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Halting Childhood Obesity in Connecticut

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University of Connecticut Graduate Program in Public Health

2005 Practicum Project Summary Report

HALTING CHILDHOOD OBESITY IN CONNECTICUT

Prepared by:
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Students of the Entering Class of 2003

Presented to the State of Connecticut on
November 16, 2005

UCONN

Preparing the Public Health Workforce for the 21st Century

The UCONN Graduate Public Health Program's Practicum Project

The Practicum Project is a supervised service-learning experience that integrates curriculum with hands-on experience in a public health setting. All 2nd year students are expected to work collaboratively in assessing the extent, causes and public health responses to a selected public health problem confronting citizens of Connecticut. The focal topic for the 2005 Project was Control of Childhood Obesity in Connecticut.

During this past spring, 25 students of our program, working alongside and in partnership with more than 130 community-based stakeholders across Connecticut, completed 2,083 hours of service-learning in pursuit of answers to 3 questions:

Can the present and future burden of childhood obesity be estimated for Connecticut?
What is the current capacity of Connecticut's health and social service system to address the crisis we confront today?
Can new policy and regulatory strategies be put forth to reduce the severity and scope of the problem?

This occasion and the accompanying report mark the completion of their project and acknowledges the considerable contributions that many have made to the success of this educational experience. Through those combined efforts, students gained experience and skill addressing one of the most significant public health issues of our time; also, they gained insight into the breadth and capacity of our public health system and established invaluable relationships with public health practitioners, agencies and institutions around the state. Their report documents a rich campus-community partnership to advance public health goals.

October 20, 2005

2005 Practicum Project Report

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HALTING CHILDHOOD OBESITY IN CONNECTICUT

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Logic Model for Analysis of Childhood Obesity

Assumptions	Resources	Activities	Outputs	I
Society has an interest in behavior and well-being of its members	Stakeholders	Review statistics & program info	Call stakeholders together for meeting	Reduce to 5% the proportion of children and adolescents who are obese or overweight
There are known social determinants of overweight & obesity among children	Secondary data	Data from LHD's	Draft summary report with recommenda-tions	
Physical inactivity and dietary excess contribute to childhood obesity	Bibliographies	Inventory programs & providers	Increase awareness of UCHC Graduate Program	
Diet & activity patterns of children are not their choice	Action Plan	Initiate observational studies	Encourage interaction by public health practitio-ners	
Overweight & obesity predis-pose persons to ill health and poor quality of life	Schools	Review legislative and policy options		
Surveillance and service data are incomplete	Communities	Support implementation of interventions		
There is lack of consistent messages & information	Education			
Sustainable change in public health response to childhood obesity levels can be achieved within 5 years	Health care			
Sustainable change in child-hood obesity levels can be achieved within 10 years	Academia			
Multifaceted solutions are required	Fitness industry			
	Food Industry			
	P.H. agencies			
	Government advocates			
	Primary data			

Can the present and future burden of childhood obesity be estimated for Connecticut?

Globesity – the problem

> ***"…if you look at any epidemic - whether it's influenza or plague from the Middle Ages - they are not as serious as the epidemic of obesity in terms of the health impact on our country and our society".***
>
> **-Julie Gerberding, Centers for Disease Control and Prevention.**

Worldwide, an epidemic is underway in which some 300 million persons face serious health, social and economic problems because of their weight. The number of overweight or obese persons is staggering – increasing by more than 50% in just five years.[7]

Obesity contributes to the onset of diabetes, cardiovascular disease, hypertension, stroke, asthma, musculoskeletal problems, kidney diseases and certain cancers. Experts are warning that obesity related illness is on track to overtake tobacco-related illness as the leading cause of death in the United States.[13] Overweight and obesity often diminishes quality of life by limiting physical activity, undermining self-esteem and magnifying the impact of other health related conditions.[7,20,124]

Our children are of particular concern. Rates of obesity and overweight among women have increased worldwide. Maternal fatness (>120% of ideal body weight) has been linked with many negative outcomes for both mother and baby. Increased weight is associated with problems conceiving, an increased risk of gestational diabetes, cesarean sections, stillbirths, large infants (macrosomic: birth weight >4000g) and impaired lactation performance, initiation and early discontinuation of breastfeeding. Investigators found that those women who were overweight or obese prior to becoming pregnant had infants that were heavier at one year of age than those women who were at a normal BMI.[152]

Worldwide, as many as 22 million kids under age five and one in ten between five to 17 years are thought to be overweight or obese.[8] In the U.S., as many as one-third of children aged six to 19, or 9 million individuals, may be so affected. Remarkably, that proportion has ***tripled*** in just 20 years.[1] Should present trends continue, two out of every five children in America could be overweight or obese by 2008.[16]

Our children may be the first in American history to live lives shorter and sicker than their parents.[2,3,16,15.20] Weight problems during childhood often continue into adult years and can dramatically affect quality of life and

health.[16,22] Overweight or obese children are considerably more likely than normal weight children to have weight problems as adults and develop lifelong health problems. Weight status is usually long-term; adolescents who are obese are 50 to 70% more likely to be so as adults.[22] Among obese adults, is estimated that 8-11% of their numbers can be attributed to the prevalence of obesity during their childhoods.[17]

Beyond physical concerns, overweight and obese children often face mental health issues of poor self-esteem, depression and social isolation. Overweight children are more likely to be the victims of bullying and social discrimination that contributes to these children reporting higher rates of loneliness, sadness and nervousness. Moreover, obese children are more likely to smoke, consume alcohol and experiment with drugs.[48,121-123,125] The American Psychological Association (APA) has done work lately to educate clinicians and parents of the effects of obesity on a child's mental health, underscoring the growing need for prevention and counseling services.

Obesity's costs

> **"Every state is on track to fail to meet obesity rate goals for children and adults…there is no aggressive, coordinated national strategy to address obesity"**
>
> **-Shelley Hearne, Trust for America's Health**

The expense of obesity to our nation is equally great. Direct and indirect health costs may already exceed $120,000,000,000.[8] In Connecticut alone, $665,000,000 in Medicare or Medicaid spending (6.5% of the state's total Medicare and 11% of its Medicaid expenditures) can be attributed to health problems caused by or related to obesity.[25] If present trends continue, strains on the national and regional health care systems are unavoidable.

Continuing to ignoring present and looming problems of overweight and obese children will exact substantial medical, economic and social costs on future generations. Until recently, overweight and obesity have been regarded as a personal issue of diet, exercise and weight management. With new insights, popular thought is changing to realize that overweight and obesity are affected by where we live and work, what we desire and expect from one another, and where and what foods are available for consumption.

Obesity is a preventable disease that, left untreated, threatens the health of our nation's youth and well-being of our nation.

The face of obesity in Connecticut

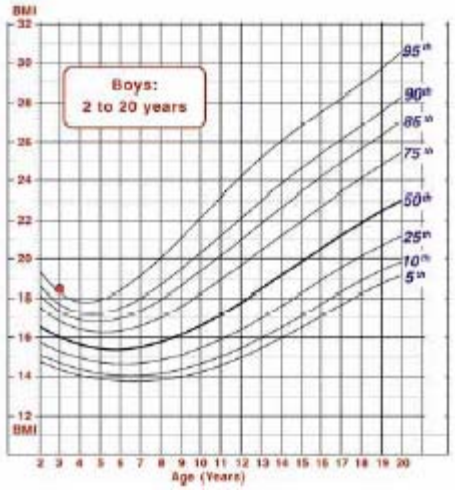
Obesity is an excess of body fat in proportion to lean body mass. The Body Mass Index (BMI) is a useful calculation for distinguishing persons who are underweight, normal weight, overweight or obese.[153]

$$\textbf{Body Mass Index} = 703 \times \frac{\textbf{Weight (in pounds)}}{\textbf{Height (in inches) x Height (in inches) inches)}}$$

BMI	Classification
Below 18.5	Underweight
18.5 – 24.9	Normal weight
25.0 – 29.9	Overweight
30.0 & above	Obese

Because boys and girls grow at different rates and all children's body fatness changes over time, the BMI for children and teens must be interpreted in relation to standards developed to describe normal child development. Those charts provide curved lines to delineate percentiles of weight compared to national norms. The BMI for children and teens is used to assess one's risk of being underweight, overweight, or at risk for overweight.

BMI for children and teens	Classification
< 5th percentile	Underweight
6th-84th percentile	Normal weight
85th–94th percentile	At risk of overweight
> 94th percentile	Overweight



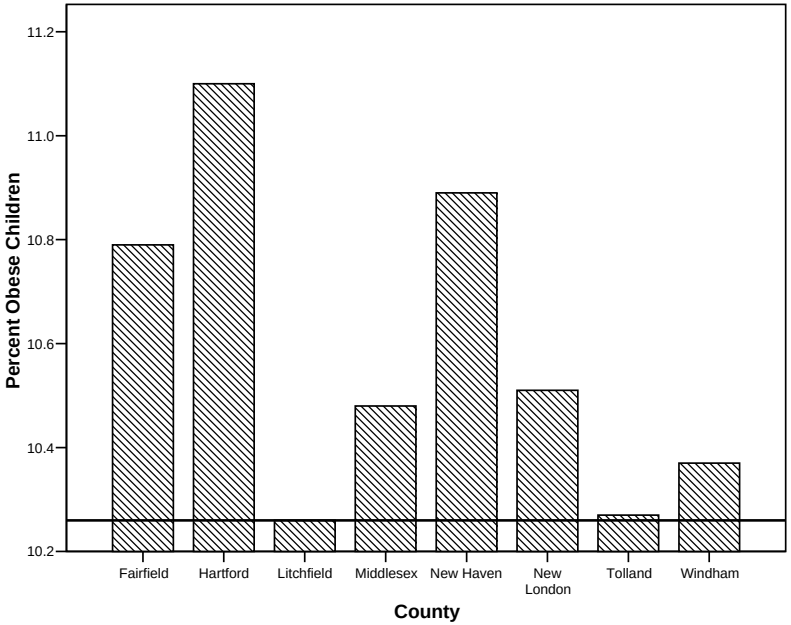
anywhere else in the nation.[22,25] It suggests that childhood obesity may be a very real, and growing, concern.

Childhood obesity is a statewide problem. One-quarter of Connecticut's children six to 17 years of age are considered to be overweight[28] and the problem may be considerably greater among poor children (those living at or below 200% of the federal poverty level).[45,154]

A report from the National Health and Nutrition Examination Survey, 1999-2000 (NHANES) found 10.1% of non-Hispanic white children to be obese, but 13.7% of Hispanic children and 18.5% of non-Hispanic black children were similarly classified.[155]

Few Connecticut communities have examined obesity in children at a local level and there is no current information specific to Connecticut's youth. However, one thing is clear, Connecticut's municipalities should commit to collecting and reporting weight related information on children in order to assess accurately the local and statewide extent of the childhood obesity problem.

Figure 1. Obese Children in Connecticut, 2000.



Estimating the number of obese children in Connecticut.

A Centers for Disease Control and Prevention (CDC) survey from 1999 indicated that 9.1% of Connecticut's high school students were overweight. A review of Hartford school records during 2000, however, suggests that a considerably larger proportion of the school-age population may be affected. According to that review, it was estimated that 13% of Kindergarteners, 24% of 6th graders and 21% of 10th grade students were overweight. The proportion of those overweight students who are obese was not determined. Based on national prevalence data, we can estimate the number of obese children in Connecticut.

There are 618,355 children in Connecticut five to 17 years of age. Available information on the prevalence of obesity allows us to estimate that 71,150, or 12% of children in this age group within Connecticut, are sufficiently overweight to be considered obese.

Figure 1 summarizes estimates for Connecticut's eight counties, accounting for differences in the age and racial/ethnic composition (which are associated with differing rates of childhood obesity) of each county. Estimated numbers of obese children for each of Connecticut's 169 municipalities are provided in Table 1. Estimates range from 10.1 - 16.5% of a community's population of children and adolescents.

If every Connecticut community was able to limit the proportion of obese children living there to 10.1% (i.e., the lowest observed rate in the state),we could reduce the number of obese children by 8,696 or 12% of the current total.

Table 1. At-risk and obese children in Connecticut towns, 2000.

