WEBVTT

10 00:00:58.800 --> 00:01:26.669 Alixandra Rachman: so without further you let me introduce our speak today. Dr. he's a senior researcher at the Department of Technology, at the Lazio Regional House services in Rome, Italy, he's also a jump to Senior Institute in Sweden, and he currently, he's some recent researcher at the Uci. Video.

11 00:01:26.960 --> 00:01:37.610 Alixandra Rachman: It's my great pleasure to have Dr. Stafford being here today is that he has really, truly one pioneers in in

12 00:01:38.150 --> 00:01:59.739 Alixandra Rachman: studies. If you look at some early to the 2,000 and I have collaboration, but also, and lending from in his work. So this is really great honor to have him here.

13 00:01:59.740 --> 00:02:12.040 Alixandra Rachman: Among many type of projects he has done one thing I want to mention is that he's has leading many hosts international but also Europe

14 00:02:21.350 --> 00:02:25.019 Alixandra Rachman: and the last thing I want to measure is that, as you.

15 00:02:25.220 --> 00:02:30.029 Alixandra Rachman: you know, we a lot of work. Our work is, you know.

16 00:02:30.350 --> 00:02:43.480 Alixandra Rachman: and most of those recent paper has been selected as fast amount every month. It provides the amount of international society for every month.

17 00:02:43.550 --> 00:02:51.829 Alixandra Rachman: So I think it's the the excitement for us to have him today and without residue. Appropriate your perfect.

18 00:02:55.170 --> 00:03:01.890 Alixandra Rachman: Thank you very much. Good morning, everybody. It's a big pleasure to be here. Thank you to the organizers for this opportunity.

19 00:03:02.170 --> 00:03:22.420 Alixandra Rachman: So in this presentation I will. As Kay said, I am environmentally ideologist, I am a statistician by train. So during the my decades of study I try to develop statistical methods. So I will try to focus a little bit on the methodological side, on the on the

20 00:03:22.630 --> 00:03:32.209 Alixandra Rachman: and but of course there will be a lot of results that we can discuss. So I'm very happy to get your comments on methods, results, interpretations. Whatever you do.

21 00:03:32.240 --> 00:03:33.860 Alixandra Rachman: you can think of.

22 00:03:33.890 --> 00:03:41.729 Alixandra Rachman: So the topic of the presentation will be interactive effects of heat and revolution on mortality, innovative methodological approaches.

23 00:03:41.900 --> 00:03:44.370 Alixandra Rachman: This is a topic which is very much.

24 00:03:44.430 --> 00:03:55.740 Alixandra Rachman: Let's say, though, we know that their pollution affects help. We know that string temperatures affect health. We don't know exactly how to how they interact on health, whether

25 00:03:55.760 --> 00:04:14.440 Alixandra Rachman: you know tha tha? There is a synergy between the 2. The independent effects are, you know, the the the interaction between the 2 is greater than the some of the individual effects, whether that is the same in different parts of the world. There is a lot of complexity there, and there is a lot of divergence results across the world.

26 00:04:14.450 --> 00:04:24.190 Alixandra Rachman: So in this study I will present you 2 main projects where we have been working on this on this topic. The first project, if is, I don't know.

27 00:04:25.150 --> 00:04:26.260 Alixandra Rachman: Stevie.

28 00:04:30.050 --> 00:04:30.760 Great.

29 00:04:33.160 --> 00:04:35.490 it's not working. So

30 00:04:35.880 --> 00:04:37.160 Alixandra Rachman: move them up.

31 00:04:37.560 --> 00:04:41.460 Alixandra Rachman: anyway. The the first project is a European project.

32 00:04:42.270 --> 00:05:10.420 Alixandra Rachman: Yes, the Exhaustion project and the the it's a funded by the horizon. 2020. It's a very big project involved many countries in Europe. You see, the topic is about heat, air, pollution is a side, and this project the focus of the the the project is exposure to heat and the pollution in Europe currently, in box and benefits of mitigation and adaptation. So it's not only research. There is a lot of a you know public.

33 00:05:10.630 --> 00:05:16.189 Alixandra Rachman: We entered the, you know, investigation here in terms of adaptation and mitigation strategies.

34 00:05:16.590 --> 00:05:26.110 Alixandra Rachman: And but it's a big project with different types of data that have been collected, that you can see 3 3 different levels of analysis.

35 00:05:26.170 --> 00:05:30.599 Alixandra Rachman: So there is data from individual cities.

36 00:05:30.930 --> 00:05:40.340 Alixandra Rachman: The Continent, with time series approaches to investigate the effect of heat on Cardi Bordinari outcomes at the city level.

37 00:05:40.420 --> 00:05:41.539 Alixandra Rachman: Then there is a

38 00:05:41.790 --> 00:05:51.780 Alixandra Rachman: this is which is the one I will focus today, which is a small area analyzed. So for a few of the countries

we were able to collect data, not just for the main.

