Audio Podcast about the Symposium on the Science of Disproportionate Environmental Health Impacts

CHRISTINE GUITAR: Now with us is Dr. Stephen Linder who will be discussing his paper on multiple and cumulative impacts. Hi, Dr. Linder.

STEPHEN LINDER: Hi. Thanks for having me here.

CHRISTINE GUITAR: Now can you tell us a little bit about who you work for and what your scientific expertise is?

STEPHEN LINDER: Yes. I am with the University of Texas, School of Public Health, which is located in Houston with campuses in five other locations, and I'm in the Division of Management, Policy and Community Health. And, I have training in political and social sciences and my most recent work has focused on the nature of hazardous air pollutants and their effect on communities.

CHRISTINE GUITAR: Okay. And your paper addresses multiple and cumulative impacts. Can you tell us what that means?

STEPHEN LINDER: Well, normally we think about exposure to air pollution on a chemical by chemical basis. We think about ozone, or we think about particulate matter and how it affects our health and how regulators are attending to the concentrations of those chemicals in the air. But if you take a closer look, you find there are a variety of chemicals that we're exposed to on a daily basis that together are likely to have a greater effect on our health than any one acting alone or singly. And, so we're trying to come up with ways to expand the framework that will eventually affect the way regulation is done, to move away from a chemical by chemical consideration, to consider these toxic mixtures of chemicals where we're exposed to not only indoor sources of toxic chemicals in the cleaning agents we use and some of the building materials but also the presence of a variety of hazardous air pollutants that interact with the more familiar ozone and particulate matter to create conditions that really begin to take a toll on our health over time. So it's more of a chronic effect on our health throughout our lifetime and if we have susceptibility to other kinds of disease processes, not just those that would affect our breathing of ozone or particulate matter. We have other disease processes going on either from genetic susceptibility or for other conditions having to do with our poverty levels, also the kinds of neighborhoods we live in, the kind of stress we deal with on a day to day basis. Those things make us vulnerable to disease and this toxic mix over time, the accumulation of the effects of these chemicals take a toll on our health in subtle ways and actually make those disease processes more manifest. We're more likely to get sick more often and earlier than what otherwise would be the case without being exposed to this accumulation of toxic chemicals.

CHRISTINE GUITAR: And how do you see your paper contributing to eliminating or reducing some of these impacts that grow and make us sicker because there are so many multiple factors making, contributing to this exposure and the ultimate impact?

STEPHEN LINDER: Although it makes sense, I think, from a common sense perspective that there would be multiple things affecting your health, it's difficult to accumulate the scientific base that will provide the evidence for making decisions on a new basis rather than a chemical by chemical basis…thinking in terms of multiples of chemicals, because it's not always an additive effect where you'd simply take one chemical A plus one chemical B and that equals twice what you'd have with just chemical A. Sometimes the effects are multiplicative, that is to say it's A x B or sometimes it actually has some unpredictable effects when you combine chemicals in certain ways. And so all these combination rules have to be worked out and the evidence has to be accumulated in order to have an impact on decision-making. And what we are talking about isn't just changing a few decisions but really changing the framework for regulation. And so ultimately we'd like to have attention paid to this notion of cumulative effects but also the extent to which the social context, the places where you live and work, contribute to that accumulation. There are sources of stress that are non-chemical too and a portion of my paper is focused on how we accommodate the non-chemical sources of stress having to do with psychological factors that we deal with on a daily basis, having to do with the social and material conditions that we live in, having to do with our accessibility of social support and other kinds of resources that not only make life worth living but also give us the cushion against the stresses of daily life. Those contribute too in a cumulative way to the chemical stressors on us and so the difficult scientific problems that we're trying to find ways to deal with directly is not just that mechanism of accumulation that I talked about when it comes to chemical stressors but this whole idea of combining non-chemical stressors that in effect make us sick with chemical stressors that are accumulating and affect disease processes we have ongoing especially in vulnerable populations. And that's the puzzle and we haven't sorted it out yet, although we know what the pieces look like. And it's difficult again to accumulate the science that provides the evidence base so we can change the way regulation is done. And I think that's ultimately the objective.

CHRISTINE GUITAR: So that's the next step. Thank you, Dr. Linder.

STEPHEN LINDER: Well, thank you.