Town	Children 5-17 yrs	# Obese Children	Excess Obesity[1]
Andover	597	61	1
Ansonia	3,208	372	48
Ashford	801	82	1
Avon	3,119	321	6
Barkhamsted	683	70	1
Beacon Falls	981	100	1
Berlin	3,474	354	3
Bethany	1,053	108	2

Town	Children 5-17 yrs	# Obese Children	Excess Obesity[1]
Bethel	3,671	378	7
Bethlehem	692	70	0
Bloomfield	3,186	526	204
Bolton	998	102	1
Bozrah	425	44	1
Branford	4,367	454	13
Bridgeport	28,275	4,128	1,272
Bridgewater	327	34	1
Bristol	10,161	1,087	61
Brookfield	3,265	336	7
Brooklyn	1,324	135	1
Burlington	1,708	174	2
Canaan	197	20	0
Canterbury	957	98	1
Canton	1,672	171	2
Chaplin	403	42	1
Cheshire	5,554	578	17
Chester	596	61	1
Clinton	2,438	251	5
Colchester	3,110	320	6
Colebrook	270	28	1
Columbia	974	99	1
Cornwall	281	29	0
Coventry	2,291	234	2
Cromwell	2,080	220	10
Danbury	11,328	1,303	159
Darien	4,336	442	4
Deep River	877	95	6
Derby	1,929	212	17
Durham	1,467	154	6
East Granby	915	94	2
East Haddam	1,543	160	5
East Hampton	2,154	220	2
East Hartford	8,722	1,151	270
East Haven	4,616	485	18
East Lyme	3,082	317	6
East Windsor	1,617	175	11
Eastford	330	34	0
Easton	1,522	155	2
Ellington	2,430	248	2
Enfield	7,705	801	23

Town	Children 5-17 yrs	# Obese Children	Excess Obesity[1]
Essex	1,001	102	1
Fairfield	9,508	979	19
Farmington	4,414	459	13
Franklin	344	35	1
Glastonbury	6,283	653	19
Goshen	473	48	0
Granby	2,108	215	2
Greenwich	11,250	1,181	45
Griswold	2,148	221	4
Groton	6,694	736	60
Guilford	4,151	428	8
Haddam	1,354	139	3
Hamden	8,795	1,082	193
Hampton	350	36	0
Hartford	26,452	3,994	1,323
Hartland	440	44	0
Harwinton	1,021	104	1
Hebron	1,801	184	2
Kent	473	48	0
Killingly	3,212	334	10
Killingworth	1,178	120	1
Lebanon	1,487	153	3
Ledyard	3,239	340	13
Lisbon	806	81	0
Litchfield	1,682	175	5
Lyme	304	31	0
Madison	3,849	393	4
Manchester	9,003	1,044	135
Mansfield	2,153	226	9
Marlborough	1,182	121	1
Meriden	10,823	1,288	195
Middlebury	1,235	126	1
Middlefield	801	82	1
Middletown	6,553	786	125
Milford	8,548	898	34
Monroe	4,153	428	8
Montville	3,370	354	13
Morris	436	44	0
Naugatuck	6,181	655	31
New Britain	12,535	1,604	338
New Canaan	4,498	459	4

Town	Children 5-17 yrs	# Obese Children	Excess Obesity[1]
New Hartford	1,230	125	1
New Haven	22,697	3,473	1,180
New London	4,148	556	137
New Milford	5,504	567	11
Newington	4,517	474	18
Newton	5,310	542	5
Norfolk	288	29	0
North Branford	2,656	274	5
North Canaan	611	62	1
North Haven	3,941	410	12
North Stonington	968	99	1
Norwalk	12,621	1,603	328
Norwich	6,388	715	70
Old Lyme	1,355	138	1
Old Saybrook	1,661	171	3
Orange	2,526	258	3
Oxford	2,013	205	2
Plainfield	2,986	308	6
Plainville	2,830	297	11
Plymouth	2,288	233	2
Pomfret	789	80	1
Portland	1,617	170	6
Preston	836	86	2
Prospect	1,611	166	3
Putnam	1,596	166	5
Redding	1,823	186	2
Ridgefield	5,319	543	5
Rocky Hill	2,617	275	10
Roxbury	379	39	0
Salem	880	91	2
Salisbury	747	78	2
Scotland	326	33	0
Seymour	2,785	290	8
Sharon	516	53	1
Shelton	6,625	689	20
Sherman	774	79	1
Simsbury	5,192	535	10
Somers	1,721	176	2
South Windsor	5,137	539	21
Southbury	3,248	331	3
Southington	7,071	728	14

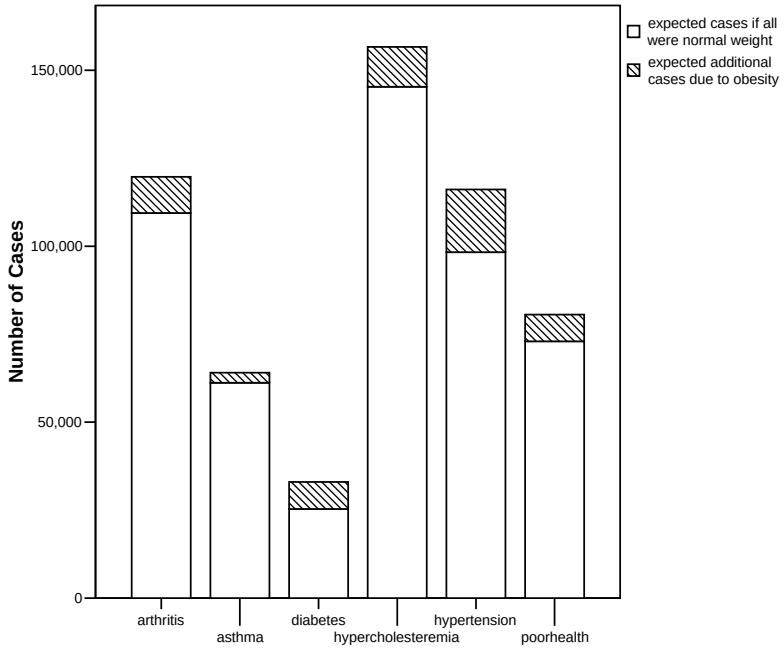
Town	Children 5-17 yrs	# Obese Children	Excess Obesity[1]
Sprague	625	64	1
Stafford	2,164	221	2
Stamford	17,788	2,259	462
Sterling	648	66	1
Stonington	2,891	295	3
Stratford	8,523	997	136
Suffield	2,279	235	5
Thomaston	1,464	149	1
Thompson	1,707	174	2
Tolland	2,733	279	3
Torrington	6,004	630	24
Trumbull	6,547	681	20
Union	101	10	0
Vernon	4,492	485	31
Voluntown	515	53	1
Wallingford	7,714	802	23
Warren	215	22	0
Washington	724	75	1
Waterbury	20,278	2,636	588
Waterford	3,247	341	13
Watertown	4,112	424	8
West Hartford	10,424	1,147	94
West Haven	8,838	1,096	203
Westbrook	1,028	106	2
Weston	2,528	258	3
Westport	5,270	543	11
Wethersfield	3,884	412	19
Willington	962	98	1
Wilton	4,173	426	4
Winchester	1,874	195	6
Windham	3,789	455	72
Windsor Locks	2,139	225	9
Windsor	5,263	700	168
Wolcott	3,000	309	6
Woodbridge	1,988	205	4
Woodbury	1,671	172	3
Woodstock	1,504	152	0

[1]Number of obese children living in a town in excess of the baseline obesity rate of 10.1%

Health consequences of childhood obesity

Childhood obesity poses both immediate and long-term challenges for children. The physical and emotional burdens they confront because they are seriously overweight are obvious, but have not been adequately measured. The impact of today's childhood obesity rate on health problems when these children grow to be Connecticut's adults, on the other hand, can be estimated as the excess number of chronic illnesses that might occur if children who were considered obese in 2000 remain so as adults and rates of obesity-related diseases persist over time. Connecticut's Commission on Children estimates that one-half of obese 6 year olds are destined to be obese adults!

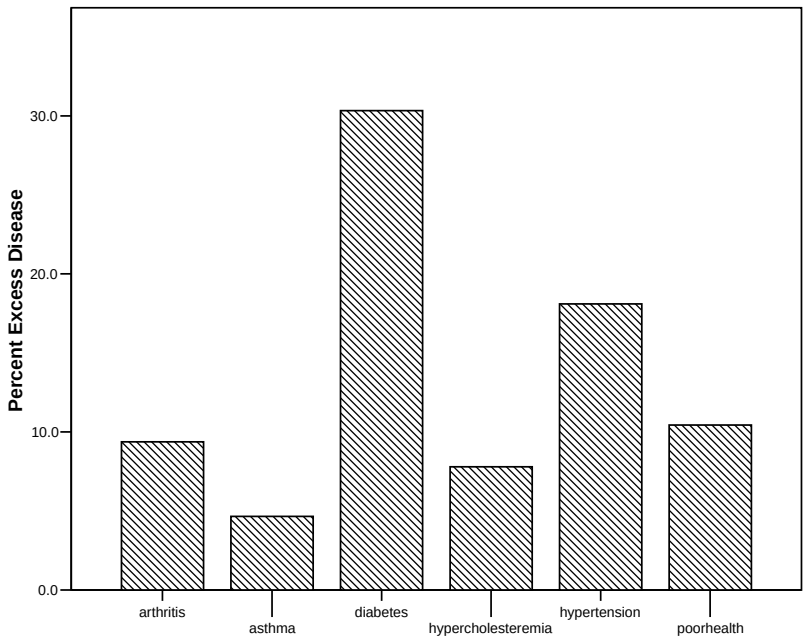
Figure 2. Estimated numbers of selected chronic illnesses expected among obese adults of Connecticut who were obese children in 2000.



Should trends in Connecticut go unchecked as children age into adulthood, we estimate that at some time in the future, Connecticut may be confronted by as many as 10,251 excess cases (i.e., cases beyond an expected baseline level) of osteoarthritis, 2,898 excess cases of asthma, 7,688 excess cases of diabetes, 11,318 excess cases of hypercholesteremia, 17,796 excess cases of hypertension and 7,616 excess cases of overall poor health.

Our estimates represent the difference between estimated prevalence of selected diseases among normal weight (BMI < 25) and obese (BMI ≥ 30) individuals. That difference between values represents excess cases attributable to obesity among Connecticut children. These cases represent significant portions of the current burden of disease within our state. For example, 10,251 'extra' osteoarthritis cases attributable to childhood obesity represent roughly 10% of all osteoarthritis cases likely to be seen in the State in the future. Our estimated numbers of childhood obesity-related cases of diabetes and hypertension would contribute nearly one-third and one-fifth of future diabetes and hypertension cases, respectively.

Figure 3. Percent excess cases of selected chronic illnesses expected among obese Connecticut adults who were obese children in 2000.



Contributing factors to obesity

Many things lead children to become overweight and obese. Only rarely is one factor the cause. Some persons may carry genetic predispositions that contribute to what and how they eat, as well as how they burn energy. Such genetic factors may also contribute to the capacity of some individuals to

effectively diet and/or maintain physical activity necessary to maintain desired body weight.[11,32] For the majority of us, however, body weight is the consequence of the interplay of several factors. While causes of childhood obesity are complex, they also suggest numerous avenues for how we might address the problem!

Maternal weight

Primary prevention of obesity should begin with women of reproductive age, *before* a woman becomes pregnant. Overweight women incur problems with conception, pregnancy and childbirth. They are more likely than normal weight women to have impaired lactation performance and to discontinue breast feeding sooner. Women who are overweight or obese prior to becoming pregnant tend to have infants that are heavier at age one than infants born to women of normal weight.[152]

Early Diet

What and how infants eat is important. Breastfeeding benefits an infant's immune system and contributes favorably to his or her psychological and physical development. The practice also reduces the risk that infants will become obese or overweight children.[5] Breastfed infants have a higher level of leptin, a hormone found in human breast milk that regulates food intake and metabolism, than infants fed formula. Formula fed infants tend to be introduced to solid foods earlier than their breast fed counterparts, leading to differences in feeding patterns in the first year of life.[152] Breastfeeding also may promote feeding styles that are less controlling and more responsive to cues for hunger and satiety which, in turn, allows infants to self regulate feedings.[156]

Lifestyle and Behavior

Children who are physically active and expend their daily consumption of calories through exercise and play will maintain or lose weight. Children whose diet exceeds a normal amount of calories per day and who do not engage in significant physical activity will experience problems with overweight and obesity.[11] Children and adolescents should participate in 60 minutes or more of moderate to vigorous physical activity every day through a variety of enjoyable and developmentally appropriate activities.[157] Schools play an undisputable role in the health of children by imparting information about how to be healthy, by providing settings where healthful activities can be undertaken, and by nurturing healthy lifestyle choices. Unfortunately, few schools (none of the 62 Connecticut schools that participated in 2004 study by the EHHI survey[164]) meet the national recommendations for physical activity. On average, elementary and middle school students receive physical activity less than one-half the time per week that is recommended. High school students receive less than one-third per week of the national recommended time for physical activity. Fewer than 1 in 10 Connecticut students attend daily physical education classes. Staff shortages, facility

limitations and competing objectives are typically cited as barriers to achieving nationally recommended physical activity levels.

Food Availability

Accessibility to grocery stores featuring affordable, nutritious foods is essential to maintaining proper diets of adults and children. The absence of a variety of fresh fruits and vegetables, lean meats, and healthy snacks and substitution of high fat, convenience foods greatly increases one's risk of being overweight or obese.[71] Access to such healthy foods is often lacking in urban settings, placing low-income and minority populations in particular peril.[72] In place of access to healthy food, fast food restaurants proliferate and are easily accessible to children. Their impact on the quality of children's diets is unmistakable.[79] One fast food meal can provide a child with nearly all of the daily calories and fat recommended by the USDA. Soda, with its extremely high sugar content, is among the foods most likely to cause weight gain in children. Each 12 oz soda consumed per day is associated with a 0.18-point increase in a child's BMI and a 60% increase in their risk of obesity.[89] As defined by Health Eating Index scores[158], a substantial percentage of children eat 'poor diets'.