39 00:05:51.950 --> 00:06:03.440 Alixandra Rachman: for the entire country. So cities, rural areas, small towns, villages, etc. And so the purpose there was to exploit the potential of the special templeite contrasts

40 00:06:03.440 --> 00:06:25.599 Alixandra Rachman: in exposures and outcomes, especially to see whether there was some differences between rural, suburban and rural areas when it comes to effect of heat and people outcome. And the level 3, which is here is called data. So we have a few cohorts in Europe, and the idea was to investigate both long term effects and short term effects.

41 00:06:25.660 --> 00:06:39.630 Alixandra Rachman: And also we study the different aspects of the relationship between a temperature and outcomes. And we focus on what is create that blue blue circle here which is the interaction between the temperature and their pollution.

42 00:06:39.680 --> 00:06:45.080 Alixandra Rachman: So that's that was the the the focus of this presentation for exhaustion.

43 00:06:45.980 --> 00:06:52.969 Alixandra Rachman: Some details about the methodological steps that we have undertaking this this project

44 00:06:53.010 --> 00:07:02.370 Alixandra Rachman: so that we can go, we can go more into the details of the again. The objective was to estimate the effect of high temperatures by levels of airplane.

45 00:07:02.690 --> 00:07:04.879 Alixandra Rachman: So in this part, in this project.

46 00:07:04.920 --> 00:07:14.450 Alixandra Rachman: we are considering a third temperature as our main exposure. So we are interested in the effect of our temperature, and specifically the heat.

47 00:07:14.480 --> 00:07:18.370 Alixandra Rachman: So we are focusing on the part of the relationship

48 00:07:18.450 --> 00:07:21.870 Alixandra Rachman: on the right side of the exposure response function. So when it

49 00:07:21.900 --> 00:07:29.389 Alixandra Rachman: so if you look at the scale of temperature. We are not investigating this part, the effect of cold temperatures, or the effect of heat.

50 00:07:29.540 --> 00:07:50.210 Alixandra Rachman: and that's the first choice that we made in this project to kind of a restrict to the the size of the study. Air pollutants are considered in in this study as effect modifiers, so the task here is to investigate whether the effect of temperature changes for different levels of air pollution

51 00:07:50.990 --> 00:07:56.490 Alixandra Rachman: in the next project that I will talk in the second part of the presentation. Now we will do also the other

way about.

52 00:07:56.570 --> 00:08:10.039 Alixandra Rachman: So we would see whether the effect of the pollution changes for different levels of temperature, because that is also interesting. And that's part of the the synergy between the 2 exposure. I think this part we will focus on.

53 00:08:10.470 --> 00:08:20.230 Alixandra Rachman: So, as I said, that we focused study on those countries which provided the small area data. And these were 5 countries that I will present in the next slides.

54 00:08:20.360 --> 00:08:23.510 Alixandra Rachman: So we have added the up levels.

55 00:08:23.630 --> 00:08:29.180 Alixandra Rachman: larger area units like counties or regions, and smaller.

56 00:08:29.490 --> 00:08:41.300 Alixandra Rachman: like provinces or municipalities, or in in Uk. The business distinction between Ms way, which are different size of zoom, and we will explain that

57 00:08:41.330 --> 00:08:52.840 Alixandra Rachman: later why we decided to have different levels. Exposure is daily in temperature as effect modifiers. We are considering these 3 pollutants. So just to have an understanding.

58 00:08:53.340 --> 00:09:03.449 Alixandra Rachman: all of you are more or less familiar with the air, pollution, epidemiology? Or do you need some kind of a introduction to what Pm. Is what ozone is?

59 00:09:04.120 --> 00:09:06.430 Alixandra Rachman: Can I assume that more or less

60 00:09:06.740 --> 00:09:27.990 Alixandra Rachman: so? Pm. Stands for particulate matter. 10 or 22.5 is the size, fraction, the finest, the fraction, the most, the more plausible are the particles to penetrate deep into the air wave system, and then to translocate into other blood circulation, and to to affect other other organs as well.

61 00:09:28.020 --> 00:09:45.140 Alixandra Rachman: So in this, that is, we are considering. Pm, 10 pm. 2.5 and and so let's focus a little bit on the analytical strategy. So first of all, we couldn't pull the country specific data, all in one big data set, each

62 00:09:45.270 --> 00:10:09.550 Alixandra Rachman: country referent analyze their own data. So it's country specific analysis. This meant that we had to produce a code that was standardized and that was shared among all the study participants. Each one of them run the analysis. They sent back the results we double checked, and we kind of find you under the process.

63 00:10:10.410 --> 00:10:15.100 Alixandra Rachman: So in each country, as I said, we defined the large areas, meaning.

64 00:10:15.830 --> 00:10:29.969 Alixandra Rachman: for example, just make to make it simple. In Italy we have, more or less, 8,000 municipalities, but some of them are very, very small. So analyzing each one of them individually, was not feasible.

