longitudinal assessment of this same population found that over a three-

year period rural students were more likely to use the SBHC than urban students (RR = 1.29). Thus, demonstrating how long-term assessment of these programs can be informative of a program's impact.

Differences in the utilization patterns were consistently\ found for children depending on insurance statuses, health concerns, and gender. Those with public medical insurance or no medical insurance accounted for over 80% of SBHC utilizations combined in two different populations [23, 34]. Moreover, when looking at children with public insurance and children with no insurance, both groups of children were more likely to visit the SBHC when compared to children with private insurance (OR = 1.48; OR = 1.57) [23, 34]. Another study looking at Colorado high school student's school's clinic utilization patterns observed that 90% of their high utilizers visited the school's clinics for mental health or substance abuse matters [49]. This differed from regular utilizers whose mental health visits made up only 10% of all visits [49]. Finally, another study found in their population of children ages 5-12, SBHC visits concerning mental health issues increased from less than one-percent in the first year to almost 22% in the third year of their study [23]. Utilization patterns were also found to vary between genders. Two studies found that high school females used the navigator more frequently than male students (71% vs. 29% for high utilizers, 52% vs. 48% for regular utilizers, and 62% vs. 58.2% overall) which suggests that high school males are less likely to seek care [23, 49].

Other evidence demonstrates that trends in the population's usage of the SBHC change at difference stages of child development [23]. For instance, older children in one population had more visits to the SBHC concerning respiratory problems than the younger population (23.7% vs. 19.8%), while younger children used the SBHC for more nervous system/sense organ-related issues, mental issues, and infections (12.6% vs. 9.0%, 12.3% vs. 7.2%, 12.7% vs. 8.1%) [23].

This is evidence that children experience different needs at difference stages of development, so having a system of care incorporated at each stage of schooling could ensure that children are getting the most complete health care [23].

The few interventions that have occurred among preschoolers have been well received by the parents and children, and there is evidence of positive, lasting outcomes such as increased attendance rates [31]. Today, school nurses play an important role in helping their students and community members identify and manage chronic health conditions and connect them to healthcare resources [35-37]. While the use of school nurses is widespread, it has not resolved the issue of chronic absenteeism. For example, Atlanta experienced over 180,000 school-aged children who missed three or more weeks of school in 2010 [25]. Thus, while school nurses are critical in improving the overall health of the child, the consistent number of children missing school indicates that these nurses may lack all the necessary resources to meet every child's needs, proving there is a need for a school based health care delivery system that promotes community partnerships [25].

D. Federal Head Start Programs

Head Start programs, which began in 1965, are federally funded programs that aim to provide ongoing child development services and education for disadvantaged children, from birth to age five, throughout the country [38, 39]. They were created with the intention to reduce gaps in education and aid in increasing school readiness among these children [38, 40]. Early Care and Education Centers in Georgia, including Head Start Programs, in 2014 provided services for over 337,000 children in the state [41]. Further, the 340 Head Start and Early Head Start programs individually provide services that promote child health and school readiness to over 27,000 low-income children annually in Georgia [39].

Sheltering Arms Educare Atlanta early learning program is a Head Start program for families and children living in Atlanta, Georgia's Neighborhood Planning Unit-V (NPU-V) [13]. NPU-V is a low-income community, median income just under $21,000, with an average of 45% of the community living below the poverty line [42]. The majority of the residents in this planning unit are black (89%) and the children in this community experience high rates of serious health issues including low-birthweight, asthma, malnutrition, and diabetes [13, 42]. Further, adults in NPU-V have reported their community lacks basic, necessary health services, such as mental health services, that could improve their current health status [43, 44]. However, evidence indicates that health-based interventions would be well received since community members report a willingness to be engaged in increasing the access and overall health of their community [43, 44].

E. Healthy Beginnings System of Care

For the reasons previously mentioned, the Annie E. Casey Foundation partnered with Sheltering Arms Early Education and Family Centers and other organizations in the area to gain support to implement a system of care, *Healthy Beginnings*, within Atlanta's NPU-V's Sheltering Arms Educare Atlanta [13]. *Healthy Beginning* System of Care began in 2011 with the goal to help reduce health and developmental disparities experienced by the children in NPU-V by providing health education and links to health services to the children and families at Sheltering Arms Educare Atlanta [13]. Studies show that an integrated system of care, such as *Healthy Beginnings*, is highly beneficial especially for children with complex needs because it streamlines the communication between parents, staff, the school nurse, and community providers so that the child's issues are effectively addressed [2, 3, 25]. Further, *Healthy Beginnings* uses a targeted approach to ensure that the children with the most pressing needs,

including developmental delays, behavioral issues, chronic conditions, and infants, are getting the most complete system of care [13]. Previous studies have found that the use of a school Nurse Health Navigator (NHN) is associated with better management of children's health issues, particularly children at high-risk of developmental delays or with chronic conditions, and overall better attendance rates [23, 50, 51].

The NHN who interacts with the parents and children enrolled in the program is a full-time registered nurse who is employed by Children's Healthcare of Atlanta (CHOA). The NHN oversees enrollment of families and children into the program, and aids *Healthy Beginnings* in achieving its goals of ensuring every child is healthy and developing on tract to become successful learners. This is achieved by actively linking individual families and children to the appropriate community providers and services. *Healthy Beginnings* uses the NHN as a way to encouraged parents to be actively involved in their child's health by engaging with a health provider, which is important because the positive effects of these habits can be seen in children as young a three-years-old [31]. Further, evidence has demonstrated that the more engaged a NHN was with a family and the more the NHN advocated for a child's health, the more likely a parent/family was to see health care referrals to completion [51]. This demonstrations how fostering relationships with the center's parents can positively influence them to be accountable for their child's health [51].

Along with health navigation, the incorporation of health education that informs parents how to manage chronic conditions and of other health topics is associated with reduced Medicaid expenses by these families and children because of reduced numbers of ER visits [36]. Furthermore, studies show that health education that covers a broad range of topics that can be applicable to persons of all ages in tandem with health navigation can enable the parents to

become more knowledgeable of their own health [52]. Thus, with these factors in mind, *Healthy Beginnings* System of Care was implemented with the intent to meet and maintain every child's needs enrolled at Educare Atlanta so that they can lead healthy lives and be successful in the future.