School Nutrition

The National School Lunch Program (NSLP) is a federally funded program supplying nutritious meals to 28 million school aged children.[159] Unfortunately, participation by children and adolescents in the NSLP is often hampered by inadequate lunch periods at schools and the increasing availability of 'competitive foods', such as chips, soda, candy, ice cream, cookies, etc.[164] The faulty perception that the NSLP is intended for low-income students who cannot afford to buy competitive foods. Insufficient time to eat lunch encourages students to skip lunch altogether, discard portions of their meal, and/or rely upon competitive food purchases from the cafeteria or vending machines. Sale of competitive foods in schools increases the likelihood a child will over-consume foods low in nutrients but high in fat. Federal regulations restrict sale of only a small subset of competitive foods (candy, gum, and flavored ice) in school cafeterias during meal times.[169] So long as schools receive revenue from the sale of competitive foods and are dependent on such funding to support school programs and functions not covered by school budgets, there is little incentive by schools to restrict sales. An increasing number of schools are entering into "pouring rights" or contracts with soft drink companies. Such contracts have already provided schools with $200 million in revenue.[89]

Safety and Our Built Environment

Opportunities for children to be sufficiently active to burn excess calories are limited if neighborhoods or communities are thought to be unsafe. Crime, blight, traffic and other environmental hazards deter people from outdoor activities. Communities that lack secure play areas within and around

schools, playgrounds or recreation centers implicitly discourage physical activity. Persons who perceive their neighborhood to be unsafe are less likely to be physically active.[69] Pleasant neighborhoods with attractive walkways, lighting, signage, landscaping and destinations are important contributors to active outdoor recreation.[67]

Household Characteristics

Children who live in single parent households have been found to be at greater risk of being obese than those living in two parent families. Maternal employment, especially among those of lower socioeconomic status, also lends itself to an increase in childhood obesity.[57,58] Reasons may include greater strain on economic resources, less consistent dining patterns and more sedentary lifestyles. Single parents often lack the resources and time to properly supervise their children, prompting more TV viewing, less exercise and greater opportunity for making poor dietary choices.

Economic Resources

Poverty is associated with a greater likelihood a child will be overweight. While not completely understood, it is recognized that the amount of money available to a household affects the quality and amount of healthy food (fresh fruit, vegetables, lean meats) purchased and consumed. Unfortunately, unhealthy, high calorie foods loaded with sugar, fat and salt are inexpensive and readily available.[37]

Race/Ethnicity

Long before globesity entered our consciousness, African Americans and Hispanics were known to have been disproportionately affected. Researchers continue to examine these disparities and their possible associations with social economic disadvantage, culture and value orientation, and physiological pathways that contribute to overweight. Indeed, children of these backgrounds may not be protected by the benefit of higher socio-economic standing afforded other children.[34,42]

Data shortages and sources

Information on the prevalence of obesity and obesity-related conditions for Connecticut or its municipalities is hard to come by. Relevant data from the Youth Risk Behavior Surveillance (YRBS) system were collected in 1997, 1999 and 2003, but participation in that project was so low (below 60% of eligible high school students) that the usefulness of results is limited to those students who actually completed surveys rather than the target group of high school students living in Connecticut.[26,31] In 2003-2004, Connecticut was one of thirteen states that failed to report overweight levels for low income children in federally funded programs, and one of nineteen states that failed to report overweight levels of high school students.[15]

Successful strategies to limit the occurrence and consequences of childhood obesity will require valid, timely data on the characteristics of children who are at risk of being overweight and obese as well as the capacity of communities to address the problem. Action to remedy this shortcoming is needed.

National estimates of the prevalence of childhood obesity and obesity-related illnesses are available through

Youth Risk Behavior Surveillance (YRBS) System, at:
www.cdc.gov/HealthyYouth/yrbs/index.htm

National Health and Nutrition Examination Surveys (NHANES), at:
www.cdc.gov/nchs/nhanes.htm

National Center for Health Statistics (NCHS) at:
www.cdc.gov/nchs

Two published sources estimating childhood obesity include:

Hedley, AA, Ogden, CL, Johnson, CL, et al., Overweight and obesity among US children, adolescents, and adults, 1999-2002. JAMA 291:2847-50. 2004.

Ogden CL, Flegal KM, Carroll MD, Johnson CL. Prevalence and trends in overweight among US children and adolescents, 1999-2000. JAMA 288:1728-32. 2002.

Are children in my town at-risk of overweight and obesity?

Yes, children across Connecticut face risks of being overweight, obese and afflicted with obesity-related health problems. We provide you here with a brief inventory of questions and several recommended resources for you to evaluate this question and work with others in your community toward reducing the risk children presently face.

How many children might be affected?

Take the number of persons under age 19 _____ and multiply it by 0.16 (estimated prevalence of childhood obesity) to get a quick estimate of the burden in your community. _____ children

If you live in a rural community, multiple number of persons under age 19 by 0.20 _____ children

If you know the composition of your community, take the number of persons under 19 years who are…

White _____ and multiply it by .16 =_____ children

Black _____ and multiply it by .23 =_____ children

Hispanic _____ and multiply it by .31 =_____ children

Asian _____ and multiply it by .14 =_____ children

For 2000 Census data for your town, follow this link to create your own data sheet. Use "Summary File 1" data for population and race/ethnicity at: factfinder.census.gov/servlet/DatasetMainPage Servlet?_ds_name=DEC_2000_SF3_U&_program=DEC&_lang=en

How 'safe' is my physical environment?

'Walkability' of a community can be described by relating the number of miles of sidewalks (A) _____ to miles of roadways (B) _____

What is the average speed limit on roads in your town? _____

What is the rate of crimes against persons _____ and property _____?

Proportion of student population bused to school each day _____

Busing radius _____ miles

This information is available from your local highway, police and school departments. As the ratio of A ÷ B approaches 1.0, your town is more walkable. Many towns lack sufficient sidewalk mileage, making bicycling, jogging or walking to a destination difficult. As motorized vehicle speed increases, pedestrian traffic is discouraged. Higher crime rates deter pedestrian traffic and other outdoor activities by causing concerns about personal security. Fewer kids walk to school today than any time in the past. Factors such as sidewalks, distances, safety and preferences all affect the likelihood kids will exercise on their way to and from school. Explore with your schools' parent-teacher groups strategies that encourage students to walk on safe designated routes to school.

How 'appealing' is my physical environment?

This can be hard to put into measurable terms, but research shows that people like nice scenery when they are outdoors. Does your community have any 'scenic' routes for walking, jogging, etc.?

_____

_____

_____

Walking guides are helpful in reminding residents about destinations and routes that encourage physical activities. Ask your local police to recommend safe routes and encourage targeted traffic enforcement and/or foot or bicycle patrols. Speak with your local historical and economic development commissions to identify places to which walkers and joggers might go. Work with your park and recreation boards to develop activity programs for town residents. Lastly, speak with your highway department about marking routes with signage.

What are my Parks and Recreation Program options?

How would you describe the availability, cost and desirability of the following facilities in your community?

Swimming facilities _____

Playgrounds _____

Recreational fields _____

Bikeways, walkways _____

Open spaces _____

Age-appropriate recreation services_____

What additional recreation programs & services are run by other community and social service organizations (e.g., churches, YMCA, clubs, etc.)?

_____

_____

_____

_____

_____

More and less costly access to recreational programs and facilities encourages people to utilize opportunities for physical activity. Boy Scouts and other service organizations in your community often seek to engage their communities with 'lasting impacts' projects such as efforts to create, refurbish or modify public resources.

What is competing with a healthy diet for our children?

Number 'Fast food' restaurants operating in your town _____

Number 'Full service' restaurants operating in town _____

Number of children in breakfast/lunch program at school _____

Are the following a la carte alternatives available in your school cafeteria?

____ Hamburger/Cheeseburger ____ Hot dog ____ Pizza
____ Ice cream ____ Cookies ____ Candy
____ French fries ____ Gum ____Soda

Are soda and candy vending machines available?

____ during restricted hours
____ after school only
____ all day

Research indicates that the greater the imbalance of fast food to full service restaurants in a community, the greater the risk of obesity. Readily available competitive foods in schools decrease the likelihood that children will eat nutritious meals and snacks and, by substitution of these items, increase a child's risk of being overweight or obese. Work with your school administration and food service provider to determine the appropriate venue for making competitive foods available to children. Work with your school's parent teacher organization to identify other sources of revenue to fund school programs.

What is the current capacity of Connecticut's health and social service system to address the crisis we confront today?

Best practices

Evidence of successful interventions to modify lifestyle and reduce overweight and obesity rates is scarce.

- The Child and Adolescent Trial for Cardiovascular Health (CATCH) intervention was a multi-center study in 96 schools (involving 5,106 students) in California, Minnesota, Louisiana and Texas. The effectiveness of nutritional education within a classroom health curriculum, enhanced physical education and school food service modification was evaluated.[204] Follow-ups occurred three years later to see if changes were made regarding the amount of moderate-to-vigorous physical activity in physical education classes and in the fat content of school lunches; in addition, individual children were assessed for changes in improved cardiovascular fitness through a fitness test, self reported physical activity, physical weight change, triceps skin-fold, and sub-scapular skin-fold test. Results showed that there was a significant decrease in the percentage of energy intake from fat in the intervention schools' lunches compared to the controls. There was an increase in the intensity of physical activity in physical education classes of the intervention schools, which was also seen in the self-reported physical activity of the students. After adjusting for baseline values, gender, age, race and school random effect, results did show a change in triceps skin fold test, sub-scapular skin test and Body Mass Index. This intervention had no significant effect in preventing weight gain.
- The Planet Health project used an interdisciplinary approach with 1295 ethnically diverse 6th and 7th graders in 10 different schools in four Massachusetts communities to prevent childhood obesity in the school setting by focusing on decreasing television watching, decreasing consumption of high-fat foods, increasing fruit and vegetable intake and increasing moderate and vigorous physical activity.[205] The intervention's interdisciplinary approach was implemented by teachers and incorporated within the curricula of four major subject areas and physical education classes. Findings were consistent with (but not statistically significant) a decrease in hours of television watching, greater consumption of fruit and vegetables, and physiological measurements of Body Mass Index (BMI) and Triceps skinfold tests (TSI).
- The Kiel Obesity Prevention program was a school based intervention in Germany among 5-7 year olds for which students in three different elementary schools received an intervention and were followed for eight years.[206] With the collaboration of school physicians, the intervention focused on nutrition education and health promotion for all children and their parents as well as their teachers. Results at one year showed a decrease in triceps skin fold (TSI) and fat mass percentage of obese children undergoing the intervention compared to three matched 'comparison'

groups. The normal age-related increase in the mean TSI was lower in the intervention group than in the control group. Thus this study shows that behavioral change messages regarding nutrition and exercise can have an effect in preventing obesity in students when parents and teachers are involved.

- Flores tested and evaluated a different approach to physical education, *Dance for Health*, an aerobic dance program as a medium to increase physical activity, increase aerobic capacity, maintain or decrease weight, and improve attitudes toward physical activity and physical fitness. This study among African American and Hispanic adolescents aged 10-13 involved a twice weekly health education sessions and a three times a week dance-oriented curriculum.[207] Girls were found at follow-up to have a decrease in Body Mass Index and a decrease in resting heart rate. Boys did not change significantly over the follow-up period.
- A school-based intervention to reduce TV viewing using behavior modification and parental involvement among 3rd and 4th grade students was evaluated.[208] Results showed a significant decrease in reported TV viewing and video game use, compared to children in the comparison setting. Although this intervention had no nutrition or physical activity components, reducing television viewing alone resulted in changes in Body Mass Index, triceps skin fold test, waist circumference and hip to waist ratio.

Connecticut program inventory

Just as the causes of childhood obesity are many and complex, so must be our approaches to reducing its impact on the community. Around the State, there are many Stakeholders who are focused on childhood obesity prevention and control. Some are working to eliminate the hazards that cause children to be overweight; others deliver health and social services to minimize the effects of childhood obesity when it occurs. Still others serve as advocates to advance desirable social and health policies. Together, they are a formidable force in service to Connecticut's well being.

Remedying the problem of childhood obesity in Connecticut will require the expertise and effort of many. A multi-faceted approach bringing together persons from fields of nutrition, community development, health care, recreation, social services, and education is needed. There is much that is already underway and considerable opportunity to contribute to the effort. Herein, we describe some of the many programs and stakeholders that are committed to meeting this challenge. By reviewing these varied efforts, we challenge others to determine how they too may add their voice, resources and experience to reducing childhood obesity and its associated problems.

Federal Programs

The federal government funds many programs that address maternal-child health care needs. Most of these programs provide needed education and resources to both the mother and child because it is the most effective method with which to combat poor nutritional outcomes.