65 00:10:30.070 --> 00:10:49.749 Alixandra Rachman: both, computationally speaking, but also in terms of statistical power. Many small municipalities contribute very, very few cases, so it was impossible to analyze each one of them individually. So what we did was to pull the municipality specific data into province specific data sets.

66 00:10:49.800 --> 00:10:52.449 Alixandra Rachman: And we analyzed each province

67 00:10:53.250 --> 00:11:09.859 Alixandra Rachman: per se. So we have 20 provinces. So you can understand in each province that are, I don't know, 200 300 municipalities. That is what how we clustered our data set to make it treatable. So analyze the study unit is still the municipality and the day.

68 00:11:09.900 --> 00:11:14.239 Alixandra Rachman: But the data set that we analyzed it one by one was the products.

69 00:11:14.340 --> 00:11:26.849 Alixandra Rachman: And we did the same in the other countries, different types of denominations. So Uk, the large areas are the Mso and the small areas are the way other places. We have counties.

70 00:11:26.890 --> 00:11:38.330 Alixandra Rachman: And yeah, but see, why is it so? Okay? So the ideas that we analyzed, for for example for Italy, each one of the 20 countries separately. Then we met, analyzed

71 00:11:38.530 --> 00:11:42.350 Alixandra Rachman: the 20 county specific results in order to get

72 00:11:42.370 --> 00:11:49.129 Alixandra Rachman: country specific result. And then we put together the 5 countries to get

73 00:11:49.780 --> 00:11:53.500 Alixandra Rachman: both associations. Is that clear that the process?

74 00:11:54.120 --> 00:11:55.020 Alixandra Rachman: Okay?

75 00:11:55.630 --> 00:12:02.229 Alixandra Rachman: And as I said, we focused on the world season because the project was much about heat.

76 00:12:02.590 --> 00:12:19.149 Alixandra Rachman: climate change, global warming. So even though there is an interest even in investigating the other side of the relationship, we had to kind of restrict our our study in some way. So we focused but the attention of the world season that we defined as a May September.

77 00:12:19.510 --> 00:12:24.669 Alixandra Rachman: and in sensitivity analysis, we also further restrict to June to August.

78 00:12:25.140 --> 00:12:33.439 Alixandra Rachman: We will see next project, which is based on global data. We couldn't just decide define, based on monthly.

79 00:12:33.470 --> 00:12:43.740 Alixandra Rachman: because May, September is summer, in some places is winter, in others we have to do something different, and we will see that later and in terms of models.

80 00:12:43.980 --> 00:12:58.540 Alixandra Rachman: It is a time series, approach. We have daily counts of specific mortality, daily mean temperature, daily air pollution. So it's a postal regression. We apply the time quasimos on regression modeling

81 00:12:59.210 --> 00:13:02.939 Alixandra Rachman: adjusted for time trends and other potential confounders.

82 00:13:03.240 --> 00:13:09.519 Alixandra Rachman: Don't think I would go too much into the details of the modeling part. But if there are specific questions on that.

83 00:13:10.080 --> 00:13:24.720 Alixandra Rachman: of course you can. You can ask. But the idea of the awesome regression for those of you who are not familiar with that is that they poison is based on count. So it nicely fits into the the analysis of count data. Firstly.

84 00:13:24.800 --> 00:13:30.549 Alixandra Rachman: second, the idea of a time series analysis is that you want to kind of a.

85 00:13:30.620 --> 00:13:39.909 Alixandra Rachman: let's say, focus on the day to day variability between exposure and outcome. So you want to filter out long term and seasonal trend

86 00:13:39.990 --> 00:13:48.270 Alixandra Rachman: seasonal trends, so that what is left to be to to to make our inference off is the short term day to day vulnerability.

87 00:13:48.330 --> 00:13:59.929 Alixandra Rachman: So this is what we did in this analysis to analyze the data adjusting for time trends both to capture the long term and to capture the seasonality aspects.

88 00:14:01.380 --> 00:14:11.530 Alixandra Rachman: Okay, so the complex part was the the this tensors motor here. So the idea was that we wanted to capture the

89 00:14:11.680 --> 00:14:17.739 Alixandra Rachman: complex relationship between co-exposure to our temperature and air pollution.

90 00:14:17.790 --> 00:14:22.649 Alixandra Rachman: So that's the idea. And to do that, basically, what we did was

91 00:14:22.710 --> 00:14:38.879 Alixandra Rachman: trying to be as flexible as possible by considering products of of splines. So we we were flexible in

terms of the exposure response functions, both for the air pollution and for our temperature. And we use this tensor smooter, which is

92 00:14:38.910 --> 00:14:43.089 Alixandra Rachman: basically a product of splines. You know what the spline is.

