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Obesity and Diabetes Type II in Childhood and Adolescence

State of Connecticut, Department of Social Services

MERCER

Government Human Services Consulting

MMC Marsh & McLennan Companies

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Executive Summary

Obesity has been identified as a national epidemic due to the steady increase in prevalence rates for adults, children, and adolescents. According to the United States Department of Health and Human Services (DHHS), increased rates of obesity are impacting all ages, races/ethnicities, and genders. Since the 1960's, rates of obesity for 6 through 11 year olds have increased 50 percent and 39 percent for 12 through 17 year olds. National statistics for 2002 indicate that 10 percent of children ages 2 through 5 are overweight, 15.8 percent of children ages 6 through 11, and 16.1 percent of adolescents ages 12 through 19 are identified as obese. According to the State Commission document titled "Childhood Obesity in Connecticut: Where we Stand,"[1] the State of Connecticut's (State's) obesity rate for overweight children in 2004 was 19.1 percent up from 11.7 percent in 1990.

Obesity is associated with significant problems in children and adolescents and is an important early risk factor causing many serious medical conditions, including chronic conditions, such as diabetes type II. In the past, diabetes type II was referred to as adult onset diabetes and commonly thought to occur in adults often after age 40. This condition is now occurring with greater frequency in children and adolescents. Diabetes type II used to account for 2 to 4 percent of diabetes cases in children; however, by 1994 prevalence of diabetes type II in children and adolescents had increased to 16 percent. An estimated 85 percent of children diagnosed with diabetes type II are also obese.

Despite the fact that the rate of childhood obesity is rapidly increasing, this condition often remains undiagnosed and under treated. Likewise, diabetes type II in children may be under-diagnosed, as symptoms may be difficult to identify as the child may be asymptomatic, symptoms may be mild, or the typical patterns of symptoms may vary.

[1] State Commission, "Childhood Obesity in Connecticut: Where We Stand."

The State, Department of Social Services (DSS), requested a focused study to understanding the prevalence and rate of identification of obesity and diabetes type II in the population of children and adolescents, through 17 years of age, in the State Medicaid program. DSS was also interested in how the diagnoses of obesity and diabetes type II impacts utilization patterns of those children. Proper diagnosis, early treatment, and ongoing monitoring are essential in maintaining effective quality health care attempting to manage risk and disease progression.

Limitation and Caveats

Information for this study was obtained from administrative data. Using administrative data to identify and measure services by diagnosis may have several limitations which can impact study results and analysis. Encounter or claims data is subject to errors or incomplete coding which will affect data collection accuracy and impact results. Some managed cared organizations (MCOs) and/or providers may not submit all diagnoses that are connected with an encounter. The lack of diagnoses, other than primary, may impact the ability to correctly identify co-morbid conditions.

Another limitation impacting this study is the presence of a social and personal stigma attached to being “labeled” obese and as a result, a documented diagnosis of obesity may not be present. As a result, the ability to fully identify prevalence rates for obesity in the population may be limited.

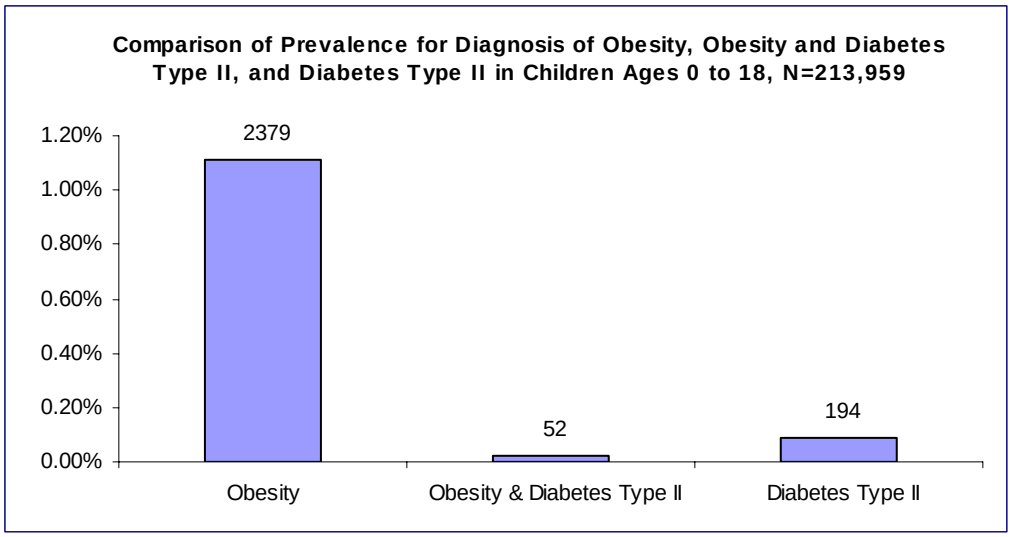
The focus of the study was on children and adolescents with diagnosis of obesity and obesity with diabetes type II. As results derived from data indicate, a number of members with a diagnosis of diabetes type II do not have an associated diagnosis of obesity. To fully address the population and use of service trends, this report was adjusted to include a third category of children with a diagnosis of diabetes type II without an associated diagnosis of obesity.

Key Findings

This focused study reveals several key observations about children and adolescents through the age of 17 in the State Medicaid population. It is easily observed from the sample population that the current methods of identifying and properly diagnosing children with obesity and diabetes type II are not as effective as they could be. With an obesity diagnostic prevalence of slightly more than 1 percent, well below the national average of 16 percent, one can observe that children under the age of 17 are not adequately being identified within the current State Medicaid structure or, at best, identification of these diagnoses is not reflected in the coding of claims and encounters. Likewise, children with diabetes type II are also being under-identified and/or under-reported across all age ranges, ethnicities, and genders.

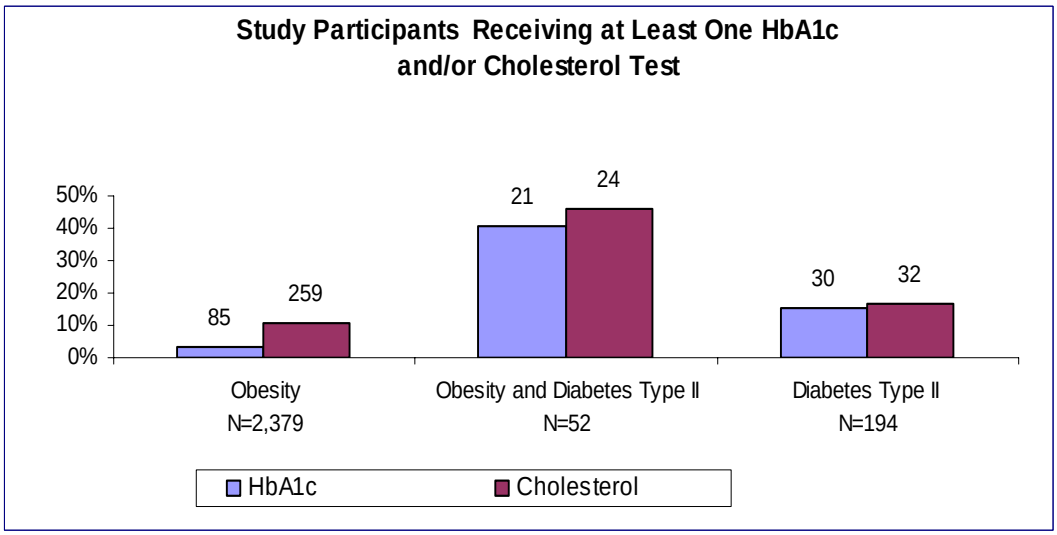
The chart below reflects the prevalence rate for diagnosis of obesity, obesity with diabetes type II, and diabetes type II only, as identified through administrative data.

Chart 1



The following chart represents diagnostic and testing rates for Hemoglobin A1C (HbA1c) and cholesterol those children diagnosed with either obesity or diabetes type II. HbA1c is a blood test indicating blood levels of glucose and is indicative of the presence of diabetes. Rates for these two measures are low across all three diagnostic categories.

Chart 2



Key Recommendations

- Remind physicians and providers of the prevalence of both obesity and the growing incidence of diabetes type II, which can be communicated via newsletters or other communications forms and forums which provide access to providers.
- Create physician and provider communication or educational forums focusing on the challenges of diagnosing diabetes type II in children, related to variations in symptom presentation.
- Survey providers to determine the level of acceptance of treatment protocols supporting cholesterol and HbA1c screening in children.
- Partner with the medical society to aggregate resources and explore opportunities to develop or reinforce awareness and treatment protocols for obesity and diabetes type II.
- Distribute tools to assist in identification and diagnosis of childhood obesity, such as a pocket body mass index (BMI) calculator.
- Use an aspect of the study topic as a focus for future quality initiatives which may include a performance improvement project.
- Partner with physician groups and community organizations to create or enhance awareness efforts; include the State Medical Society, pediatric professional organizations, American Diabetes Association, etc.

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Introduction

As a component of the External Quality Review (EQR) process, Mercer Government Human Services Consulting (Mercer) conducted a focused study targeting obesity and diabetes type II in children and adolescents for the State DSS. The State Medicaid program provides health care services to approximately 213,000 children and adolescents through 17 years of age. Nationally, the rapidly increasing rate of occurrence of childhood and adolescence obesity is considered to have reached epidemic levels. Obesity is linked with numerous health conditions and is a known risk factor contributing to the development of a variety of chronic conditions, including diabetes type II. Diabetes type II, a condition traditionally present in adults over 40 years of age, is now occurring with increasing rates in children and adolescents. Both conditions, obesity and diabetes type II, often go undiagnosed for varying reasons. Lack of identification of the presence of either condition may leave the child vulnerable to developing other physical and behavioral health conditions.

DSS is interested in understanding the prevalence and rate of identification of obesity and diabetes type II in the population of children and adolescents, through 17 years of age, in the State Medicaid program. DSS is also interested in how the diagnoses of obesity and diabetes type II impacts utilization patterns of those children.

The goals of this focused study are to:

- identify the prevalence rate of obesity and diabetes type II for children and adolescents, from 0 through 17 years of age, in the State Medicaid program;
- identify the Top 10 co-morbid conditions associated with children and adolescence having a diagnosis of obesity and obesity with diabetes type II;
- assess and compare the use of services by children and adolescents with a diagnosis of obesity and obesity with diabetes type II;

- compare identification rates and service utilization patterns for study participants by MCO; and
- compare identification and service utilization patterns between children with special health care needs (SHCN) to non-SHCN.

Literature Review

Obesity has been identified as a national epidemic due to the steady increase in prevalence rates for adults, children, and adolescents. According to the United States DHHS, increased rates of obesity are impacting all ages, races/ethnicities, and genders. Since the 1960's, rates of obesity for 6 through 11 year olds have increased 50 percent and 39 percent for 12 through 17 year olds. National statistics for 2002 indicate 10 percent of children ages 2 through 5 are overweight, while 15.8 percent of children ages 6 through 11 and 16.1 percent of adolescents ages 12 through 19 are identified as obese. According to the State Commission document titled "Childhood Obesity in Connecticut: Where We Stand,"[2] the State's obesity rate for overweight children in 2004 was 19.1 percent up from 11.7 percent in 1990.