- WIC, the USDA Special Supplemental Nutritional Program for Women, Infants, and Children, is a federal grant program that serves low income pregnant, postpartum and breastfeeding women and their infants and children up to five years of age that are at nutritional risk. WIC is one of the nation's most successful and effective nutritional intervention programs. The program provides nutritional counseling; foods that contain nutrients that are frequently lacking in the diets of the participants (protein, calcium, iron, vitamins A and C); and referrals to health and social services. WIC provides their clients with foods that include: infant formula and cereal, vegetables and fruit, eggs, milk, cheese, peanut-butter, beans and tuna fish. Participants that are deemed to be at nutritional risk include those with medical conditions such as anemia, underweight, overweight, poor pregnancy outcomes, and pregnancy complications. WIC is very committed to encouraging women to breastfeed if possible. Between 1996-2001 58.2% of WIC mothers breastfed in the hospital and the percentage of infants being breastfed at 6 months of age increased by 61.2%. In July 1992, Congress established the WIC Farmer's Market Nutrition Program (FMNP), which provides participants with fresh locally grown fruits, herbs and vegetables. WIC also provides services to migrant workers and their children.[100]
- The University of CT collaborates with the federally funded program *Expanded Food and Nutrition Education Program* (EFNEP) to support low-income families with knowledge and skills to assist in the management and control of their food and nutritional practices. When EFNEP is combined with both WIC and the food stamp program, EFNEP can make a difference in helping families to make appropriate, nutritional food choices. EFNEP also helps clients with special needs such as pregnant women, infants and children and persons with weight-related conditions.
- The Connecticut Birth to Three Program is a state and federally funded program that serves children with developmental delays and significant disabilities. In 1998, the program realized the important role that nutrition plays in the overall health of children. Birth to Three is committed to provided information to families on feeding, nutrition and assessing cultural needs.
- The Child and Adult Care Food Program (CACFP) is a federally funded program that provides funds and meals to non-residential day care facilities (i.e. Head Start).

- The U.S. Department of Agriculture provides funding to schools that participate in the National School Lunch program and the School Breakfast program. Regardless of the meal plan options, these schools are required to meet specific nutritional requirements.
- Healthy School Nutrition Environment Initiative, funded by the USDA, is a statewide initiative that is working to assist schools in promoting healthy eating habits and encouraging physical activity.
- Head Start, in close collaboration with WIC, has been promoting the *Adventures of Captain 5-A-Day program* which emphasizes increasing fruit and vegetable intake to 5 servings a day.

State & Local Programs

CT Commission on Children

Established by the CT General Assembly in 1985, the CT Commission on Children brings parties from the private sector together with representatives from the State's legislative, judicial and executive branches to examine and promote public policies of interest to Connecticut's Children. During Spring 2005, the Commission sponsored a public forum, W*eighing in on Childhood Obesity*, bring attention across the state to the scope and severity of childhood obesity. The work of the Commission can be followed through: www.cga.ct.gov/coc/About%20the%20Commission.htm.

CT State Department of Public Health (CTDPH)

The effort to establish a statewide obesity prevention plan was spearheaded by the CTDPH which brought together an advisory panel of more than 100 clinicians, epidemiologists, health educators, program administrators and communications experts to increase general awareness of the overweight/obesity crisis within the state and to put forth recommended strategies for the prevention and management of obesity and overweight for State residents. *Connecticut's Plan for Health Promotion through Healthy Eating and Active Living* offers a framework for building a comprehensive infrastructure of surveillance and technical assistance, recommends community-level models for obesity prevention and control, and proposes mechanisms for tracking policy and programmatic change to increase physical activity and healthy eating across communities. With regard to the problems of childhood overweight/obesity, *Connecticut's Plan* emphasizes the role schools should play in changing eating and activity patterns. The four pertinent objectives of the state plan are

1. Provide healthy school nutrition environments - from cafeteria lines to concessions at sports games.
2. Develop state and local school district policies that increase physical activity opportunities and encourage healthy eating habits.
3. Communicate the positive correlation between child health, physical activity and academic performance.

4. Provide tools to help educators make changes in their own classroom/education environments.

Connecticut Association of Directors of Health (CADH)

Recognizing the important role that local public health departments play in disease prevention and health promotion, the Connecticut Association of Directors of Health, Inc. developed the *Healthy Eating Active Living Toolkit* located at www.cadh.org. This web-based resource provides resources and tools to assess existing nutrition and physical activity practices, policies and environmental factors in a community and to build partnerships to facilitate policy change at the local level. The toolkit provides a comprehensive set of resources organized in a stepwise fashion to maximize success in identifying priority areas of action, involving stakeholders, developing a plan of action, implementing change and evaluating progress. Recognizing that obesity prevention will only be recognized through the synergy and organized collection of initiatives, local health departments are uniquely qualified to provide leadership in this area and many have built community partnerships to advance public health initiatives including obesity.

Through engagement of CADH in this project, students were provided placements within local health departments where they participated in setting up and carrying out programs related to preventing childhood obesity in these communities:

Health Department	Project
Central CT Health District	Community Assessment
East Hartford Health Dept.	H.E.A.L.T.H.Y. East Hartford
Eastern Highlands Health Dist.	Matters of the Heart Partnership
LedgeLight Health District	Obesity Prevention (LIFE) Project
Manchester Health Dept.	Healthier U Manchester Initiative
Middletown Health Dept.	Needs Assessment of the Town of Middletown Related to Childhood Obesity
North Central Health District	Nutritional Education and Weight Management Program
Uncus Health District	Assessing Food Offered at Community Restaurants
Wallingford Health Dept.	Cafeteria Point of Sale Evaluation

Local Public Health

Many local health departments are working with their community partners on obesity prevention initiatives. These programs are varied ranging from community walking programs to healthy eating initiatives. The ability of local health departments to engage in these programs is limited by lack of funding and inadequate staffing. This is particularly true in communities served by a part-time health director. Some of the larger health departments,

including East Hartford, Stamford and Norwalk, have developed comprehensive programs. The majority of local health departments, however, have not yet begun efforts to address the issue.

School-Based Health Centers

School-Based Health Centers (SBHCs) are comprehensive primary care facilities located within or on the grounds of schools which utilize a number of strategies to address the issue of overweight children. SBHCs promote and enhance the physical and mental health of children and youth, particularly in the uninsured and underinsured populations, and assure their access to comprehensive and preventive healthcare. Stamford, Norwalk, Windham and East Hartford all have SBHCs conducting programs designed to promote fitness, proper nutrition and healthy living. While the components of each program differ, their overall emphasis is on behavior modification and change rather than dieting.

Connecticut Primary Care Association (CPCA)

The CPCA involves 13 community health centers across Connecticut that deliver comprehensive, accessible, family-oriented community-based health care for all who seek it, regardless of ability to pay. Community Health Centers provide a wide range of primary health care services to youth of our State and are in position to implement childhood obesity prevention interventions that address screening, promote increased physical activity and healthy nutrition, and monitor nutritional and physical health status. The CPCA mission and scope of programs is outlined at: www.ctpca.org/

Connecticut Center for Primary Care (CCPC)

A not-for-profit organization created by ProHealth Physicians in 2002, the CCPC focuses on strategies to increase knowledge sharing among providers and encourage the application of efficacious research in the medical office setting. In 2004, the CCPC launched a Statewide Childhood Obesity Initiative to sponsor provider education programs, distribute of provider reference guides for childhood obesity, develop an internet resource site for patients and providers and create a speakers bureau to be made available to Connecticut communities. The CCPC can be reached at: 860-284-5288.

Hospital-based Programs

Leading hospitals in Connecticut have implemented programs to address the increasing incidence of childhood obesity. These programs include *TEAM (**T**ry your best, **E**at well, **A**ttitude count, and **M**ove for fun)* offered by Connecticut Children's Medical Center in Hartford. Lawrence and Memorial Hospital in New London partnered with CCMC to offer the same program in its community. Yale-New Haven Hospital sponsors Bright Bodies and New Britain General Hospital provides *Fit Kids*. These multidisciplinary 10-14 week programs are designed to focus on children ages 6 to 9 or 7 to 16 who are identified as being at risk for obesity based on body mass indices. The individual sessions provide nutritional education

and group exercises with an emphasis on behavior modification. Some of the programs are covered by insurance companies, while others are largely dependent on grants. Individuals without coverage are charged out-of-pocket fees ranging from $250-$600 per participating family.

Non-Profit Agency Programs

- The YMCA, the largest non-for profit community service organization in America, is implementing a national initiative called Activate America. The goal of the campaign is to help Americans live longer, better and healthier lives by focusing on community-based solutions to combat obesity and chronic disease. As part of the national campaign, it is starting to develop programs to promote healthy living with a set curriculum on physical activity and healthy nutrition promotion. Several YMCAs in Connecticut have been selected, along with 19 other YMCAs in the United States, to pilot test the Gullick Project. The purpose of the Gullick Project is to help pioneer healthy communities by improving the health and wellness of all Americans; it will equip the nation's YMCAs to become more effective in working in collaboration with community partners to help individuals and families live healthier lives.
- As a national organization, the Girl Scouts of the US has developed programs for increased physical activity and healthy nutrition promotion. These programs were developed on the national level and are implemented at the local level. Local councils provide resources to individual troops and the troops decide the programs in which they wish to participate. Girls who participate and fulfill the requirements of certain programs are rewarded with a patch of achievement.

Public-Community Partnerships

- The Connecticut Department of Public Health (CT DPH) is committed to improving children's health care through partnerships with non profit organizations and federally qualified health centers. The focus of these collaborations is to assist families in developing strategies to acquire and sustain healthy habits and life styles. By providing nutrition education, encouraging healthy eating habits and increasing physical activity, the overall risks of obesity and its consequences will be decreased. The CT DPH has formed a partnership with Community Health Network of Connecticut, Inc. (CHNCT), a not-for-profit managed care organization, to create sustainable health promotion initiatives in underserved communities in Connecticut. The *DPH-CHNCT Choices – A Nutrition Initiative* will help educate Connecticut families about strategies to maintain good health and services available to them.

Community Coalition Efforts

- Environment and Human Health, Inc., a non-profit 501(c)(3) organization established in Connecticut since 1997, is dedicated to protecting human health from environmental harms through a coalition of physicians, policy

advocates and public health practitioners. Their 2004 study, *the State of Nutrition and Physical Activity in our Schools*[164] documented on-site findings from 62 Connecticut schools regarding time spent for lunch, dietary options, nutrition and physical education programs. The report highlights concerns and recommends strategies for a comprehensive initiative to increase physical activity and improve nutrition within schools.

- In July 2001, The Connecticut Breastfeeding Coalition was formed to support breastfeeding as the norm for infant feeding in CT. Their mission is to improve the health of CT by working collaboratively to protect, promote, and support breastfeeding regarding to the Healthy People 2010 breastfeeding objectives, CT is close to meeting the requirements of 75% initiation (CT 67.8%) and 50 % at 6 months (32.9%).

Local Parks and Recreation

With the relationship between childhood obesity and physical inactivity well documented, local parks and recreation programs have the potential to be an asset to childhood obesity prevention. Unfortunately, local departments of parks and recreation have yet to institute programs aimed at combating childhood obesity. The town of Ledyard was the only town surveyed that had a primary prevention program aimed at all teenagers called *Teens Get Fit*. The city of Middletown attempted to institute a program for self-described overweight children or children not involved in a team sport in grades 3-5. The program, however, was cancelled due to lack of interest and participation. Parks and recreation departments need to be included in collaborative efforts to reduce and prevent childhood obesity with programs designed specifically for increasing physical activity among children.

The Built Environment

Planning and zoning commissions are primarily concerned with the development of their community's natural and "built environments." The "built environment" is any environment that has been modified by humans, including homes and schools, businesses, highways, urban sprawl and air and light pollution. Planning and zoning commissions are not currently concerned with enacting regulations aimed at reducing childhood obesity. But, these entities can have a positive impact on childhood obesity by altering the built environment in their communities. In both rural and urban settings, planning and zoning commissions can design communities to include mixed land use zones, which offer residents the opportunity to walk or bike to their destination rather than drive. Planning and zoning commissions can also encourage "walkable communities" with parks and walking trails. The Town of Salem has taken the first steps toward creating a walkable community by endorsing the town's first official walking and biking loop.

Promising Clinical Research

- Dr. Marlene Schwartz, Co-Director of the Yale Center for Eating and Weight Disorders, is actively involved in clinical research that highlights the difficulty of bringing about major dietary change through public education alone. In combination with efficacious interventions, her research calls for increased regulation or policy changes to improve environments where dietary changes is called for.
- The medical literature has established connections between leptin and obesity in children. Leptin is a hormone that is secreted from adipocytes and functions to suppress appetite and increase energy expenditure. Leptin is an attractive candidate for the *treatment* of obesity as it is an endogenous protein and has been demonstrated to have potent effects on bodyweight and adiposity in rodents. Relative leptin concentrations may be "programmed" by early diet – one mechanism that may link early nutrition with later obesity. Researchers have found that infants who are fed in excess or are formula fed (rather than breastfed) have higher leptin levels at follow-up (around age 16). Children who lose weight and have lower levels of leptin after weight reduction are at higher risk of relapse after the weight loss. These children may be easily identified by measuring leptin levels before and after the weight reduction program and should receive careful follow-up due to their high risk of relapse. ("Leptin serum levels are involved in the relapse after weight excess reduction in obese children and adolescents."). Leptin has been successfully used in the treatment of leptin-deficient obese patients but trials in hyperleptinemic obese patients have yielded variable results.[209-215]

As a complement to this report, students prepared *Childhood Weight Management, A Resource Guide*, with contact information on more than 20 Connecticut-based programs and services for children at risk of overweight or obesity.

