City of Berkeley
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Public Health Division

Prevalence of Obesity, Underweight, and Anemia in the Child Health and Disability Prevention Program (CHDP), Berkeley, 2006-2007

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PREVALENCE OF OBESITY, UNDERWEIGHT, AND ANEMIA IN THE CHILD HEALTH AND DISABILITY PREVENTION PROGRAM (CHDP), BERKELEY, 2006-2007

SUMMARY

Obesity is a critical child health problem in the nation. Childhood obesity is associated with adult obesity, which in turn is associated with an increased risk for a wide range of chronic illnesses, including heart disease, diabetes and some cancers.

Using data collected from local physicians who examined Berkeley children from low-income families, the Public Health Division found that approximately 14% of 0-4 year olds and 28.6% of 5-19 year olds were obese in 2006 and 2007. These findings were essentially unchanged from a previous estimate in 2005. The rate of obesity in Berkeley's CHDP children was similar to that of Alameda County and California. Six percent of the children had signs of anemia.

Therefore, the data shows that childhood obesity is a serious health problem. We recommend that the City of Berkeley Public Health Division and our community partners take the following action:

- Encourage and support greater participation among students in breakfast programs at their schools and increase enrollment for the healthy free- and reduced- lunch program.
- Facilitate policy development related to the overall food environment, for example menu labeling requirements for Berkeley restaurants.
- Increase support and follow-up on registering eligible individuals for Electronic Benefit Transfer, EBT (to access farmers' markets, retailers that accept food stamps) and/or Women, Infants, Children (WIC) programs and benefits.
- Provide mini-grants for community residents or community-based organizations that provide innovative solutions and programs that encourage healthy eating and physical activity for youth.
- Explore joint use agreements for school sites and recreation sites for evening and weekend for use by physical activity programs for children and families.
- Offer nutrition education and cooking classes for parents to encourage healthy eating.
- Build partnerships with City of Berkeley Parks and Recreation, Planning Division, and Law Enforcement to begin to create safe, accessible green spaces for children to play and exercise.

INTRODUCTION

The Child Health and Disability Prevention Program (CHDP) provides health care and periodic preventive health assessments to California children in low-income families. Eligible children include all Medi-Cal recipients through age 20 and other low-income eligible children up to 19 years of age. As part of routine assessments, physicians monitor childhood physical development and indicators of anemia. To receive reimbursement for services physicians submit encounter forms (PM 160s) that record the child's age, sex, weight, height or length, hemoglobin, and hematocrit. These administrative data are part of a state and national surveillance system for monitoring childhood obesity and anemia.[1]

Copies of PM 160s are provided to local health departments and are compiled by the California Department of Health Care Services (formerly Department of Health Services), which key-enters data and provides extracts to the Centers for Disease Control, as part of the national Pediatric Nutrition Surveillance System (PedNSS). Physicians indicate on the PM 160 form the county health jurisdiction in which the patient resides. A previous assessment of PM 160s submitted in 2005, indicated that over 90% of Berkeley providers use the code for Alameda County (01) rather than Berkeley's code (59).[2] Consequently, an overwhelming majority of encounters are subsumed into the Alameda County total, and leaving Berkeley with few observations in official statistics (e.g. 104 children in 2005).

This study was undertaken to accurately estimate the prevalence of obesity and anemia in Berkeley's CHDP population using methods comparable to previous study, and to document changes in the prevalence of obesity and anemia in a subsequent year.

MATERIALS AND METHODS

Data Source

The data source was PM 160 encounter forms for services rendered between July 1, 2006 and June 30, 2007 (measurement year) and received by the Berkeley Public Health Division by November 1, 2007. Encounter reporting was thought to be highly complete after allowing for a greater than 4 month claims lag.

