

City of Berkeley Department of Health and Human Services Public Health Division

# Prevalence of Obesity, Underweight, and Anemia in the Child Health and Disability Prevention Program (CHDP), Berkeley, 2007-2008

Prepared by

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## PREVALENCE OF OBESITY, UNDERWEIGHT, AND ANEMIA IN THE CHILD HEALTH AND DISABILITY PREVENTION PROGRAM (CHDP), BERKELEY, 2007-2008

#### SUMMARY

Obesity is a national critical child health problem. Childhood obesity has been linked with adult obesity. Adult obesity is associated with an increased risk for a wide range of chronic illnesses, such as heart disease, diabetes and some cancers.

Since 2005, the Public Health Division has analyzed data collected from local physicians who examined low-income Berkeley children. In fiscal year 2007/8, the percentage of obese children 0 to 19 years older was 14.4%. This represents a large reduction since 2005, when the percentage was 24.2%. In FY 2007/8, approximately 9.9% of 0-4 year olds and 23.9% of 5 to 19 year olds were obese. The overall rate of obesity in Berkeley is slightly lower than that of Alameda County or California. Neither Alameda County nor California showed a significant decrease in childhood obesity since 2005. Unlike obesity, the percentage of underweight children (7.0%) or those with anemia (4.7%) did not show a changing trend since 2005.

Although the prevalence of obesity in FY 2007/8 has improved compared to the Berkeley baseline measurement in 2005, it is now comparable to the Alameda County average, and is still unacceptably high. 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 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.<sup>1</sup>

Local physicians provide copies of the PM 160 form to local health departments and to 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 (CDC), 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 to the Public Health Division in 2005 indicated that over 90% of Berkeley providers use the code for Alameda County (01) rather than Berkeley's code (59).<sup>2</sup> Consequently, statistical analyses of the data key-entered by the State of California and CDC misclassify the overwhelming majority of Berkeley encounters as Alameda County encounters, thus leaving Berkeley with few observations in official statistics (e.g. 104 children in 2005).

This study, which used all PM160 paper forms submitted to the Public Health Division as a data source, was undertaken to accurately estimate the prevalence of obesity and anemia in Berkeley's CHDP population using methods comparable to those used since 2005<sup>2</sup>, and to examine changes in the prevalence of obesity and anemia since 2005.

#### **MATERIALS AND METHODS**

#### **Data Source**

The data source was PM 160 encounter forms (See Appendix) for services rendered between July 1, 2007 and June 30, 2008 (measurement year, FY2007/8) and received by the Berkeley Public Health Division by December 31. The PM 160 reporting was thought to be complete due to the allowance of a greater than 4 month claims lag.

#### Sample

Insufficient resources did not allow over 1700 PM 160 encounter forms to be abstracted and logged for the entire measurement year. After discussion with the CHPD staff, it was determined to take a three months sample, which reflected typical seasonal volume variation (September 2007, January 2008, May 2008). These months fell within the measurement period (7/1/2007-6/30/2008) and were based on a fiscal year, similar to the two previous studies. The use of the fiscal year was chosen in order to synchronize Berkeley's performance measurements with the requirements of the State of California.<sup>3</sup>

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  $\pm$  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.<sup>1,4</sup> Height/length measurements were assumed to be recumbent at ages 24 months and younger.

#### Definition of Obesity and Anemia

Children at the 95th% or greater weight distribution were classified as obese. (CDC's PedNSS describes this same cut-off as "overweight" at the 95<sup>th</sup>%). Age-, sex-, cut-offs for low/normal hemoglobin were programmed using CDC guidelines.<sup>5</sup>

#### Data Quality

Missing data and outliers were assessed using frequency distributions. Due to missing and inaccurate information, BMI could not be calculated for 42 children. Hemoglobin and hematocrit were not recorded for most children (85%). 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 previous analyses, 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 412 unique children in the sample, 66.7% of whom were under 5 years old (Table 1). Males comprised 48.8%. Few children (<2%) had providers who used the correct jurisdiction code to identify the child as a Berkeley resident.

The prevalence of obesity was 9.9% in 0-4 year olds and 23.7% 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. However, the



prevalence of obesity in Berkeley's CHDP 0-4 year olds was significantly lower than that of their California counterparts (p = 0.01). The prevalence of underweight was 8.7%. In 0-4 year olds, Berkeley had a higher prevalence of underweight than that of Alameda County (p>.0.05) and California (p=.02) [Table 3].

The prevalence of anemia was 4% (Table 4).

# Time Trends 2005 to 2008

There was a statistically significant decline in the prevalence of obesity in Berkeley 0-4 year olds from 2005 to FY2007/8 (Table 5). The prevalence of underweight had a nonsignificant increase in both age groups from 2005 to FY2007/8. Anemia prevalence did not significantly differ by time period.

# DISCUSSION

From 2005 to 2008, there has been a significant decrease in the prevalence of obesity among Berkeley CHPD participants. This decline is apparent in both younger and older children, but the 0-4 years age group showed the largest reduction change over time. Berkeley CHDP children now have a prevalence of obesity on par with their counterparts in Alameda County and the State of California. The decreasing trend observed in Berkeley children was not observed in CHDP participants in Alameda County or California, whose prevalence was essentially unchanged between 2005 and 2007. In contrast to obesity, no significant changes were observed in the prevalence of underweight or anemia in Berkeley CHPD children.