Can new policy and regulatory strategies be put forth to reduce the severity and scope of the problem?

Legislative efforts

Proponents of state legislation to control childhood obesity include child advocacy groups, disease-related special interest groups (e.g., Juvenile Diabetes Society), and provider organizations. These organizations believe that schools are a good venue for influencing children and changing their behavior. Opponents of state legislation to control childhood obesity include the soda industry, the State Department of Education and the Connecticut Association of Boards of Education. These groups believe that local school boards are a more appropriate entity to address childhood obesity and that unfunded state mandates will adversely affect the educational process.

According to a March 2004 Government Accounting Office (GAO) report, 17 states, including Connecticut, have adopted restrictions on the availability of competitive food in schools. Connecticut restrictions provide that: (a) no school can sell extra food items of minimal nutritional value (soda & candy) anywhere on school grounds for both 30 minutes prior to and after a federally mandated food program; (b) each local board of education must make nutritious, low-fat foods and drinks available for purchase at schools. Beverages should include low-fat milk, 100% fruit juice, and water when drinks are available for purchase; and (c) low-fat dairy products and fresh or dried fruits should be made available for purchase at all times when food is available for purchase. Despite these protections, competitive foods are readily and frequently available to students in school.

In Connecticut

- *An Act Concerning Childhood Nutrition in Schools, Recess and Lunch Breaks* (PA 04-224) passed during the last term in the General Assembly, required local and regional school boards to provide nutritious food and drink options to students whenever students have the opportunity to purchase drinks or food in school during school hours. In addition, school boards were directed to establish a minimum 20-minute period for lunch for all full school days and weeks, and also include a daily period of physical exercise for all full time students in grades kindergarten through five. Originally, the bill passed by the House contained a provision that would have required that students be provided with 20 minutes a day or 100 minutes a week of physical activity. That provision was eliminated by the Senate.
- *An Act Concerning School Nutrition* (PA 05-117) represented a revisitation of the issue by the General Assembly during the 2005 session. The bill required a daily 20-minute minimum period of recess for students in full-day kindergarten through fifth grade. The legislation also limited the availability of certain drinks available to students in school to water, dairy and non-dairy milk, 100% fruit juice, 100% vegetable juice or a combina-

tion of the two, and beverages that contain only water and fruit juice with no added natural or artificial sweeteners. The act also required the State Department of Education (SDE) to develop and publish a list of recommended foods other than those that are served as part of the National School Lunch and Breakfast program that may be offered for sale to students at schools. Governor M. Jodi Rell vetoed the bill, which had been passed by the Legislature, claiming the legislation put an undue burden on local cities and towns and took too much discretion away from parents.

Outside of Connecticut

- Initiatives addressing the childhood obesity problem have been considered in numerous states throughout America and in Congress. Last year, Congress considered legislation that would have combated childhood obesity by increasing physical activity rates of school-aged children and to help them make better nutritional choices through the promotion of community based and school programs.[189]
- Over the past two years, states have considered a variety of legislation dealing with numerous different facets of the childhood obesity problem. In 2004, 14 states passed legislation addressing childhood obesity either with measures designed to increase physical activity or with initiatives aimed at improving nutrition in schools.[190] In 2005, 38 states considered legislation related to childhood obesity. Of these states, 15 enacted legislation. Legislation considered in the last year dealt with topics including nutrition standards for schools, nutrition education, body mass indexing, physical activity, recess or physical education and nutrition information on school menus.[191]

Non-legislative efforts

Listed below are three states that are taking non-legislative approaches to addressing the issue of childhood obesity.

- In Florida, six schools are participating in a study seeking to determine if school cafeterias are capable of serving more nutritious food, whether kids will eat it, and whether their health will improve. The study is conducted by a research center sponsored by the author of "The South Beach Diet"; although the 3,000 students are following the guiding principles, these have not been put on the diet.
- A commission in Maine recommended that the state develop an action plan to begin BMI testing for school-aged children and coordinate school based programs. The commission also suggested an advertising tax to be assessed on items that have low nutritional value and are marketed to children under 13 years of age. A tax on soft drinks to finance the action plan was also recommended.

- Wisconsin is considering a BMI testing program similar to those launched in other states. Due to concern about unintended consequences, such as pushing some vulnerable children toward eating disorders, experts agree that BMI testing should be accompanied by substantial education about healthy eating habits and active lifestyles.[192]

Recommendations

First and foremost, it is critical that the public, as well as health professionals and agencies that work with people, understand that obesity is a public health problem. The problem is a culmination of countless internal and external factors. If we are to slow the tide of obesity, we must approach the problem simultaneously from many angles. We must look at how education, health disparities, low socioeconomic status, environmental factors and many other issues play a role in obesity. We must also invest in research in the area of prevention and treatment interventions as well as investigate methods that evaluate whether screening and intervention programs are working, with what impact and at what costs.

Forming partnerships with those organizations that have a vested interest in keeping our children healthy and happy will only increase resources and decrease redundancy. The ability to share knowledge and expertise, as well as funding and infrastructure will only benefit children and their families.

Our principal recommendation is that implementation of the Connecticut Obesity Prevention Plan be implemented fully and without impediment.

Related to this, we note that relatively less attention in the plan has focused on the issue of childhood obesity. The full extent and implications of the problem must be recognized if we are to alter the current course. Therefore,

We further recommend that the Obesity Prevention Plan be revisited to include a comprehensive analysis and strategy focused specifically on childhood obesity's burden, and options for its control.

As an "authoritative" institution in children's lives, schools must set examples by ensuring that nutritional, healthful meals which include fruits and vegetables, reasonable portion sizes, and variety are provided on a daily basis. When schools adopt healthy nutritional policies that are consistent with dietary guidelines, we are demonstrating to our children that we care about their health and well-being. Vending machines should contain nutritional foods that encourage healthy choices by students. We must be consistent in our approach in keeping children healthy.

Ensuring that schools provide daily, quality physical education to all school children in all grades will not only lead to a decrease in weight but also a sense of well being and higher self esteem. Exercise becomes a daily routine for children who are exposed to the benefits of moving their bodies either through play, organized sports or other creative outlets. The recommendation is to aim for 60 minutes of moderate physical exercise on most days of the week. Families who exercise together reinforce the importance of physical activity.

Of course, a program of any kind cannot exist without appropriate funding. We need only look to the example of the cigarette tax for revenue. Potential resources for funding obesity treatment and prevention programs can come from taxation on snack foods and soda, surcharges on fast food purchases and monies from bottle deposits. Existing revenue via governmental grants (i.e. CDC) can provide monies for screening and prevention programs. Insurance companies are reevaluating their long -standing policies on obesity and now distinguish the illness as a legitimate diagnosis. Many insurance companies now provide preventive care as well as treatment.

Recommendations regarding Schools

- ***Improve the nutrition, freshness, quality and appeal of food served and sold in schools.***
- ***Restrict unhealthy competitive foods. Impose nutrition standards on all food and beverages sold or served at school. Elementary schools should eliminate sale of all foods sold outside the school meal program during the school day and should not have vending machines accessible by students.***
- ***Offer more healthy food items such as fruits, vegetables, low fat dairy foods and low fat grain products.***
- ***Restrict advertising and vending contracts.***
- ***Increase participation in school nutrition programs and ensure that no student goes hungry.***
- ***Better integrate food service with school educational, health, and environmental issues.***
- ***Monitor and enforce food policies.***
- ***Expand the physical education curriculum and require certified physical education instructors. All students should have at least one opportunity for supervised physical activity every day and weekly time with a qualified instructor as follows:***
    - ***A minimum of 150 minutes/week for grades K – 6***
    - ***A minimum of 225 minutes/week for middle and secondary school students.***

Recommendations regarding health status surveillance

Complete, timely data are essential for assessing the burden of childhood obesity in the State and evaluating efforts to remedy the problem.

- ***Schools in Connecticut should participate fully in the Youth Risk Behavior Surveillance System as an important step toward assessing the prevalence of and solutions to childhood obesity in our state.***
- ***BMI data for students by schools and/or medical care providers should be routinely collected and analyzed for the overall assessment and evaluation of obesity-related programs and services.***
- ***The State should periodically report on the status of childhood obesity-related concerns including physical, social and emotional issues facing children.***
- ***Allocation of financial and other supports for obesity-related programs and services should be evidence-based to maximize the effectiveness of resources.***

Recommendations regarding health and social service programs

Currently, a myriad of obesity-related programs and services operate in the State. The effect of that effort could be maximized and the benefit to target populations improved through greater coordination and heightened visibility.

- ***A state-wide task force, with representation from all areas of the state, should be established to coordinate activities underway, in development or under consideration to stem childhood obesity in Connecticut. Such a body could be assisted by the Connecticut Association of Directors of Health (CADH) to address and measure results of programs for childhood obesity.***

Recommendations regarding health policy

Government organizations, non-profits, professional entities, advocacy groups, and the general public provide a wealth of information, knowledge, and opinion on the growing crisis of childhood obesity in our country. Each organization has its own beliefs and recommendations to halt the progression of this public health problem. Although many groups may confront the issue of obesity through their unique organizational perspectives, several points of common attention are recommended.

- ***Multi-faceted approaches that use education to address the issue as an economic, social, medical and public health problem should be emphasized.***
- ***Broad partnerships (between government, private industry, communities, schools and physicians) should be encouraged.***
- ***Mandatory nutrition standards for schools and foods sold in cafeterias and vending machines should be implemented.***

- ***Mandatory minimum time for daily sustained physical activity in schools should be set.***
- ***Dedicated revenue sources for programs used to combat and prevent childhood obesity should be identified.***

Funding Sources for Childhood Obesity Initiatives

Programs and initiatives designed to combat childhood obesity would provide long-term benefits and cost savings. These prevention efforts, however, can prove to be costly, and deter policy makers from enacting meaningful change. Numerous proposals concerning taxing food items to combat the obesity problem exist. For example, some have suggested raising the price of snack foods, soda and other "junk" foods, using the money raised to lower or subsidize the costs of fruits and vegetables, and to fund obesity information and prevention programs. Other proposals include taxing food items that raise serum cholesterol levels, such as high saturated fat foods, and exempting those foods that have a neutral effect on cholesterol. In this scenario, whole milk would be taxed, but skim milk would not, providing an incentive for consumers to change their diets and for manufacturers to reformulate the ingredients of their food. Additionally, some economists suggest levying a one percent tax on entire classes of food, such as snack food, candy and soda, rather than taxing each food based upon its nutritional content.

Another proposal includes instituting a $.01 transaction tax on all purchases at "fast food" restaurants. Patrons would be assessed a surcharge, in addition to the sales tax on food items, on the total purchase of all food items which would then be earmarked for a special fund devoted to financing childhood obesity related programs.

Another potential revenue source could come from using the money from unreturned bottle deposits, known as escheats. Each year, approximately $16.4 million dollars goes unutilized by the State of Connecticut because it does not require distributors to refund the state for unclaimed bottle deposits. Legislation would be required to change existing law to require distributors to refund the unclaimed money to the state.

References

The following material was used in completion of this project and preparation of this report. It represents a sample of available sources, organized by theme, on the subject.

The Obesity Epidemic

1. Hedley AA, Ogden CL, Johnson CL, et al., Prevalence of overweight and obesity among US children, adolescents, and adults, 1999-2002. JAMA 2004;291(23):2847-50.
2. Mokdad AH, Marks JS, Stroup DF, Gerberding JL. Correction: actual causes of death in the United States, 2000. JAMA 2005; 293(3):293-4.
3. Allison D, Fontaine K, Manson J, et al.,. Annual deaths attributable to obesity in the United States. JAMA 1999;282: 1530-8.
4. International Obestity TaskForce Press Statement. 2003. (Accessed 4/2/2005, at: www.iotf.org/media/iotfaug25.htm.)
5. Trends and Challenges relating to the rising incidence of obesity. 2003. (Accessed 4/2/2005, at: www.katelundy.com.au/obesity.htm.)
6. Obesity. 2004. (Accessed 4/2/2005, at: www.betterhealthchannel.com.au/bhcv2/bhcarticles.nsf/pages/Obesity?OpenDocument.)
7. Nutrition- controlling the global obesity epidemic. 2005. (Accessed 4/2/2005, at www.who.int/nut/obs.htm.)
8. Fight childhood obesity to help prevent diabetes, say WHO & IDF. 2004. (Accessed 4/2/2005, at: www.who.int/mediacentre/news/releases/2004/ pr81/en/print.html.)
9. Childhood Obesity: Prevalence and Identification. 2005. (Accessed 4/1/1005, at: www.obesity.org/subs/childhood/prevalence.shtml.)
10. Overweight and Obesity: Defining Overweight and Obesity. 2005. (Accessed 4/2/2005, at: www.cdc.gov/nccdphp/dnpa/obesity/ defining.htm.)
11. Obesity and genetics. (Accessed 4/2/2005, at: www.cdc.gov/genomics/info/perspectives/files/obesedit.htm.)
12. BMI - Body Mass Index: BMI for Children and Teens. 2005. (Accessed 4/2/2005, at: www.cdc.gov/nccdphp/dnpa/bmi/bmi-for-age.htm.)
13. Public health priorities web site. 2005. (Accessed 4/2/2005, at: www.surgeongeneral.gov/publichealthpriorities.html.)
14. Hill JO, Trowbridge FL. Childhood obesity: future directions and research priorities. Pediatrics 1998;101(3 Pt 2):570-4.
15. F as in Fat: How Obesity Policies are Failing in America. Trust for America's Health, 2004. (Accessed 4/2/2005, at: healthyamericans.org/reports/obesity/ObesityReport.pdf.)
16. Mokdad AH, Marks JS, Stroup DF, Gerberding JL. Actual causes of death in the United States. JAMA 2000;291(10):1238-45.