93 00:14:43.670 --> 00:15:12.420 Alixandra Rachman: It's a nonlinear function. So we relaxed the assumption of linearity, and we assume that that the relationship between temperature and mortality could be nonlinear, because this is what it is, it is nonlinear. So there is a point of temperature where the risk is minimum, and then, departing from that point, you see the risk increasing both on the right, left side for cold temperature and on the right side for the world damage. So it's a nonlinear relationship

94 00:15:13.060 --> 00:15:20.560 Alixandra Rachman: for air pollution. Is not that clear? I mean, there is a lot of evidence that the linearity assumption might hold

95 00:15:20.620 --> 00:15:28.950 Alixandra Rachman: so ideally. We might have kept air pollution. As you know. we will see in the second project, that this is exactly what we decided

96 00:15:29.060 --> 00:15:38.960 Alixandra Rachman: to keep our pollution as linear in order to simplify the interpretation and the presentation of the results. Here their pollution was just an effect modifier.

97 00:15:39.180 --> 00:15:44.949 Alixandra Rachman: Here we were interested in extrapolating the effect of temperature by levels of our pollution.

98 00:15:45.110 --> 00:15:58.229 Alixandra Rachman: So we use this tensor smoothing. And also we simplify the the the latency of the relationship. Considering a luxio, one luxio, one means that we are investigating the relationship between today's

99 00:15:58.350 --> 00:16:02.189 Alixandra Rachman: mortality and today's and yesterday exposure.

100 00:16:02.440 --> 00:16:03.699 Alixandra Rachman: we didn't go

101 00:16:03.860 --> 00:16:06.000 Alixandra Rachman: back more days.

102 00:16:06.420 --> 00:16:07.760 Alixandra Rachman: because

103 00:16:07.910 --> 00:16:15.669 Alixandra Rachman: from the literature we know that when it comes to the effect of heat, usually it is the very first days which have strongest impact.

104 00:16:15.760 --> 00:16:19.219 Alixandra Rachman: You don't usually go much. Thank you, Tom.

105 00:16:19.380 --> 00:16:30.390 Alixandra Rachman: When it comes to cold effects it is a more delayed association. Usually you you would see effect even that way. You study the exposure one or 2 weeks before the outcome.

106 00:16:30.510 --> 00:16:38.029 Alixandra Rachman: But for the heat it's more the heat wave that that you know the very peak in exposure today or yesterday.

107 00:16:38.420 --> 00:16:43.059 Alixandra Rachman: So like 0, one is basically the the average exposure between today and yesterday.

108 00:16:43.450 --> 00:16:44.310 Alixandra Rachman: Okay.

109 00:16:45.470 --> 00:16:56.720 Alixandra Rachman: okay, we have to. Since the effect of temperature is not linear. We have to define how to express this relative risk, this effect

110 00:16:56.920 --> 00:17:18.209 Alixandra Rachman: that are different for the possible ways in the literature. If any one of you is studying this kind of literature, you will see different ways to express the effect of heat. So you have. When I say effective, you have to define a reference point, and you have to compare the risk at some point versus the reference. That's the relative risk we have in mind.

111 00:17:18.800 --> 00:17:27.029 Alixandra Rachman: We've decided that since we are, we were analyzing different countries and different special units within each country, we decided

112 00:17:27.280 --> 00:17:36.130 Alixandra Rachman: to choose some person types which will correspond to different levels of temperature in each flavor department.

113 00:17:36.310 --> 00:17:45.489 Alixandra Rachman: We we do not expect that the effect would be the same at the same level of temperature because of adaptation to different climates. Even within a country you were that

114 00:17:45.550 --> 00:17:50.529 Alixandra Rachman: diverts, you know, temperature ranges north to south.

115 00:17:50.780 --> 00:17:54.489 Alixandra Rachman: So we decided to be kind of relatively

116 00:17:54.960 --> 00:18:06.659 Alixandra Rachman: dies. So basically, we are expressing the the effect of temperature for increments of temperature from the 70 fifth to the 99 percentile of the location specific distribution.

117 00:18:08.690 --> 00:18:23.870 Alixandra Rachman: Okay? And for revolution same, we have to define what is low, what is medium, what is high. And we decided to use a fifth, fiftieth and 90 fifth percentile as levels of air pollution

118 00:18:23.940 --> 00:18:28.170 Alixandra Rachman: and insensitivity. Analysis will be did something. Okay.

119 00:18:28.520 --> 00:18:32.689 Alixandra Rachman: So this is just to give you a visual

120 00:18:32.780 --> 00:18:35.020 Alixandra Rachman: representation of what we are doing.

121 00:18:35.150 --> 00:18:39.049 Alixandra Rachman: You can see this is kind of a complex relationship. You have a

122 00:18:39.260 --> 00:18:47.860 Alixandra Rachman: your outcome here when it's written linear, predatory. You can imagine that as the risk of mortality, you have air pollution. Here you have temperature.

123 00:18:48.130 --> 00:18:49.390 Alixandra Rachman: and for increased

124 00:18:49.590 --> 00:18:56.470 Alixandra Rachman: temperature, you have the risk which goes up in different ways, depending on where you are in this joint relationship.

