



Obesity Prevention: The Impact of Local Public Health Departments

April 21, 2010

Presented at the 2010 PHHSSR Keeneland Conference

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The findings in this presentation are the views of the authors and should not be interpreted to imply CDC policy or determination.

Motivation

- ❑ Cost of obesity: Missed opportunities in obesity prevention
 - Slater, Powell, & Chaloupka (2007): local health departments (LHD)
 - Enhancing the role of the public health system in containing the epidemic and associated healthcare burden is of major concern to public health researchers, practitioners, and policymakers (Huberty et al., 2010).
- ❑ Public health systems and services research
 - Scutchfield & Patrick (2007), Scutchfield, Marks, Perez, & Mays (2007)
- ❑ **Questions to be answered in this research**
 1. Did LHD achieve their goals? – e.g., reducing incidence of obesity in the jurisdiction (EPHS#3, 4, 5)
 2. What methods are effective? E.g., contracting, done by LHD, done by state HD, ... (EPHS#9)
 3. Did LHD serve the most needed? (EPHS#7)

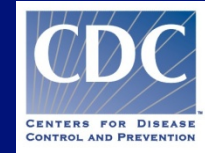
Data

- ❑ National Association of County and City Officials (NACCHO) 2005 Profile study
 - Collect data on local health department infrastructure
 - Five National Profiles conducted to date
 - 1989, 1992-3, 1996-7, 2005, 2008
 - Census design – includes all LHDs in U.S.

- ❑ Behavioral Risk Factor Surveillance System (BRFSS)
 - 2005 wave
 - The Behavioral Risk Factor Surveillance System (BRFSS) is a state-based system of health surveys that collects information on health risk behaviors, preventive health practices, and health care access primarily related to chronic disease and injury (<http://www.cdc.gov/BRFSS/>)

Method

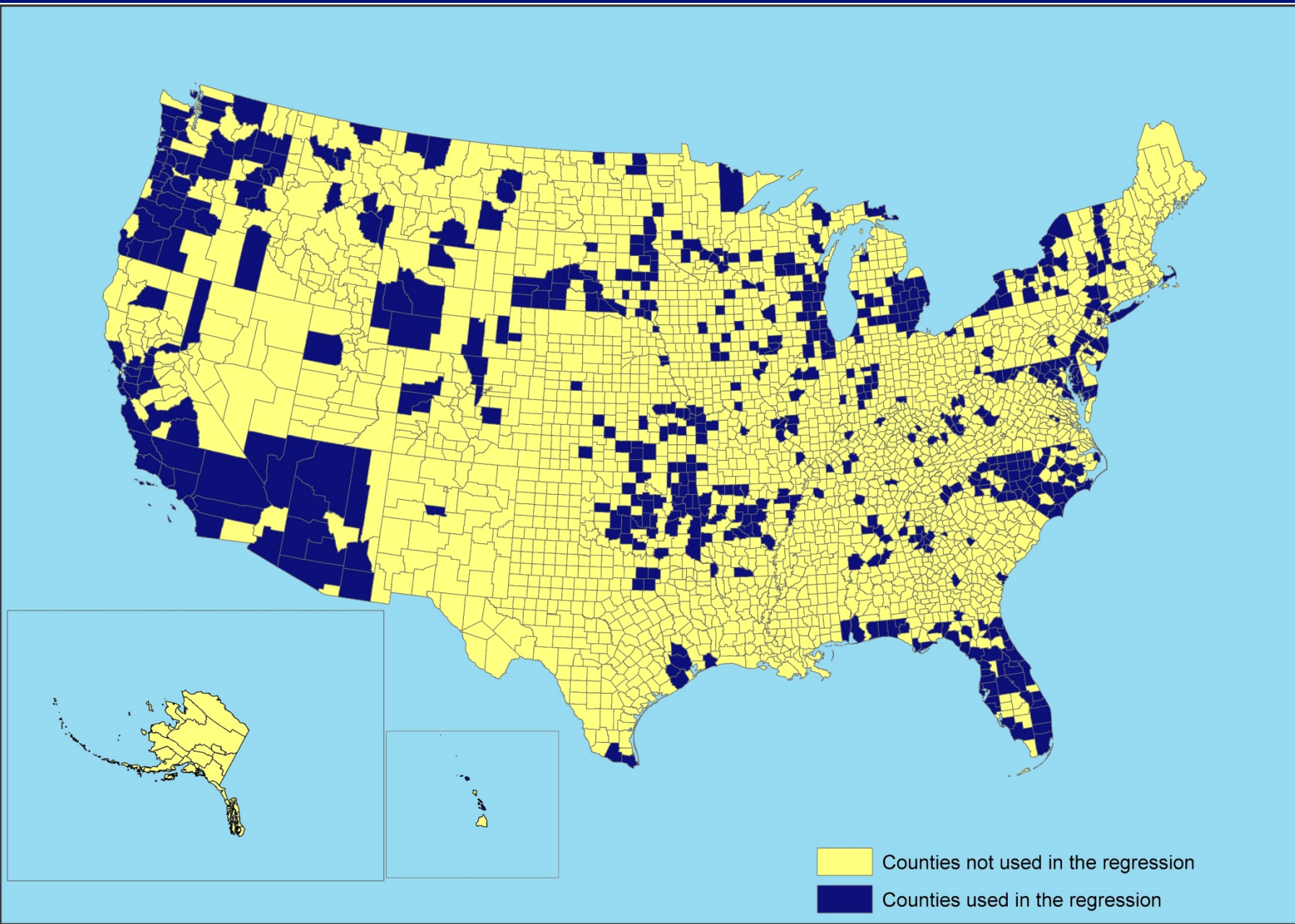
- ❑ Merging NACCHO Profile study (2005) and BRFSS (2005)
 - Using county FIPS code
 - How? Zip code from Profile study and manual matching
- ❑ Variables
 - Dependent variable
 - Obesity: $BMI \geq 30$
 - Morbid obesity: $BMI \geq 40$
 - Regressors of interest
 - Q67f: obesity prevention service not available
 - Q67a-e: obesity prevention done by LPHA, contractor, state HD, another local govt. agency, others
 - Other control variables
 - Age, sex, race, marital status, education, income, employment status, job-related physical activity
- ❑ Multilevel modeling
 - 598 counties, 140,628 (35,165 in low income sample) respondents
 - Multilevel logit regression