17. Serdula MK, Ivery D, Coates RJ, et al., Do obese children become obese adults? A review of the literature. Prev Med 1993;22(2):167-77.
18. Obesity rate could reach nearly 40% in five years. USAToday.com, 2003. (Accessed 4/2/2005, at: www.usatoday.com/news/health/2003-02-06-obesity-usat_x.htm.)
19. The Power of Prevention. Reducing the Health and Economic Burden of Chronic Disease. Department of Health and Human Services, Centers for Disease Control and Prevention, 2003. (Accessed 4/2/2005, at: www.cdc.gov/nccdphp/power_prevention/pdf/power_of_prevention.pdf.)
20. Statement of Richard H. Carmona, MD, MPH, FACS: "The Growing Epidemic of Childhood Obesity". 2004. (Accessed 4/2/2005, at: www.surgeongeneral.gov/news/testimony/childobesity03022004.htm.)
21. Testimony of Howell Wechsler, EdD, MPH: "HHS Efforts to Combat the Obesity Epidemic Among Children and Adolescents." 2004. (Accessed 4/2/2005, at: www.hhs.gov/asl/testify/t040616.html.)
22. Looking Toward 2000- State Health Assessment. (Accessed 4/2/2005, at: www.dph.state.ct.us/oppe/sha99/emerging%20issues.htm.)

Childhood Obesity in Connecticut Reference 15, and…

22. Looking Toward 2000- State Health Assessment. (Accessed www.dph.state.ct.us/oppe/sha99/emerging%20issues.htm.)
23. Behavioral Risk Factor Surveillance System - Prevalence Data - Demographics 2003: Weight Classifications Based on BMI. US Department of Health and Human Services, Centers for Disease Control and Prevention, 2005. (Accessed 4/9/2005, at: apps.nccd.cdc.gov/brfss/list.asp?cat=DE&yr=2003&qkey=4409&state=CT.)
24. Behavioral Risk Factor Surveillance System - Prevalence Data - Connecticut 2003 vs. 2000 Demographics Weight Classifications based on BMI. US Department of Health and Human Services, Centers for Disease Control and Prevention, 2005. (Accessed 4/9/2005, at apps.nccd.cdc.gov/brfss/display_c.asp?yr_c=2000&yr=2003&cat=DE&state=CT&bkey=20030926&qkey=4409&qtype=C&grp=0&SUBMIT2=Compare.)
25. ChimeData Factsheet: Obesity. 2005. (Accessed 4/9/2005, at www.chime.org/ChimeData/documents/Obesity-FactSheet.pdf.)
26. The Burden of Chronic Diseases and their Risk Factors: National and State Perspectives 2002 Section IV Appendix: Technical Notes. US Department of Health and Human Services, Centers for Disease Control and Prevention, 2004. (Accessed 4/9/2005, at www.cdc.gov/nccdphp/burdenbook2002/06_technical.htm.)
27. Massachusetts 2003 Youth Risk Behavior Survey (YRBS) Results. US Department of Health and Human Services, Centers for Disease Control and Prevention, 2003. (Accessed 4/9/2005, at: www.cdc.gov/healthyyouth/ yrbs/pdfs/statefacts/massachusetts.pdf.)

28. Grunbaum JA, Kann L, Kinchen S, et al. Youth risk behavior surveillance--United States, 2003. MMWR Surveillance Summary 2004;53(2):1-96.
29. Promoting Healthy Children and Families in Connecticut: Part #1 Health Problems of Infancy and Early Childhood. The Child Health and Development Institute of Connecticut, Inc., 2003. (Accessed 4/10/2005, at: www.chdi.org/files/Impact_low_0203.pdf.)
30. The Seventh Annual Maternal and Child Health Epidemiology Conference: Incidence of Obesity Among Hartford School Children. Centers for Disease Control and Prevention, 2001. (Accessed 4/10/2005 at: 128.248.232.90/archives/mchb/mchepi2001/slides/burke/frame.htm.)
31. Connecticut School Health Survey. 2003. (Accessed 4/26/2005 at: www.dph.state.ct.us/BCH/HISR/cshs.htm.)

The Science of Obesity References 1, 9, 10, 11, 12, 19 and

32. Physical Activity. 2004. (Accessed 4/24/2005 at: www.nlm.nih.gov/medlineplus/ency/article/001941.htm.)

Socioeconomic Status and Obesity Reference 29 and

33. Promoting Healthy Children and Families in Connecticut: Part #1 Health Problems of Infancy and Early Childhood. The Child Health and Development Institute of Connecticut, Inc., 2003. (Accessed 4/10/2005 at: www.chdi.org/files/Impact_low_0203.pdf.)
34. Goodman E. The role of socioeconomic status gradients in explaining differences in US adolescents' health. Am J Public Health 1999;89(10):1522-8.
35. Crawford PB, Story M, Wang MC, et al., Ethnic issues in the epidemiology of childhood obesity. Pediatr Clin North Am 2001;48(4):855-78.
36. Moore DB, Howell PB, Treiber FA. Changes in overweight in youth over a period of 7 years: impact of ethnicity, gender and socioeconomic status. Ethn Dis 2002;12(1):S1-83-6.
37. Danielzik S, Czerwinski-Mast M, Langnase K, et al., Parental overweight, socioeconomic status and high birth weight are the major determinants of overweight and obesity in 5-7 y-old children: baseline data of the Kiel Obesity Prevention Study (KOPS). Int J Obes Relat Metab Disord 2004;28(11):1494-502.
38. Drewnowski A, Specter SE. Poverty and obesity: the role of energy density and energy costs. Am J Clin Nutr 2004;79(1):6-16.
39. Whitaker RC. Predicting preschooler obesity at birth: the role of maternal obesity in early pregnancy. Pediatrics 2004;114(1):E29-36.
40. Jain A, Sherman SN, Chamberlin LA, et al., Why don't low-income mothers worry about their preschoolers being overweight? Pediatrics 2001;107(5):1138-46.
41. Child Poverty Council. Child Poverty Council, 2004. (Accessed 4/10/2005 at: www.opm.state.ct.us/pdpd1/cpc/childpovertycouncil.htm.)

42. Sampson AE, Osuch D, Bongard E. An Odyssey of Connecticut's Children: 2001 Kids Count Data Book. Hartford: Connecticut Association for Human Services; 2001.

Race/Ethnicity and Obesity Reference 35, 42 and

43. Gordon-Larsen P, Adair LS, Popkin BM. The relationship of ethnicity, socioeconomic factors, and overweight in US adolescents. Obes Res 2003;11(1):121-9.
44. Haas JS, Lee LB, Kaplan CP, et al., The association of race, socioeconomic status, and health insurance status with the prevalence of overweight among children and adolescents. Am J Public Health 2003;93(12):2105-10.
45. Thorpe LE, List DG, Marx T, et al., Childhood obesity in New York City elementary school students. Am J Public Health 2004;94(9):1496-500.
46. Lobstein T, Baur L, Uauy R. Obesity in children and young people: a crisis in public health. Obes Rev 2004;5 Suppl 1:4-104.
47. The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity: Overweight and Obesity: At a glance. US Department of Health and Human Services, 2001. (Accessed 4/2/2005, at: www.surgeongeneral.gov/topics/obesity/calltoaction/fact_glance.htm.)
48. Resource Guide for Nutrition and Physical Activity Interventions to Prevent Obesity and Other Chronic Diseases. US Department of Health and Human Services, Centers for Disease Control and Prevention, 2003. (Accessed 4/2/2005, at: www.cdc.gov/nccdphp/dnpa/pdf/ guidance_document_3_2003.pdf.)
49. Krebs NF, Jacobson MS. Prevention of pediatric overweight and obesity. Pediatrics 2003;112(2):424-30.
50. Fitzgibbon ML, Stolley MR. Environmental changes may be needed for prevention of overweight in minority children. Ped Ann 2004;33(1):45-9.
51. Winkleby MA, Cubbin C, Ahn DK, Kraemer HC. Pathways by which SES and ethnicity influence cardiovascular disease risk factors. Ann N Y Acad Sci 1999;896:191-209.
52. Nesbitt SD, Ashaye MO, Stettler N, et al. Overweight as a risk factor in children: a focus on ethnicity. Ethn Dis 2004;14(1):94-110.
53. Bridgeport Child Advocacy Coalition Report. Bridgeport Child Advocacy Coalition, 2003. (Accessed 4/2/2005, at: www.bcacct.org/pub/obesity-6.pdf.)

Single Parent Households

54. Anderson PM, Butcher KF, Levine PB. Maternal employment and overweight children. J Health Econ 2003;22(3):477-504.
55. Caroli M, Argentieri L, Cardone M, Masi A. Role of television in childhood obesity prevention. Int J Obes Relat Metab Disord 2004;28 Suppl 3:S104-8.

56. Christakis DA, Ebel BE, Rivara FP, Zimmerman FJ. Television, video, and computer game usage in children under 11 years of age. J Pediatr 2004;145(5):652-6.
57. Johnson-Down L, O'Loughlin J, Koski KG, Gray-Donald K. High prevalence of obesity in low income and multiethnic schoolchildren: a diet and physical activity assessment. J Nutr 1997;127(12):2310-5.
58. Lindquist CH, Reynolds KD, Goran MI. Sociocultural determinants of physical activity among children. Prev Med 1999;29(4):305-12.
59. Siega-Riz AM, Carson T, Popkin B. Three squares or mostly snacks--what do teens really eat? A sociodemographic study of meal patterns. J Adolesc Health 1998;22(1):29-36.

Safety and Physical Activity

60. Gomez JE, Johnson BA, Selva M, Sallis JF. Violent crime and outdoor physical activity among inner-city youth. Prev Med 2004;39(5):876-81.
61. Molnar BE, Gortmaker SL, Bull FC, Buka SL. Unsafe to play? Neighborhood disorder and lack of safety predict reduced physical activity among urban children and adolescents. Am J Health Promot 2004;18(5):378-86.
62. Burdette HL, Whitaker RC. Neighborhood playgrounds, fast food restaurants, and crime: relationships to overweight in low-income preschool children. Prev Med 2004;38(1):57-63.
63. Eyler AA, Baker E, Cromer L, King AC, et al., Physical activity and minority women:a qualitative study.Health Educ Behav 1998;25:640-52.
64. Huston SL, Evenson KR, Bors P, Gizlice Z. Neighborhood environment, access to places for activity, and leisure-time physical activity in a diverse North Carolina population. Am J Health Promot 2003;18(1):58-69.
65. Humpel N, Owen N, Leslie E. Environmental factors associated with adults' participation in physical activity: a review. Am J Prev Med 2002;22(3):188-99.
66. King AC, Castro C, Wilcox S, et al., Personal and environmental factors associated with physical inactivity among different racial-ethnic groups of U.S. middle-aged and older-aged women. Health Psychol 2000;19:354-64.
67. Saelens BE, Sallis JF, Black JB, Chen D. Neighborhood-based differences in physical activity: an environment scale evaluation. Am J Public Health 2003;93(9):1552-8.
68. Sallis JF, Johnson MF, Calfas KJ, et al., Assessing perceived physical environmental variables that may influence physical activity. Res Q Exerc Sport 1997;68(4):345-51.
69. Boslaugh SE, Luke DA, Brownson RC, et al.,. Perceptions of neighborhood environment for physical activity: is it "who you are" or "where you live"? J Urban Health 2004;81(4):671-81.

70. Centers for Disease Control and Prevention. Neighborhood safety and the prevalence of physical inactivity--selected states, 1996. MMWR Morb Mortal Wkly Rep 1999;48(7):143-6.

Food Acquisition Reference 46and

71 America's Children 2004: Table - ECON4B. 2004. (Accessed 4/2/2005, at: www.childstats.gov/ac2004/tables/econ4b.asp.)

72. Morland K, Wing S, Diez Roux A, Poole C. Neighborhood characteristics associated with the location of food stores and food service places. Am J Prev Med 2002;22(1):23-9.

73. Morland K, Wing S, Diez Roux A. The contextual effect of the local food environment on residents' diets: the atherosclerosis risk in communities study. Am J Public Health 2002;92(11):1761-7.

74. Cummins SC. The local food environment and health: some reflections from the United kingdom. Am J Public Health 2003;93(4):521; author reply -2.