We do not know with certainty the reason for the decreasing trend in obesity prevalence in Berkeley's CHDP children. Changes in Berkeley's population, activities of the Public Health Division's CHDP program and its partners, and other factors may contribute to the explanation.

Between 1990 and 2000, the percentage of low- and middle-income families has decreased in Berkeley, and African American families have borne a disproportionately large share of this decrease.<sup>6</sup> Likewise, there has been a small, steady decrease in the number of children in our annual 3-month samples. Although the eligibility requirements for CHDP have not changed, it is possible, albeit speculative, that the CHDP-eligible population that remains resident in Berkeley may have a lower prevalence of risk factors or higher prevalence of assets (e.g., education) that impact childhood obesity.

There is a small group of stable Berkeley pediatric and family practices that provide the bulk of care to CHDP children. Changes in access to care are not likely to explain changing obesity rates. However, in the last decade providers have begun to monitor physical development using age- and sex-specific growth charts incorporating body mass index (BMI) rather than height and weight, which tended to underdiagnose overweight and obesity in children.<sup>4</sup> Over this transition period, the Public Health Division CHDP program has routinely provided educational support for providers, often in collaboration with Medi-Cal managed care plans. An initial prevalence in 2005 that was higher than county-average may reflect an improved diagnosis in Berkeley providers. The decline may reflect increased counseling or referrals that may have indeed reduced obesity rates. It seems less likely that diagnostic sensitivity has changed because it is presumed that Berkeley providers continue to use BMI-specific growth charts. We do not have information on educational outreach to providers in non-Berkeley Alameda County that may shed light on changes in their diagnostic practices or referral patterns.



The CHDP program reviews PM160s and makes referrals to a public health nurse for uninsured children on a variety of issues, including anemia and overweight. The referral may culminate in a home visit or telephone consultation to provide or arrange nutritional counseling. However, in the FY2007/8 sample, of 17 patients who were referred, only 1 was related to obesity. Although public health nursing referrals for obesity may not have impacted obesity prevalence before 2008, they may play an important role in maintaining or accelerating post-2008 improvements.

# **Data Quality**

Berkeley physicians have continued to use the Alameda County code (01) rather than the unique Berkeley code (59) to indicate the local health jurisdiction. The use of the proper code would obviate the need for this special survey. Pre-printing downloadable forms from the State website with the Berkeley code, or key entry of (Berkeley) city of residence by the State's commercial processor of PM160s has been suggested, but ruled out as technically or economically infeasible by State agencies.

The prevalence of race/ethnicity could not be taken into account due to the large amount of missing data. Since the measurements of hemoglobin or hematocrit were missing for the majority of the children, these measurements could not be analyzed. Providers must be continually reminded of the importance of collecting complete data, so the data can be compared to County and State benchmarks.

Despite the limitations of missing data, the administrative data of the CHDP program is a valuable resource in monitoring the prevalence of childhood obesity, which is a growing public health concern.<sup>7</sup> This data has also provided the opportunity to observe whether City of Berkeley obesity programs are having an impact in the community.

# **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:

- <u>Eat Well Berkeley</u> 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.
- <u>Corner Store Market Program</u> 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.
- **<u>Be Fit Berkeley</u>** 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.



• <u>Nutrition Education and Food Access Projects</u> – 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 create safe, accessible green spaces for children to play and exercise.
- Disseminate this report to City Departments and community partners, including the BUSD and community-based organizations.

#### ACKNOWLEDGMENTS

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Item	Ν	Percent
Total	412	100
Age (Years) 0 – 4 5 – 19 Missing	275 131 6	68 32
Sex Male Female Missing	201 211 0	49 51
Ethnicity Asian African Am. Filipino Latino White Other Missing	31 51 73 18 197 41	8 14 <1 20 5 53
County Code Alameda County (01) Berkeley (59) Others (7, 38,41) Missing	378 16 8 10	94 4 2

Table 1. Description of CHDP Population, 7/1/07-6/30/08\*

\* Sample months Sept. 2007, Jan. 2008, May 2008

Note: Missing data excluded from percentages

	V					
	Ages 0-4		Age	es 5-19	Total	
	(N=	=252)	(N:	=118)	(	N=370)
Item	Ν	Percent	Ν	Percent	Ν	Percent
Berkeley Total	25	9.9	28	23.7	53	14.3
95% CI		6.5 – 14.3		16.4 – 32.4		10.9 – 18.3
Sex						
Male	14	10.9	14	24.6	28	15.1
Female	11	8.9	14	23.0	25	13.6
Alameda Co., 2007	4,270	13.2	3,812	21.8		
California, 2007	157,619	15.5 <sup>a</sup>	109,305	23.1		

**Table 2.** Prevalence of Overweight (≥95<sup>th</sup>%)<sup>†</sup>, CHDP, Berkeley, 7/1/07-6/30/08\*

† Based on BMI (> 2 years of age) and length for weight (0 < 2 years) \* Sample months Sept. 2007, Jan. 2008, May 2008;