Sample

Resources were not available to abstract over 1700 encounter forms logged for the entire measurement year. After consultation with senior CHDP staff, 3 monthly samples were selected that reflect typical variation in seasonal volume (September 2006, January 2007, May 2007). This time period was within the measurement period (7/1/2006-6/30/2007) and was based on a fiscal year rather than a calendar year as in the 2005 study. The new measurement period was chosen in order to synchronize the PHD's performance measurements with requirements of the State of California.[3]

The minimum sample size of 190 was estimated based on an expected frequency of obesity of 16.7% (Alameda County average), and a margin of error of ± 5% with 95% confidence in a population of 1700 children.

Data Collection

Patient name, age, sex, ethnicity (American Indian, Asian, Black, Filipino, Hispanic, White, Other, Pacific Islander), county of residence code, weight and height/length, hemoglobin levels, and hematocrit were abstracted from each PM 160 form into an Excel spreadsheet. For patients with multiple visits or for duplicate entries, only most recent unique and complete entry was used. The Excel spreadsheet was imported into an SPSS program (provided by the Centers for Disease Control), which calculated the percentile score for weight of each child based on BMI-for-age in children 25 months to 19 years, and weight-for-length in children 24 months or younger.[1,4] Height/length measurements were assumed to be recumbent at ages 24 months and younger. Children at the 95% or greater weight distribution were classified as obese. Age-, sex-, cut-offs for low/normal hemoglobin were programmed using CDC guidelines.[5]

Data Quality

Missing data and outliers were assessed using frequency distributions. Due to missing and inaccurate information, BMI could not be calculated for 60 children. Hemoglobin and hematocrit were not recorded for most children (86%). Rather than exclude children with missing hemoglobins or hematocrits from the analysis of anemia, it was assumed that missing data were below thresholds for anemia. While this approach is consistent with the 2005 analysis, the results are not comparable to PedNSS, which excludes any missing data from analysis. The resulting anemia prevalence is likely to be an underestimate, however, it provides information to detect changes in temporal trends.

Physicians classified the race of the majority of children as "Other". It is not known whether this reflects multiracial categories or underclassification of specific race/ethnicities. Because concerns with validity of this information, analyses of outcomes stratified by race/ethnicity were not performed.

Statistical Analysis

Frequency distributions of prevalence of anemia and obesity were calculated in age strata of 0-4 years of age and 5 to 19 years of age. These strata are used in published data at the state and county level to facilitate comparisons. 95% confidence intervals were calculated using the exact binomial distribution.

RESULTS

There were 387 unique children in the sample, 72.4% of whom were under the 5 years old (Table 1). Males comprised 54.8%. Few children (<2%) had providers who used the correct jurisdiction code to identify the child as a Berkeley resident.

The prevalence of obesity was 14.0% in 0-4 year olds and 28.6% in 5-19 year olds (Table 2). At 0-4 years of age, males and females had a similar obesity prevalence, but at 5-19 years, males tended to have higher obesity rates than females (p=0.11). In each age strata, Berkeley's CHDP children had a similar prevalence of obesity as Alameda County and California (p >0.05). The prevalence of underweight was 11.7%. In 0-4 year olds, Berkeley had a higher prevalence of underweight than that of Alameda County (p=.008) and California (p=.003) [Table 3].

The prevalence of anemia was 6% (Table 4). Males had a higher prevalence at younger age groups and females had a higher prevalence at older ages (p > 0.05).

Comparison of 2005 and 2006-7

There was a statistically nonsignificant decline in the prevalence of obesity in Berkeley 0-4 year olds from 2005 to 2006-7 (Table 5). The prevalence of underweight had a nonsignificant increase in both age groups from 2005 to 2006-7. Anemia prevalence did not significantly differ by time period.