F. Project Aims

The primary objective of this thesis is to identify commonalities among the program participants who used the NHN from August 2011-June 2017, including: (1) demographic trends and (2) health status similarities. Moreover, this thesis will identify those who are using the NHN more frequently, high utilizers, and determine if there are differences among this group when compared to the regular utilizers of the NHN, specifically assess chronic condition statuses across groups. A secondary objective of this thesis is to examine NHN utilization longitudinally across the six years used in this analysis to assess the number of high utilizers within each school year, the number of years a child qualified as a high utilizer, and overall management of health between these two groups.

Evidence suggests that it is necessary to assess commonalities among high utilizers and regular utilizers of the NHN to determine if the health efforts taken are effective and to determine if a SBHC, like *Healthy Beginnings,* is successful [23, 34]. Thus, this information will facilitate *Healthy Beginnings* to successfully implement a targeted approach [9, 50]. Commonalities are important to identify so that program coordinators can use this information to (1) develop ways to streamline the NHN's process of managing the children's health needs (i.e. if group settings would be a more effective and time-efficient way to present information), (2) identify who will be high utilizers during the enrollment process in future cohorts, and (3) assess if visits with the NHN are correlated with better health status among these children.

Longitudinal assessment of each child's involvement with the NHN can allow for program coordinators to track the changes in *Healthy Beginnings* participants' health during the duration of the program. This analysis of current and past children enrolled in *Healthy Beginnings* System of Care will allow for program coordinators to have insight of future cohorts' utilizers of the NHN and how to modify current approaches from information gleaned about NHN utilization patterns. Lastly, the information produced from this report will help in determining if implementing a System of Care in a program such as Head Start is successful in this population or how to make it more successful. Future programs can use the data in this report to gain a better understanding of how they can reach each child and meet every child's health needs, and if that is done then children will be healthier, missing less school, and more likely to achieve academic success [8, 20, 22].

II. Methods

A. Program Setting

Healthy Beginnings System of Care is conducted in one of Atlanta's Head Start Programs, Sheltering Arms Educare Atlanta Early Education Center (Educare), in southwest Atlanta's Neighborhood Planning Unit (NPU-V). This System of Care was implemented in 2011 and has continued through 2018.

B. Program Population

From 2011-2017, there have been 648 participants in *Healthy Beginnings*, and all participants were included in this analysis. The children's ages range from newborn to five-years-old and their household incomes fall below the poverty line, which is in accordance with Head Start Program criteria. Over the six years used in this analysis, there was a total of 1,740 visits with the NHN combined.

C. Eligibility

Eligibility criteria for the program had evolved as the System of Care cultivated relationships with Educare Atlanta's community members. From 2011-2016, all children enrolled at Educare were eligible to participate in the System of Care. In 2016, due to the program's expansion, *Healthy Beginnings* adopted a more targeted approach to ease the burden on program coordinators. This targeted approach requires for center staff to identify high-risk children, those that are showing signs of behavioral and developmental delays, have chronic conditions, or are infants and toddlers. These high-risk children are then referred to *Healthy Beginnings'* NHN. Teachers and staff members are typically the gatekeepers that identify and refer the high-risk children to the NHN; however, parents involved in the center can also connect with the NHN if their child is showing signs of high-risk conditions. Once a child connects with the NHN the child's parents are guided through the informed consent process by the NHN. If the parents give their consent, the child is enrolled into *Healthy Beginnings* and the baseline health information is collected at this time.

D. Data Measures

All data used in this analysis was collected by *Healthy Beginnings* NHN and data manager. Data is then stored in REDCap, a web-based database managing system. The REDCap data system is Health Insurance Portability and Accountability Act (HIPPA) compliant and allows for program coordinators to compile longitudinal, unidentified health histories on the children enrolled in the program. The data was collected via paper forms by the NHN and entered into the system by the data manager and Emory evaluation team interns.

The program's data is collected on an ongoing basis throughout the school year. The data used for this thesis comes from four forms including: Intake Form, NHN Visit Form, Medical

Tracking Form, and SOC Exit Form (see appendix). All baseline visits for new cohort members occurred at enrollment in the beginning of the school year and was recorded via the Intake Form. The NHN Visit Form was used throughout the school year to record new health issues for individual children and their families. The Medical Tracking Form was used to follow-up with children who were reported having chronic or developmental conditions. The Exit Form was completed at the end of the year, and its purpose was to record what children are exiting *Healthy Beginnings* System of Care and their reason for exit. The NHN completes the Intake Form, NHN Visit Form, and Medical Tracking Form and then passes them to the Data Manager who enters the information into the REDCap database. The Exit Form is completed by the Data Manager who obtains this information from Educare's Procare Database.

Outcome Measures

The outcome of interest in this analysis is NHN utilization which is grouped into two categories: high utilizers and regular utilizers. To categorize this variable, each child's total number of NHN, inclusive of children with no visits, was assessed by school year to give a range of number of visits (0 - 44). This information was used to create a distribution of the number of visits by school year in a univariate procedure. The distribution was right skewed, so the 75^{th} percentile was used as the cutoff point to differentiate high utilizers from regular utilizers. Therefore, high utilizers are children who used the NHN two or more times throughout a given school year. With this knowledge, the outcome variable was coded into a dichotomous variable that indicates if a child was a high utilizer in at least one school year of program involvement. If the child was indicated as being a high utilizer in at least one year, data for subsequent years was removed from this analysis to ensure that no child was included more than once in following analyses.

Subsequently, the NHN visits were categorized further into reason of visit including: immunization information, primary care provider information, early intervention information, insurance information, family education information, and family care information. Evaluating the specific topics of the NHN visits is necessary to determine if high utilizers and regular utilizers vary in what health resources they seek.

Exposure Variable

The main exposure variable for this analysis was child's chronic condition status. A child's chronic condition status was reported at enrollment and was recorded in either the Intake Form or Medical Tracking Form. Together, these forms allow for coordinators to track children's chronic conditions while also assessing if they developed new conditions while enrolled in the center. Chronic conditions were first recoded into a dichotomous variable indicating that a child did or did not have a condition. This was done to assess if there were overall differences in NHN usage by chronic condition status.

Next, categories of chronic conditions were used to assess if usage varied by specific ailments compared to children with no chronic disorders. For this analysis, chronic condition categories included: allergies, asthma/other respiratory conditions, overweight/obese, and other conditions. No conditions reported will be used as the referent group in the logistic regression analysis.

