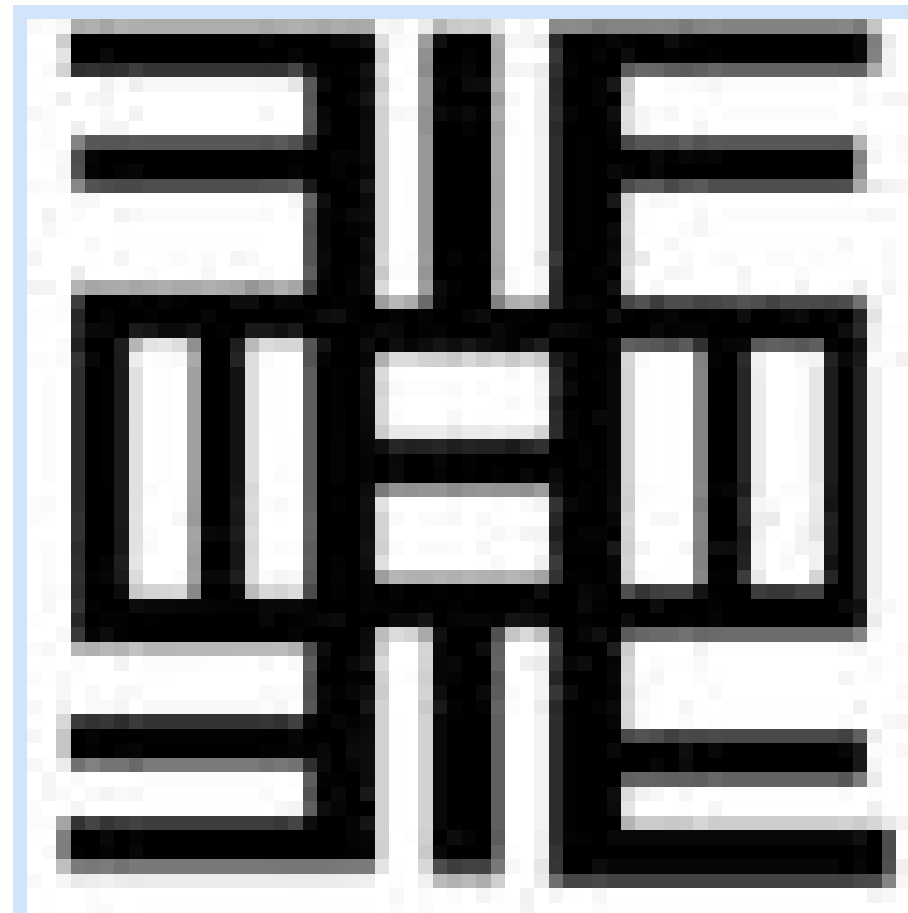




# Knowledge of Air Pollution and its Effects on Brooklyn Residents

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ITAVA (It Takes a Village Academy) & Brooklyn College of the City University of New York



## Introduction

Air pollution is a big problem in urban environments and can cause many breathing related illnesses such as asthma, bronchitis and chronic obstructive pulmonary disease (COPD). Sources of air pollution include exhaust from industrial sites and automobiles, and is especially concentrated near highways. After learning about the components, causes, and effects of air pollution, we decided that we wanted to know what the people in our school and community knew about air pollution, what their attitudes were regarding air pollution, and what effect air pollution has had on them. To answer our questions we designed the Air Pollution Knowledge and Attitude Survey and administered it to the students at our high school and to a sample of Brooklyn College students. To determine what effect air pollution has had on the students at ITAVA we decided to measure lung capacity, which can be used to determine the extent of respiratory problems caused by air pollution. FEV1 (Forced Expiratory Volume in the first second) meters were used. These meters are used by smokers, asthma and COPD patients to determine the severity of the disease. Patients with respiratory diseases and smokers have lower FEV1 values than healthy adults.