DISCUSSION

In fiscal year 2006-7, Berkeley children in the CHDP program had a prevalence of obesity on par with their Alameda County and California counterparts. Younger children in Berkeley's CHDP program had a higher prevalence of underweight than their county and state peers. This pattern is different from that observed in 2005, in which each Berkeley age group experienced a higher prevalence of obesity than their county and state peers, and the prevalence of underweight was statistically the same for Berkeley, Alameda County, and California. Age-specific prevalence of obesity, underweight, or anemia did not significantly change in Berkeley between 2005 and 2006-7 (Table 5), so volatility in the estimates due to sample variation may be the most parsimonious explanation.

Physicians persisted in miscoding the local health jurisdiction and overwhelmingly assigned Berkeley's children (59) to Alameda County (01). Prevalence by race/ethnicity could not be estimated because of the large amount of missing data. Similarly, measurements of hemoglobin or hematocrit were not recorded for the majority of children. Providers should be encouraged to collect more complete information so that potential disparities and anemia outcomes can be monitored and compared to County and State benchmarks.

Despite these limitations, administrative data in the CHDP program is a valuable resource to monitor the prevalence of childhood obesity, which, in Berkeley, as in the rest of the State and country, is a growing public health concern.[6]

CONCLUSIONS AND RECOMMENDATIONS

Obesity is a critical child health problem in Berkeley. Childhood obesity is associated with adult obesity, which in turn is associated with an increased risk for a wide range of chronic illnesses, including heart disease and some cancers. Public health interventions to prevent obesity are a high priority. Current Public Health Division programs to address this issue include:

- **Eat Well Berkeley** is a new community health program, sponsored by the Kaiser Permanente Healthy Eating Active Living Program. This program is designed to work with restaurants to provide healthy options for their customers, and to support and promote restaurants that provide healthy food choices. For restaurants that offer a kid's menu, one of the criteria for program participation is offering fruit or vegetables but neither French fries nor soda.

- **Corner Store Market Program** is an extension of our Eat Well Berkeley program that works with corner stores near our 3 middle schools and our continuation high school to offer healthier snack and beverage choices for students.

- **Be Fit Berkeley** is a community-wide campaign encouraging Berkeley citizens to eat healthy foods and exercise regularly. Anyone who lives or works in Berkeley can participate in the

campaign by registering with the Public Health Division and tracking pounds lost or minutes exercised, and be eligible for raffle prizes.

- **Nutrition Education and Food Access Projects** – Through presentations, taste-testings, and various community outreach events, nutrition education aims to increase fruit and vegetable consumption and physical activity among low-income children and families. We work in collaboration with Head Start, Project BUILD, the Berkeley Unified School District, and various community organizations like Farm Fresh Choice, Berkeley Youth Alternatives, and Youth Spirit Artworks to improve access to affordable, healthy food and increase community awareness and participation in the local food system.

We recommend that the City of Berkeley and our community partners:

- Encourage and support greater participation among students in breakfast programs at their schools and increase enrollment for the healthy free- and reduced- lunch program.
- Facilitate policy development related to the overall food environment, for example menu labeling requirements for Berkeley restaurants.
- Increase support and follow-up on registering eligible individuals for Electronic Benefit Transfer, EBT (to access farmers' markets, retailers that accept food stamps) and/or Women, Infants, Children (WIC) programs and benefits.
- Provide mini-grants for community residents or community-based organizations that provide innovative solutions and programs that encourage healthy eating and physical activity for youth.
- Explore joint use agreements for school sites and recreation sites for evening and weekend for use by physical activity programs for children and families.
- Offer nutrition education and cooking classes for parents to encourage healthy eating.
- Build partnerships with City of Berkeley Parks and Recreation, Planning Division, and Law Enforcement to begin to create safe, accessible green spaces for children to play and exercise.