The measure to identify appropriate weight for an individual is the BMI. This measure is expressed as weight/height^2 (BMI: kg/m^2) and is commonly used to classify weight and obesity among adults. The Center for Disease Control and Prevention (CDC) developed BMI charts appropriate by age and gender, to identify children and adolescents who are overweight or at risk of becoming overweight. The CDC's National Health Statistic Chart Book defines overweight (obesity) for children as a BMI greater than or equal to the 95th percentile. An additional 15 percent of children and adolescents in the 85th percentile for BMI are identified as "at-risk" for becoming obese. Due to the social stigma that continues to be associated with "obesity," the CDC has begun to replace the term with "overweight."

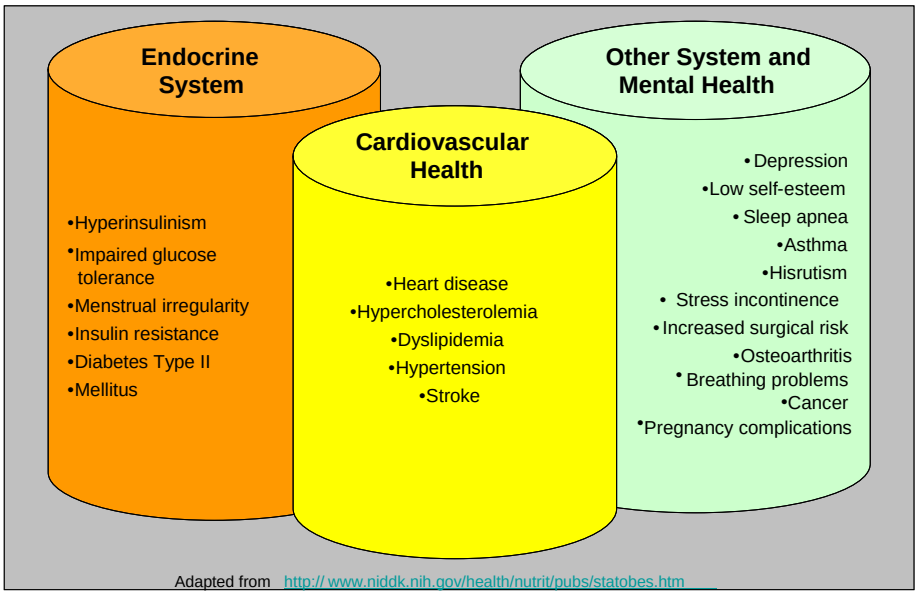
Prevalence rates for obesity vary by gender, race, and ethnicity. Overall rates for obesity are slightly higher in boys than girls in age groups 6 through 11 (girls 14.7 percent and boys 15.8 percent) and 12 through 19 (girls 15.4 percent and boys 16.7 percent). Healthy People 2010 indicate that overall rates of obesity among the Caucasian, non-Hispanic children are at 12 percent while overweight rates among African American, non-Hispanic children are 22 percent, and rates for Hispanic children are 24 percent.

While there are genetic and hormonal factors leading to being overweight or obese it is estimated that only approximately 10 percent of obesity is a result of these factors. Socio-economic status and environmental factors, including poverty, have also been shown to impact rates of obesity. According to some sources in the literature, the major cause of obesity is excessive caloric intake coupled with too little exercise. The vast majority of weight gain is controllable. Teaching healthy eating habits and the value of

[2] State Commission, "Childhood Obesity in Connecticut: Where We Stand."

exercise in maintaining a healthy weight can be effective tools in achieving a healthy approach to managing weight.

When obesity occurs in childhood, the tendency to experience ongoing weight problems carries forward through later stages in life. Studies show that an overweight child at age 4 has a 20 percent chance of being overweight as an adult. An overweight child having one overweight parent has a 79 percent chance of being obese as an adult.



Obesity is associated with significant problems in children and adolescents and is an important early risk factor causing many serious medical conditions and is responsible for much of adult morbidity and mortality. According to the RAND Corporation, an independent organization providing research and analysis, "obesity is more damaging to health than smoking, high levels of alcohol consumption, and poverty. Obesity affects all major body systems — heart, lung, muscle, and bone."[3] The chart above represents potential health risks associated with obesity.

Orthopedic problems related to obesity may occur as an adverse health effect in children and adolescents. A growing child may experience bowing or over-growth of leg bones due to obesity. Other orthopedic conditions for which children considered to be obese may be at greater risk include hip and/or knee pain. Hip or knee pain may impact or limit the child's range of motion, thus limiting their ability to be fully active. Dermatologic conditions related to skin sensitivity or skin breakdown may also be attributable to obesity. Endocrine problems, including pre-diabetes, which develops as a resistance to the body's appropriate use of insulin, may occur and if allowed to continue, over time may progress to diabetes type II. Insulin resistance further leads to increasing blood levels of triglycerides and other lipids, and decreasing levels of high density lipoprotein (HDL) — "good" cholesterol. This pattern of changing lipid and cholesterol levels can lead to hypertension and over time, possible development of other cardiac risk factors. A cultural stigma continues to exist toward individuals who are obese, including overweight

[3] Finally A Cure For Obesity, American Obesity Association, 2002.

children; this may result in both behavioral and social issues. Negative responses to the overweight child can result in psychosocial events, including low self-esteem and episodes of depression.

Due to the effects of being overweight or obese, conditions that in the past had been thought of as occurring predominantly in adulthood are now appearing with increasing prevalence in children and adolescents. An early occurrence of a chronic condition results in added years of disease burden and a higher probability of developing serious condition-related complications at a younger age. Complications may impact life expectancy, may reduce the quality of life, and impact functionality throughout an individual's lifetime.

An article found in American Family Physician recommends obese children and adolescents be screened for cardiac risk factors. Obesity in childhood is associated with high blood cholesterol levels which if unidentified or untreated, may lead to more serious conditions, such as hypertension and cardiac disease. It is estimated that nearly 60 percent of overweight children have at least one cardiovascular risk factor compared to 10 percent of those with a BMI-for-age < 85th percentile; 25 percent of obese children had two or more risk factors.

While obesity is an independent and significant health problem, it is also a risk factor for diabetes type II. In the past, diabetes type II was referred to as adult-onset diabetes and commonly thought to occur in adults often after age 40. This condition is now occurring with greater frequency in children and adolescents. According to the CDC, when diabetes type II occurs in childhood, it occurs most frequently in children ages 10 through 19. Diabetes type II used to account for 2 to 4 percent of diabetes cases in children; however, by 1994 prevalence of diabetes type II in children and adolescents had increased to 16 percent. Diabetes type II is associated with modifiable risk factors such as obesity, physical inactivity, and exposure to abnormal metabolism *in utero*. According to the American Obesity Association (AOA), "Obese children are 12.6 percent more likely to have high fasting blood sugar levels than non obese children."[4] High fasting blood sugar levels is a risk factor to developing diabetes type II. Over time, diabetes type II can lead to heart disease, stroke, blindness, kidney failure, and possible foot and leg amputations.

Despite the fact that the rate of childhood obesity is rapidly increasing, this condition often remains undiagnosed and under-treated. Likewise, diabetes type II in childhood may be difficult to identify as the child may be asymptomatic, symptoms may be mild, or the typical patterns of symptoms may vary.

[4] Obesity in Youth, AOA Fact Sheet, American Obesity Association, 2002.

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Methodology

Overview

This section describes the methodology used to identify the population and services included in the study. The purpose of this study is to identify children and adolescents through 17 years of age in the State Medicaid program with documented diagnosis of obesity and diabetes type II. Co-morbid conditions will be identified and use of services compared by race/ethnicity, gender, age, and children identified as having SHCN with the non-SHCN population. Services to be included in this study are as follows:

- HbA1c,
- cholesterol testing,
- office visits,
- hospitalizations,
- emergency room (ER) visits, and
- nutritional services — Current Procedural Terminology (CPT) codes.

Data Collection

Information from several data sources was combined in order to identify the population and evaluate its use of health care services. The study was based upon data from State Fiscal Year 2004 (July 2003 to June 2004). The SFY04 data is mostly complete, with the exception of a few plans with some pending claims which remain unresolved.

Encounter data from SFY04 was used to identify children for inclusion in the study and evaluate their utilization of health care services. All diagnoses reported on inpatient, hospital-based outpatient, physician, and other practitioner encounters were utilized to identify the targeted population.

A combination of procedure codes, revenue codes, and other necessary data elements were utilized to identify the health care services included in the study. This information

was combined with information from the eligibility file to determine a recipient's age and MCO enrollment.

Co-Morbid Conditions

Once the cohort of diabetics and obese recipients were identified, all of their other diagnoses were utilized to evaluate their co-morbid conditions.

HbA1c

Hemoglobin tests were identified by procedure code. All medical and outpatient encounters were evaluated for the study period to determine if the recipient received a hemoglobin test on an outpatient basis. The procedure code used to identify recipients that received a hemoglobin test was 83036.

Cholesterol Testing

Cholesterol testing was identified using 4 procedure codes. All medical and outpatient encounters were evaluated for the study period to determine if the recipient received a cholesterol test on an outpatient basis. The procedure codes used to identify recipients that received a cholesterol test were:

- 80061,
- 83715,
- 83716, and
- 83721.

Physician Visits

Physician visits were computed using the procedure code, claim type, provider number, recipient number, and date of service from an encounter. The number of office visits was then unduplicated to limit each recipient to 1 visit per day with a provider. The procedure codes listed were used to identify office visits: 99201, 99202, 99203, 99204, 99205, 99211, 99212, 99213, 99214, 99215, 99381, 99382, 99383, 99384, 99385, 99386, 99387, 99391, 99392, 99393, 99394, 99395, 99396, 99397, 99401, 99402, 99403, 99404, 99429, 99499, 99241, 99242, 99243, 99244, 99245, 99354, 99355, 99450, and 99455.

Inpatient Services

Inpatient services were identified using the claim type for an encounter. Inpatient stays that spanned multiple encounters were consolidated into 1 stay. The number of inpatient days for a stay was computed using the beginning and ending dates of service.

ER Visits

ER visits were identified using the claim type and revenue codes for an encounter. ER visits that resulted in an admission visit were excluded.

Nutritional Services

Referrals for nutritional counseling were identified using 5 procedure codes. All medical and outpatient encounters were evaluated for the study period to determine if the recipient received a referral for nutritional counseling. Only 4 referrals for nutritional counseling were reported during the study period. The procedure codes used to identify recipients that received nutritional services were:

- 97802,
- 97803,
- 97804,
- G0270, and
- G0271.

Only 4 procedure codes were found in the encounter data that indicated that the member had been referred for nutritional counseling. Given the low occurrence of this procedure, tables have not been included in the findings for this service.

SHCN children were identified from the eligibility files using eligibility group codes of D01, D02, and F25 where the member was their own head of household, this includes Children in Foster Care. Further, DSS provided Mercer with files of Title V and Supplemental Security Income (SSI) children which were matched to the eligibility data and added to the main set identified in the first step.

The encounter data diagnoses and eligibility information was processed through the Adjusted Clinical Group (ACG) risk adjustment system. The ACG system assigns each recipient to 1 of 104 mutually-exclusive risk groups. A recipient's ACG group assignment is indicative of their health status. The ACG groups distinguish between recipients with no health care problems versus members with 10 or more chronic conditions. Each ACG group is assigned a case mix index that can be utilized to contrast the health status of the recipients in the group with the average recipient. The distribution of recipients across the ACG groups can be utilized to evaluate the case mix of the recipients enrolled in each health plan.