<sup>a</sup> Significantly different than the State of California (p < 0.05);

CI, Confidence Interval



	Ages 0-4		Ages 5-19		Total		
	(N=	=252)	(N=	:118)	(N=370)		
Item	N	Percent	Ν	Percent	Ν	Percent	
Berkeley Total	22	8.7	4	3.4	26	7.0	
95% CI		5.6 – 12.9		0.9 – 8.5		4.6 – 10.1	
Sex							
Male	15	11.6	3	5.3	18	9.7	
Female	7	5.7	1	1.6	8	4.3	
Alameda Co., 2007	2,135	6.6	472	2.7			
California, 2007	54,912	5.4 <sup>a</sup>	11,356	2.4			

Table 3. Prevalence of Underweight	(< 5th Percentile), CHDP,	Berkeley, 7/1/07-6/30/08*
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\* Sample months Sept. 2007, Jan. 2008, May 2008 † Based on BMI (> 2 years of age) and length for weight (0 < 2 years) <sup>a</sup> Significantly different than the State of California (p < 0.05);

CI, Confidence Interval

Table 4. Prevalence of Anemia, CHDP, Berkeley, 7/1/07-6/30/08\*

		, ,			1		
	Ages 0-4		Ag	es 5-19	Total		
	(N=	=275)	275) (N=131)		(N=406)		
Item	Ν	Percent	N Percent		Ν	Percent	
Total	11	4.0	8	6.1	19	4.7	
95% CI		2.0 – 12.0		2.7 – 11.7		2.8 – 7.2	
Male	5	3.6	3	4.9	8	4.0	
Female	6	4.4	5	7.1	11	5.3	

\* Sample months Sept. 2007, Jan. 2008, May 2008

Table 5. Prevalence of Overweight (	≥95 <sup>th</sup> %), Underweight, and Anemia	a, CHDP, Berkeley, 2005,
FY2006/7, FY2007/8*		-

		20	05		2006	6-2007	2007-2008		
Item	Ν	%	Cl <sub>95%</sub>	Ν	%	Cl <sub>95%</sub>	Ν	%	Cl <sub>95%</sub>
Overweight									
Total	107	24.2	20.0 – 28.4	58	17.7	13.8 – 22.3	53	14.3	10.9 – 18.3
0-4	59	21.0	15.6 – 25.8	34	14.0	9.9 – 19.0	25	9.9	6.5 – 14.3
5-19	48	29.8	22.9 – 37.5	24	28.6	19.2 – 39.5	28	23.7	16.4 – 32.4
Underweight									
Total	20	4.5	2.8 – 6.9	29	9.1	6.3 – 12.8	26	7.0	4.6 – 10.1
0-4	18	6.4	3.8 – 9.9	26	10.7	7.1 – 15.3	22	8.7	5.6 – 12.9
5-19	2	1.2	0.2 - 4.4	3	4.8	1.3 – 11.7	4	3.4	0.9 – 8.5
Anemia									
Total	33	6.7	4.7 – 9.3	23	6.0	3.8 – 8.9	19	4.7	2.8 – 7.2
0-4	18	5.7	3.3 - 8.8	13	4.6	2.5 – 7.8	11	4.0	2.0 – 12.0
5-19	15	8.7	4.9 –13.9	10	9.7	4.8 –17.1	8	6.1	2.7 – 11.7

\* Sample months 2005: Apr. 2005, August 2005, Dec. 2005 Sample months 2006-7, 2007-8: Sept., Jan., May

CI, Confidence Interval





Figure 1. Prevalence of Total Overweight (≥95th%), Underweight, and Anemia, CHDP, Berkeley, 2005, FY2006/7, FY2007/8

Source: PM 160 encounter forms for services rendered between July 1, 2007 and June 30, 2008



Figure 2. Prevalence of Overweight (≥95th%) CHDP in Berkeley, Alameda County, and

Source: California Department of Health Care Services, 2006, 2007, 2008 and PM 160 encounter forms





Figure 3. Prevalence of Overweight (≥95th%) in 0-4 age group in CHPD of Berkeley, Alameda County, and California, 2005, FY2006/7, FY2007/8

Source: California Department of Health Care Services, 2006, 2007, 2008 and PM 160 encounter forms



Figure 4. Prevalence of Overweight (≥95th%) in 5-19 Age Group in CHDP of Berkeley, Alameda County, and California, 2005, FY2006/7, FY2007/8

Source: California Department of Health Care Services, 2006, 2007, 2008 and PM 160 encounter forms



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IDP EXAM 1-American Isolan 24/560 - 24/560 24/560 - 38/00/5 20/P) Code 5-Reator 5-Mite - 5-Reator 5-Mite - 7-000
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TELEPHONE NUMBER
TELEPHONE NUMBER
ENTS/PROBLEMS
PATIENT IS A FOSTER CHILD (v/ GNOSIS CODES 2
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IC 22 Referred to WIC , Wt. and Hemoglobin/Hematocrit SCREENING PROCEDURE RECHECK
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## Appendix. Example of a PM 160 Form