Covariates

Demographic variables that were thought to be associated with either the outcome or exposure variables were determined a priori through review of the literature and were included in this analysis as covariates. These variables included: gender (male or female), race/ethnicity

(Black, Hispanic, Native Hawaiian/Pacific Islander, and Multiracial), primary parent's marital status (single, unmarried, married, and other), parent's highest form of education (less than high school diploma, high school diploma or GED, some college/post high school training, undergraduate degree or currently enrolled, graduate degree), family income (< $5,000, $5,000-$10,000, $10,000-$20,000, $20,000-$30,000, $30,000-$40,000, and +$40,000), premature birth (yes/no), child's insured (yes/no), child's insurance type (Medicaid, Peachcare, and Private), and emergency room (ER) usage in the past 12 months (yes/no).

ER Usage information was recorded at each medical tracking visit with the NHN, so this variable was categorized by each school year for each child. The overall number of children with ER visits represents that a child used the ER within 12 months of at least one school year while enrolled in *HB*. Other covariates used in this analysis included: Child's Birthweight (ounces) and Number of Households with Other Children Living.

E. Data Analysis

Descriptive Statistics

First, each variable was assessed for adhering to the normality assumption. Every variable used in this analysis met that assumption. Second, frequency measures and percentages of chronic condition status were assessed within the study population. Using the previously determined cutoff for high utilizers, the frequency and percentage of chronic conditions status was found for both high and regular utilizers.

This was then repeated for all other categorical covariates to result in the total frequencies and percentages for each demographic variable for the entire study population. Frequencies and percentages were assessed for all categorical variables, while the mean and standard deviation

were calculated for the continuous variable birth weight. These variables were then assessed by high and regular utilizer status using the same measures.

Third, frequencies and percentages for all covariates were calculated by each school year, resulting in measures for all the participants in a given year. Further analysis examined these proportions for high utilizers and regular utilizers within each school year. A t-test was used to examine the difference in the means for the continuous variable while chi-square tests were used for categorical variables.

Logistic Regression

A logistic model was fitted in this analysis with utilization status as the dependent outcome of chronic condition status and the other seven independent covariates. First, the odds ratios (OR) and confidence interval (CI) estimating the crude relationship between chronic conditions and utilization status were assessed using PROC GENMOD in SAS.

Second, once the crude relationships were obtained, logistic regression was used to complete an interaction assessment. A Wald Test and backwards elimination were used together to determine whether any covariates should be included in models as effect modifiers. Following the interaction assessment, covariates that did not show evidence of effect measure modification (EMM) were examined as potential confounders.

Third, bivariate analyses were performed using logistic regression in SAS on the seven other covariates and the utilization status outcome variable. Each covariate was assessed independently with the dichotomous outcome, and corresponding ORs, CIs, and p-values of appropriate tests statistics were reported. Those ORs with a p-value less than 0.05 were noted and that covariate was kept in the final model.

Finally, fourth, a more thorough confounding assessment was conducted by fitting multiple logistic regression models with every combination of covariates, including the fully adjusted model. The ORs produced in this assessment were compared against the fully adjusted model and those that resulted in a change of the OR greater than 10% indicated confounding by the variables dropped. Thus, these variables were kept in the final, best fitting model. Data from the IRB approved *Healthy Beginning's* System of Care was used in this evaluation. All statistical operations were run on SAS 9.4 (SAS Institute Inc., Cary, NC).

III. Results

Overall, there were 648 children who participated in *Healthy Beginnings* System of Care from July 2011 – June 2017. Of those participants, 18 (2.8%) were missing gender and premature birth status information, three (0.5%) were missing information on chronic conditions, and one was missing enrollment date information (0.2%); thus, these participants were excluded in this analysis. This resulted in an analytic sample size of 626 children. After initial assessment of the variables, race/ethnicity was missing for over one-quarter of participants (26.4%), family income and number of households with other children were missing for 467 (74.6%) of children, and ER visits in past 12 months was missing for 427 participants (68.2%). As a result, these variables were not examined in this analysis.

Almost 20% (n=122) of children in *HB* reported at least one chronic condition (Table 1). Participation was divided equally among males and females (49.5% vs. 50.5%). Overall, the children in this population tend to be insured (96.5%) with the majority insured by Medicaid (84.7%). There were 45.3% (n=283) participants classified as high utilizers which was evenly divided between males and females (50.9% vs. 49.1%). There were also 27.9% (n=79) high

utilizers who had at least one reportable chronic condition during their involvement with *Healthy Beginnings.*

Parents' education among both high utilizers and regular utilizers was similar with most parents in both groups reporting to have received a high school diploma or GED (44.3% vs. 30.4%). Children in both groups of utilizers were mostly insured under Medicaid (88.3% and 81.7%) but regular utilizers had slightly higher percentages of children covered under private insurance (11.4% vs. 7.7%). When NHN was assessed by each school year, the 2015-2016 school year had the highest percentage of children that were classified as high utilizers while the 2011-2012 school year had the lowest percentage of high utilizers (42.7% vs. 8.3%) (see appendix A). The most popular reason for visiting the NHN for all children combined involved immunization or primary care physician, such as obtaining a medical record (n=191) or confirming immunization status (n=134) (see appendix B).

Crude logistic regression analysis demonstrated that children with at least one chronic condition had nearly three times the odds of being classified as a high utilizer than children without chronic conditions (OR=2.70, 95% CI (1.79, 4.08)) (Table 2). Further, in the unadjusted analyses the only variable that resulted in a statistically significant relationship with the outcome was if a child had a chronic condition in the respiratory/asthma category (OR=1.39, 95% CI: (1.19, 1.64), p-value<0.001). A Wald test statistic was statistically insignificant at an alpha-level of 0.05 indicating that there was no evidence of interaction among the relationship of chronic disease status and NHN utilization status by the covariates of interest (Wald X^2=9.64; p-value= 0.0862).

The confounding assessment indicated that none of the other variables used in this analysis produced strong evidence of being confounders (Table 3). Further assessment was done

by examining evidence of confounding by each individual variable and combinations of variables, and this second form of a confounding assessment indicated type of insurance was influencing the measure of association for the relationship of interest (Table 4). The model in which child's insurance type was the only variable removed resulted in an estimate that fell outside the 10% range of the gold standard model, indicating confounding (aOR= 2.59, 95% CI: (1.71, 3.92)). Due to this, the fully adjusted model used in the analysis since it controlled for any potential unmeasured confounding by the covariates. The fully adjusted model showed that children with a chronic condition were more than two-times as likely to become high utilizers than children without any chronic conditions, controlling for all demographic and health variables (aOR=2.29, 95% CI: (1.49, 3.52), p-value=0.0001).