In addition to assigning each recipient to an ACG group, the ACG system also assigns each diagnosis reported for a recipient to an Expanded Diagnostic Cluster (EDC) group. There are 236 EDC groups in the ACG system. The EDC groups classify diagnoses by body system and within body system by disease. EDC groups can be used to identify members with specific diseases.

The EDC system contains 1 group to identify recipients with obesity, and 4 groups that identify recipients with diabetes. The 2 diabetes groups applicable to this study include:

- diabetes type II with complications, and
- diabetes type II without complications.

Limitations and Caveats

Using administrative data to identify and evaluate service measures may have several limitations which can impact results of the analysis process. Encounter or claims data is subject to errors or incomplete coding which will affect data collection accuracy and impact results. Some MCOs and/or providers may not submit all diagnoses, diagnosis other than the primary, that are connected with an encounter. The lack of diagnoses other than primary diagnosis may impact the ability to correctly identify co-morbid conditions.

Another limitation impacting this study is the presence of a social and personal stigma attached to being “labeled” obese and as a result, a documented diagnosis of obesity may not be present. As a result the ability to fully identify prevalence rates for obesity in the population may be limited.

As results derived from data indicate, a number of members with a diagnosis of diabetes type II do not have an associated diagnosis of obesity. To fully address the population and use of service trends, this report was adjusted to include a third category of children with a diagnosis of diabetes type II without an associated diagnosis of obesity.

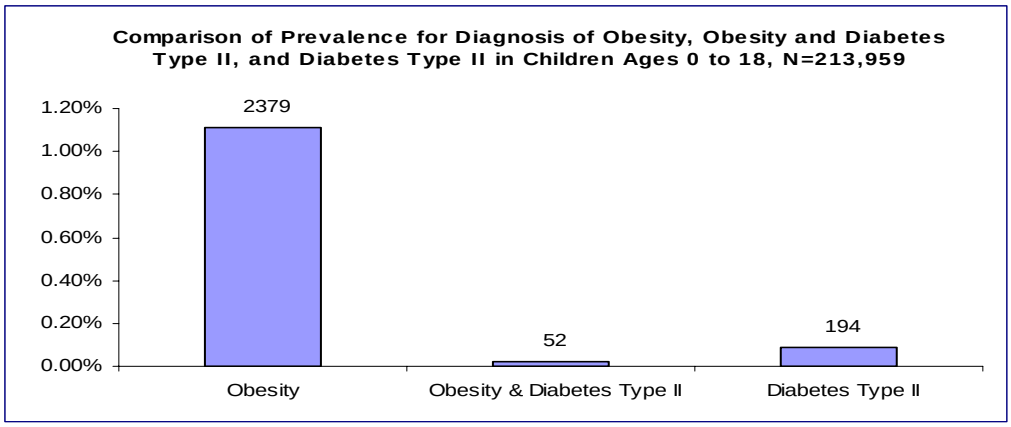
4

Results and Discussion

Prevalence Rates

Prevalence rates for children ages 0 through 17 with diagnosis of obesity, obesity with diabetes type II, and diabetes type II are demonstrated in the chart below. According to the CDC, national rates for obesity among children ages 6 through 19 years is nearly 16 percent and nearly 10 percent for children ages 2 through 5 years. With an approximate population of 213,000 children in the State Medicaid program, the current rate for diagnosis of obesity is only slightly more than 1 percent which is significantly less than national prevalence rates. A larger number of children and adolescent members diagnosed with obesity would be expected. An additional 52 children in the study population were identified with a diagnosis of obesity with diabetes type II and 194 children were identified with a diagnosis of diabetes type II without a diagnosis of obesity. Studies indicate that approximately 85 to 90 percent of children with diabetes type II are also obese. This means that of the 194 members diagnosed with diabetes type II, 85 to 90 percent are most likely also obese and at risk for the factors associated with childhood obesity.

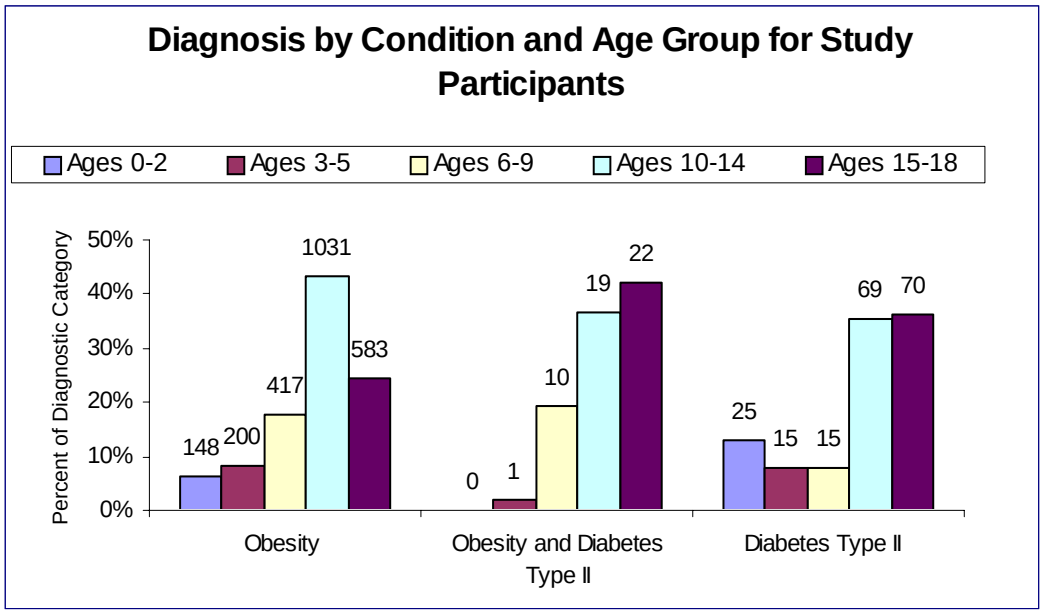
Chart 3



Diagnosis by Age Group

Age ranges 10 through 14 and 15 through 17 show the highest rates for all 3 diagnostic categories. For children with a diagnosis of obesity the greatest frequency of diagnosis is seen in the age range 10 through 14, followed by 15 through 17 followed by age range 6 through 9; children with a diagnosis of obesity with diabetes type II and those diagnosed with diabetes type II have the greatest frequency of diagnosis in the 15 through 17 age range followed by the 10 through 14 age range. Age ranges for national data are grouped slightly different than age grouping used in this study. National age ranges being grouped by age ranges 6 through 11 and 12 through 19. Nationally age ranges 12 through 19 demonstrate a slightly higher prevalence rate (16.1) than 6 through 11 year old (15.8) rates. Despite the variation in age ranges, study results are in line with national age-related prevalence rates with the highest rates occurring in adolescents. The obesity only group and the diabetes type II only group identify children in age ranges 0 through 2 and 3 through 5. National rates for obesity in 2 through 5 year olds is 10 percent, with State study data reflects lower rates. Further study would be required to determine factors contributing to obesity and diabetes type II in the 0 through 2 population.

Chart 4

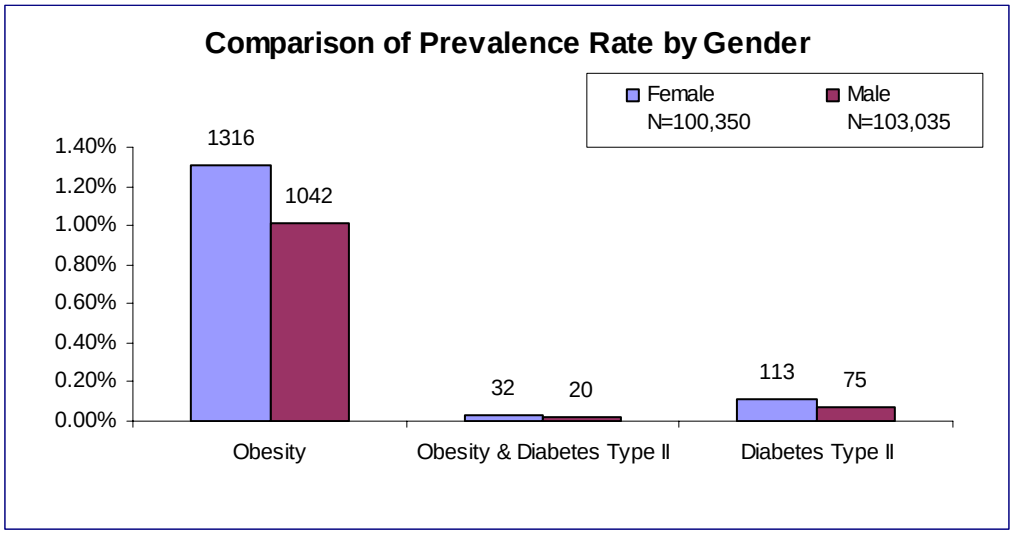


Diagnosis by Gender

Statistical data from the National Center for Health Statistics, 2002, shows the presence of obesity by gender as occurring more frequent in males (19.9 percent) than females (15.4 percent) in the age range 6 through 11, and continuing slightly higher for males in age range 12 through 19 (16.7 percent) than their females (15.4 percent) counterparts. National prevalence data for diabetes type II is not yet available but is beginning to accumulate regionally. Diabetes type II is thought to be more prevalent in females than in males. State data reflects this same trend in occurrence.

The chart below reflects a higher rate of diagnosis of obesity in females than in their male counterparts. One factor contributing to the higher identification rate in females may be that females tend to seek and use more medical services than males do, until this trend reverses later in life. The greater exposure to health care services may result in higher levels of condition identification. Also, the societal focus on weight presents a heavier burden on females than males and may result in females seeking medical assistance to achieve weight loss goals.

Chart 5

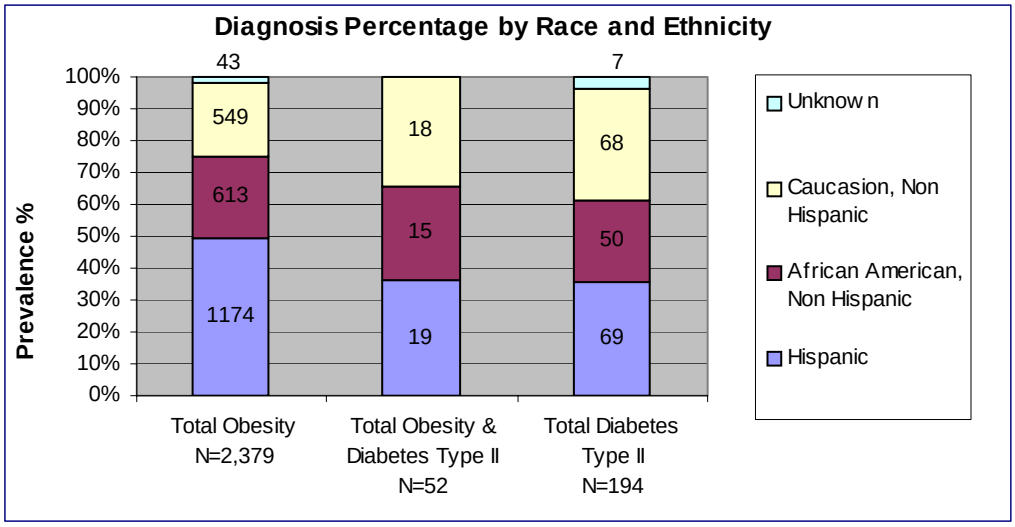


Does not include members with unknown gender.