Results

- Representativeness of the sample
- Regression Results
- Sensitivity Analysis

Map of the counties



Comparing NACCHO sample and the study sample counties

Table 1. Summary Statistics of the counties

Variable	NACCHO sample		Regression sample	
	Mean	SD	Mean	SD
Population in the jurisdiction (Million)	0.132	(0.428)	0.249	(0.598)
# jurisdictions	2284		598	
q67a (LHD) (%)	0.552	(0.497)	0.645	(0.479)
q67b (contractor) (%)	0.027	(0.161)	0.030	(0.171)
q67c (state HD) (%)	0.163	(0.370)	0.201	(0.401)
q67d (another govt agency) (%)	0.068	(0.252)	0.075	(0.264)
q67e (other) (%)	0.498	(0.500)	0.503	(0.500)
q67f (no obesity prevention service) (%)	0.062	(0.242)	0.047	(0.211)
q67g (unknown) (%)	0.060	(0.238)	0.042	(0.200)



Comparing BRFSS 2005 sample and the study sample individuals



	BRFSS sample				Study sample		
	Pooled	Men	Women		Pooled	Men	Women
Number of persons	352,679	136,139	216,540		140,628	54,228	86,400
BMI (Kg/m ²)	30.6	28.8	31.7		30.3	28.7	31.3
Obesity (%)	28.8%	26.7%	30.2%		28.4%	26.6%	29.5%
Morbid obesity (%)	7.8%	3.9%	10.2%		7.5%	3.8%	9.8%
Male (%)	38.6%				38.6%		
Age	51.8	51.0	52.4		52.0	51.3	52.5



Regression Results

	Pooled sample			Male sample			Female sample		
	OR		95% CI	OR		95% CI	OR		95% CI
<i>Low-income sample (income < \$35,000)</i>									
	<i>N = 35,165</i>			<i>N = 11,302</i>			<i>N = 23,863</i>		
Obesity	1.140	**	(1.002;1.297)	0.923		(0.735;1.159)	1.219	***	(1.053;1.410)
Morbid Obesity	1.202	*	(0.978;1.477)	0.777		(0.482;1.254)	1.315	**	(1.053;1.641)
<i>All income levels</i>									
	<i>N = 140,628</i>			<i>N = 54,228</i>			<i>N = 86,400</i>		
Obesity	1.078	*	(0.988;1.175)	1.044		(0.934;1.167)	1.102	*	(0.998;1.216)
Morbid Obesity	1.128	*	(0.990;1.285)	1.025		(0.803;1.309)	1.159	**	(1.014;1.324)



		Low income sample (n=31,615)		
		OR		95% CI
<i>Obesity</i>				
	LHD	1.069	**	(1.010;1.130)
	Contr.	1.183	**	(1.033;1.354)
	SHD	1.054		(0.984;1.129)
	Oth.Govt.	1.009		(0.921;1.106)
	Other	0.964		(0.914;1.016)
<i>Morbid Obesity</i>				
	LHD	1.097	*	(1.000;1.203)
	Contr.	1.168		(0.932;1.464)
	SHD	1.050		(0.935;1.178)
	Oth.Govt.	1.034		(0.887;1.206)
	Other	0.937		(0.858;1.024)

Results

❑ Did obesity prevention services work?

- Respondents living in counties without obesity prevention service are more likely to be obese and morbidly obese;

❑ Which agencies fared well?

- Obesity prevention service performed by LHDs is associated with lower BMI and incidence of obesity;
- Results are mixed for contractors and state HDs;
- No significant effects were found for obesity prevention services done by another government agency and others.

❑ Did LHDs serve those needed?

- Effects are stronger among low-income population.



Sensitivity Analysis

- Time lag?
 - Matched with BRFSS 2006
- Missing city and multi-county health departments
 - Matched by using office zipcodes

Discussions

❑ Association and causal inference

- Reverse causality: underestimation
- Other contributing factors that lead to higher implementation of obesity prevention service among LHDs *and* lower level of obesity among BRFSS respondents: not likely
- Measurement error in BMI that correlates with obesity prevention: not likely

❑ Gender difference

- Effects of obesity prevention are stronger among women

❑ Time lag?

- Survey design of Profile study and BRFSS
- Christiansen, Garby, & Sørensen (2005): less than one year to reach a weight equilibrium.



Limitations

- ❑ Self reported height and weight
- ❑ Measurement error in NACCHO data
 - Misinformation on state HD and other agencies?
- ❑ Use of sampling weights
 - Muramatsu (2003)

Conclusions

- ❑ Availability of population-based primary (obesity) prevention service in the LHD jurisdiction is associated with lower incidence of obesity and morbid obesity
- ❑ Mixed results on which agencies are more effective
- ❑ The association between obesity prevention services and incidence of obesity and morbid obesity is stronger among low-income population

Acknowledgement

□ NACHHO Profile team

- Carolyn Leep
- Barbara Laymon
- Gulzar Shah

(1): NACCHO LHD map