Analyses were also performed using the categorical exposure variable to assess what the different levels of this variable's relationships with the outcome were (Table 5). In the fully adjusted model, children with asthma and other respiratory conditions than children were three times more likely to be high utilizers when compared to children without any chronic conditions, controlling for all other variables (aOR=3.06, 95% CI: (1.42, 6.61), p-value=0.0044). Children whose parents have earned a graduate degree were more likely to frequently visits the NHN compared to children whose parents earned less than a high school education, controlling for all other factors (aOR=3.44, 95% CI: (1.05, 11.32), p-value=0.0291).

IV. Discussion

This report produced the first assessment of the commonalities among the high utilizers and regular utilizers of the NHN within *Healthy Beginnings* System of Care. Overall, there were four key finding from this analysis. First, results from this study demonstrated that there was a significant difference in the likelihood of being classified as a high utilizer among children with

and without chronic conditions in the *Healthy Beginnings* population from 2011-2017. This supports the hypothesis that children with chronic conditions were more likely to take advantage of the SOC and have at least two visits with the NHN during at least one school year [49]. This trend is consistent with what was found in the literature where it is known that SBHC have been successful in helping children with chronic conditions get connected to care and better manage those conditions [23]. Further, children with chronic conditions may seek a provider to better manage their health and access resources for specific health concerns that their PCP may not have much experience with treating [43, 44].

A second finding is that children with asthma or other respiratory conditions were more likely to be high utilizers compared to children without any known chronic conditions, indicating that specific illnesses require different levels of care from the NHN. It was expected that children with asthma would use the NHN more frequently than other children since the literature revealed that African-American children living in low-income areas, particularly urban areas, are more likely to experience severe asthmatic symptoms compared to white children in the same areas [9, 14,15, 19, 20].

However, our results were inconsistent with the literature where one study reported that older children, middle school age, typically visited a SBHC for respiratory conditions while younger children, like *Healthy Beginnings'* population, reported more visits to the SBHC for more developmental issues and infections [23]. This could suggest that the children in *Healthy Beginnings* are experiencing above average levels of respiratory conditions compared to other populations, and as a result they seek help more frequently to manage these conditions [43, 44]. If this is the case, it is necessary for *Healthy Beginnings* to implement better health tracking

forms to assess if these children are truly receiving effective care and experiencing better management of conditions long-term.

Additional demographic and health factors were included in analyses to assess if other characteristics of this population could distinguish the high utilizers from regular utilizers. The third key finding from this analysis is that children whose parents with at least a graduate degree was significantly associated with being a high utilizer when compared to children whose parents earned less than a high school diploma. Parent's education was of interest in this analysis because it was expected that parents with higher education would be more inclined to seek out care for their children than parents with lower levels of education. The literature did not reveal much about parent's education status and their likelihood of using a health navigator, but it was hypothesized that parents with more education would feel more empowered to ask questions about their child's health and seek advice on managing their conditions [23, 49, 52]. However, since participants whose parents received up to an undergraduate degree or are currently enrolled in higher education were less likely to be classified as high utilizers the hypothesis was not fully supported. Due to these conflicting results it is necessary that future program coordinators assess this relationship in more depth by gathering more information on parent's education status and perhaps add information pertaining to job status. This could not only add richness to the data gathered on the participants but could also allow for further assessment of the relationship between parents' education and child's NHN usage.

Finally, the fourth finding from this analysis was that child's insurance type affected the relationship between chronic condition status and NHN usage. This relationship was expected since insurance is likely associated with both a child's chronic condition status and NHN usage. Parents whose children have a chronic condition likely seek out medical insurance to aid in

expensing frequent provider visits and they also likely seek a health navigator to help with filling out forms and completing the steps necessary to obtain insurance. This analysis' results were consistent with the literature in the fact that the type of insurance a child receives impacts the rate of usage of a SBHC in other studies [23, 34]. These studies also found that persons with public insurance were more likely to be high utilizers which is consistent with the results in this analysis. The higher usage could attribute to the fact that providers covered under public insurance are more difficult to find or parents could need help going through the process of obtaining Medicaid process. However, while children with Medicaid were more likely to become high utilizers in this population compared to children with other forms of insurance, neither of the estimates were statistically significant.

A. Strengths and Limitations

There were at least three strengths of this analysis. First, *Healthy Beginnings'* program being located within Sheltering Arms Educare Atlanta allowed for community members to build a relationship with NHN who was highly invested in program. This effort to nurture relationships in the center allowed for the program to be more successful in delivering services and meeting the children's needs because the program is well received by community members. Second, the program's structure allows for data to be collected longitudinally on an ongoing basis. This resulted in a large database of information on the participants. Finally, the survey tools used for data collection were thorough and easily adapted as the goals of the program and the children's needs changed. This allowed for the data collected to more accurately reflect the population's current state.

Despite these strengths, there were at least three limitations. First, *Healthy Beginnings'* SOC experienced change in the data manager position around the middle time point used in this

analysis. This resulted in data being collected and recorded in different manners causing variables to be missing for multiple observations and inconsistent missingness. Second, there were several covariates of interest with sample sizes that were too small to use in the analysis, so different levels of variables, such as chronic conditions, had to be combined to increase sample size and power. This impacted the levels at which covariates could be examined, and even prevented some covariates from being eligible to use in this analysis. Further, these variables could have been potential EMM or confounders, but the reduced sample size prevented any EMM or confounding assessment from being performed. Finally, there is the possibility of measurement error. Since data is manually entered into the database, it is possible that the information from written forms was incorrectly entered into the database resulting in human error.

B. Implications

This analysis demonstrated that children with varying health statuses experience different levels of NHN usage. This is important for *Healthy Beginnings* coordinators to know, especially since children with asthma are far more likely to use NHN, so that they can adjust their targeted approach onto these children and ensure these children's health needs are being met. Additionally, knowing different family and demographic characteristics distinguish high and regular utilizers allows for program coordinators to further hone their approach to meet the community's needs and determine what subpopulation within *Healthy Beginnings* will be seeking help the most.