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Table 1. Description of CHDP Population, 7/1/06-6/30/07*

Item	N	Percent
Total	387	100
Age (Years)		
0 – 4	280	72.4
5 – 19	103	26.6
Missing	4	
Sex		
Male	212	54.8
Female	175	45.2
Missing	0	
Ethnicity		
Asian	21	5.4
African Am.	57	14.7
Filipino	1	0.3
Latino	68	17.6
White	12	3.1
Other	198	51.2
Missing	27	7.0
County Code		
Alameda County (01)	360	93
Berkeley (59)	9	2.3
Others (7, 38,41)	4	1.1
Missing	10	2.6

* Sample months Sept. 2006, Jan. 2007, May 2007

Table 2. Prevalence of Overweight (>95th Percentile)†, CHDP, Berkeley, 7/1/06-6/30/07*

	Ages 0-4 (N=243)		Ages 5-19 (N=84)		Total (N=327)	
Item	N	Percent	N	Percent	N	Percent
Berkeley Total	34	14.0	24	28.6	58	17.7
95% CI		9.9–19.0		19.2–39.5		13.8–22.3
Sex						
Male	19	13.1	15	36.6	34	18.3
Female	15	15.3	9	20.9	24	17.0
Alameda Co., 2006	4,052	13.1	3,445	22.0		
California, 2006	162,685	15.4	112,338	23.1		

† Based on BMI (> 2 years of age) and length for weight (0 < 2 years)
* Sample months Sept. 2006, Jan. 2007, May 2007; CI, Confidence Interval

Table 3. Prevalence of Underweight† (< 5th Percentile), CHDP, Berkeley, 7/1/06-6/30/07*

	Ages 0-4 (N=243)		Ages 5-19 (N=84)		Total (N=327)	
Item	N	Percent	N	Percent	N	Percent
Berkeley Total	26	10.7[ac]	4	4.8	30	9.1
95% CI		7.1–15.3		1.3–11.7		6.3–12.8
Sex						
Male	15	10.3	0	0	15	8.1
Female	11	11.2	4	9.3	15	10.6
Alameda Co., 2006	2,010	6.5	407	2.6		
California, 2006	58,101	5.5	12,158	2.5		

* Sample months Sept. 2006, Jan. 2007, May 2007
† Based on BMI (> 2 years of age) and length for weight (0 < 2 years)
[a] Significantly different than Alameda County ($p < 0.05$);
[c] Significantly different than California ($p < 0.05$)
CI, Confidence Interval

Table 4. Prevalence of Anemia, CHDP, Berkeley, 1/06-6/30/07*

	Ages 0-4 (N=280)		Ages 5-19 (N=103)		Total (N=383)	
Item	N	Percent	N	Percent	N	Percent
Total	13	4.6	10	9.7	23	6.0
95% CI		2.5–7.8		4.8–17.1		3.8–8.9
Male	10	6.1	4	8.9	14	6.7
Female	3	2.6	6	10.3	9	5.2

* Sample months Sept. 2006, Jan. 2007, May 2007

Table 5. Prevalence of Overweight, Underweight, and Anemia, CHDP, Berkeley, 2005 and 2006-2007

	2005			2006-2007		
Item	N	Percent	$CI_{95\%}$	N	Percent	$CI_{95\%}$
Overweight						
Total	107	24.2	20.0 – 28.4	58	17.7	13.8 – 22.3
0-4	59	21.0	15.6 – 25.8	34	14.0	9.9 – 19.0
5-19	48	29.8	22.9 – 37.5	24	28.6	19.2 – 39.5
Underweight						
Total	20	4.5	2.8 – 6.9	29	9.1	6.3 – 12.8
0-4	18	6.4	3.8 – 9.9	26	10.7	7.1 – 15.3
5-19	2	1.2	0.2 – 4.4	3	4.8	1.3 – 11.7
Anemia						
Total	33	6.7	4.7 – 9.3	23	6.0	3.8 – 8.9
0-4	18	5.7	3.3 – 8.8	13	4.6	2.5 – 7.8
5-19	15	8.7	4.9 –13.9	10	9.7	4.8 –17.1

* Sample months 2005: Apr. 2005, August 2005, Dec. 2005
Sample months 2006-2007: Sept. 2006, Jan. 2007, May 2007
CI, Confidence Interval