75. BRFSS: Behavioral Risk Factor Surveillance System. (Accessed 4/2/2005, at: www.cdc.gov/brfss/.)

76. 5 a Day: Data and Statistics. 2005. (Accessed 4/2/2005, at: apps.nccd.cdc.gov/5ADaySurveillance/displayV.asp?group=0&yr=2002&state=CT.)

77. YRBSS: Youth Risk Behavior Surveillance System. 2003. (Accessed 4/2/2005, at: www.cdc.gov/healthyyouth/yrbs/index.htm.)

Fast Food Availability Reference 62 and

78. Block JP, Scribner RA, DeSalvo KB. Fast food, race/ethnicity, and income: a geographic analysis. Am J Prev Med 2004;27(3):211-7.

79. Maddock J. The relationship between obesity and the prevalence of fast food restaurants: state-level analysis. Am J Health Promot 2004;19(2):137-43.

80. Eating at Fast-food Restaurants More than Twice Per Week is Associated with More Weight Gain and Insulin Resistance in Otherwise Healthy Young Adults. 2004. (Accessed 4/2/2005, at: www.nih.gov/news/pr/dec2004/nhlbi-30.htm.)

81. French SA, Story M, Neumark-Sztainer D, et al., Fast food restaurant use among adolescents: associations with nutrient intake, food choices and behavioral and psychosocial variables. Int J Obes Relat Metab Disord 2001;25(12):1823-33.

82. Bowman SA, Gortmaker SL, Ebbeling CB, et al., Effects of fast-food consumption on energy intake and diet quality among children in a national household survey. Pediatric 2004;113(1 Pt 1):112-8.

83. Brownell KD. Fast food and obesity in children. Pediatrics 2004;113(1 Pt 1):132.

Carbonated beverages (Soda) and Obesity

84. About the Council. (Accessed 4/2/2005, at: www.corpschoolpartners.org/about.shtml.)

85. Beverage Digest: The Factbook. 2005. (Accessed 4/2/2005, at: www.beverage-digest.com/factbook/factbook.html.)

86. 2003 Interactive Annual Report. 2003. (Accessed 4/2/2005, at: ccbn.mobular.net/ccbn/7/470/519/.)

87. Soft Drinks - America's Other Drinking Problem. 2000. (Accessed 4/2/2005, at: www.kauhawaii.com/softdrinks.html.)

88. The Amazing Statistics and Dangers of Soda Pop. 2001. (Accessed 4/2/2005, at: www.mercola.com/2001/mar/10/soda_pop_dangers.htm.)

89. Grimm GC, Harnack L, Story M. Factors associated with soft drink consumption in school-aged children. J Am Diet Assoc 2004;104: 1244-9.

90. American Academy of Pediatrics Committee on School Health. Soft drinks in schools. Pediatrics 2004;113(1 Pt 1):152-4.

Food Security

91. Adams EJ, Grummer-Strawn L, Chavez G. Food insecurity is associated with increased risk of obesity in California women. J Nutr 2003;133(4):1070-4.

92. Alaimo K, Olson CM, Frongillo EA, Jr. Low family income and food insufficiency in relation to overweight in US children: is there a paradox? Arch Pediatr Adolesc Med 2001;155(10):1161-7.

93. Core indicators of nutritional state for difficult-to-sample populations. J Nutr 1990;120 Suppl 11:1559-600.

94. Casey PH, Szeto K, Lensing S, et al. Children in food-insufficient, low-income families: prevalence, health, and nutrition status. Arch Pediatr Adolesc Med 2001;155(4):508-14.

95. Dietz WH. Does hunger cause obesity? Pediatrics 1995;95(5):766-7.

96. Drewnowski A. Obesity and the food environment: dietary energy density and diet costs. Am J Prev Med 2004;27(3 Suppl):154-62.

97. Household Food Security in the United States, 2003. USDA Economic Research Service, 2004. (Accessed 4/2/2005, at: www.ers.usda.gov/ publications/fanrr42/fanrr42.pdf.)

98. Making Room at the Table: Ending Hunger in Connecticut. 2003. (Accessed at www.endhungerct.org/Resources/End%20HungerRpt7Rev.pdf.)

99. Townsend MS, Peerson J, Love B, Achterberg C, Murphy SP. Food insecurity is positively related to overweight in women. J Nutr 2001;131(6):1738-45.

100. Obesity, Poverty, and Participation in Food Assistance Programs FSP-04-PO. 2004. (Accessed 2005, at www.fns.usda.gov/oane/MENU/Published/NutritionEducation/Files/ObesityPoverty.pdf.)

101. Nutritional Consequences of Food Insecurity in a Rural New York State County. Institute for Research on Poverty, University of Wisconsin, 1997. (Accessed 2005, at www.irp.wisc.edu/publications/dps/pdfs/dp112097.pdf.)
102. Exploring the Links Between Food Insecurity and Obesity. 2005. (Accessed 2005, at courses.washington.edu/nutr531/final%20paper%20FI.doc.)
103. Kaiser LL, Townsend MS, Melgar-Quinonez HR, Fujii ML, Crawford PB. Choice of instrument influences relations between food insecurity and obesity in Latino women. Am J Clin Nutr 2004;80(5):1372-8.

Medical Burden

104. von Kries R, Koletzko B, Sauerwald T, et al. Breast feeding and obesity: cross sectional study. Bmj 1999;319(7203):147-50.
105. Gidding SS, Bao W, Srinivasan SR, Berenson GS. Effects of secular trends in obesity on coronary risk factors in children: the Bogalusa Heart Study. J Pediatr 1995;127(6):868-74.
106. Pinhas-Hamiel O, Dolan LM, Daniels SR, et al., Increased incidence of non-insulin-dependent diabetes mellitus among adolescents. J Pediatr 1996;128(5 Pt 1):608-15.
107. Clarke WR, Woolson RF, Lauer RM. Changes in ponderosity and blood pressure in childhood: the Muscatine Study. Am J Epidemiol 1986;124(2):195-206.
108. Healthy People 2010: DATA2010. 2005. (Accessed 4/23/2005, at: www.healthypeople.gov/Data/data2010.htm.)
109. Lusky A, Barell V, Lubin F, et al. Relationship between morbidity and extreme values of body mass index in adolescents. Int J Epidemiol 1996;25(4):829-34.
110. Sinha R, Fisch G, Teague B, et al. Prevalence of impaired glucose tolerance among children and adolescents with marked obesity. N Engl J Med 2002;346(11):802-10.
111. Rashid M, Roberts EA. Nonalcoholic steatohepatitis in children. J Pediatr Gastroenterol Nutr 2000;30(1):48-53.
112. Freedman DS, Dietz WH, Srinivasan SR, Berenson GS. The relation of overweight to cardiovascular risk factors among children and adolescents: the Bogalusa Heart Study. Pediatrics 1999;103(6 Pt 1):1175-82.
113. Rodriguez MA, Winkleby MA, Ahn D, et al. Identification of population subgroups of children and adolescents with high asthma prevalence: findings from the Third National Health and Nutrition Examination Survey. Arch Pediatr Adolesc Med 2002;156(3):269-75.
114. Clinical practice guideline: diagnosis and management of childhood obstructive sleep apnea syndrome. Pediatrics 2002;109(4):704-12.
115. Dietz WH, Jr., Gross WL, Kirkpatrick JA, Jr. Blount disease (tibia vara): another skeletal disorder associated with childhood obesity. J Pediatr 1982;101(5):735-7.

116. Loder RT, Aronson DD, Greenfield ML. The epidemiology of bilateral slipped capital femoral epiphysis. A study of children in Michigan. J Bone Joint Surg Am 1993;75(8):1141-7.
117. Cook S, Weitzman M, Auinger P, et al., Prevalence of a metabolic syndrome phenotype in adolescents: findings from the third National Health and Nutrition Examination Survey, 1988-1994. Arch Pediatr Adolesc Med 2003;157(8):821-7.
118. Mahoney LT, Burns TL, Stanford W, et al. Coronary risk factors measured in childhood and young adult life are associated with coronary artery calcification in young adults: the Muscatine Study. J Am Coll Cardiol 1996;27(2):277-84.
119. McGill HC, Jr., McMahan CA, Herderick EE, et al. Obesity accelerates the progression of coronary atherosclerosis in young men. Circulation 2002;105(23):2712-8.
120. Detection, Evaluation and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III), NIH Pub. No. 02-5215. National Institutes of Health, 2002. (Accessed 4/2/2005, at: www.nhlbi.nih.gov/guidelines/cholesterol/atp3full.pdf.)
121. Pandemic of Obesity', says Director of Centers for Disease Control and Prevention in Atlanta. The University of Georgia Public Affairs News Bureau, 2004. (Accessed 5/1/2005, at www.terry.uga.edu/news/ releases/2003/gerberding.html.)

Mental Health and Obesity Reference 48 and

122. Obesity can be harmful to your child's mental health; research shows significant risks, impacts. American Psychiatric Association, 2003. (Accessed 4/3/2005, at: www.psych.org/news_room/press_releases/childrenobesity92903.pdf.)
123. Janssen I, Craig WM, Boyce WF, Pickett W. Associations between overweight and obesity with bullying behaviors in school-aged children. Pediatrics 2004;113(5):1187-94.
124. Strauss RS. Childhood obesity and self-esteem. Pediatrics 2000;105(1): e15.
125. Friedlander SL, Larkin EK, Rosen CL, et al., Decreased quality of life associated with obesity in school-aged children. Arch Pediatr Adolesc Med 2003;157(12):1206-11.
126. Hesketh K, Wake M, Waters E. Body mass index and parent-reported self-esteem in elementary school children: evidence for a causal relationship. Int J Obes Relat Metab Disord 2004.
127. Pearce MJ, Boergers J, Prinstein MJ. Adolescent obesity, overt and relational peer victimization, and romantic relationships. Obes Res 2002;10(5):386-93.
128. Strauss RS, Pollack HA. Social marginalization of overweight children. Arch Pediatr Adolesc Med 2003;157(8):746-52.

129. Schwimmer JB, Burwinkle TM, Varni JW. Health-related quality of life of severely obese children and adolescents. JAMA 2003;289(14):1813-9.
130. Williams J, Wake M, Hesketh K, et al., Health-related quality of life of overweight and obese children. JAMA 2005;293(1):70-6.
131. Mustillo S, Worthman C, Erkanli A, et al., Obesity and psychiatric disorder: developmental trajectories. Pediatrics 2003;111(4 Pt 1):851-9.
132. Conduct Disorder. 2004. (Accessed 4/3/2005, at: www.aacap.org/ publications/factsfam/conduct.htm.)
133. Erermis S, Cetin N, Tamar M, et al., Is obesity a risk factor for psychopathology among adolescents? Pediatr Int 2004;46(3):296-301.
134. Richardson LP, Davis R, Poulton R, et al. A longitudinal evaluation of adolescent depression and adult obesity. Arch Pediatr Adolesc Med 2003;157(8):739-45.
135. Erickson SJ, Robinson TN, Haydel KF, Killen JD. Are overweight children unhappy? Body mass index, depressive symptoms, and overweight concerns in elementary school children. Arch Pediatr Adolesc Med 2000;154(9):931-5.
136. Davison KK, Birch LL. Weight status, parent reaction, and self-concept in five-year-old girls. Pediatrics 2001;107(1):46-53.
137. Schnoll R, Burshteyn D, Cea-Aravena J. Nutrition in the treatment of attention-deficit hyperactivity disorder: a neglected but important aspect. Appl Psychophysiol Biofeedback 2003;28(1):63-75.
138. Goldman J, Lerman R, Contois J, Udall J, Jr. Behavioral effects of sucrose on preschool children. J Abnorm Child Psychol 1986;14(4):565-77.
139. Wolraich ML, Lindgren SD, Stumbo PJ, et al., Effects of diets high in sucrose or aspartame on the behavior and cognitive performance of children. N Engl J Med 1994;330(5):301-7.
140. Eigenmann PA, Haenggeli CA. Food colourings and preservatives--allergy and hyperactivity. Lancet 2004;364(9437):823-4.
141. Harding KL, Judah RD, Gant C. Outcome-based comparison of Ritalin versus food-supplement treated children with AD/HD. Altern Med Rev 2003;8(3):319-30.
142. Uhlig T, Merkenschlager A, Brandmaier R, Egger J. Topographic mapping of brain electrical activity in children with food-induced attention deficit hyperkinetic disorder. Eur J Pediatr 1997;156(7):557-61.

Economic Costs of Obesity References 1, 15, 25 and

143. Overweight and Obesity: Economic Consequences. US Department of Health and Human Services, Centers for Disease Control and Prevention, 2005. (Accessed 4/3/2005, at: www.cdc.gov/nccdphp/dnpa/obesity/ economic_consequences.htm.)
144. Costs of Obesity. 1999. (Accessed 4/3/2005, at: www.obesity.org/ treatment/cost.shtml.)