Diagnosis by Race and Ethnicity

Prevalence rates for obesity and diabetes type II demonstrate significant variation by race and ethnicity. National statistics indicate that Caucasian, non-Hispanic children and adolescents have the lowest rates of obesity being near 12 percent. African American, non-Hispanic children and adolescents have rates near 20 percent and the highest rates for diagnosis of obesity are seen in Hispanic children at 24 to 26 percent. The frequency of diagnosis of obesity in State statistics follows the national pattern. The remaining 2 diagnostic categories do not. Diabetes type II patterns nationally are less well known but regional patterns of prevalence show lowest incidence patterns in Caucasian, non-Hispanics followed by African American, non-Hispanics with highest levels in the Hispanic populations. Neither of the 2 diagnostic patterns for diabetes type II below appears to follow the national pattern; however; results are too small to be conclusive.

Chart 6



Co-Morbid Conditions

Once the cohort of members with diagnoses of obesity and diabetes type II was identified, all of its other diagnoses were utilized to identify its co-morbid conditions. The majority of co-morbid conditions identified by diagnosis were present across all 3 conditions while the prevalence of each varied. Upper respiratory infection was the top co-morbid condition for all 3 categories. Some of the conditions commonly associated with obesity and identified as co-morbid conditions for members diagnosed with obesity, include asthma, frequent infections, orthopedic conditions, and psychosocial issues. Conditions commonly associated with diabetes type II and identified as co-morbid conditions for members diagnosed with diabetes type II include increased risk of infections, other endocrine problems, eye problems and other conditions also associated with obesity.

Table 1

Top Comorbid Conditions Associated with Diagnosis of Obesity, Obesity with Diabetes Type II, and Diabetes Type II

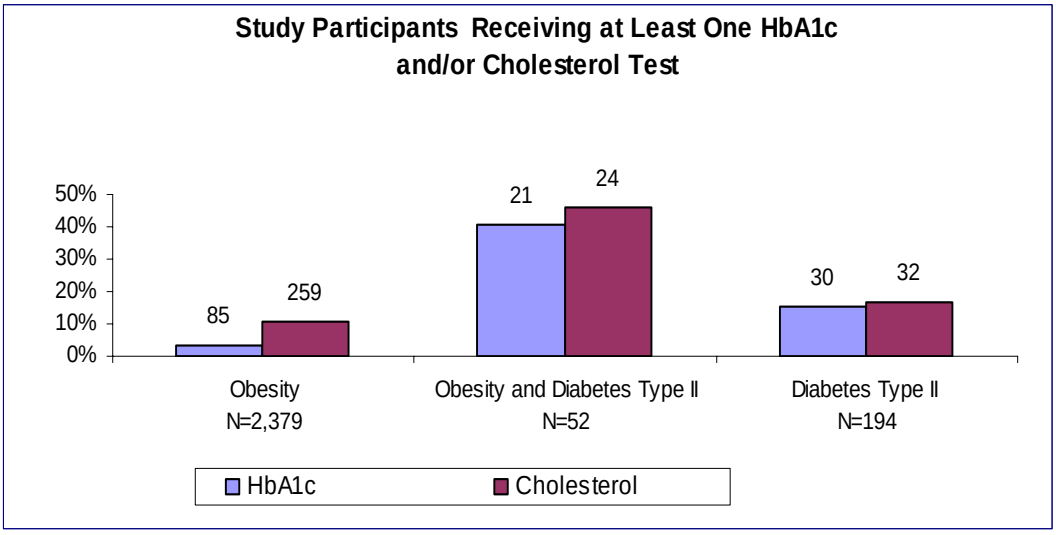
Obesity		Obesity and Diabetes Type II		Diabetes Type II	
Acute URI	908	Acute URI	22	Acute URI	84
Cataract, aphakia	524	Other Endrocrine	21	Cataract, aphakia	45
Otitis media	487	Cataract, aphakia	15	Otitis media	42
Asthma without Status Asthmaticus	458	Anxiety, neuroses	13	Asthma without Status Asthmaticus	36
Anxiety, neuroses	299	Otitis media	10	Anxiety, neuroses	32
Allergic Rhinitis	255	Viral Syndromes	7	Abdominal Pain	30
Viral Syndromes	252	Musculoskeletal signs and symptoms	7	Diarrhea	27
Musculoskeletal signs and symptoms	225	Allergic Rhinitis	6	Musculoskeletal signs and symptoms	21
Contusions and abrasions	213	Contusions and abrasions	6	Acute lower respiratory tract infection	21
Acute sprains and strains	211	Abdominal Pain	5	Allergic Rhinitis	20

Use of Services (Diagnostic/Monitoring)

Obesity is considered a risk factor for development of diabetes type II. Pre-diabetes may develop as a result of obesity; this condition may precede the development of diabetes type II and impacts the body's ability to use insulin efficiently enabling sugar (glucose) to remain in the blood stream rather than moving into the cells. Pre-diabetes continued over time may develop into diabetes type II. Participants diagnosed with obesity and/or diabetes type II should receive screening for HbA1c, based upon their medical evaluation. HbA1c measures the level of glucose attached to circulating blood cells. Of the population diagnosed with obesity, 85 or 4 percent of the 2,379 participants received HbA1c screening. For members diagnosed with obesity and diabetes type II, 21 or 40 percent of the 52 participants received HbA1c screening, and for participants diagnosed with diabetes type II, 30 or 15 percent of the 194 participants were screened.

Obesity in childhood is associated with increased levels of cholesterol and triglycerides and decreased levels of high density lipoproteins (good cholesterol). According to the literature 85 to 90 percent of children diagnosed with diabetes type II are also obese. The National Cholesterol Education Program Expert Panel has recommended consideration of cholesterol screening for obese children greater than 2 years old. Of the 2,379 study participants diagnosed with obesity, 259 or 11 percent were screened for cholesterol. For members diagnosed with diabetes type II and obesity, 24 or 46 percent were screened and for diabetes type II, 32 children or 16 percent received a cholesterol screen.

Chart 7



Use of Services (Medical)

Physician visits, inpatient days, and ER usage are shown on the table below as average visits or days used per participant during the study period within each diagnostic category. Participants with a diagnosis of obesity used the lowest number of physician visits per participant with 4.1 visits per member, the second lowest level of ER visits at 0.6, and used the mid range for inpatient days at 0.6.

Participants with diagnosis of obesity and diabetes type II experienced the second highest number of physician visits per member at 5.1 and the lowest use of ER visits at .4 visits per participant. No data appeared for inpatient days for this condition. Possibly, using ambulatory services more frequently resulted in decreased use of inpatient services or data coding issues prevented identification of those visits. Participants diagnosed with diabetes type II used the greatest number of physician visits with 5.4 per member, the highest level of inpatient days at 2 per member, and the largest ER usage with 1 visit per member. The level of utilization across all 3 service types assessed may reflect higher levels of acuity for that member population.

Table 2

Total Services Used by Condition and Average Utilization Per Participant				
Study Diagnosis	**Physician's Visits Avg/Member**	**Inpatient Days Avg/Member**	**ER Visits Avg/Member**	**Members by Condition**
Obesity	4.1	0.6	0.6	2,379
Obesity and Diabetes Type II	5.1	-	0.4	52
Diabetes Type II	5.4	2.0	1.0	194

Use of Services by Age (Diagnostic/Monitoring)

The following chart presents members receiving at least one HbA1c or cholesterol testing by age grouping within each diagnostic category. For those participants with a diagnosis of obesity, screening rates for HbA1c were less than 5 percent for all age ranges. Age range 6 through 9 and older received similar rates of testing for HbA1c at 4 percent tested per age range. Age range 3 through 5 followed, receiving a lower rating at 1 percent of participants tested. Cholesterol testing for participants diagnosed with obesity only was higher ranging from 1 to 14 percent.

Of participants diagnosed with obesity and diabetes type II, 100 percent of children in the 3 through 5 age range were tested for HbA1c. Screening levels were also high for the 6 through 9 (60 percent) age range; a decline in screening rates occurs for ages 10 through 14 (32 percent) and 15 through 17 age ranges (36 percent). Likewise, cholesterol testing for these participants was also high, particularly 100 percent testing for the 3 through 5 age group, and 70 percent testing for ages 6 through 9.

For participants diagnosed with diabetes type II, 20 percent of children ages 3 through 5 and 23 percent of 15 through18 year olds received HbA1c testing; screening rates were 7 percent for children in the 6 through 9 year age range. Testing for cholesterol was highest in age range 10 through 14 at 23 percent and no testing was observed for children 5 years of age and younger. Overall, testing rates were higher than in those diagnosed with obesity only, but having a diagnosis of diabetes type II would anticipate higher testing.

Table 3

Percentage of Participants Recieving HbA1c and Cholesterol Testing by Age and Condition

Study Diagnosis	Age Range	HbA1c Percent Tested	Cholesterol Percent Tested
Obesity with no Diabetes	Ages 0-2	0%	1%
	Ages 3-5	1%	6%
	Ages 6-9	4%	8%
	Ages 10-14	4%	13%
	Ages 15-18	4%	14%
Obesity and Diabetes Type II	Ages 0-2	0%	0%
	Ages 3-5	100%	100%
	Ages 6-9	60%	70%
	Ages 10-14	32%	32%
	Ages 15-18	36%	45%
Diabetes Type II	Ages 0-2	0%	0%
	Ages 3-5	20%	0%
	Ages 6-9	7%	7%
	Ages 10-14	14%	23%
	Ages 15-18	23%	21%

Use of Services by Age (Medical)

For members diagnosed with obesity, office visits per participant are lower across all age ranges as compared to other diagnostic categories with the exception of children ages 0 through 2, where 5.9 visits/participants are exceeded in the diagnostic category of obesity and diabetes type II (6.3). Participants in the obesity category also have associated inpatient days and ER visits across all age ranges. The obesity and diabetes type II diagnosis category appears with 1 member with 13 visits, and should be considered an outlier in the overall scope of the analysis. Participants 6 through 9 showed the highest office visit rate and the lowest ER usage rate.

The highest level of inpatient use was seen in the pre-adolescent and adolescent populations age 10 through 14 for those participants diagnosed with diabetes type II, averaging 4.6 inpatient days per member. It is interesting to note that for those individuals diagnosed with both obesity and diabetes type II, 0 inpatient days per member are observed across all age ranges. This anomaly may be attributable to data inaccuracy or sample size of that particular population.

ER usage of, 1.4 visits per member are observed for children 0 through 2 years of age for both obesity and diabetes type II populations. The increased ER usage may reflect the fragile age of these children and their increased health needs related to the diagnosed condition and related diagnoses.