125 00:18:56.760 --> 00:18:58.870 Alixandra Rachman: So the idea was to

126 00:18:58.970 --> 00:19:12.660 Alixandra Rachman: take cross sections of this relationship at different levels of pm, so let's say low, I'm sorry. Yes, low, medium and high. And take out of these 3 curves. Take the

127 00:19:12.740 --> 00:19:25.539 Alixandra Rachman: effect of temperature expressed top 70 fifth to the 99% time. And the nice feature of this graph is that you can reverse, and you can express the effect of air pollution

128 00:19:25.580 --> 00:19:33.119 Alixandra Rachman: levels of temperature from exactly the same model. That was what we did in the second project that have been.

129 00:19:33.590 --> 00:19:43.580 Alixandra Rachman: and the complex part was to derive standard error. So using a statistical lifestyle.

130 00:19:44.800 --> 00:19:45.680 Alixandra Rachman: okay.

131 00:19:45.930 --> 00:19:51.399 Alixandra Rachman: so these are the countries that were involved, you can see the the special units.

132 00:19:52.500 --> 00:19:59.480 Alixandra Rachman: And this is the map of yes, mean or temperature level. Kind of difficult to see the

133 00:19:59.540 --> 00:20:02.000 Alixandra Rachman: the range. You see, it's it's in

134 00:20:02.020 --> 00:20:14.559 Alixandra Rachman: Centigrade Centigrade. So I don't know in far 9. How I mean how that converts! But it's there is different, of course, variability. We have Norway, which is far north.

135 00:20:14.900 --> 00:20:24.050 Alixandra Rachman: much colder. We have England and Germany, which are kind of more in the center, and then Antarctica, which represents the Mediterranean climate.

136 00:20:25.010 --> 00:20:28.830 Alixandra Rachman: and these are maps of Pn. 2.5

137 00:20:28.970 --> 00:20:36.700 Alixandra Rachman: higher level. Even here you can see some vulnerability. In Italy we usually see this very high

138 00:20:36.950 --> 00:20:44.240 Alixandra Rachman: level in Mobile, which is part of Italy, which is one of the most pollutant polluted areas to Europe.

139 00:20:44.700 --> 00:20:49.829 Alixandra Rachman: And I mean different levels in different. This is, of course, London, for example.

140 00:20:50.160 --> 00:20:51.520 etc.

141 00:20:52.980 --> 00:21:04.410 Alixandra Rachman: That's awesome. That we didn't have data for Uk. So only this is quite small. But just give you an idea of the amount of data.

142 00:21:04.580 --> 00:21:16.669 Alixandra Rachman: So this is a number of events in terms of hundreds of thousands. So good part of the study was the power. We had a lot of statistical power, small effects.

143 00:21:16.960 --> 00:21:24.319 Alixandra Rachman: but I will start to the next step. Okay, so this is a summary of the main effects

144 00:21:25.070 --> 00:21:28.590 Alixandra Rachman: as a meta analysis of the 5 countries.

145 00:21:28.780 --> 00:21:36.589 Alixandra Rachman: And so this is the effect of our temperature by a revolution by Pm. Toward 5 levels, which is low, medium, and high.

146 00:21:36.820 --> 00:21:48.099 Alixandra Rachman: and these are expressed, as I said, change in mortality. This case you can see Co specific. So after it calls, which is the the

147 00:21:48.560 --> 00:21:54.550 Alixandra Rachman: some of cardiovascular and respiratory. And then you see the 2 groups separated.

148 00:21:55.030 --> 00:22:08.279 Alixandra Rachman: And basically what we saw, which is something that we usually see, especially from European studies. It's an increasing effect of temperature for higher levels. So this is quite a

149 00:22:08.380 --> 00:22:10.450 Alixandra Rachman: quite common tool to see.

150 00:22:12.520 --> 00:22:30.769 Alixandra Rachman: and we run also several sensitive analysis, where, as I said, we define the world period, does the 3 warmest months rather than the the 5. We tried to use a more extended log definition up to 4 days, and with different use, different types of their pollutants

151 00:22:30.800 --> 00:22:35.229 Alixandra Rachman: as the partiles, but basically the the name, each of the main.

152 00:22:35.500 --> 00:22:37.800 Alixandra Rachman: And this is the same for those.

153 00:22:38.810 --> 00:23:06.330 Alixandra Rachman: So this case it is less clear. I mean, we have in this case we see much higher effect in the high levels, not so great difference between low and medium. So it's not an an increasing, smooth, increasing gradient of effect. But it seems that the interaction happens especially at very extremes. And interestingly, this is also what happens in the global analysis from the the second project that would come.

154 00:23:07.390 --> 00:23:20.110 Alixandra Rachman: Okay, this is just some results for the country. Specific analysis also see them. There was some consistencies across countries. In some cases like, like, I guess.

155 00:23:20.130 --> 00:23:33.740 Alixandra Rachman: Italy, Germany, it was more pronounced in other cases. It was a little bit so. For example, in England it was not. That's from the, but mostly they would kind of suggest in the same pattern.

156 00:23:35.830 --> 00:23:42.310 Alixandra Rachman: and that that is below zone again for us, and we have some more. Heterogeneous sessions

157 00:23:42.600 --> 00:23:46.790 Alixandra Rachman: in some cases also the opposite way don't know.

