

phenomenon was assumed to have occurred due to the inexperience with the test in the morning and having “trained” in the morning, they performed better in the afternoon. This phenomenon resulted in supporting the change in experimental design that occurred from the other agency backing out, because now the practice effect would be removed on the second day of data collection with this group of landscape workers.

On March 28, 2003 data collection resumed. It was 50°F when the PFTs were administered to the participants and the high for the day was 64°F. The worksite for the second day of data collection was in Dublin, Virginia. Only seven participants were available for data collection on this day, two of which were not used on the first day of data collection due to absents, but had participated in the preliminary screening. All were equipped with functioning pumps and they performed their PFT before and after their shift. The conditions of the day were very good for collecting dust in the participants’ breathable air space; however, due to a complication with the equipment, the afternoon PFT results were lost and irretrievable. The complication that occurred with the equipment is not completely clear, the technician claimed that he deleted the memory card in the field spirometer after printing what he thought was the afternoon PFTs, but in actuality were the morning PFTs. Deletion of the information from the memory card is difficult and has to be intentional, which is not common practice with the organization that employed the technician. The other theory is that the technician never replaced the memory card in the spirometer after downloading and printing the morning PFTs during the shift before returning to the site for afternoon PFTs. This equipment failure caused critical information to be lost, and made it impossible to perform the proposed correlation between pulmonary function and the exposure to endotoxin and fungal spores. The lack of data and inability to correlate the possible “cause and effect” of the exposure to the symptoms created a challenge for completely addressing the original hypotheses.

From the data that were successfully collected and analyzed several recommendations can be made in response to the research questions. With the loss of data some changes had to be made to the matter in which the research questions were addressed though fundamentally the questions were answered as originally proposed. The following are the proposed research questions for this study.

## **4.2 Research Question Revisited**

1. Are landscape workers that are exposed to respiratory irritants via wood mulch experiencing a significant shift in pulmonary function?
2. Is there a need for occupational exposure limits for non-infectious microorganisms?
3. Are respirators a necessary and effective intervention for career landscape workers working with wood mulch?

The resulting data accumulated in this study are shown in the chart below:

**Table 6: Overview of Collected Data**

<b>First Day of Data Collection</b>	<b>Second Day of Data Collection</b>
Three air samples	Seven air samples
Eight AM PFTs	Seven AM PFTs
Eight AM PFTs	No PM PFTs
<b>Total Data</b>	
Nine completed preliminary questionnaires	
Ten completed respirator design questionnaires	
Nine completed Rylander questionnaires	

The alternate analysis was developed using the original research questions and the obtained data. Using the data, connections were analyzed for significance between age and smoking habit and the responses on the questionnaires. Also, the investigation of the available respirators, recommendations were made about a more suitable disposable respirator that can be used in this industry. These analyses resulted in future research opportunities. The analysis was as follows:

Alternate Analysis:

- Make descriptive connections between age and smoking habits to responses on Rylander's questionnaire and the respirator design questionnaire.

- Compile and reduce the responses from the respirator design questionnaire and perform a thorough review of manufactured N-100 respirators and make design recommendations.
- Make recommendations on future research in this industry with this hazard.

### **4.3 Preliminary Demographic Responses**

During the preliminary meeting with the participating landscaping crew members demographic information was collected and compiled in Table 7. All of the employees were male and were tobacco users in the chosen population. Eight of the nine (88.9%) were smokers and the one non-smoker used chewing tobacco regularly. The number of years that participating employees have been smoking tobacco products ranges from 5 to 19 years. Of the nine employees all claimed to have no reported respiratory disease.

**Table 7: Participant Demographics**

Current Smokers (n=9)	8 (88.9%)	
Number of Male Workers (n=9)	9 (100%)	
Number Reporting Respiratory Diseases (n=9)	0 (0%)	
	<b>Mean</b>	<b>Standard Deviation</b>
Number of Years Smoked	10.25	5.37
Average Age (years)	28	10.23

### **4.4 Rylanders Questionnaire Responses**

The adapted Rylanders' questionnaire was administered to the landscaping workers individually via interview. Volunteers read the questions to the employees (Figure 4) after their shift on the first day and on the second day to any participants that were not present on the first day. The workers' responses were documented by the volunteers verbatim from the worker. This process allowed for a semi-private environment for obtaining medical history and previous work information that may be