



# Pre-Operative Clinical Variation by Health Insurance Carrier in 12,285 Male Surgical Patients with Moderate Morbid Obesity

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## Background

In the ongoing obesity epidemic, every surgeon now treats patients with weight-related medical problems. In managing these medically fragile surgical patients, every clinical insight helps. While variation according to health insurance has been reported in mixed sex bariatric surgery populations, whether or not clinical characteristics in the subset of moderately obese male surgical patients vary by insurance carrier is unknown.

## Objectives

The objective of this study was to identify clinical variation by insurance type in moderately obese men.

## Methods

Data on 12,285 moderately obese men from the Surgical Review Corporation's BOLD database who were pre-operative for adjustable gastric band was analyzed in four insurance groups: Private (n=10,102), Medicare (n=1,220), Self-Pay (n=770), and Medicaid (n=193). Data included weight, BMI, demographics, and the percent incidence of 31 weight-related medical co-morbidities. Continuous variables were analyzed using an ANOVA with treatment in the model. Categorical variables were examined using a general linear model with treatment in the model and modified for a binomial distribution to account for dichotomous variables.

## Results

Cardiopulmonary	Medicare	Medicaid	Private	Self	P value
Angina	5.9%	9.33%	3.14%	1.69%	<.0001
Asthma	14.92%	16.58%	10.24%	9.74%	<.0001
CHF	8.36%	10.88%	2.53%	0.78%	<.0001
DVT/PE	5.08%	5.7%	2.46%	1.17%	<.0001
Hypertension	80.74%	69.95%	65.88%	59.48%	<.0001
Ischemic heart disease	21.07%	13.47%	7.48%	4.16%	<.0001
Leg edema	36.72%	31.61%	20.87%	17.53%	<.0001
Obesity/Hypoventilation	4.34%	3.11%	1.89%	1.17%	<.0001
Peripheral Vascular Disease	4.51%	3.63%	1.2%	0.91%	<.0001
PHT	5.74%	3.11%	3.87%	2.6%	0.0023
Sleep apnea	67.3%	64.77%	56.3%	48.44%	<.0001

Abdominal / Hepatobiliary	Medicare	Medicaid	Private	Self	P value
Abdominal hernia	9.59%	8.81%	6.56%	5.45%	0.0002
AP	5.82%	6.74%	3.14%	4.16%	<.0001
Cholelithiasis	11.39%	11.92%	6.87%	5.97%	<.0001
GERD	41.31%	46.11%	36.48%	33.77%	<.0001
Liver disease	4.84%	6.22%	5.97%	3.25%	0.0081
SUI	8.93%	5.7%	2.94%	3.77%	<.0001

Endocrine / Metabolic	Medicare	Medicaid	Private	Self	P value
Diabetes	58.85%	46.11%	35.84%	25.97%	<.0001
Dyslipidemia	62.87%	48.19%	47.1%	41.56%	<.0001
Gout	11.31%	8.29%	6.72%	5.06%	<.0001
PTC	0.66%	2.59%	0.7%	0.78%	0.0243

Somatic	Medicare	Medicaid	Private	Self	P value
Back pain	52.95%	54.92%	42.84%	40.26%	<.0001
Fibromyalgia	1.48%	0.52%	0.49%	0.39%	0.0003
Musculoskeletal pain	53.03%	47.15%	37.79%	33.25%	<.0001

Psychological / Behavioral	Medicare	Medicaid	Private	Self	P value
Depression	27.62%	32.64%	19.58%	19.35%	<.0001
MHD	9.75%	15.54%	5.62%	5.71%	<.0001
Psychological impairment	16.07%	25.39%	9.3%	9.09%	<.0001
Alcohol abuse	26.48%	20.21%	37.43%	37.01%	<.0001
Substance abuse	0.49%	2.59%	0.53%	1.17%	0.0005
Tobacco use	7.87%	13.47%	8.22%	9.09%	0.0507
Employed	9.59%	13.47%	72.77%	69.09%	<.0001
Unemployed	76.48%	61.66%	12.89%	9.22%	<.0001

## Results

- Medicaid/Medicare/Private/Self-Pay age (45+-12/60+-11/47+-12/45+-12), weight (kg. 154+-28/145+-26/147+-24/150+-28), BMI (50+-9/46+-8/46+-7/47+-8) varied significantly (p<0.005-0.0001).
- Race (%) varied between Medicaid/Medicare/Private/Self-Pay: African-American (16/5/7/2), Caucasian (69/84/79/86), Hispanic (9/3/7/6), Asian (0/0.1/0.3/0.7), Other (6/8/8/5) (p<0.0001).
- Obesity co-morbidities by insurance (%) are displayed in the Table.
- Medicaid were heaviest and had highest depression, mental health diagnosis (MHD), substance abuse, GERD, liver disease, back pain, cholelithiasis, abdominal panniculitis (AP), asthma, CHF, DVT/PE, angina, pseudo tumor cerebri (PTC), and psychological impairment and were lowest in alcohol.
- Medicare were oldest and had highest ischemic heart disease, hypertension, diabetes, gout, sleep apnea, obesity hypoventilation, pulmonary hypertension (PHT), peripheral vascular disease, dyslipidemia, musculoskeletal pain, leg edema, fibromyalgia, hernia, stress urinary incontinence (SUI), and unemployment (n=16) and lowest PTC and substance abuse.
- Private patients experienced the highest alcohol abuse and the lowest AP, MHD, and SUI.
- Self-Pay patients were lowest in all but AP, alcohol use, PHT, SUI and substance abuse (n=27) and highest in none. Self-Pay were second highest in alcohol and substance use.
- Of the 31 obesity co-morbidities evaluated, only tobacco use (p=0.0507) did not vary significantly by health insurance type.

## Conclusions

- ✓ Pre-operative clinical characteristics of moderately obese male surgical patients vary by the health insurance coverage type to which they subscribe.
- ✓ Medicare and Medicaid insured suffer the most from weight-related problems. Medicaid patients had the highest incidences of psychological and abdominal/hepatobiliary issues, as well as increased CHF, DVT/PE, and angina. Medicare obese men have increased prevalence of all other cardiopulmonary complications examined in this study. Private and Self-Pay patients are at lower risk of obesity co-morbidities than Medicaid and Medicare.
- ✓ Whether or not Medicaid high weight and BMI, and Medicare increased age contribute to these findings is not clear from the data.
- ✓ These results suggest that surgeons should consider moderately obese Medicare and Medicaid men at increased risk for peri-operative medical illnesses.
- ✓ This advance clinical knowledge may raise pre-operative index of suspicion for serious co-morbidities, and might improve medical care and surgical outcomes of moderately obese men.