Future *Healthy Beginnings* cohorts can use this information to determine who should be enrolled prior to the enrollment period. Other programs can also use this knowledge gained to assess if their population share commonalities with *Healthy Beginnings* and determined if a

NHN could be used to implement a SOC into their community. Knowing what traits are correlated with the usage of a NHN will allow for other program coordinators to predict the effectiveness of their programs during the developmental stages of program while simultaneously saving resources by targeting children and families that share these commonalities. Additionally, this information helps providers that work with children in similar populations to know what ailments these children and families need more help with managing. Finally, using a Head Start program as a setting for a SOC allows for these trends to be generalized to other Head Start programs across the country, and these results indicate that a successful SOC can be implemented not only in this Atlanta community but other Head Starts programs throughout the United States with populations like the one in this analysis.

C. Conclusion

This report provided an evaluation of the NHN utilization in *Healthy Beginnings* SOC, specifically examining the high utilizers of the program. Children with chronic conditions are seeking support from the NHN more frequently than children without, indicating that these children and families likely need more help with meeting the child's health needs. Additionally, families of children with chronic respiratory conditions or asthma are being high utilizers of the NHN more than children with other conditions, indicating that children with chronic respiratory conditions would be lacking sufficient health support without the *Healthy Beginnings*' NHN.

Furthermore, evidence for this report suggests that future program initiatives should include longitudinal assessment on the high utilizer's health status to determine if the NHN interactions are associated with better health management in these participants. Finally, this report indicates that children in lower income, metro-Atlanta areas with chronic conditions likely need help managing their conditions and obtaining resources to do so; thus, if a system of care

like *Healthy Beginnings* were implemented in other centers throughout the area it may improve the health of children in this population.

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VI. Tables and Figures

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Table 1. Demographic Characteristics and Corresponding Test Statistics[a] of Enrolled Children Identified ad High Utilizers and Regular Utilizers in *Healthy Beginnings* System of Care, 2011-2017.

	All Cohorts Combined (n = 626)		All Cohorts Combined High Utilizers (n = 283)		All Cohorts Combined Regular Utilizers (n = 343)		Test Statistic	P-Value
Variables	**N**	**%**	**N**	**%**	**N**	**%**		
Children with Chronic Conditions	122	19.5	79	27.9	43	12.5	25.95	<.0001
Gender[b]							0.38	0.5357
Male	310	49.5	144	50.9	166	48.4		
Female	316	50.5	139	49.1	177	51.6		
Race/Ethnicity[c]							*	*
Black	454	98.5	234	97.9	220	99.1		
Hispanic	4	0.9	4	1.7	-			
Native Hawaiian or Pacific Islander	1	0.2	-		1	0.3		
Biracial	2	0.4	1	0.4	1	0.3		
Premature Birth[d]	114	18.2	53	18.7	61	17.8	0.09	0.7608
Birthweight (ounces), mean ± SD[e]	107.8	24.5	107.1	25.7	107.9	23.6	0.38	0.7033
Parent's Marital Status[f]							1.28	0.7334
Single, never Married	409	67.1	191	69.0	218	65.5		
Unmarried	95	15.6	43	15.5	52	15.6		
Married	62	10.2	25	9.0	37	11.1		
Other	44	7.2	18	6.5	26	7.8		
Parent's Highest Form of Education[g]							4.59	0.4677
Less than High School	98	16.1	48	21.1	50	15.0		
High School Diploma or GED	156	30.5	70	44.3	86	30.4		
Some College/Post High School Training	259	27.0	114	36.3	145	27.4		
Undergraduate Degree or Currently Enrolled	76	10.5	31	10.5	45	11.4		
Graduate Degree	20	3.1	13	4.6	7	2.0		
Child has Health Insurance[h]							0.82	0.3657
Yes	603	96.5	270	95.7	333	97.1		
No	22	3.5	12	4.3	10	2.9		
Child's Type of Insurance[i]							5.12	0.0774
Medicaid	513	84.7	214	88.3	272	81.7		
Peachcare	34	5.6	11	4.0	23	6.9		
Private	59	9.7	21	7.7	38	11.4		
Number of Children with ER Visits in Past 12 Month[j]	102	51.3	55	48.3	42	49.4	*	*

[a] T-Tests were performed on continuous variables and chi-square test performed on categorical variables

[b] Missing 3

[c] Missing 165

[d] Missing 23

[e] Missing 34

[f] Missing 16

[g] Missing 14

[h] Missing 1

[i] Missing 20

[j] Missing 427

* Invalid due to missingness

Table 2. Unadjusted Estimated Odds Ratios (OR) and 95% Confidence Intervals (CI) for the Odds of High Utilization among *Healthy Beginnings* Cohort Members

	High Utilizers (N=283)	Total (N=626)	OR	95% CI		P-Value[a]
Chronic Conditions						
No	204	504	1.00			
Yes	79	122	2.70	1.79	4.08	<0.001
Chronic Conditions						
No Known Medical Conditions	204	504	1.00			
Allergies	22	37	1.21	0.35	1.03	0.0222
Asthma & Other Respiratory Conditions	28	38	1.39	1.19	1.64	<0.001
Overweight/Obese	4	5	1.48	0.97	2.28	0.0711
Other Conditions[b]	25	42	1.21	1.04	1.41	0.0149
Sex						
Male	144	310	1.00			
Female	139	316	0.91	0.66	1.24	0.5358
Premature Birth						
No	230	512	1.00			
Yes	53	114	1.07	0.71	1.60	0.7604
Type of Insurance						
Medicaid	214	513	1.00			
Peachcare	11	34	0.54	0.26	1.13	0.1021
Private	21	59	0.62	0.36	1.09	0.0988
Parent's Marital Status						
Single, never Married	191	409	1.00			
Unmarried	43	95	0.94	0.60	1.48	0.8004
Married	25	62	0.77	0.45	1.33	0.3486
Other	18	44	0.79	0.42	1.49	0.4649
Parent's Education						
Less than High School	48	98	1.00			
High School Diploma or GED	70	156	0.85	0.51	1.41	0.5230
Some College/Post High School Training	114	259	0.82	0.51	1.31	0.4008
Undergraduate Degree or Currently Enrolled	31	76	0.72	0.39	1.31	0.2824
Graduate Degree	13	20	1.93	0.71	5.26	0.1962