## Method

The Air Pollution Knowledge and Attitude Survey is a 13 item scale. It contains multiple choice and agreement statements. Some of the questions were on general knowledge like "The air we breathe is mostly made up of what gas?" and the choices: oxygen, nitrogen, carbon dioxide, methane, helium, and carbon monoxide. To answer these questions the participant has to choose their answer. There were agreement statements like "There are many things that I can do to help solve the air pollution problem in my community." To answer these items the participant indicates their level of agreement to the statement using a 7-point scale from completely disagree (1) to completely agree (7).

In addition to the survey we took FEV1 measurements using FEV1 meters. The participant has to blow into a tube on the FEV1 meter for one full second until it beeps. We did this 3 times for each participant and then we took the mean of all 3 readings as their FEV1 value. Along with the FEV1 measurements, demographic information was collected (sex, age, and height). Additionally, we collected respiratory health and smoking histories from each participant. We asked whether or not they or anyone in their family had a history of asthma or if they smoked. The values obtained from the participants were then compared with the standard FEV1 values using participants' sex, age, and height information.

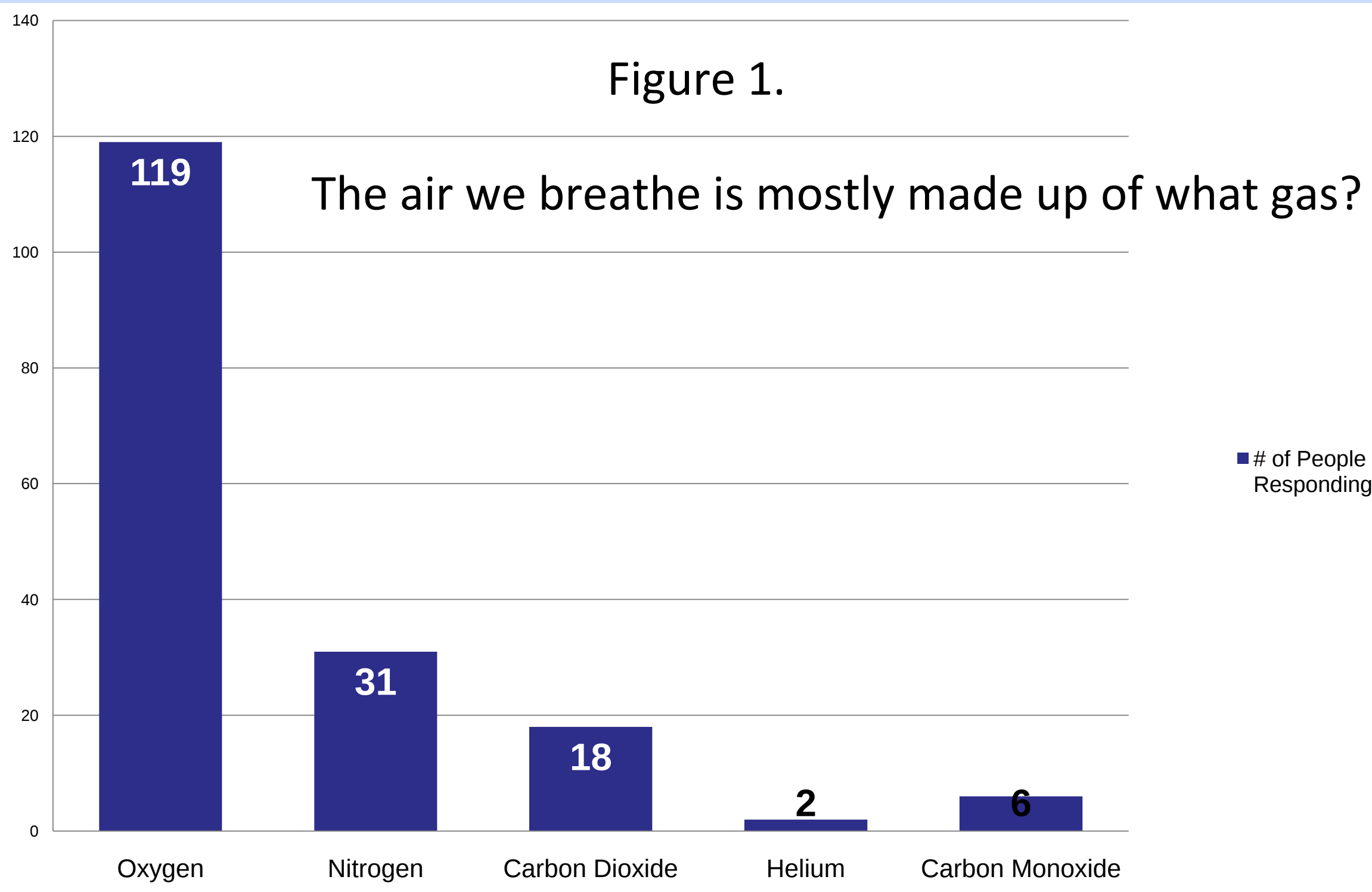
## Participants

232 people in total completed the survey.  
181 from ITAVA (M = 93 or 52.4% , F = 86 or 47.5%; 2 missing)  
Median age= 16  
Mode age= 16  
Age Range = 13 – 20

51 from Brooklyn College (M = 6, F = 25; 20 not reported)  
Median = 21  
Mode = 19  
Age range = 18 – 40

## Results

We wanted to know if people had general knowledge about what is in the air we breathe. So we asked 181 ITAVA high school students the following question. The air we breathe is mostly made up of what gas? The correct answer is nitrogen (the air we breathe is approximately 78 % nitrogen). However, most people (119 out of 181 or 65%) who took our survey incorrectly answered and chose oxygen. Only 31 people (or 17%) chose the correct answer. (See figure 1.)



## Results cont'd

We wanted to know if people felt that they could be part of the air pollution solution. So we asked 181 ITAVA students and 51 Brooklyn College students if they believed that they could help solve problems created by air pollution in their community. Statistical analysis revealed that the ITAVA students responded with significantly higher levels of agreement to this statement than the Brooklyn College students. (See figure 2.)

