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Interview with Martha Sue Carraway

In this interview, EPA's Indoor Environments Division Communication Specialist Kelly Hunt talks with Martha Sue Carraway, a medical officer and scientist in the Clinical Research Branch at EPA's Human Studies Facility in Chapel Hill, North Carolina.

KH = Kelly Hunt (EPA, Communications Specialist)

MSC = Martha Sue Carraway (EPA, Human Studies Facility in Chapel Hill, North Carolina)

Kelly Hunt: Hello and welcome to the asthma edition of Science Notebook. I'm Kelly Hunt from EPA's Indoor Environments Division. Today I have the opportunity to speak with Martha Sue Carraway, a physician specializing in pulmonary and critical care medicine. Martha conducts research on the health effects of air pollution. She currently works as a medical officer and scientist in the Clinical Research Branch at EPA's Human Studies Facility in Chapel Hill, North Carolina. Martha has a faculty appointment and sees patients at Duke University Medical Center and the Durham VA Medical Center. Glad to have you here, Martha.

Martha Sue Carraway: Glad to be here. Thank you.

KH: So you conduct research on the relationship between asthma and the elderly. Can you tell me a little bit about your work, and when you started researching this relationship?

MSC: I began the study in 2009 to investigate the respiratory and cardiovascular effects of air pollution exposure in older asthmatics. The study that I'm doing now will be compared to a similar study which we already had in progress here at the EPA of young asthmatic individuals. Both studies are being done in our exposure chambers at the Human Studies Facility in Chapel Hill, North Carolina. The subjects will come and breathe a mixture of very small air pollution particles that we actually pull into the building from our local Chapel Hill air. The subjects breathe these particles for two hours and then we are looking at lung function, blood pressure and checking for heartbeat abnormalities. We also are looking at a wide range of blood tests to see if the exposure affects things such as cholesterol handling, blood clotting or blood cells that respond to infection. The way that these subjects respond to air pollution will be compared with what we saw in past studies in older, healthy individuals and of older people with pre-diabetic conditions, who we know are predisposed to developing cardiovascular complications. We also recently completed exposures of a similar study that was performed in young asthmatic adults. And the idea here is that older people may be more susceptible to air pollution, and the responses to the particles could be magnified in asthmatic people. We don't really know if this is the case, but we think it's very important to find this out.

KH: What drew you towards this work and why?

MSC: A couple of things. The EPA regulates air pollution levels based on research which shows that specific levels of pollutants are harmful to people's health. Much of the research that led to these standards was done in young and healthy people. What we don't know is whether the current levels of pollutants that are allowed are too high. We think it's possible that certain groups of people, either with older age or with underlying medical conditions, could be more susceptible to the same level of

pollutants that don't cause effects in young and healthy individuals. For example, we now know that air pollution seems to cause worsened lung function in children with asthma. So we don't know whether older adults with asthma are also more susceptible, and this is an important question because approximately six percent of adults older than 65 years of age in the U.S. have active asthma. Another important thing is that we think that asthmatic people don't clear air pollution particles from the airways, and so they can have an increased overall exposure at the same levels of air pollutants. And it's possible that asthmatics respond to air pollutants by different mechanisms than healthy people. So our research is really aimed to address all of these issues.

KH: How did you actually conduct this research?

MSC: In the study that is ongoing now, we are finding middle-aged people who have mild asthma that's under good control, which means they do not have frequent symptoms. After we make sure they are healthy, they are asked to come back for the study. They have two separate exposures which are at least two weeks apart. One is to clean indoor air, and the other is to air pollution particles from the Chapel Hill area. The amount of air pollution particles that are exposed to are approximately what one would inhale on a smoggy day in a polluted city like L.A. or Mexico City. Before and after the exposure, we measure breathing tests, blood tests and we monitor the heart rate and blood pressure. On the day following the exposure we look into the airways in the lungs to see if the air and particles that were inhaled had any effects on the lungs.

KH: So where can I go to learn more about this subject?

MSC: The National Institutes of Health has a wonderful website on asthma at the National Heart, Lung and Blood Institute. Also the American Lung Association has great asthma information on their website.

KH: Well thank you Martha for taking time to speak with me today about your work on asthma and the elderly. I really appreciate it.

MSC: Thank you.

KH: To learn more about asthma explore the rest of the asthma edition of Science Notebook or visit epa.gov/asthma.