Table 4

Service Utilization by Age Range					
Study Diagnosis	**Age Range**	**Physician's Visits Avg Use/Member**	**Inpatient Days Avg Use/Member**	**ER Visits Avg Use/Member**	**Members by Age**
Obesity	Ages 0-2	5.9	2.4	1.4	148
	Ages 3-5	4.3	0.1	0.8	200
	Ages 6-9	3.8	0.4	0.5	417
	Ages 10-14	3.8	0.4	0.4	1,031
	Ages 15-18	4.3	0.7	0.5	583
Obesity and Diabetes Type II	Ages 0-2	0.0	0.0	0.0	-
	Ages 3-5	13.0	0.0	0.0	1
	Ages 6-9	5.6	0.0	0.1	10
	Ages 10-14	5.3	0.0	0.5	19
	Ages 15-18	4.4	0.0	0.6	22
Diabetes Type II	Ages 0-2	6.3	0.6	1.4	25
	Ages 3-5	5.5	0.0	0.5	15
	Ages 6-9	4.9	0.0	0.5	15
	Ages 10-14	5.6	4.6	0.7	69
	Ages 15-18	5.0	0.7	1.2	70

Services by Gender

Female participants have been diagnosed at greater rates than male participants in each diagnostic category included in this study. However, testing rates for HbA1c and cholesterol are slightly lower for female participants than males for diagnosis of obesity, although screening rates overall in this category are low. For females with a diagnosis of obesity, screening rates for HbA1c was 3 percent and cholesterol 10 percent; screening rates for males for HbA1c was 4 percent screening and cholesterol 12 percent.

Screening rates for HbA1c and cholesterol across the remaining 2 diagnostic categories were greater for females than males. Rates varied most significantly in the category of obesity and diabetes type II. HbA1c screening rates for females were 47 percent and males 30 percent. Cholesterol screening rates were 53 percent for females and 35 percent for males. For participants diagnosed with diabetes type II, screening rates were slightly greater for females with HbA1c at 17 percent and males at 15 percent; cholesterol screening rates were 16 percent for females and 19 percent for males.

Physician visits are slightly higher for females than males for diagnosis of obesity and obesity with diabetes type II. Females used slightly fewer physician visits at 5.3 per participant than males (5.5) per participant in the diabetes type II diagnostic category. ER visits were similar or slightly more prevalent among females across diagnostic categories. The highest level of inpatient utilization overall was seen in the category of diabetes type II with males using 3.6 days per participant compared to same group females at .7 days.

Table 5

Service Utilization by Gender and Diagnostic Condition								
Study Diagnosis	Gender	HbA1c Avg Tests/ Member	Cholesterol Avg Tests/ Member	Physician's Visits Avg/ Member	Inpt Days Avg/ Member	ER Visits Avg/ Member	Members by Diagnosis by Gender	Members by Diagnosis
Obesity	Female	3%	10%	4.3	0.9	0.5	1,316	2,358
	Male	4%	12%	3.9	0.2	0.6	1,042	
Obesity and Diabetes Type II	Female	47%	53%	5.8	-	0.5	32	52
	Male	30%	35%	4.1	-	0.4	20	
Diabetes Type II	Female	17%	16%	5.3	0.7	1.1	113	188
	Male	15%	19%	5.5	3.6	0.7	75	

Does not include members with unknown gender.

Services by Race and Ethnicity

For participants diagnosed with obesity, without a diagnosis of type II diabetes, Hispanic members received the highest rates of testing for both HbA1c and cholesterol . The highest number of office visits was depicted in the Caucasian, non-Hispanic population with 4.7 average visits per member. Inpatient days were also more frequently used by the Caucasian, non-Hispanic population with .8 average visits per member, and the unknown segment of the participant population. The greatest number of ER visits was .8 visits per participant for the other category with the second highest level of use of .6 for Hispanic populations.

For participants with diagnosis of obesity associated with diabetes type II, testing rates were highest in Caucasian, non-Hispanic participants, followed by African American and Hispanic participants. Diagnosis of obesity and diabetes type II shows African American participants with the lowest rate of office visits and ER usage. Inpatient use for this diagnostic category is inconclusive with no inpatient days recorded for any ethnicity throughout SFY04. The greatest number of office visits (6.3 per member) is observed in the Caucasian, non-Hispanic population, while the Hispanic population displays greater prevalence in average ER visits (0.7 per member). The greater frequency of office visits used by Caucasian, non-Hispanic participants could be related to the higher HbA1c and cholesterol screening rates.

For participants with the diagnosis of diabetes type II, without a diagnosis of obesity African American participants received the highest rate of testing for HbA1c and cholesterol. Caucasians had the highest average use of office (6.7), inpatient days (4.9), and ER visits (1.2), displaying the highest levels in all diagnosis categories. The lowest rate of office and ER visits were used by the African American population, with the Hispanic populations reflecting the smallest average of inpatient days per member (.2).

There does not appear to be a trend in screening rates by race or ethnicity; however, it does appear that significantly higher rates of screening for both HbA1c and cholesterol occurred in the population diagnosed with both obesity and diabetes type II.

Table 6

Utilization of Services by Diagnostic Category by Race and Ethnicity							
Study Diagnosis	Race/Ethnicity	HbA1c	Cholesterol	Office Visits	Inpatient Days	ER Visits	Members by Diagnostic Category by Race/ Ethnicity
		Percent Tested	Percent Tested	Avg Use/ Member	Avg Use/ Member	Avg Use/ Member	
Obesity	African American, Non-Hispanic	3.8%	9.1%	3.4	0.4	0.4	613
	Caucasian, Non-Hispanic	2.6%	11.1%	4.7	0.8	0.5	549
	Hispanic	4.0%	11.8%	4.2	0.5	0.6	1,174
	Other	2.3%	7.0%	4.2	0.9	0.8	43
Obesity and Diabetes Type II	African American, Non-Hispanic	33.3%	40.0%	3.9	-	0.2	15
	Caucasian, Non-Hispanic	55.6%	66.7%	6.3	-	0.3	18
	Hispanic	31.6%	31.6%	4.9	-	0.7	19
	Other	0.0%	0.0%	-	-	-	-
Diabetes Type II	African American, Non-Hispanic	22.0%	22.0%	3.7	0.5	0.5	50
	Caucasian, Non-Hispanic	14.7%	13.2%	6.7	4.9	1.1	68
	Hispanic	13.0%	17.4%	5.2	0.2	1.2	69
	Other	0	0	7.1	0.9	0.6	7

Comparison of Children with SHCN to Non-SHCN

The targeted population for this study was children and adolescents ages 0 through 17. The average population in the Medicaid program for the time period of this study was approximately 213,000, of which approximately 19,000 members identified as SHCNs. The charts below represent the number of children from both the SHCN and non-SHCN populations who were diagnosed with obesity, obesity and diabetes type II, or diabetes type II. While the numbers of children diagnosed vary between SHCN and non-SHCN populations, the rate of diagnosis for each of the categories is similar for both. Nationally, diabetes type II prevalence rates are not yet available but regional rates range from 1.7 to 7 percent. The national prevalence rate for obesity is 16 percent for age range 6 through 19, which includes participants in this study; therefore, higher rates of diagnosis would have been expected for both the SHCN and non-SHCN populations.

Chart 8

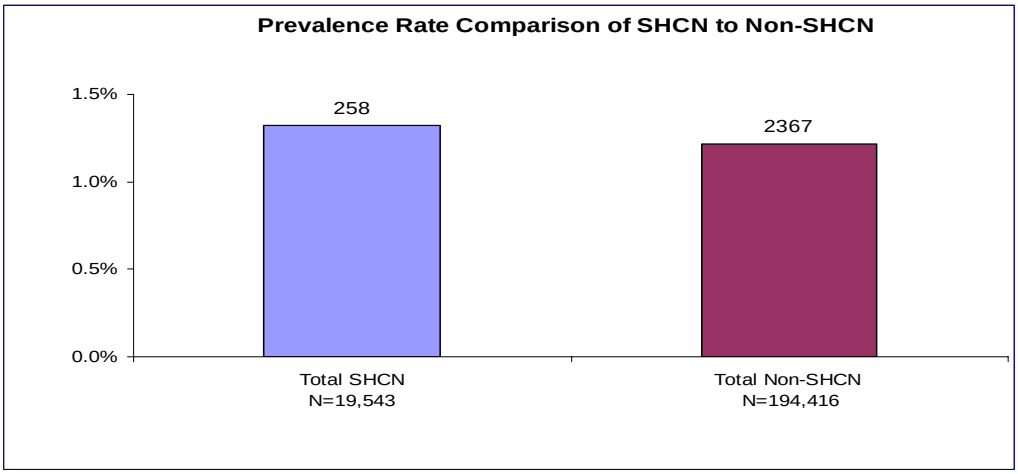
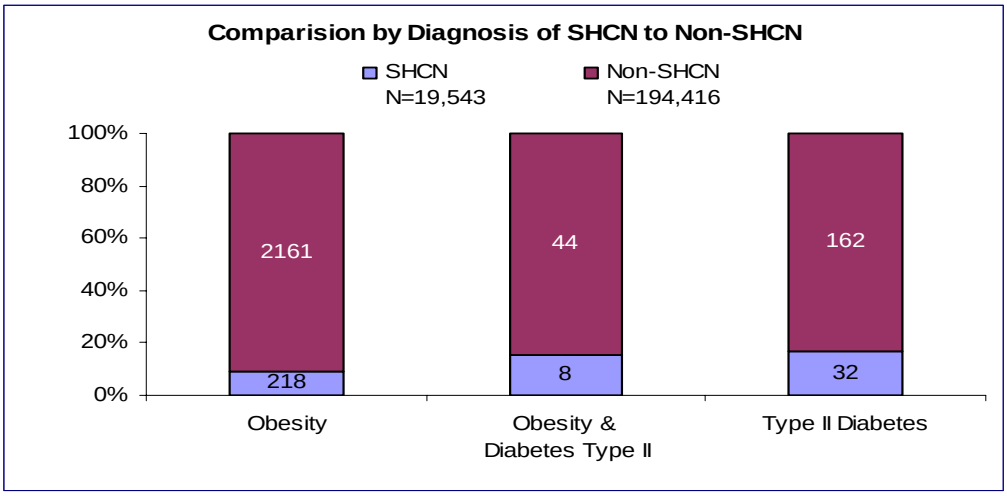


Chart 9

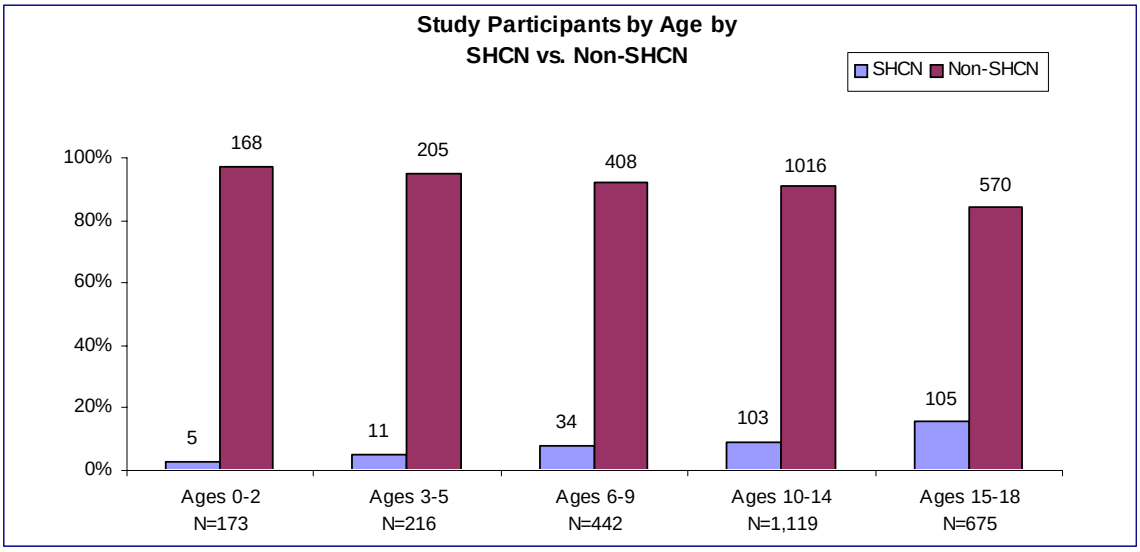


Comparison by Age of SHCN to Non-SHCN Children

The highest levels for identification of study diagnosis occurs in age ranges 10 through 14 and 15 through 17 followed by ranges 6 through 9, 3 through 5, and 0 through 2. The pattern is almost the same in the SHCN population. This pattern is consistent with national prevalence rates by age groups. National data indicate highest rates for obesity in the age ranges of 12 through 19 followed 6 through 11. Diabetes type II also occurs most frequently in age ranges 12 through 19, with the average diagnosis occurring between 12 through 14 years of age.

