The Elderly, Air Pollution, and Hospitalization

Although air quality is very important for all of our health, one group of humans is especially impacted by poor air quality: the elderly.

Various factors cause the elderly to be a vulnerable population when it comes to health. They have more 'garbage' in their lungs than most of us because they have been breathing longer. They may have been smokers or may have been brought up in a smokers' household in an age where smoking was an acceptable behavior. Because of these things, their lungs typically have less capacity than younger people's lungs.

The lungs of an older person are less elastic and less able to filter out polluted air than when they were younger. Furthermore, the elderly has a more compromised immune system than younger people. Their immune system is not as agile at killing off or sequestering foreign particles as it once was. As a result, it takes much longer for them to heal and sometimes they are unable to heal at all. For those who have autoimmune diseases, this problem is exacerbated because either their body is busy fighting things it should not be fighting or it is suppressed via medication. If the elderly is fighting any type of respiratory disease or infection or have some sort of cardiovascular disease, the effects of pollution are even worse because they are unable to breathe well and their heart is unable to function well enough.

How Does Air Pollution Affect the Elderly Directly?

Particulates in the air, especially fine particulate matter that is 2.5 microns or smaller in size (PM2.5), increases the risk of hospitalization among the elderly, even if the exposure was only for a short time. Very fine particles that are inhaled by the elderly infiltrate the very depths of the lungs' bronchial where they cannot be cleared, especially by weakened older lungs. These small particles reach the small airways and alveoli and cause chronic difficulties breathing as well as cardiovascular problems. When the lungs can't get enough air because of the infiltration of these small particles, the rest of the body can't get enough oxygen. The immediate effects of this include ischemic effects that can be seen in the heart and in the brain.

Essentially, without enough oxygen, the heart can stop beating or beat irregularly, the brain can become damaged, and the patient can have chronic obstructive pulmonary disease or even chronic respiratory disease. The effects on the hearts of the elderly are especially pronounced.

Another effect of having small particles infiltrate the deep recesses of the lungs is that the body goes to work trying to fight the 'foreign invasion' of particles. In the elderly, antibody responses tend to be weakened, but inflammatory responses are often exaggerated. Research shows that these patients seem to have a large release of cytokines in their systems, a chemical associated with an increase in systemic inflammation. Inflammation, by its very nature, decreases the functionality of any organ, including the lung and heart.

Because of all of these difficulties, when the elderly is overcome by the effects of pollution, they are often hospitalized. This is a large public expense because most elderly are on Medicare. It seems that the best future option may be to focus on cleaning up the pollution so that we will be able to live healthier lives much longer. But until then, a helpful tool to purchase is a high-quality air purification system so that at least indoors, the elderly can safely breathe. Because particulate matter is the main concern, a medical grade HEPA filtration unit is the best place to start.