[a] P-values of Chi-Square statistics

[b] Other includes Anemia, Cardiac Conditions, GI Conditions, Infectious Diseases/HIV, Neuromuscular Disorders, Seizures, and Skin Conditions

Table 3. Assessment of Potential Confounders (n=626)

	Chronic Conditions			High Utilization		
Covariates	**OR**	**Lower Limit**	**Upper Limit**	**OR**	**Lower Limit**	**Upper Limit**
Gender						
Male	1.00			1.00		
Female	1.15	0.77	1.71	0.91	0.66	1.24
Premature Birth						
No	1.00			1.00		
Yes	0.99	0.59	1.65	1.07	0.71	1.60
Type of Insurance						
Medicaid	1.00			1.00		
Peachcare	0.52	0.18	1.50	0.54	0.26	1.13
Private	0.44	0.18	1.05	0.62	0.36	1.09
Parent's Marital Status						
Single, never Married	1.00			1.00		
Unmarried	0.81	0.45	1.43	0.94	0.60	1.48
Married	0.71	0.35	1.46	0.77	0.45	1.33
Other	0.58	0.24	1.43	0.79	0.42	1.49
Parent's Highest Form of Education						
Less than High School	1.00			1.00		
High School Diploma or GED	1.48	0.79	2.77	0.82	0.34	1.98
Some College/Post High School Training	0.89	0.48	1.62	0.85	0.51	1.44
Undergraduate Degree or Currently Enrolled	1.28	0.61	2.69	0.82	0.51	1.31
Graduate Degree	0.49	0.11	2.32	0.69	0.36	1.30

Table 4. Assessment of Potential Confounder by Model

Model #	Variables in Model	Variables dropped	$OR_{HU=1}$	$CI_{95\%}$	Within 10% GS	Evidence of confounding if dropped?
1	Chronic, Sex, Premature, Insurance, Marital Status, Education	None	2.24	1.46, 3.42	-	-
2	Chronic, Sex, Premature, Insurance, Marital Status	Education	2.24	1.47, 3.43	Yes	No
3	Chronic, Sex, Premature, Insurance, Education, ER use	Marital Status	2.36	1.55, 3.60	Yes	No
4	Chronic, Sex, Premature, Marital Status, Education, ER use	Insurance Type	2.59	1.71, 3.92	No	Yes
5	Chronic, Sex, Insurance, Marital Status, Education, ER use	Premature	2.24	1.46, 3.42	Yes	No
6	Chronic, Premature, Insurance, Marital Status, Education, ER use	Sex	2.23	1.46, 3.41	Yes	No
7	Chronic, Sex, Premature, Insurance	Education, Marital Status	2.36	1.55, 3.60	Yes	No
8	Chronic, Sex, Premature, Marital Status	Eduacation, Insurance Type	2.58	1.70, 3.91	No	Yes
9	Chronic, Sex, Insurance, Marital Status	Education, Premature	2.24	1.47, 3.43	Yes	No
10	Chronic, Premature, Insurance, Marital Status	Education, Sex	2.23	1.46, 3.41	Yes	No
11	Chronic, Sex, Premature, Education	Marital Status, Insurance Type	2.72	1.80, 4.11	No	Yes
12	Chronic, Sex, Insurance, Education	Marital Status, Premature	2.36	1.55, 3.59	Yes	No
13	Chronic, Premature, Insurance, Education	Marital Status, Sex	2.35	1.54, 3.58	Yes	No
14	Chronic, Sex, Marital Status, Education	Insurance Type, Premature	2.59	1.71, 3.92	No	Yes
15	Chronic, Premature, Marital Status, Education	Insurance Type, Sex	2.58	1.70, 3.90	No	Yes
16	Chronic, Insurance, Marital Status, Education	Premature, Sex	2.23	1.46, 3.41	Yes	No
17	Chronic, Sex, Premature	Education, Marital Status, Insurance	2.72	1.80, 4.10	No	Yes
18	Chronic, Sex, Insurance	Education, Marital Status, Premature	2.36	1.55, 3.59	Yes	No
19	Chronic, Premature, Insurance	Education, Marital Status, Sex	2.35	1.54, 3.58	Yes	No
20	Chronic, Sex, Education	Marital Status, Insurance, Premature	2.72	1.80, 4.11	No	Yes
21	Chronic, Insurance, Education	Marital Status, Premature, Sex	2.35	1.54, 3.57	Yes	No
22	Chronic, Marital Status, Education	Insurance, Premature, Sex	2.58	1.70, 3.90	No	Yes
23	Chronic, Sex	Education, Marital Status, Insurance, Premature	2.72	1.80, 4.10	No	Yes
24	Chronic, Education	Sex, Marital Status, Insurance, Premature	2.70	1.79, 4.08	No	Yes
25	Chronic, Marital Status	Education, Sex, Insurance, Premature	2.57	1.70, 3.90	No	Yes
26	Chronic, Insurance	Education, Marital Status, Premature, Sex	2.35	1.54, 3.57	Yes	No
27	Chronic, Premature	Education, Marital Status, Insurance, Premature	2.70	1.79, 4.08	No	Yes
28	Chronic	Sex, Education, Marital Status, Insurance, Premature	2.70	1.80, 4.08	No	Yes

Table 5. Unadjusted and Adjusted Estimated Odds Ratios (OR) and 95% Confidence Intervals (CI) for the Odds of High Utilization among *Healthy Beginnings* Cohort Members (n = 626)

