Asthma

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Background

- **Asthma is a chronic disease where a person's bronchial passages become inflamed, causing symptoms such as wheezing, shortness of breath, chest tightness, and coughing.**
- **There are a number of different types of asthma (exercise-induced, allergy-induced, occupational, and childhood).**
- **As of 2011, the CDC estimates that 25 million people in the United States have asthma and that number is rising.**
- **The CDC also estimates that asthma related costs due to medical expenses and missed school and work days were over $56 billion in 2007.**

Asthma and Its Risk Factors

Biological	Environmental	Demographic	Behavioral
• Family history of asthma • Allergies • Frequent respiratory illness	• Second hand smoking • Labor conditions • Air quality	• Gender • Age • Race • Income	• Smoking Status • Exercise • Being Overweight

- **Can we determine which of the above risk factors is most predictive of asthma status?**

Methods and Data

- Created proxy variables as indicators for behavioral and environmental risk factors:
  - Daily hours of exercise, second hand smoking, labor conditions, years smoking, bad air quality.
- All included control variables for demographic and biological factors
  - Family history of asthma, gender, age diagnosed with asthma, income.
- Final data set contains 6307 observations
- Logistic regression model with asthma status as outcome variable on proxy and control variables

Summary Statistics

Summary Statistics of Continuous Variables						
Variable	Mean	Median	Standard Deviation	Minimum	Maximum	Range
Hours Daily Activity	3.03	1	7.362418	0	173	173

Summary Statistics

Proportions of Categorical Variables		
Variable	Count	Proportion
Female		
Yes	3191	0.153243497
No	3110	0.119935691
Bad Air Quality		
Yes	755	0.230463576
No	5546	0.124053372
Overweight		
Yes	2006	0.183948156
No	4290	0.114685315
Family History		
Yes	1305	0.265134100
No	4860	0.100617284

Results

	Model Results	
Variables	**Initial Model**	**Current Model**
Intercept	0.09214***	0.0920042***
Female	1.86E-02	0.0186023
Bad Air Quality	0.08669***	0.0867153***
Overweight	0.07545***	0.0754405***
Family History	0.01955***	0.0195727***
Hrs Daily Activity	2.04E-04	0.0002070***
Dust	NA	-
Years Smoked	-4.92E-05	-
Second Hand Smoke	NA	-
C-Index	-	0.6049528

Interpretations

- Gender is an insignificant predictor of asthma status.
- People who have changed their daily activities because of bad air quality are 1.09 times more likely to have asthma than those who haven't changed their daily activities.
- People who are overweight are 1.078 times more likely to have asthma than those who are not.
- People with a family history of asthma are 1.01 times more likely to have asthma than those who do not.
- Surprisingly, people who do an additional hour of work or recreational activity are 1.00 times more likely to have than those who do not.

Conclusion

- **Bad air quality, being overweight, and family history of asthma all have the expected impact on likelihood of asthma.**
- **Bad air quality is the most predictive of asthma status followed by being overweight, family history of asthma, and hours of daily activity.**
- **Problems:**
  - **Unobtainable Omitted Variables: Allergies, Medical History,**
  - **Incorrectly Formatted Variables: Years Smoked, Second Hand Smoke Exposure, Industrial Dust Exposure and Income are incorrectly formatted to conclude any meaningful results at the moment. Once these errors are accounted for, the beta-values in the current model will likely change.**