**<This study has been published in** [***Annals of American Thoracic Society***](https://www.ncbi.nlm.nih.gov/pubmed/29053337)**>**

**Title of Study**: The association of obesity with acute severity of chronic obstructive pulmonary disease exacerbation

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**Co-authors (role):** NAME (Analysis), NAME (Data management), NAME (supervision), NAME (supervision)

**Aim**: The study objective is:

1. To investigate the association between obesity and severity of acute exacerbation of chronic obstructive pulmonary disease (AECOPD).

Hypothesis 1: Obesity is associated with a higher in-hospital mortality, rate of mechanical ventilation use, and longer hospital length-of-stay (LOS).

**Background (public health burden, what’s known, what’s unknown/knowledge gaps)**:

COPD and obesity are important public health problems. Obesity is prevalent among individuals with COPD, corresponding to 35% of patients with COPD.[1](#_ENREF_1) Obesity is thought to be a risk factor of an adverse health consequences in patients with AECOPD, such as general quality of life, reduced 6-min walk distance, increased dyspnea.[2](#_ENREF_2),[3](#_ENREF_3) However, there is a dearth of research that examined the relationship between obesity and acute severity of AECOPD.

Major articles

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| **Author, year** | ***Journal*** | **PMID** | **Design** | **Population** | **Outcomes** | **Main findings** | **Limitations** |
| Allison A. Lambert  2016 | *Chest* | 27568229 | Secondary analysis of a prospective observational cohort study (COPDGene) in US, 2008-2011 | 3,631 patients with COPD | 1-year mortality | Obesity was associated with a poor general quality of life, reduced 6-min walk, increased dyspnea, and a risk of **self-reported severe AECOPD**. | Self-reporting bias.  No investigation on in-hospital mortality and ventilation use. |
| Landbo C, 1999 | *AJRCCM* | 10588597 | Retrospective cohort study, 1976-1978 | 2,132 patients with COPD | Mortality in COPD within the study period | Low BMI is an independent risk factor for mortality in subjects with COPD, and that the association is strongest in subjects with severe COPD. Mortality continued to decrease with increasing BMI in severe COPD | No investigation on severity of AECOPD |

Knowledge gap(s): Whether obesity is associated with acute severity of AECOPD.

**Methods**

Study design: Retrospective cohort study (or cross-sectional study)

Study settings: HCUP-SID from seven states (AR, FL, IA, NE, NY, UT, WA) between 2012 and 2013

Study population:

1. Inclusion criteria: Patients aged ≥40 years and hospitalized for AECOPD (defined by *ICD-9-CM* codes: 491.21, 491.22, 491.8, 491.9, 492.8, 493.20, 493.21, 493.22, and 496), or those with a primary diagnosis of respiratory failure (codes: 518.81, 518.82, 518.84, and 799.1) and a secondary diagnosis of COPD.[4](#_ENREF_4)
2. Exclusion criteria: Patients who left the hospital against medical advice, patients who were transferred to another acute care facility.[4](#_ENREF_4)

Important variables: Age, sex, race/ethnicity, primary payer, median household income, patient residence (urban vs. rural), hospital state, and new Elixhauser comorbidity indices.

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|  | Aim 1 |
| Primary exposure(s) | Obesity in any diagnosis field~~s~~ (280.00, 280.02, v85.31-v85.39, v85.41-v85.45) |
| Outcome(s) | Primary: In-hospital mortality  Secondary: The use of mechanical ventilation (invasive mechanical ventilation and NIPPV), and hospital LOS.[5](#_ENREF_5),[6](#_ENREF_6) |
| Confounders | Age, sex, race/ethnicity, primary payer, median household income, patient residence (urban vs. rural), comorbidities, and hospital state. |
| Effect modifiers (if any) | Sex? |
| Mediators (if any) |  |

Statistical analysis:

1. Main analysis: Unadjusted and adjusted logistic regression models with generalized estimating equations (GEE) to account for patient clustering within-hospitals, with normal and overweight individuals as the reference.[2](#_ENREF_2) For LOS as an outcome measure, negative binomial model with GEE will be used to account for overdispersion.
2. Sensitivity analysis: Stratification by age category (40-64 and ≥65 years) and sex.

**Potential limitations:** (e.g., selection bias, measurement bias, confounders, generalizability)

・Lack of BMI information and low sensitivity of obesity (but high specificity): biasing toward the null.

・Lack of clinical information, such as medication and lung function.

・Generalizability: patients with severe AECOPD only.

**Timeline**:

| **Milestones** | **Planned date (month/year)** |
| --- | --- |
| * Finalize analytical plan (this 2-pager summary) | MM/DD/YYYY |
| * Primary data analysis | Done |
| * Finish first draft | MM/DD/YYYY |
| * Submit primary manuscript (brief report) to *\*\*\* journal* | By early MM, YYYY |

**Future plans (brief)**:

**References:**

1. Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of childhood and adult obesity in the United States, 2011-2012. *JAMA.* 2014;311(8):806-814.

2. Lambert AA, Putcha N, Drummond MB, et al. Obesity is Associated with Increased Morbidity in Moderate to Severe COPD. *Chest.* 2016.

3. O'Donnell DE, Ciavaglia CE, Neder JA. When obesity and chronic obstructive pulmonary disease collide. Physiological and clinical consequences. *Ann Am Thorac Soc.* 2014;11(4):635-644.

4. Yale New Haven Health Services Corporation/Center for Outcomes Research & Evaluation. 2014 Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Readmission Measures. 2014; <http://altarum.org/sites/default/files/uploaded-publication-files/Rdmsn_Msr_Updts_HWR_0714_0.pdf>. Accessed October 1, 2015.

5. Lindenauer PK, Stefan MS, Shieh MS, Pekow PS, Rothberg MB, Hill NS. Outcomes associated with invasive and noninvasive ventilation among patients hospitalized with exacerbations of chronic obstructive pulmonary disease. *JAMA Intern Med.* 2014;174(12):1982-1993.

6. Hasegawa K, Tsugawa Y, Tsai CL, Brown DF, Camargo CA, Jr. Frequent utilization of the emergency department for acute exacerbation of chronic obstructive pulmonary disease. *Respir Res.* 2014;15:40.