## Acknowledgments

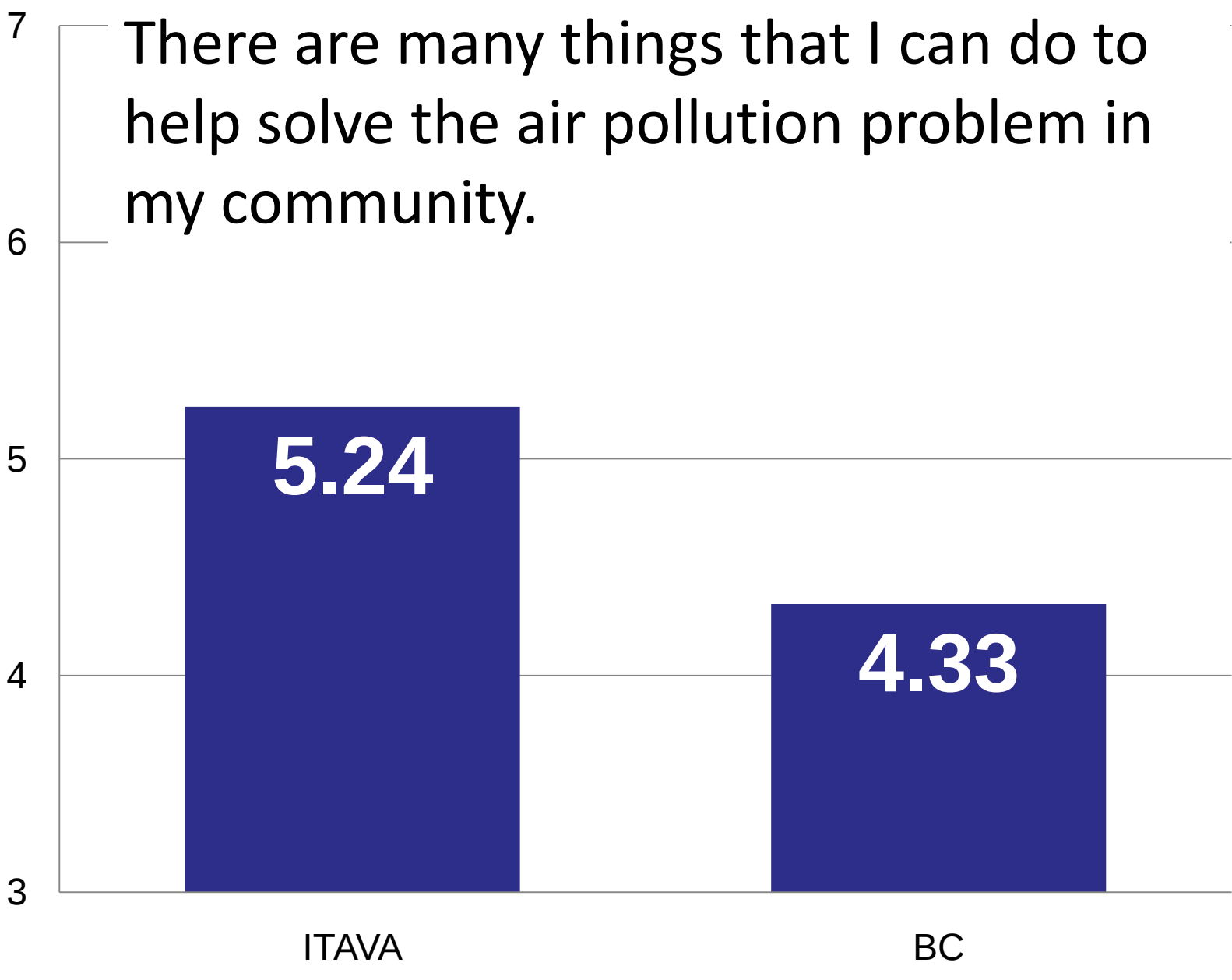
We'd like to thank our teacher Mr. Julius Buh-Mbi and the GK12 fellows Michael Magee and Reena Rahi for their guidance and support of this project.

These are the means.

They are statistically different from each other.

The ITAVA students are more optimistic.