The number of SHCN children diagnosed with obesity and/or diabetes type II from the total population less than 18 years of age is very small, with less than 1 percent identified. The non-SHCN population is a little greater with just over 1 percent of the population diagnosed with at least 1 of the diagnostic conditions. Considering the size of the total less than 18 population, the actual number of children diagnosed may be slightly greater for non-SHCN, but overall is minimal. There appears to be no significant variation in the identification of the study conditions based upon SHCN or non-SHCN status.

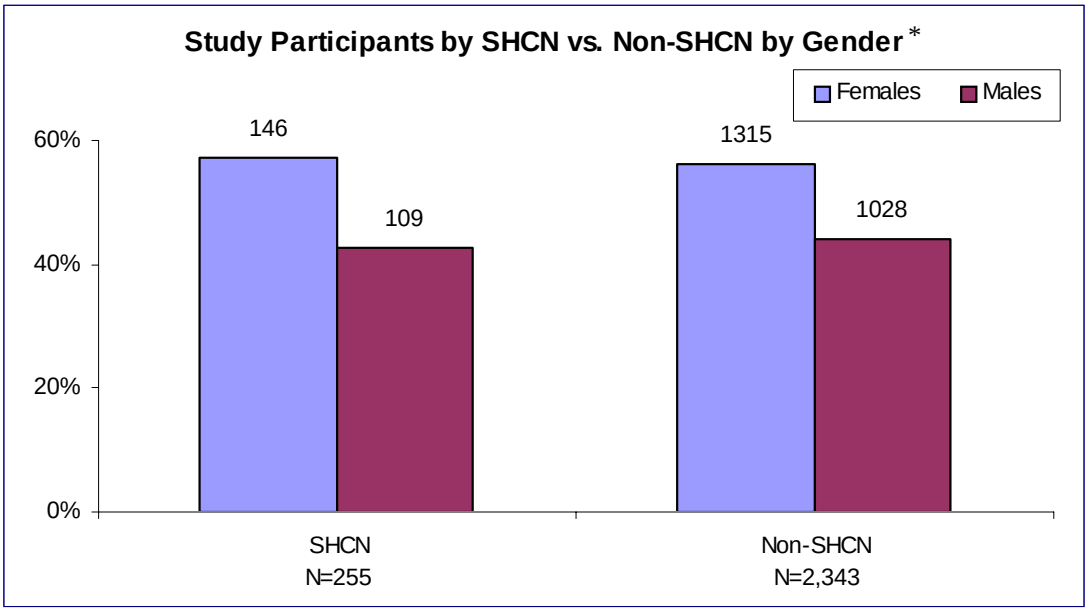
Chart 10



Comparison of SHCN to Non-SHCN Participants by Gender

The diagnosis of obesity, obesity with diabetes type II, or diabetes type II for study participants in the grouping of SHCN is split by females (146) and males (109). Of the total population of SHCN diagnosed with 1 of the study conditions, 57 percent were female and 43 percent male, indicating a difference of 14 percentage points, demonstrating a higher rate of diagnosis among females in the group. The grouping of non-SHCN participants identified 1,315 females and 1,028 males with 1 of the study conditions. Of the total population of non-SHCN participants, 56 percent were female and 44 percent male, representing a 10 percent difference in the diagnosis of females and males. Across SHCN and non-SHCN participants, females are diagnosed with greater frequency; however, the ratios within each population are consistent.

Chart 11



*Does not include members with unknown gender

Comparison of Prevalence for SHCN to Non-SHCN Participants by Race and Ethnicity

Prevalence patterns of obesity by race and ethnicity, according to CDC, indicate descending patterns, starting with highest prevalence occurring in the Hispanic population followed by African American, non-Hispanic followed by Caucasian, non-Hispanic populations. The study population as charted below followed the national pattern and was consistent for both the SHCN and non-SHCN groupings. Diabetes type II is understood to follow the same pattern of prevalence and is included in the study population.

Chart 12

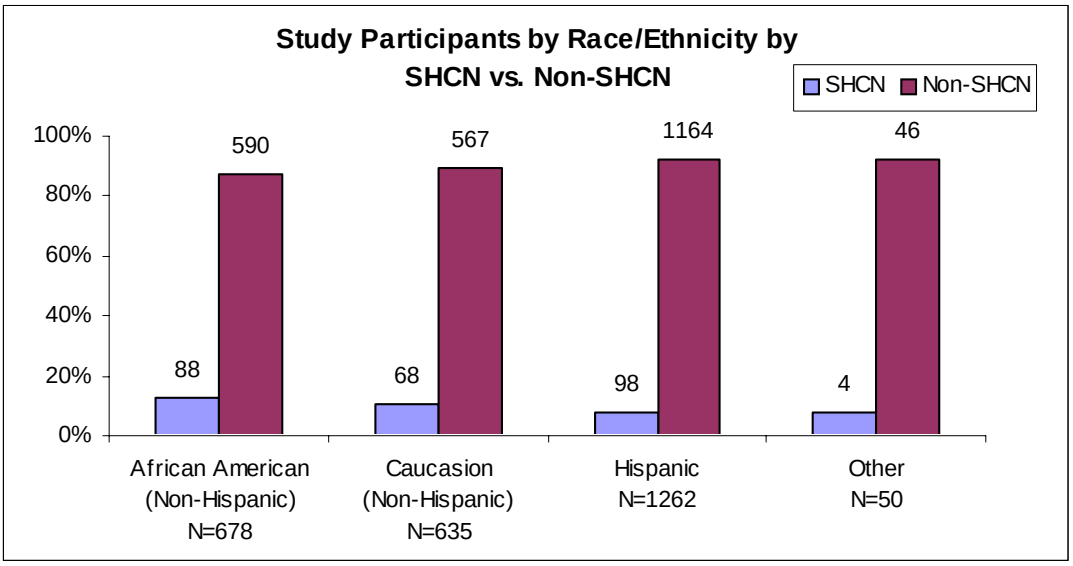
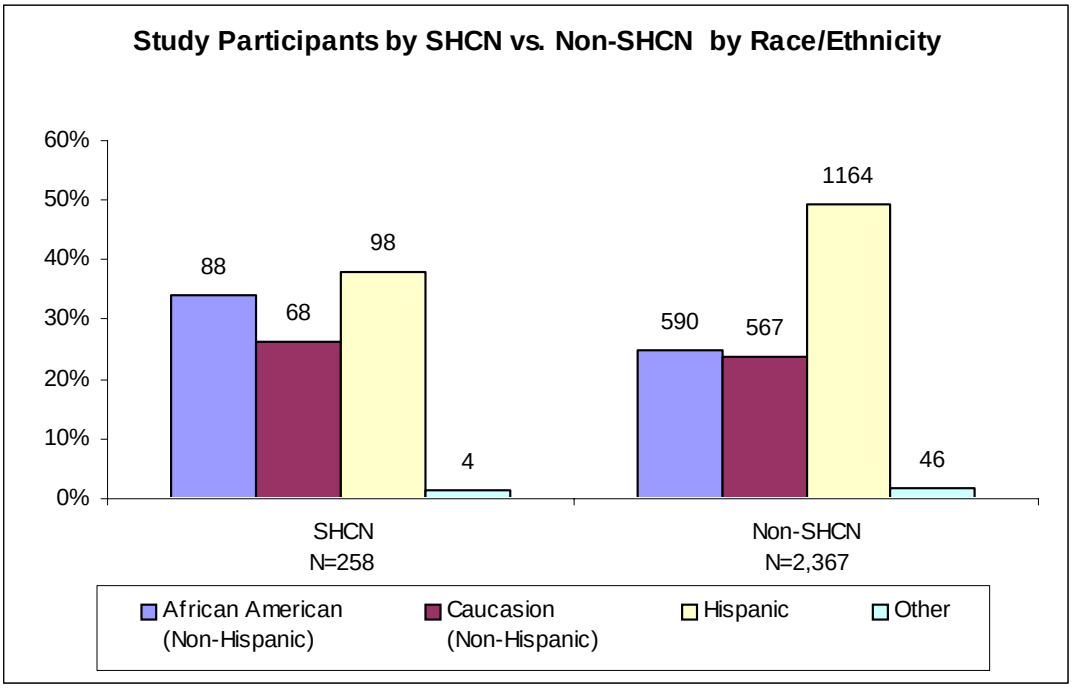


Chart 13



Comparison of Service Utilization by Study Conditions by SHCN and Non-SHCN Participants

The table below assesses use of services by diagnostic condition and children with SHCN compared to non-SHCN children. Testing levels for HbA1c and cholesterol are lowest for those participants diagnosed with obesity only. Testing increases for those participants diagnosed with diabetes type II and shows yet a greater increase in testing levels for those participants diagnosed with both obesity and diabetes type II. On the average, testing rates are slightly higher for SHCN participants than non-SHCN participants.

Higher average per individual rates of physician office visits are seen in the SHCN population across 2 of the 3 study conditions. The most significant variation is seen in participants diagnosed with obesity and diabetes type II. SHCN were seen in the office an average of 7.5 visits compared to 4.7 visits for non-SHCN participants. Inpatient days for this category of participants were not available. The largest variation in ER utilization occurred in the SHCN participants diagnosed with diabetes type II only. Overall, SHCN participants use more services than non-SHCN participants.

