

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

CHRISTINE GUITAR: With us is Dr. Joel Schwartz. Hi, Joel.

JOEL SCHWARTZ: Hi, how are you?

CHRISTINE GUITAR: Great. We're going to be discussing your paper on susceptibility and vulnerability. So, can you start by telling us a little bit about who you work for and what your area of expertise is?

JOEL SCHWARTZ: I'm a Professor at Harvard University and I'm in the Departments of Environmental Health and the Department of Epidemiology and I'm the Director for the Harvard Center for Risk Analysis.

CHRISTINE GUITAR: Before we go any further, can you tell me what epidemiology means is in sort of plain terms?

JOEL SCHWARTZ: Epidemiology is study of what are the causes of disease in populations, as opposed to an individual—not what made you sick, but what tend to be the things that drive disease in populations, be it infectious diseases or chronic diseases. So, for example, epidemiology is the field that showed that people who had high cholesterol had a greater risk of having a heart attack subsequently. It's not a statement about one individual, we can never say you had your heart attack because your cholesterol was high; it's a statement about the population.

CHRISTINE GUITAR: Thank you. And, so what is your paper about?

JOEL SCHWARTZ: So what my paper is about is one really simple concept, which is that the way we have traditionally done risk assessment is to come up with a number. And, then we come up with information about uncertainty about it. But we come up with a number which is how many cases of whatever it is we're looking at that we think will occur at a given exposure. And, if we reduce the exposure, how many cases are we going to avoid? That's a very important number to come up with to help EPA or other regulators to set standards to decide how much they want to reduce emissions to make those cases go down. And, our argument is they need to come up with some additional numbers as well.

And, the additional numbers are basically numbers about what is the distribution of the risk in the population. That is to say—imagine I had a scenario where I had an exposure that caused 100 excess cases of cancer. If that caused 100 excess cases of cancer in a large metropolitan area of 3,000,000 people, that would still be something we'd worry about, right?

CHRISTINE GUITAR: Right.

JOEL SCHWARTZ: But if I told you that those 100 cases were all located in a small neighborhood in that area and the risk was zero for everyone outside that neighborhood—but it was in this neighborhood that, instead of 3,000,000 people had 30,000 people and 100 of those 30,000 people were getting cancer, then that sounds like that would be interesting information to have and might affect the decision that you made. Because, instead of talking about a small risk

to a large number of people, we would be talking about a high risk to a small number of people and that raises issue of inequity.

CHRISTINE GUITAR: Right, and now can you now explain or make a link between the title of the panel which is Susceptibility and Vulnerability and what you just discussed with us?

JOEL SCHWARTZ: Sure. So the example I just gave you was really about differential exposure. But the same thing could happen with differential susceptibility. So for example the EPA recently put out a risk assessment that said if we lowered particulate air pollution levels in the United States from 15 to 10 then we would get somewhere between 30,000 and 90,000 fewer deaths per year as a result of doing that. That's a big number, right. That's an impressive thing and it was a very good risk assessment.

But that's out of 300,000,000 people. Now, 10 percent of the population has diabetes. Suppose all of those deaths turned out to be among diabetics.

CHRISTINE GUITAR: Okay.

JOEL SCHWARTZ: It'll be a different story, right. Then we might think, gee, there's this definable susceptible group that has really high risk and we need to do something more, because, how much do we want to tighten the standard? Can we really go down to 10? How much does it cost? How feasible is it? All of those things now have another dimension to it, which is there is a tenth of the population that's bearing 100 percent of the risk. Maybe that's unfair and we want to try a little harder. I'm not saying that's correct—I'm saying suppose that were correct—that would be important additional information to go into decision-making.

And so the idea of studying susceptibility is to identify who are the people who have different responses to particular exposures and figure how much inequity that produces in the effects of the exposure. That can be put in risk assessment and provide additional numbers to the Administrator of the EPA or the Secretary of HUD or whoever's making the decision so that they know that, in addition to how many fewer cases a given strategy will produce, how much it will reduce the inequity in the health consequences of exposure.

CHRISTINE GUITAR: Dr. Schwartz, thank you very much.