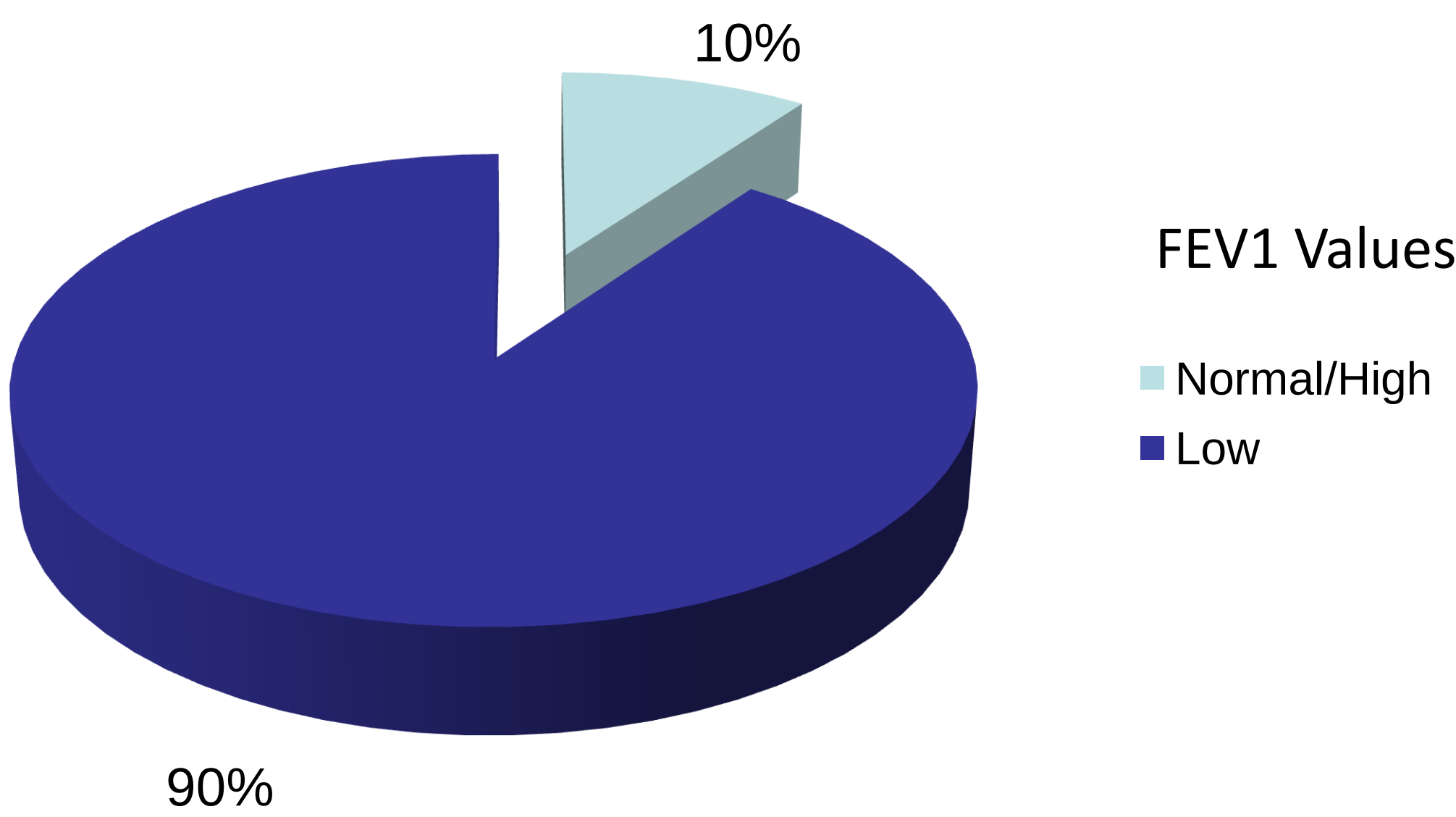
Figure 2.



## Results cont'd

We wanted to know if air pollution was possibly affecting the health of the people in our community. So we took FEV1 measurements from 181 ITAVA high school students. Obtained values were compared with national standardizes values. Our results indicate that out of 181 participants, only 18 (10%) participants have FEV1 values higher or same as the standard values. (See figure 3.)