145. Finkelstein EA, Fiebelkorn IC, Wang G. National medical spending attributable to overweight and obesity: how much, and who's paying? Health Aff (Millwood) 2003;Suppl Web Exclusives:W3-219-26.
146. Finkelstein EA, Fiebelkorn IC, Wang G. State-level estimates of annual medical expenditures attributable to obesity. Obes Res 2004;12(1):18-24.
147. The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity 2001. US Department of Health and Human Services, Public Health Service, Office of the Surgeon General, 2001. (Accessed 4/3/2005, at: www.surgeongeneral.gov/topics/obesity/calltoaction/CalltoAction.pdf.)
148. Wolf AM, Colditz GA. Current estimates of the economic cost of obesity in the United States. Obes Res 1998;6(2):97-106.
149. Wolf AM. What is the economic case for treating obesity? Obes Res 1998;6 Suppl 1:2S-7S.
150. Obesity: Facts, Figures, Guidelines: Section One - The Economic Costs of Obesity. 2002. (Accessed 4/3/2005, at: www.wvdhhr.org/bph/oehp/ obesity/economic.htm.)
151. Obesity Work Group Meeting Summary - Februrary 26, 2004. 2004. (Accessed 4/3/2005, at: www.cga.ct.gov/ph/medicaid/mmcc/qa/ qa0204Obesity.htm.)
152. MedLearn Matters: Information for Medicare Providers: Treatment of Obesity. 2004. (Accessed 4/17/2005, at: www.cms.hhs.gov/ medlearn/matters/mmarticles/2004/MM3502.pdf.)

Early Childhood

153. Baker JL, Michaelsen KF, Rasmussen KM, Sorensen TI. Maternal prepregnant body mass index, duration of breastfeeding, and timing of complementary food introduction are associated with infant weight gain. Am J Clin Nutr 2004;80(6):1579-88.
154 Koplan JP, Liverman CT, Kraak VI. Preventing childhood obesity: Health in the balance: Executive summary. J Am Diet Assoc 2005;105(1):131-8.
155 Child Poverty Council. (Accessed 4/1/2005, at: www.opm.state.ct.us/ pdpd1/cpc/CPCpresentation.ppt#19.)
156 Ogden CL, Carroll MD, Flegal KM. Epidemiologic trends in overweight and obesity. Endocrinol Metab Clin North Am 2003;32(4):741-60, vii.
157 Taveras EM, Scanlon KS, Birch L, et al., Association of breastfeeding with maternal control of infant feeding at age 1 year. Pediatrics 2004;114(5):e577-83.
158Strong WB, Malina RM, Blimkie CJ, et al. Evidence based physical activity for school-age youth. J Pediatr 2005;146(6):732-7.
159 Diet Quality. 2005. (Accessed 4/2/2005, at: childstats.ed.gov/ americaschildren/xls/econ4b.xls.)

Nutrition & Competitive Foods in Schools References 84 86,88 90 and
160. The National School Lunch Program Background and Development. USDA Food and Nutrition Service, 2003. (Accessed 4/3/2005, at: www.fns.usda.gov/cnd/Lunch/AboutLunch/ProgramHistory_5.htm.)
161. Connecting Connecticut with Services: School Lunch and Breakfast Programs. 1999. (Accessed 4/3/2005, at: www.infoline.org/ InformationLibrary/Documents/School%20Lunch%20and%20Breakfast%20Programs.asp.)
162. National School Lunch Program. 2005. (Accessed 4/3/2005, at: www.fns.usda.gov/cnd/Lunch/default.htm.)
163. Publications & Products. 2005. (Accessed 4/3/2005, at: www.frac.org/html/publications/pubs.html.)
164. Childhood Overweight: What the research tells us. 2005. (Accessed 4/3/2005, at: www.healthinschools.org/sh/obesityfs.pdf.)
165. The State of Nutrition and Physical Activity in Our Schools. Environment and Human Health, Inc., 2004. (Accessed 4/3/2005, at: www.ehhi.org/reports/obesity/obesity_report04.pdf.)
166. Did you know.? 2005. (Accessed 4/3/2005, at: www.windsorct.org/wpsmenu/Facts/did_you_know.htm.)
167. What's Cooking in Connecticut Schools? 2004. (Accessed 4/3/2005, at: www.foodpc.state.ct.us/images/Report.pdf.)
168. Giving Away Free Sodas During Lunch Evades Congressional Ban on Selling Sodas During School Lunches. 1999. (Accessed 4/3/2005, at: www.cspinet.org/new/free_sodas.html.)
169. School Lunch Program: Efforts Needed to Improve Nutrition and Encourage Healthy Eating (GAO-03-506). 2003. (Accessed 4/3/2005, at: www.gao.gov/new.items/d03506.pdf.)
170. School Meal Programs: Competitive Foods are Available in Many Schools; Actions Taken to Restrict Them Differ by State and Locality (GAO-04-673). 2004. (Accessed 4/3/2005, at: www.gao.gov/new.items/d04673.pdf.)
171. Foods Sold in Competition with USDA School Meal Programs. 2001. (Accessed 4/3/2005, at: www.fns.usda.gov/cnd/Lunch/CompetitiveFoods/report_congress.htm.)

Physical Education in Schools and Legislative policies Reference 165 and
172. Proposed Bill No. 837 - An Act Concerning Recess in Schools. 2005. (Accessed 4/3/2005, at: www.cga.ct.gov/2005/tob/s/2005SB-00837-R00-SB.htm.)
173. Fact Sheet on the Major Provisions of the Conference Report to H.R. 1, the No Child Left Behind Act. 2005. (Accessed 4/3/2005, at: www.ed.gov/nclb/overview/intro/factsheet.html.)

Other Policy & Obesity Issues
174. State Approaches to Childhood Obesity: A Snapshot of Promising Practices and Lessons Learned. National Academy for State Health Policy, 2004. (Accessed 4/16/2005, at: www.nashp.org/Files/ Obesity_final_with_correct_appendix_C.pdf.)
175. Childhood Obesity: Pediatric-Medical Recommendations: Executive Summary. Connecticut Medicaid Managed Care Council, Quality Assurance Subcommittee, 2004. (Accessed 4/16/2005, at: www.cga.ct.gov/ph/medicaid/mmcc/qa/qa0604ObesityRec2.htm.)
176. The State of Connecticut's Youth 2003: Data Outcomes and Indicators. Connecticut Voices for Children, 2003. (Accessed 4/16/2005, at: www.ctkidslink.org/publications/well03statusyouth08.pdf.)
177. Arkansas Center for Health Improvement, BMI Initiative. Arkansas Center for Health Improvement, 2004. (Accessed 4/16/2005, at: www.achi.net/current_initiatives/obesity.asp.)
178. Arkansas City School District Report. Arkansas Center for Health Improvement, 2004. (Accessed 4/16/2005, at: www.achi.net/ current_initiatives/bmi/pdf/ARKANSAS_CITY_SCHOOL_DISTRICT_2101000_04.pdf.)
179. Aim for a Healthy Weight. US Department of Health and Human Services, National Institutes of Health, 2005. (Accessed 4/16/2005, at: www.nhlbi.nih.gov/health/public/heart/obesity/lose_wt/index.htm.)
180. Publications and Reports. Center for Nutrition Policy and Promotion, 2005. (Accessed 4/16/2005, at: www.cnpp.usda.gov/publications.html.)
181. NIH Releases Research Strategy to Fight Obesity Epidemic. 2004. (Accessed 4/16/2005, at: www.nih.gov/news/pr/aug2004/niddk-24.htm.)
182 CSREES Obesity White Paper. 2004. (Accessed 4/3/2005, at: www.csrees.usda.gov/newsroom/white_papers/obesity_Aug04.pdf.)

Role of Media
183 Issue Brief: The Role of the Media in Childhood Obesity. The Henry J. Kaiser Family Foundation, 2004. (Accessed 4/3/2005, at: www.kff.org/entmedia/upload/The-Role-Of-Media-in-Childhood-Obesity.pdf.)
184 Robinson TN. Reducing children's television viewing to prevent obesity: a randomized controlled trial. JAMA 1999;282(16):1561-7.
185 Shows and Games Encourage Kids to Get Active. School Nutrition Association, 2004. (Accessed 4/3/2005, at: www.schoolnutrition.org/ Index.aspx?id=877.)

Predicting the Burden in Connecticut
186 National Health and Nutrition Examination Survey (NHANES): Prevalence of Overweight Among Children and Adolescents: United States, 1999-2002. US Department of Health and Human Services, Centers for Disease Control and Prevention, 2004. (Accessed 4/23/2005, at: www.cdc.gov/nchs/products/pubs/pubd/hestats/overwght99.htm#Table%201.)

187 Examining Demographic, Economic and Educational Factors: Overweight Children in Pennsylvania. The Center for Rural Pennsylvania, 2005. (Accessed 4/3/2005, at: www.ruralpa.org/Overweight_child.pdf.)
188 Tide of Child Obesity Rising in Rural U.S. The Associated Press, 2005. (Accessed 4/3/2005, at: www.newenglandruralhealth.org/news/items/ap05.pdf.)
189 Point-and-Click Town Profiles. Connecticut Economic Resource Center, 2005. (Accessed 4/3/2005, at: www.cerc.com/detpages/resources373.html.)

Attributable Risk of Disease

190. Mokdad AH, Ford ES, Bowman BA, et al. Prevalence of obesity, diabetes, and obesity-related health risk factors, 2001. JAMA 2003;289(1):76-9.
191. Ramchandani N. Type 2 diabetes in children. A burgeoning health problem among overweight young Americans. Am J Nurs 2004;104(3):65-8.
192. Eriksson JG, Forsen TJ, Osmond C, Barker DJ. Pathways of infant and childhood growth that lead to type 2 diabetes. Diabetes Care 2003;26(11):3006-10.
193. Bhargava SK, Sachdev HS, Fall CH, et al. Relation of serial changes in childhood body-mass index to impaired glucose tolerance in young adulthood. N Engl J Med 2004;350(9):865-75.
194. Alberti G, Zimmet P, Shaw J, et al., Type 2 diabetes in the young: the evolving epidemic: the international diabetes federation consensus workshop. Diabetes Care 2004;27(7):1798-811.
195. Weill J, Vanderbecken S, Froguel P. Understanding the rising incidence of type 2 diabetes in adolescence. Arch Dis Child 2004;89(6):502-4.
196. Blair SN, Church TS. The fitness, obesity, and health equation: is physical activity the common denominator? JAMA 2004;292(10):1232-4.
197. Apovian CM. Sugar-sweetened soft drinks, obesity, and type 2 diabetes. JAMA 2004;292(8):978-9.
198. Gungor N, Arslanian S. Progressive beta cell failure in type 2 diabetes mellitus of youth. J Pediatr 2004;144(5):656-9.
199. Carnethon MR, Gidding SS, Nehgme R, Sidney S, Jacobs DR, Jr., Liu K. Cardiorespiratory fitness in young adulthood and the development of cardiovascular disease risk factors. JAMA 2003;290(23):3092-100.
200. Rocchini AP. Childhood obesity and a diabetes epidemic. N Engl J Med 2002;346(11):854-5.

Best Practices

201. Luepker RV, Perry CL, McKinlay SM, et al. The Child and Dolescent Trial for Cardiovascular Health. CATCH collaborative group. JAMA 1996;275: 768-776.
202. Gortmaker SL, Peterson K, Weicha J, et al. Reducing Obesity via a School based Interdisciplinary Intervention among Youth. Archives of Pediatric Adolesc. 1999;153: 409-417. Muller MJ, ASbeck I, Mast M,

203. Langnase K, Grund. Prevention of Obesity- more thand intention. Concept and First Results of the Kiel Obesity Prevention Study (KOPS). International Journal of Obesity (2001) 25, Suppl. 1. S66-S74.
204. Flores R. Dance for Health: Improving fitness in African American and Hispanic adolescents. Public Health Re 1995; 110: 189-193.
205. Robinson TN. Reducing Children's Television Viewing to prevent obesity: A randomized controlled Trial. JAMA 1999; 282: 1561- 1567.

Promising Clinical Research

206. Bini V, Igli Baroncelli G, Papi F, et al., Relationships of serum leptin levels with biochemical markers of bone turnover and with growth factors in normal weight and overweight children. Hormone Research; 2004; 61(4):170-5. Epub 2004 Jan 14.
207. Celi F, Bini V, Papi F, et al.,. Leptin serum levels are involved in the relapse after weight excess reduction in obese children and adolescents. Diabetes Nutrition Metabolism; 2003; 16(5-6): 306-11.
208. Gorden P, Gavrilova O. (2003) The clinical uses of leptin. Current Opinions in Pharmacology; 3(6): 655-9.
209. Pilcova R, Sulcova J, Hill M, et al., Leptin levels in obese children: effects of gender, weight reduction and androgens. Physiology Research; 2003; 52(1): 53-60.
210. Salbe AD, Weyer C, Lindsay RS, et al., Assessing risk factors for obesity between childhood and adolescence: I. Birth weight, childhood adiposity, parental obesity, insulin, and leptin. Pediatrics; 2002;110(2 Pt 1): 299-306.
211. Savino F, Nanni GE, Maccario et al., Breast-Fed infants have higher leptin values than formula-fed infants in the first four months of life. Pediatric Endocrinology and Metabolism; 2004; 17(11): 1527-32
212. Singhal A, Farooqi IS, O'Rahilly S, et al., Early nutrition and leptin concentrations in later life. American Journal of Clinical Nutrition; 2002; 75 (6): 993-9

Our Service-Learning Partners

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