	OR	95% CI	P-Value[a]	aOR[b]	95% CI	P-Value[a]
Chronic Conditions						
No	1.00			1.00		
Yes	2.70	1.79 4.08	<0.001	2.29	1.49 3.52	0.0001
Chronic Conditions						
No Known Medical Conditions	1.00			1.00		
Allergies	1.21	0.35 1.03	0.0222	1.83	0.90 3.71	0.0953
Asthma & Other Respiratory Conditions	1.39	1.19 1.64	<0.001	3.06	1.42 6.61	0.0044
Overweight/Obese	1.48	0.97 2.28	0.0711	6.14	0.67 56.20	0.1079
Other Conditions[c]	1.21	1.04 1.41	0.0149	1.89	0.99 3.64	0.0551
Sex						
Male	1.00			1.00		
Female	0.91	0.66 1.24	0.5358	0.89	0.64 1.24	0.4821
Premature Birth						
No	1.00			1.00		
Yes	1.07	0.71 1.60	0.7604	1.09	0.70 1.68	0.7128
Type of Insurance						
Medicaid	1.00			1.00		
Peachcare	0.54	0.26 1.13	0.1021	0.60	0.28 1.28	0.6111
Private	0.62	0.36 1.09	0.0988	0.54	0.28 1.05	0.3364
Parent's Marital Status						
Single, never Married	1.00			1.00		
Unmarried	0.94	0.60 1.48	0.8004	0.93	0.58 1.49	0.8276
Married	0.77	0.45 1.33	0.3486	0.75	0.41 1.37	0.4772
Other	0.79	0.42 1.49	0.4649	0.89	0.46 1.74	0.9884
Parent's Education						
Less than High School	1.00			1.00		
High School Diploma or GED	0.85	0.51 1.41	0.5230	0.83	0.49 1.40	0.0938
Some College/Post High School Training	0.82	0.51 1.31	0.4008	0.98	0.60 1.61	0.3278
Undergraduate Degree or Currently Enrolled	0.72	0.39 1.31	0.2824	0.96	0.49 1.85	0.4047
Graduate Degree	1.93	0.71 5.26	0.1962	3.44	1.05 11.32	0.0291

[a] P-values of Chi-Square statistics

[b] OR adjusted for all other factors

[c] Other includes Anemia, Cardiac Conditions, GI Conditions, Infectious Diseases/HIV, Neuromuscular Disorders, Seizures, and Skin Conditions

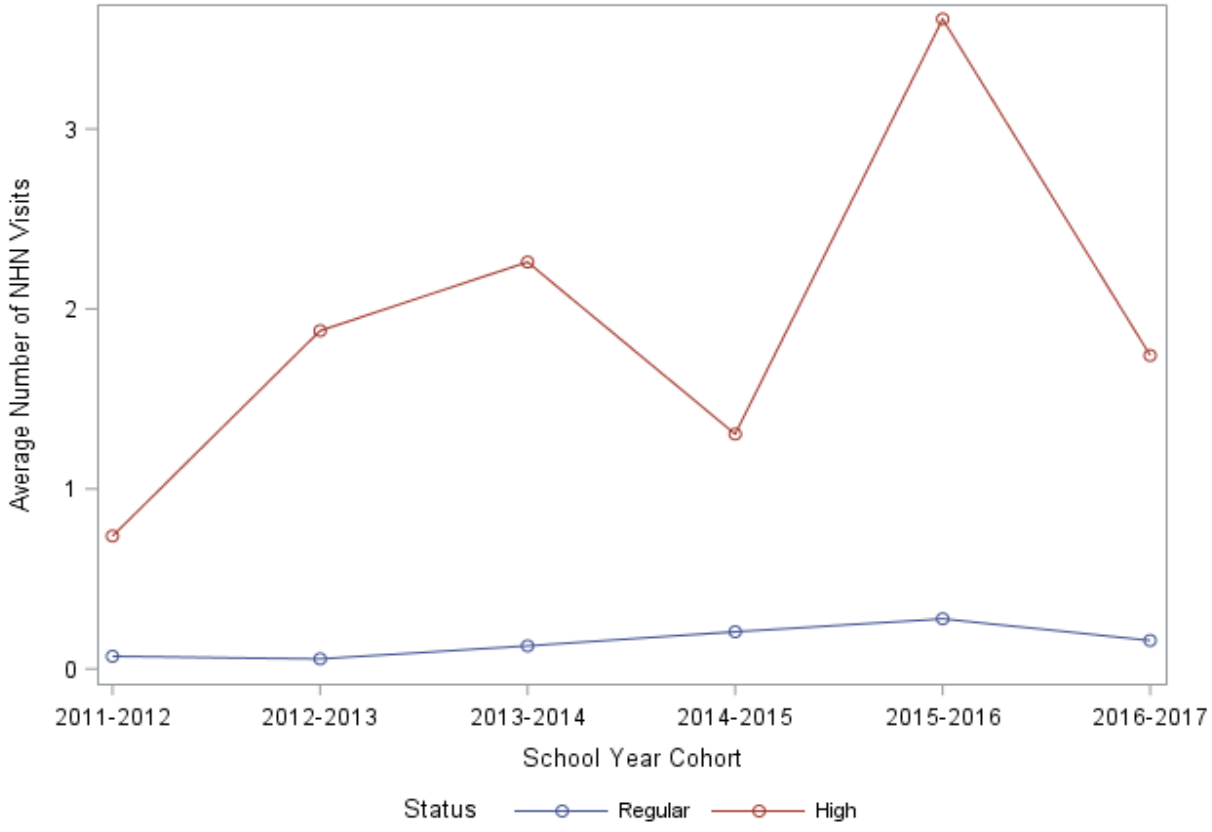
Table 6. Number of High Utilizers by School Cohort (N=283)

School Year	High Utilizers
	N
2011-2012	20
2012-2013	66
2013-2014	87
2014-2015	49
2015-2016	117
2016-2017	30

Table 7. Number of Years Children Qualified as High Utilizers of NHN (N=283)

Number of Years	High Utilizers	
	N	%
1	218	77.0
2	48	17.0
3	14	4.9
4	2	0.7
5	1	0.4

Figure 1. Average Number of NHN Visits for All Cohort Members by Utilization Status



VII. Appendix Table 1

Table 1. Forms Used During Nurse Health Navigation Visits

Form Used	Data Collector	Frequency of Collection	Purpose of Form
Intake Form	NHN	Once	Gathers baseline data including: demographic information, family and child health history, and areas of concern.
NHN Visit Form	NHN	Ongoing	Documents child's current health status, information on immunizations and insurance status, and areas of health that should be tracked by *HB* staff. This form also indicates when time was taken to educate family on various health topics and when referrals to partnered resources were provided.
Medical Tracking Form	NHN	Ongoing	Assesses health conditions and concerns addressed in previous NHN visits; also, can indicate if child has developed any new conditions or concerns.
SOC Exit Form	Data Manager	Once	Used at the end of year to record which children are exiting HB, assesses if they are leaving because they are transition into kindergarten or other factors. This information is collected by Educare into Procare, this information is then transferred from Procare to *HB's* REDCap database by Data Manager.