Table 7

Service Utilization By Children With SHCN Compared to Non SHCN					
Service	**Population**	**Obesity Tests/Member or Avg Use/Member**	**Obesity and Diabetes Type II Tests/Member or Avg Use/Member**	**Diabetes Type II Tests/Member or Avg Use /Member**	**Members Per Service**
HbA1c	**SHCN**	5%	38%	19%	20
	Non-SHCN	3%	41%	15%	116
Cholesterol	**SHCN**	13%	50%	22%	40
	Non-SHCN	11%	45%	15%	275
					Visits/Days Per Service
Physician's Visits	**SHCN**	4.8	7.5	4.8	1,256
	Non-SHCN	4.0	4.7	5.5	9,818
Inpatient Days	**SHCN**	4.8	-	8.4	1,324
	Non-SHCN	0.1	-	0.7	430
ER Visits	**SHCN**	0.8	0.1	1.5	234
	Non-SHCN	0.5	0.5	0.8	1,287
					Total Members
Total SHCNs by Diagnosis		218	8	32	258
Total Non SHCNs by Diagnosis		2,161	44	162	2,367

Health Plan Comparison

Four MCOs provide health care services to the State Medicaid population. The average eligible study population, of children and adolescents ages 0 through17 years of age, assigned to each MCO for the study period SFY04 is identified below:

- Anthem, Blue Care Family Plan (Anthem) 89,000 participants;
- Community Health Network of Connecticut (CHN) 39,000 participants;
- FirstChoice Health Plan (FCHP) 18,000 participants; and
- Health Net (HN) 68,000 participants.

Of the study participants diagnosed with at least 1 of the diagnostic conditions, HN identified 996 participants (38 percent) of the total followed by CHN who identified 739 (28 percent), Anthem with 591 (23 percent), and FCHP with 299 (11 percent). The second chart below shows the breakdown by MCO and diagnostic category. The pattern is the same with HN diagnosing the most participants across all diagnostic categories, followed by CHN, Anthem, and FCHP. Data for Anthem may be under represented due reporting of primary diagnosis only on encounter records.

Chart 14

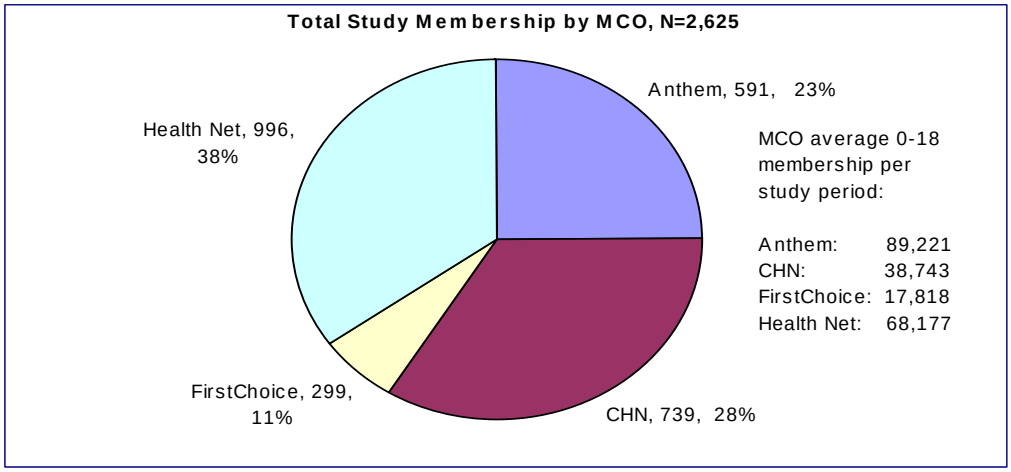
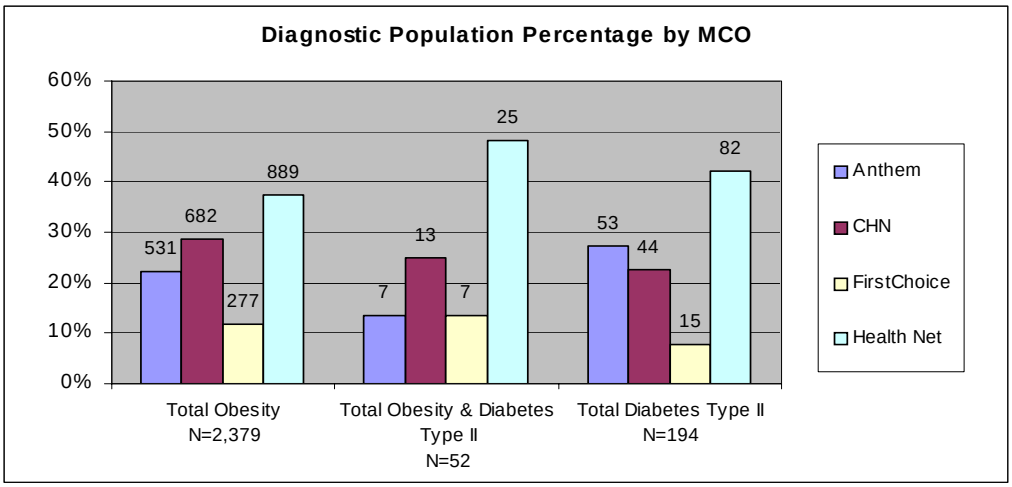


Chart 15



Prevalence Rate by MCO

National prevalence rates for obesity are approximately 16 percent. State rates identified by this study for the children in the Medicaid population with diagnosis of obesity are significantly lower than national trends as illustrated in the graph below. State identification rates in this study are approximately 1 percent of the targeted population, well below the national average.

The second chart below identifies prevalence rates, as identified for the study population through administrative data by MCO. CHN has the highest rate of identification of members, with at least one of the study conditions, from there own population followed by FCHP, HN, and Anthem. Data for Anthem may be under represented due reporting of primary diagnosis only on encounter records.

Chart 16

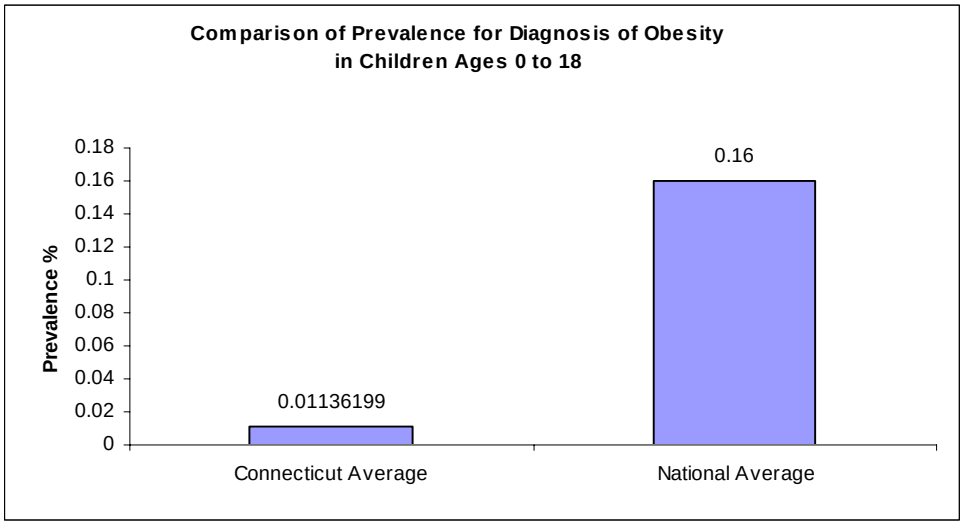
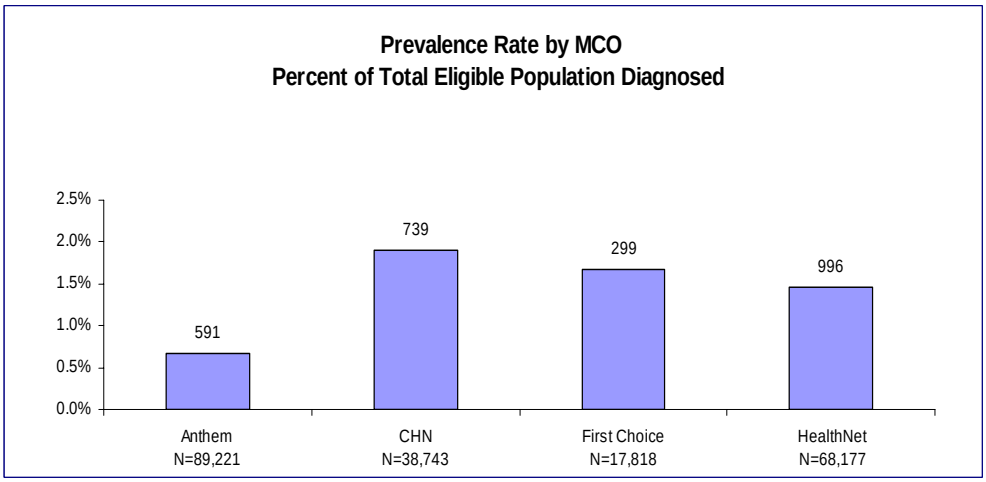


Chart 17



Comparison of Study Conditions by Risk Scores and MCO

The average concurrent ACG risk score for children and adolescents in each disease category are presented in the table below. The scores reflect the relative health status of the children, based upon a risk score of 1.0 for the average member. The lower the risk score, the healthier the members are. Children with diabetes have a higher risk score than children with obesity alone, indicating that the children diagnosed with diabetes are indeed in poorer health.

The average concurrent ACG risk score for children and adolescents included in the study by member MCO demonstrate that children enrolled with CHN have the lowest risk score, indicating those children are generally in better health than those in other plans. CHN demonstrates the healthiest population, followed by Anthem and FCHP, with HN representing the population overall in poorest health. Although it must be pointed out that the risk scores for all MCOs are greater than 1.0 representing average health.

Table 8 (a)

Study Diagnosis	Risk Score
Obesity with no Diabetes	1.9
Obesity with Diabetes Type II	2.9
Diabetes Type II without a Dx of Obesity	3.0

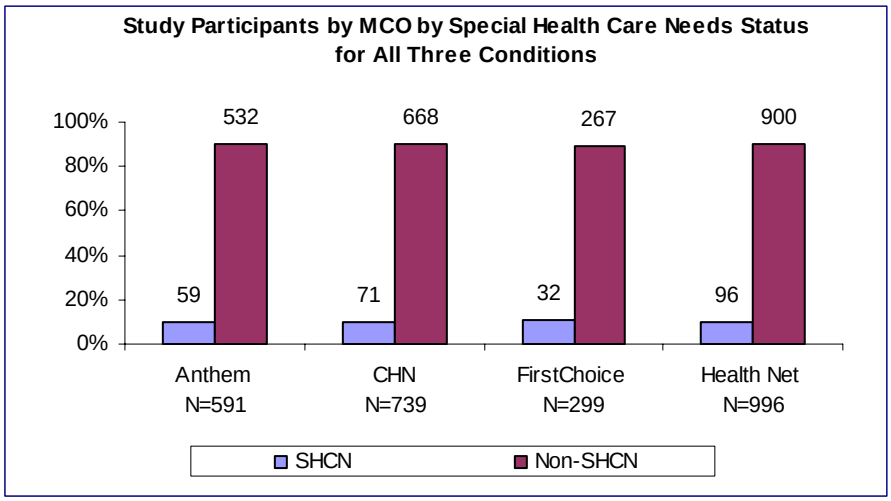
Table 8 (b)

MCO	Risk Score
Anthem	2.1
CHN	2.0
FirstChoice	2.2
Health Net	2.7

Comparison of Participant by SHCN Status by MCO

The table below compares the SHCN and non-SHCN study population by MCO. Similar to previous analyses, 90 percent of each MCO's diagnosed population is attributed to non-SHCN participants. The remaining 10 percent of each MCO's population represents the SHCN participants. These statistics remain fairly constant for all 4 of the State MCOs, as shown in the graph.