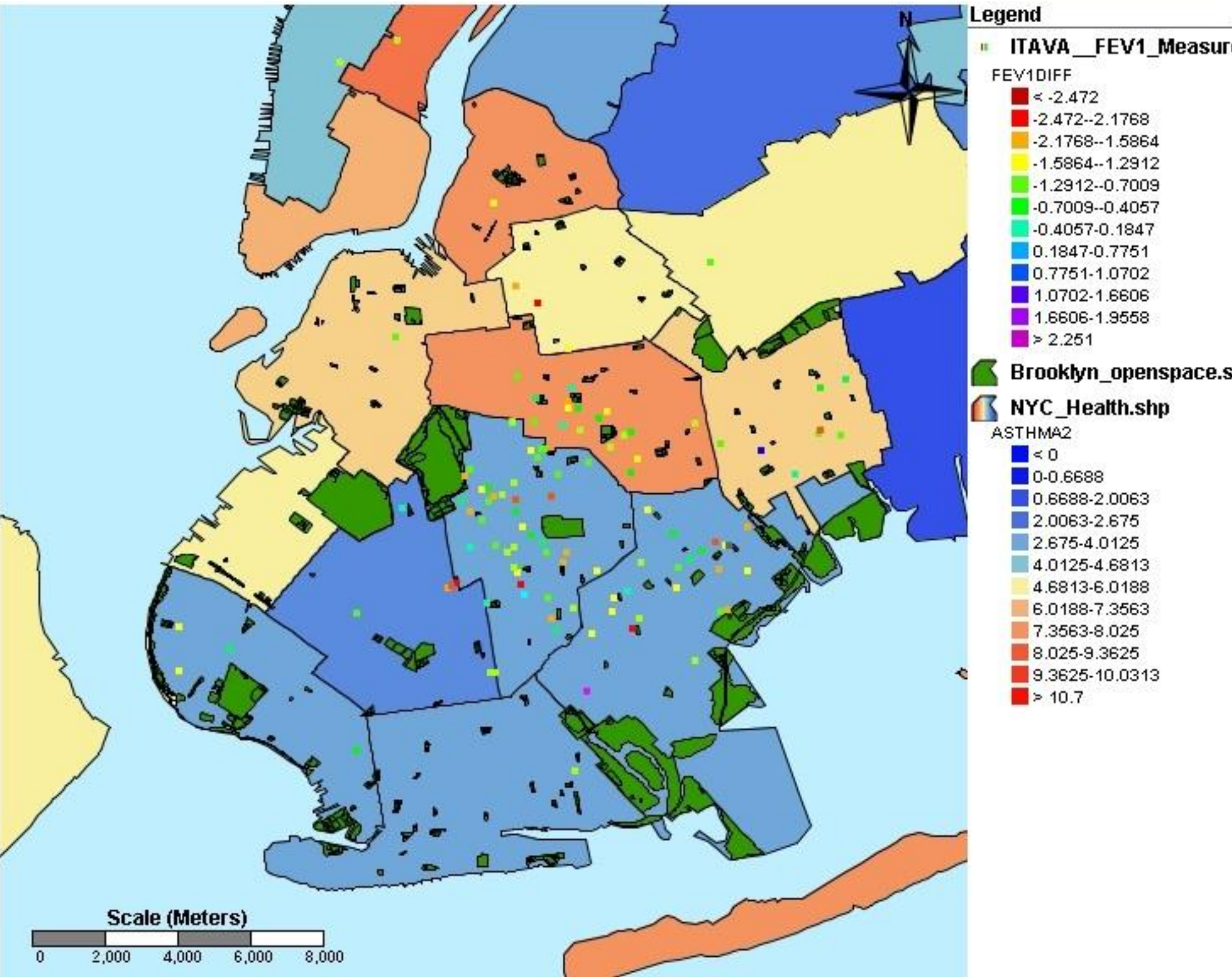
Figure 3.



## Results cont'd

We wanted to know how the people in our sample and their FEV1 values were related to other known breathing related health issues in the community. So, based on the approximate address of each participant, we plotted the FEV1 values using My World GIS (geographic information systems) software over known asthma rates obtained from the New York City Department of Health. (See figure 4.)

Figure 4.  
Obtained FEV1 values & known Brooklyn asthma rates.



## Conclusion

The results of the Air Pollution Knowledge and Attitude Survey indicate two interesting things. First, most of the people in our sample did not know what air was mostly made of. This indicates that more education about what is in the air might be needed. Second, our results indicate that ITAVA high school students were more optimistic about their role in helping solve the air pollution problem in their community than were the Brooklyn College students sampled. This might be an effect of age.

The results of the FEV1 analysis indicate that most of our ITAVA sample has a lung capacity that is lower than the standard values. This could have been caused by air pollution. Additionally, most of the people in our sample live in areas that already have high rates of asthma. Although our results are not diagnostic, they do indicate that people in our community are at risk for breathing related illnesses, and as a community we should do whatever we can to minimize air pollution.

## \*contributing students

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