158 00:23:47.660 --> 00:23:55.009 Alixandra Rachman: and we don't really know why. So if one of the question is, why not always the other way around. I don't know. The answer is, I don't know.

159 00:23:55.660 --> 00:24:06.820 Alixandra Rachman: so, in short, we found adverse effect of high temperature and mortality. But that's what that was already known from the literature, and we confirmed that in the sense

160 00:24:06.920 --> 00:24:18.389 Alixandra Rachman: we found stronger effects of high temperatures on the days with high P and point 5 concentrations, and the same also for for us, and with some heterogeneities across across counties.

161 00:24:19.790 --> 00:24:32.659 Alixandra Rachman: okay? Any question? Yes, before moving to the next. Yeah. That's really interesting. I mean, coming from from growing up in Norway myself. Ii know how cold it is.

162 00:24:32.710 --> 00:24:39.730 Alixandra Rachman: and I know how warm it is in Italy. And you said that you, you use these percentals right to reflect that we are.

163 00:24:40.150 --> 00:24:44.100 Alixandra Rachman: We are accustomed to living in a certain climate, right? Right? But did you?

164 00:24:44.290 --> 00:24:49.959 Alixandra Rachman: There might also be sort of these biological threshold points right where, like no one

165 00:24:50.030 --> 00:25:16.540 Alixandra Rachman: is dealing well with the temperature above 35°C, for instance. And like, did you? Did you look at absolute temperatures as well for this project, or just? I mean in in other projects. What we did was or investigate the the heat wave part exactly to go

in the direction you are saying. I mean, if it is above some threshold. Still, location specific is still kind of use, the the absolute values, because it will

166 00:25:16.540 --> 00:25:34.569 Alixandra Rachman: be very difficult even to find a common support in some countries. But if it is above some very high percent time prolonged for several days, maybe that is when something triggers. So we did that as well. Not here, not here. Here we try to exploit the

167 00:25:34.770 --> 00:25:49.190 Alixandra Rachman: kind of the complex relationship hopefully at those extremes with the the 3D. Function. But I agree with you that it might be interesting to focus on the very extremes, because, biologically speaking.

168 00:25:49.200 --> 00:25:57.109 Alixandra Rachman: something different might happen. So the rough studies that show that heat waves have might add something to the

169 00:25:57.450 --> 00:26:07.180 Alixandra Rachman: continuous, you know, nonlinear exposure, response function. There will be something with the heat waves which goes beyond. The simple exposure response functions we are seeing here.

170 00:26:07.820 --> 00:26:09.700 Alixandra Rachman: Yeah. thanks.

171 00:26:12.950 --> 00:26:35.569 Alixandra Rachman: Yes, it's a very great project. And my question is about so tensor, smooth product. I mean, when you form the tensile product, for example, Pm. To move wine and a high temperature. Have you ever adjusted for ozone and the Pm. Tap in the tensor app? So this is a good

172 00:26:35.810 --> 00:26:49.080 Alixandra Rachman: question definitely, not for piano, because usually when we investigate it, when we investigate. Pn. 2.5, adjusting for P. And 10 is kind of a counterintuitive one is part of the other.

173 00:26:49.190 --> 00:27:01.939 Alixandra Rachman: So you would change the interpretation of the coefficient, because usually, since one is contained in the other, adjusting for one would mean kind of make your inference on the residual part, which is the course fraction.

174 00:27:02.440 --> 00:27:06.710 Alixandra Rachman: This was not something we really wanted to do here, so we didn't adjust

175 00:27:06.810 --> 00:27:10.920 Alixandra Rachman: for PM. 10 when we investigated Pn. 2.5 or the other way around

176 00:27:11.170 --> 00:27:23.900 Alixandra Rachman: for Rosalinda. I think in some of the sensitivity analysis. We did that. And it didn't change much. So we we didn't do. We didn't change. It didn't change our our relationships.

177 00:27:24.000 --> 00:27:36.779 Alixandra Rachman: definitely, we did that in the next project that I will show. So there was not a lot of residual confounding from mutual go. Pollutant textbooks.

178 00:27:38.050 --> 00:27:44.489 Alixandra Rachman: Is it? Pm. To Pm.

179 00:27:45.030 --> 00:27:46.470 Alixandra Rachman: PM. 2.5.

180 00:27:46.580 --> 00:27:54.559 Alixandra Rachman: So what people do if they want to focus on the course fraction

181 00:27:54.840 --> 00:28:18.540 Alixandra Rachman: thing you can do is to subtract Pm. 2.5 from P. And 10 ahead. So to get a sort of estimate of the course fraction. I say it's naive, because to do that you should have exactly the same monitors make sure that they are monitoring exactly the same way at the same time, and then you get some kind of realistic estimates of the course fraction.