Chart 18



Utilization of Service Comparison for Participants with SHCN to Non-SHCN by MCO

The individual MCOs vary across diagnostic category and the testing of the SHCN and non-SHCN populations. Due to the small size of the population when broken down by MCO further evaluation may be required to identify conclusive results. Overall, HN exceeds the other MCOs for both HbA1c and cholesterol testing for both the SHCN and non-SHCN populations. The extensive testing under HN corresponds with the previous observation of HN having a generally sicker population and the overall highest prevalence in comparison to the other MCOs.

Utilization per member by MCO is consistently higher for the SHCN population compared to the non-SHCN population across all MCOs and diagnostic categories for office, ER visits, and inpatient days. The diabetes type II participants generally have a greater number of physician visits across all MCOs, with HN having the greatest number of physician visits overall for all disease categories. Diabetes type II also displays the greatest number of inpatient days per member and ER visits per member for all MCOs. Consistent with the prevalence order previously observed, average service utilization per member corresponds directly with HN having the highest utilization followed by CHN, Anthem, and FCHP.

Table 9

Average Tests Per Member by MCO and Comparison of SHCN to Non-SHCN Members							
MCO	Study Diagnosis	HbA1c Avg Tests/Member		Cholesterol Avg Tests/Member		Members by Diagnosis	
		SHCN	Non SHCN	SHCN	Non SHCN	SHCN	Non SHCN
Anthem	Obesity	0%	3%	10%	7%	49	482
	Obesity & Diabetes Type II	0%	14%	0%	14%	0	7
	Diabetes Type II	10%	14%	10%	14%	10	43
CHN	Obesity	9%	4%	10%	12%	58	624
	Obesity & Diabetes Type II	0%	0%	0%	10%	3	10
	Diabetes Type II	30%	3%	20%	6%	10	34
FirstChoice	Obesity	3%	2%	16%	9%	31	246
	Obesity & Diabetes Type II	0%	43%	0%	43%	0	7
	Diabetes Type II	0%	14%	100%	14%	1	14
Health Net	Obesity	6%	4%	16%	13%	80	809
	Obesity & Diabetes Type II	60%	70%	80%	75%	5	20
	Diabetes Type II	18%	21%	27%	21%	11	71

Table 10

Average Service Utilization Per Member by MCO and Comparison of SHCN to Non-SHCN Members									
MCO	**Study Diagnosis**	**Physician's Visits Avg/Member**		**Inpatient Days Avg/Member**		**ER Visits Avg/Member**		**Members by Diagnosis**	
		SHCN	**Non SHCN**	**SHCN**	**Non SHCN**	**SHCN**	**Non SHCN**	**SHCN**	**Non SHCN**
Anthem	Obesity	4.2	4.3	2.2	0.0	1.0	0.7	49	482
	Obesity & Diabetes Type II	-	3.7	-	-	-	1.3	0	7
	Diabetes Type II	3.5	5.7	2.5	-	2.3	1.1	10	43
CHN	Obesity	4.2	3.6	6.1	0.2	1.0	0.6	58	624
	Obesity & Diabetes Type II	7.0	4.1	-	-	-	0.3	3	10
	Diabetes Type II	2.3	4.3	20.8	-	1.1	1.6	10	34
FirstChoice	Obesity	4.0	3.9	12.7	0.0	1.3	0.8	31	246
	Obesity & Diabetes	-	2.4	-	-	-	0.7	0	7
	Diabetes Type II	5.0	4.3	-	-	-	0.9	1	14
HealthNet	Obesity	5.9	4.3	2.5	0.2	0.5	0.3	80	809
	Obesity & Diabetes	7.8	6.1	-	-	0.2	0.3	5	20
	Diabetes Type II	8.4	6.2	3.3	1.6	1.4	0.3	11	71

5

Conclusions and Recommendations

The State population of children and adolescents diagnosed with obesity reflected a prevalence rate of slightly more than 1 percent. With a national childhood obesity rate of 16 percent, a significantly higher diagnostic rate had been expected. One reason for lower diagnosis levels may be related to a continuing social stigma associated with being identified or labeled as obese. In fact, CDC has changed the label used for “obesity” in children to “overweight.”

Diabetes type II may be under-identified in the State population as a whole and an associated diagnosis of obesity for those children with diagnosis of diabetes type II may also be under identified. In analyzing the data related for diabetes type II, 52 members were found to have a diagnosis of obesity and diabetes type II and 194 children had a diagnosis of diabetes type II without a diagnosis of obesity. While there are other causes of diabetes type II in children, statistically, 85 to 90 percent of children with diabetes type II are also found to be obese.

National prevalence rates for obesity are indicated as higher in adolescents ages 14 through 19, followed by children ages 6 through 11. Although the data for this study was broken into smaller age ranges, 0 through 2, 3 through 5, 6 through 9, 10 through 14, and 15 through 17, State data also reflected this trend with higher rates of identification of obesity occurring in the 10 through 14 and 15 through 17 grouping, followed by 6 through 9 year olds. Diabetes type II, with or without a diagnosis of obesity, is thought to be most common in age ranges 12 through 14. State data results reflect almost equal levels of diagnosis for diabetes type II with 88 children in the 10 through 14 age range diagnosed and 92 children in age range 15 through 17.

National data reflect slightly higher levels of obesity in males than in females across age groupings. State data reflects a slightly higher presence of a diagnosis for obesity in females with 1,316 participants identified from the total female enrollment of 100,350 females for a prevalence rate of 1.31 percent and 1,042 males identified from 103,035

males for a prevalence rate of 1.01 percent. Visual detail on prevalence by gender can be seen in chart 5, on page 17. Diabetes type II is thought to be more prevalent in females that in males; State data while very small in sample sizes, is congruent with this trend with a total of 145 females diagnosed with diabetes type II and 95 males.

The Hispanic population nationally, has the highest rates for prevalence of obesity and diabetes type II, followed by African American, non-Hispanic and Caucasian, non-Hispanic. The State data follow this pattern for diagnosis of obesity with 1,174 Hispanic participants diagnosed followed by 613 African Americans and 549 Caucasian participants. However, data for diabetes type II reflects 88 Hispanic children diagnosed which is only slightly higher than the number for Caucasian, non-Hispanic children at 86 and 65 African American, non-Hispanic children diagnosed.

The Top 10 co-morbid conditions are presented by 3 diagnostic categories which are obesity, obesity with diabetes type II, and diabetes type II only. The purpose of presenting by the 3 diagnostic categories was to determine if there was variation in co-morbid conditions present for those children with a diagnosis of diabetes type II with obesity versus children with a diagnosis of diabetes type II only. Six conditions range across all 3 conditions with upper respiratory being the top 1 or 2 co-morbid condition for all 3 diagnoses. Some of the identified co-morbid conditions could be classified as commonly occurring in childhood. Others conditions, such as asthma, peripheral neuropathy, anxiety, and neurosis and musculo-skeletal conditions are also commonly associated with obesity and diabetes type II. Other endocrine disorders are often found with diagnosis of diabetes and these are present in 21 of the 52 children diagnosed with obesity and diabetes type II.

Service utilization patterns reflect low levels of screening for HbA1c and cholesterol across all diagnostic categories. Screening rates were lowest for children in the obesity only category at less than 10 percent for both tests, children in the diabetes type II only category had a screening rate of about 16 percent for both tests and the highest level of screening was seen in those participants with both diagnostic categories with about half of the 52 participants receiving both screenings. Office visits were least frequent when associated with a diagnosis of obesity only at 4.1 per participant. Office visits (5.4), ER usage (1.0), and inpatient days (2.0) per participant, was highest for children diagnosed with diabetes type II only. Diagnostic testing and service utilization may reflect the severity of illness of children in the diabetes type II diagnostic category and reinforce the value of identification and testing, as discussed above.

The study demonstrates no variance in identification of the diagnostic categories based upon SHCN status. The overall prevalence rate for the identified diagnoses for participants in the study with SHCN was 1.3 percent compared to non-SHCN participants 1.2 percent. Use of services for SHCN children compared to non-SHCN children is almost equal across both HbA1c and cholesterol testing rates. However, for physician visits, ER visits, and inpatient days, the SHCN population used more services than the non-SHCN population across almost all diagnostic categories. Conclusions should be

cautious based upon the small sample size; however, this greater use of services may reflect a greater severity of illness.

Severity of illness scores, as determined by applying ACG risk scoring, indicated that all 3 diagnostic categories indicated a greater than average severity of illness. The average severity score is equal to 1. For the participants in this study, those diagnosed with obesity showed a risk score of 1.9, obesity with diabetes type II had a risk score of 2.9, and diabetes type II only had a risk score of 3.0. Utilization of services was highest overall for members diagnosed with diabetes type II as would be expected, based upon acuity score. However, overall screening/diagnostic rates for this population were low at 15 and 16 percent.

The participants for this study receive their health care from 1 of 4 MCOs providing services to State Medicaid members. Membership of the targeted population in each of the health plans varies with Anthem having the greatest number (89,000), followed by HN with 68,000, CHN with 39,000, and FCHP with 18,000. HN identified the greatest number of children with at least 1 of the study diagnosis (996); the rate of diagnosis for their population was 1.5 percent. HN also had the highest severity rating for their members at 2.7. CHN identified 739 participants with at least one study diagnosis, which is approximately a 2 percent identification rate and a severity score for participants of 2.0, Anthem identified 591 participants, for a identification rate of .6 percent of their population, with a risk score of 2.1. FCHP identified 299 members, or 1.6 percent, of their population, with a risk score of 2.2.

Recommendations

While the numbers of diagnosed participants in the study may be significantly under-represented related to coding inaccuracies or incomplete data, opportunities for improvement can be identified from the results. The study results may be used to:

- remind physicians and providers of the prevalence of both obesity and the growing incidence of diabetes type II, which can be communicated via newsletters or other communications forms and forums which provide access to providers;
- create physician and provider communication or educational forums to focusing on the challenges of diagnosing diabetes type II in children, related to variations in symptom presentation;
- survey providers to determine the level of acceptance of treatment protocols supporting cholesterol and HbA1c screening in children;
- partner with the medical society to aggregate resources and develop or reinforce awareness and treatment protocols for obesity and diabetes type II;
- distribute tools to assist in identification and diagnosis of childhood obesity, such as a pocket BMI calculator;
- use an aspect of the study topic as a focus for future quality initiatives, which may include a performance improvement project;

- using available forums and newsletters communicate with members reminding them of the prevalence of the conditions, including tips on how to self manage, when to seek support, and what sources are locally in place to provide support;
- partner with physician groups and community organizations to create or enhance awareness efforts; include the State Medical Society, pediatric professional organizations, American Diabetes Association, etc.;
- explore initiating a population health or disease management program focusing on obesity and diabetes type II; where programs may exist evaluate study results to determine potential areas of focus; and
- explore partnering with MCOs and existing committees or work groups and school health organization to identify opportunities to participate in community fairs or projects to communicate and provide education regarding obesity and diabetes type II.

Appendix A

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