Appendix Table 2

Table 2. Descriptive Statistics of Nurse Health Navigator Visits for all *HB* Cohorts, 2011-2017 (n = 626)

	NHN Visits
N	1740
Mean	1.26
SD	2.86
Median	0
25th percentile	0
75th percentile	2
minimum	0
maximum	44
Skewness	6.12
Kurtosis	62.48
Kolmogorov-Smirnov Test for Normality	
Statistic	0.33
p-value	<0.01

Appendix Table 3

Table 3. NHN Visits Topics, 2011-2017

	All HB (N = 626)		High Utilizers (N = 283)		Regular Utilizers (N = 343)	
	N	%	N	%	N	%
NHN Immunization Visit						
Confirmed Immunization Status	134	31.1	131	31.9	3	15.0
Obtaind EMR	199	46.2	183	44.5	16	80.0
Provided Parent Copy EMR	21	4.9	21	5.1	-	-
Provided Center Staff Copy EMR	58	13.5	57	13.9	4	5.0
Provide Immunization Education to Family	8	1.9	8	2.0	-	-
Assist with Scheduling Immunization Appointment	9	2.1	9	2.2	-	-
Obtain or Varify Waiver if Non-Immunized	2	0.5	2	0.5	-	-
	431		411		23	
NHN PCP Visit						
ID Child's PCP	20	2.5	20	2.7	-	-
Assist with Obtaining PCP	27	3.4	24	3.3	3	5.1
Assist with PCP Change	9	1.1	8	1.1	1	1.7
Notify PCP of Child's Enrollment in *HB*	15	1.9	13	1.8	2	3.4
Notify PCP of New Concerns	3	0.4	3	0.4	-	-
Share Medical Info with Staff	128	16.1	125	17.0	3	5.1
Provide AAP Well Child Paperwork to Parent	3	0.4	3	0.4	-	-
Parent ED: AAP periodicity	8	1.0	8	1.1	-	-
Parent Ed: Self, Primary, Specialty, Urgent & Emergent Care	30	3.8	23	3.1	7	11.9
Assist with Transportation for Child's Medical Apt	6	0.8	6	0.8	-	-
Assist with Obtaining Translator for Medical Apt.	4	0.5	4	0.5	-	-
Schedule Well Child Visit	75	9.5	70	9.5	5	8.5
Schedule Sick Child Visit	22	2.8	22	3.0	-	-
Assist Family with Obtaining Urgent Care	5	0.6	4	0.5	1	1.7
Assist Family with Obtaining Retail-Based Care	19	2.4	18	2.5	1	1.7
Assist Parent with Obtaining Emergent Care	1	0.1	1	0.1	-	-
Remind Parents of Upcoming Appointments	49	6.2	47	6.4	2	3.4
Follow-Up: Assist with Obtaining PCP after ER & Sick Visits	11	1.4	11	1.5	-	-
Follow-Up with Parent after PCP Visit, Medical Directions	23	2.9	23	3.1	-	-
Request Medical Records	142	17.9	115	15.7	27	45.8
Obtain Medical Records	191	24.1	184	25.1	7	11.9
Participate in Child's Medical Visits	2	0.3	2	0.3	-	-
Total	793		734		59	
NHN Early Intervention Visit						
Participate in HB meeting related to child/family concerns	49	29.9	41	27.7	8	50.0
Participate in family meetings related to plan objectives	5	3.1	5	3.4	-	-
Obtain needed documentation to support referral	17	10.4	15	10.1	2	12.5
Assist family in completing referral paperwork	5	3.1	5	3.4	-	-
Fax referral to referral source (C1st, LEA, PCP, specialist)	15	9.2	12	8.1	3	18.8
Receive confirmation of referral from referral agency	2	1.2	2	1.4	-	-
Monitor referral status from referral agency	3	1.8	3	2.0	-	-
Receive report service delivery outcome	9	5.5	9	6.1	-	-
Act as liaison between interventionist & family	26	15.9	23	15.5	3	18.8
Assist family with obtaining f/u for screenings (H/V, Dev)	3	1.8	3	2.0	-	-
Assist family with obtaining referral for specialist care	11	6.7	11	7.4	-	-
Assist family with scheduling appt with specialist	15	9.2	15	10.1	-	-
Participate in evaluation or meeting with interventionist	4	2.4	4	2.7	-	-
Total	164		148		16	
NHN Insurance Visit						
ID Child's Insurance Coverage via Parent Report	17	27.4	17	29.3	-	-
Assist with Obtaining Insurance for Enrolled Child	11	17.7	11	19.0	-	-
Assist Parent with Maintaining Insurance	8	12.9	8	13.8	-	-
Assist with Reestablishing Insurance	25	40.3	22	37.9	3	75.0
Assist with Coverage Changes	1	1.6	-	-	1	25.0
Total	62		58		4	
NHN Family Education Visits						
Management of Chronic Conditions	33	26.6	32	26.7	1	25.0
ED Diversion	2	1.6	2	1.7	-	-
Safety	2	1.6	2	1.7	-	-
Health	25	20.2	25	20.8	-	-
Nutrition	6	4.8	6	5.0	-	-
Behavioral Health/Mental Health	12	9.7	9	7.5	3	75.0
Health Navigation	44	35.5	44	36.7	-	-
Total	124		169		4	
NHN Family Care Visit						
Coordinate contact between family & community agencies for family medical services	54	28.4	51	30.2	3	14.3
Coordinate contact between family & community agencies for family insurance coverage	54	28.4	45	26.6	9	42.9
Coordinate contact between family & community agencies for family mental health needs	15	7.9	13	7.7	2	9.5
Coordinate contact between family & community agencies for environmental health concerns	6	3.2	3	1.8	3	14.3
Coordinate contact between family & community agencies for family legal assistance from HeLP at	14	7.4	13	7.7	1	4.8
Coordinate contact between family & community agencies for family's other health-related needs	26	13.7	23	13.6	3	14.3
Provide community resource list/information to family	19	10.0	19	11.2	-	-
Participate in home visits with Center staff or partner	2	1.1	2	1.2	-	-
Total	190		169		21	
NHN Additional Actions Visits						
Serve as a clinical resource for Center staff	52	85.2	34	81.0	18	94.7
Coordinate contact btw family & FSS for support services	7	11.5	7	16.7	-	-
Coordinate contact btw family & MT for classroom concerns	2	3.3	1	2.4	1	5.3
Total	61		42		29	

[A] Multiple topics can be covered in one NHN Vists, causing a difference in Total Number of NHN Visits and NHN Topics