Effects of Obesity and Smoking on the Risk for Nursing Home Use

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Introduction

- 52.6 million of U.S. population experiences some level of disability lasting any length of time (18.6 percent in 2002)
- Disability cause varies
  - Disease
  - Chronic conditions
  - Natural process of aging
  - Injury

Behavioral Health Risk and Disability

- Behavioral health factors may be precursors of disability
  - Obesity
  - Smoking
- People with disabilities have
  - Higher obesity prevalence*
    - Adults (32 vs. 19 percent)
  - Higher smoking prevalence*
    - Adults age 18-44 (40 vs. 22 percent)
    - Adults age 45-64 (32 vs. 20 percent)
- Lowering obesity and smoking prevalence potentially may reduce disability and nursing home use
- *U.S. National Center for Health Statistics, 2008

Purpose of Study

- Although people with disability would prefer to live in the community, U.S. has a sizeable nursing home population
  - 1.4 million in U.S. nursing homes (2012)
  - $200+ billion in U.S. health care expenditures in 2006 for people in nursing homes (authors)
- Current study estimates effects of obesity and smoking on nursing home use
- Understanding risk could help focus public health efforts

Data and Sample

- Health and Retirement Study (HRS)
  - Sponsored by U.S. National Institute on Aging
  - Sample interviewed every two years
  - People age 51 and older in 7 waves (1996-2008)
  - Data on nursing home use, health behaviors, functional limitations, demographics, living situation
- Sample
  - Approximately 25,000 respondents
  - Respondents appear in 1-7 waves across the panel (4.6 waves on average)
  - Almost 120,000 observations in the panel over time

Dependent Variable for Logistic Regression (n=117,044*)

	Mean	Std. Dev.
Any nursing home use	0.024	0.152

*Unweighted person-wave observations; 4.5 percent of respondents have nursing home use

Mean Nursing Home Use by Smoking History and Obesity Status

	Mean*	Std. Dev.
Ever smoked	0.023	0.150
Never smoked	0.025	0.155
Obese	0.018	0.134
Non obese	0.026	0.158

*Weighted

Number of Survey Waves Respondents Were Obese

	Population*	Percent
0	74,212,545	69.65
1	10,054,263	9.44
2	3,454,245	3.24
3	3,828,279	3.59
4	3,701,805	3.47
5	5,052,206	4.74
6	3,744,524	3.51
7	2,510,144	2.36
Total	106,558,011	100

*Weighted estimates

Mean Proportion of Disability (Any ADLs) by Weight Status

	Mean*	Std. Dev.
Underweight	41.3	49.3
Normal weight	33.6	47.2
Overweight	34.9	47.7
Obese I (BMI 30 - <35)	40.2	49.1
Obese II (BMI 35 - <40)	50.3	50.1
Obese III (BMI 40+)	61.9	48.7
Overall	36.1	48.0

*Unweighted

Key Variable Means for the Regression Sample (n=117,044)

		Mean	Std. Dev.
Behaviors	Time obese*	1.03	1.84
	Obese	0.26	0.44
	Overweight	0.39	0.49
	Normal weight	0.33	0.47
	Underweight	0.02	0.13
	Ever smoked	0.58	0.49

*If obese, average number of waves one was obese was 3.36 waves

Key Variable Means for the Regression Sample (continued)

		Mean	Std. Dev.
Functional limitations	Number ADLs	0.28	0.80
	Number IADLs	0.22	0.68
Illness	Chronic condition count	1.88	1.40
Age	Mean age	67.9	10.0

Methods

- Logistic regression on any nursing home use
- Panel using 7 waves (14 years)
- Random effects estimation; survey weights used
- Very large sample size means all independent variables are statistically significant at $p<0.001$
- Estimated 2 models, each with a different obesity variable
  - Obese dummy variable (1 if obese, 0 otherwise if nonmissing)
  - Number of survey waves one was obese in the data
- All other variables in the models unchanged

Logistic Regression for Risk of Nursing Home Use

		Odds Ratios	
		Time Obese Model	Obese Dummy Model
		(n=117,044)	(n=119,370)
Behaviors	Time obese	1.10	***
	Obese (dummy)	***	0.90
	Overweight	0.92	0.83
	Normal weight	---	---
	Underweight	1.61	1.43
	Ever smoked	1.17	1.19

Logistic Regression for Risk of Nursing Home Use (continued)

		Odds Ratios	
		Time Obese Model	Obese Dummy Model
Functional limitations	Number ADLs	1.66	1.67
	Number IADLs	1.81	1.81
Illness	Chronic conditions	1.39	1.43
Age	Mean age	1.11	1.10

Overview of Results

- Different result for being obese depending on the measure used
  - Length of time one has been obese increases nursing home risk
    - Result is of the same order of magnitude as the effect of age (10 percent)
  - Obese dummy variable decreases nursing home risk
    - Most likely the most obese persons are at higher risk, but too few in the data
- Underweight persons most at risk of nursing home use
- Slightly protective effect of being overweight
- Having ever smoked increases nursing home risk

Conclusion

- Efforts to stop smoking should lower nursing home use
  - May explain in part the 2-decade cut in nursing home use rate
- Efforts to reduce nursing home risk for obese persons should consider the measure used to assess risk
  - If consider amount of time one has been obese, potentially focus on persons who have been obese for longer periods of time
  - If consider the obese dummy variable, potentially focus on persons who are the most obese
    - Of all obese age 60+ persons, only about 1/8 have BMI of 40 or greater*
    - Of all obese age 60+ persons, only about 1/3 have BMI of 35 or greater*
    - Roughly half of all obese age 60+ persons have BMI between 30-35*
  - *NHANES estimates from Flegal, Carroll, Ogden, Curtain; JAMA 2010

Conclusion (continued)

- Focusing on those who are most obese, or who have been obese the longest, may set the bar too high
- Instead, focusing on the rise in childhood obesity and early obesity among young adults may help shorten length of time and decrease degree of obesity
- Otherwise, in the future, people will be obese for longer periods of time

Contact Information / Acknowledgement

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Limitations / Sensitivity Analyses

- Potential cognition measure only defined for ½ of sample
  - As expected, better cognition reduced nursing home risk
  - Odds ratio for time obese unchanged; obese dummy still lower
  - Odds ratio for ever smoked not quite as large
- Inactivity measure (77.7%) only defined for last 3 waves
  - Reduced the risk of smoking to even odds
  - Decreased the time to obesity measure by 3 percentage points
  - Greatly decreased the obesity dummy variable by 15 points
- Didn't, but could lag the obesity dummy by 1+ periods
  - But the obese time variable essentially performs same function