182 00:28:18.710 --> 00:28:36.009 Alixandra Rachman: But even so, you are mixing together measurement which are taken with some errors. So you are adding up errors in the Pm. 2.5 estimates errors in the Pn. Pn. 10. And so that what usually happens is that the signal you see in the course fraction

183 00:28:36.040 --> 00:28:42.919 Alixandra Rachman: this way, you have to find it this way is more noise because of this exposure measurement, arrow, which comes from both

184 00:28:42.970 --> 00:28:51.429 Alixandra Rachman: fraction, but conceptually investigating the coarse fraction. is is very interesting, because course fraction is

185 00:28:51.590 --> 00:28:53.070 Alixandra Rachman: possibly

186 00:28:53.600 --> 00:29:12.069 Alixandra Rachman: by different sources of other pollution. And so it might be interesting. For example, natural sources in Southern Europe we have lot of intrusions that are dust from the Sahara. That impacts more the cores fraction and less than the fine fraction. So investigating different fractions might be interesting

187 00:29:12.530 --> 00:29:13.740 Alixandra Rachman: efficiently.

188 00:29:17.060 --> 00:29:17.860 Alixandra Rachman: Okay.

189 00:29:19.030 --> 00:29:20.619 Alixandra Rachman: So we move to the next.

190 00:29:22.110 --> 00:29:34.500 Alixandra Rachman: Okay? So the Ncc collaborative network for those of you who haven't heard about is a collaborative network of investigators from all around the world. people repairing data

191 00:29:34.630 --> 00:29:36.529 Alixandra Rachman: on a voluntary basis. Basically.

192 00:29:36.650 --> 00:29:41.930 Alixandra Rachman: it's Nona. It's a non. It's anonymous data. It's a a

193 00:29:42.330 --> 00:29:51.320 Alixandra Rachman: aggregated data. It's daily counts of mortality. Daily mean temperature, daily mean air pollution for

all cities around the world.

194 00:29:51.570 --> 00:29:58.140 Alixandra Rachman: It is led by the London School of Egyptian and tropical medicine as a price.

195 00:29:58.350 --> 00:30:18.189 Alixandra Rachman: It's a big effort. But the nice thing is that people can volunteer to to run up. I mean to conduct a study. So there is protocol to feel like you send it to the steering committee. Usually they are okay. Or maybe they can put you in touch with people doing something similar within the same network.

196 00:30:18.190 --> 00:30:29.310 Alixandra Rachman: You get the data, you run the analysis. So it's it's a good opportunity for all of you that might be interested in working on this time series data to to know about the

197 00:30:30.270 --> 00:30:35.329 Alixandra Rachman: yes, this is summarized here. Of course, the representation is not perfect.

198 00:30:35.350 --> 00:30:38.880 Alixandra Rachman: There are areas like most of Africa

199 00:30:38.990 --> 00:30:50.999 Alixandra Rachman: which is not represented. Other areas in Asia not represented only a few locations from Australia. But that's one of the limitations of a voluntary based, you know.

200 00:30:51.280 --> 00:30:53.120 Alixandra Rachman: and collaborations.

201 00:30:54.580 --> 00:30:56.790 Alixandra Rachman: And okay.

202 00:30:58.930 --> 00:31:06.000 Alixandra Rachman: so all this. So what we did here was to investigate whether the association between our temperature

203 00:31:06.130 --> 00:31:09.250 Alixandra Rachman: and mortality is modified by our position

204 00:31:09.300 --> 00:31:10.840 Alixandra Rachman: exactly as before.

205 00:31:10.850 --> 00:31:23.509 Alixandra Rachman: but also the other way around, so to evaluate whether the association between air pollutants and mortality is modified by our temperature. and then we try to see whether there was any. I mean differences

206 00:31:23.650 --> 00:31:29.729 Alixandra Rachman: across different countries across different continents. Try to to to have a

207 00:31:30.660 --> 00:31:33.910 Alixandra Rachman: perception of the virginity of the results.

208 00:31:35.890 --> 00:31:42.190 Alixandra Rachman: Very briefly, this is the the distribution of cities. This is temperature disease.

209 00:31:42.640 --> 00:31:43.890 Alixandra Rachman: pn, 10,

210 00:31:44.080 --> 00:31:50.729 Alixandra Rachman: average. So we use daily averages. But of course, for the map. We use the average across the entire time series.

211 00:31:50.920 --> 00:32:01.100 Alixandra Rachman: and this is piano owns on Mpm. To 45, and we have an end of tourism here. She's not here. Hello.

212 00:32:01.870 --> 00:32:11.409 Alixandra Rachman: small, very big table with a lot of numbers. We will not go into them. Just give you a flavor of the variety of the countries generally.

213 00:32:11.820 --> 00:32:14.840 Alixandra Rachman: Any one of you know about the Ncc network.

214 00:32:16.160 --> 00:32:17.520 Alixandra Rachman: Okay, let's see.

215 00:32:20.520 --> 00:32:21.380 so much.

216 00:32:21.800 --> 00:32:28.100 Alixandra Rachman: So thank you. Some different, some similarities with the previous studies and some differences.

217 00:32:28.440 --> 00:32:32.190 Alixandra Rachman: Again, here we focus the attention on the world. Video.

218 00:32:32.270 --> 00:32:37.729 Alixandra Rachman: one of the comments of the reviewers, why are you only doing world wide. Not the cold period.

219 00:32:37.880 --> 00:32:40.059 Alixandra Rachman: because it was too big.

220 00:32:40.600 --> 00:32:46.660 Alixandra Rachman: would be another paper doing also the call effects. It's very interesting.

221 00:32:46.940 --> 00:32:55.799 Alixandra Rachman: but it was another. It was matter for another. In this case we couldn't just define. Based on calendar months we had to adapt to each

222 00:32:55.920 --> 00:32:57.999 Alixandra Rachman: different country, and the best

223 00:32:58.660 --> 00:33:04.400 Alixandra Rachman: could think of was to to consider a running average of the monthly means.

224 00:33:04.420 --> 00:33:07.709 Alixandra Rachman: and to define as the warm period of the

225 00:33:07.720 --> 00:33:12.410 Alixandra Rachman: the the 6 consecutive war response in each in each country.

226 00:33:13.670 --> 00:33:15.059 Alixandra Rachman: You need to see it in sort of.

227 00:33:15.570 --> 00:33:26.559 Alixandra Rachman: And this is what we did. So we have a continuous time period, because it's consecutive months. It might shift a little bit from one place to the other, but that was exactly the point.

228 00:33:26.940 --> 00:33:30.250 Alixandra Rachman: and in sensitive analysis, with strict

229 00:33:30.520 --> 00:33:31.790 work as possible.

230 00:33:33.290 --> 00:33:48.840 Alixandra Rachman: Again, it's time series data by city. So in this case we don't have a big area, small area. It's just the city, the country, and the and the country. Yes, so we have a time series for each one of these 620 cities.

231 00:33:49.440 --> 00:33:58.690 Alixandra Rachman: and we analyze them with using again that person aggression followed by country specific, and then some global meta analysis

232 00:33:59.690 --> 00:34:08.879 Alixandra Rachman: again. Both. The exposure in this case we don't have just one exposure. All of them are exposures. All of them are effect modifiers.

233 00:34:09.230 --> 00:34:17.089 Alixandra Rachman: So because we study both sides of that 3D relationship and all of them over analyzed at the lak 0 one for the city

234 00:34:17.260 --> 00:34:18.840 Alixandra Rachman: I mentioned before.

235 00:34:19.500 --> 00:34:23.909 Alixandra Rachman: In this case we adopted a different approach. So

236 00:34:24.920 --> 00:34:33.019 Alixandra Rachman: we apply that and a product term between a cubic spline for temperature and a linear term for air pollution.

237 00:34:33.320 --> 00:34:35.210 Alixandra Rachman: And the reason for that is that

238 00:34:35.370 --> 00:34:49.219 Alixandra Rachman: one of the nice feature of the Ncc. Is that before going to external review you go to internal review, and in this collaboration there are a lot of big. you know, epidemiologists giving giving you insights.

239 00:34:49.610 --> 00:35:03.579 Alixandra Rachman: George Schwartz is Chappelle ben Armstrong. All big names. and many of them were not convinced about using their pollution as nonlinear. Originally I had used the tensors motor exactly. Yes.

240 00:35:03.670 --> 00:35:04.809 Alixandra Rachman: showed before.

241 00:35:04.860 --> 00:35:12.160 Alixandra Rachman: But then they say, Okay, it's difficult to explain. It's difficult, because one thing is to report the effect of temperature by

242 00:35:12.450 --> 00:35:22.810 Alixandra Rachman: when you express the effect of revolution. What does that mean? Going from the I don't know. From the 20 fifth to the 70 fifth person time, it's totally different levels.

243 00:35:22.930 --> 00:35:25.829 Alixandra Rachman: So the the adaptation

244 00:35:26.900 --> 00:35:37.389 Alixandra Rachman: think, you know, we can kind of easily understand it for temperature, that it it is relative because of adaptation. And so you want to keep it relative to each location.

245 00:35:37.460 --> 00:35:47.670 Alixandra Rachman: But when it comes to a pollution, it's not very that that easy to understand that you should be relatively, I mean 20 micrograms is 20 micrograms.

246 00:35:47.710 --> 00:35:58.120 Alixandra Rachman: although there might be still some adaptation there as well. There are places where, on average they have 50 or 60 micrograms per cubic meter, and they do not die.

247 00:35:58.140 --> 00:36:02.910 Alixandra Rachman: So there is some adaptation. But still it's not like Earth temperature.

248 00:36:02.990 --> 00:36:10.119 Alixandra Rachman: and also all of the literature uses, you know, usually linear turns, 10 micrograms, etc.

249 00:36:10.350 --> 00:36:14.030 Alixandra Rachman: So because of all these comments, I switched to this approach.

250 00:36:14.340 --> 00:36:20.599 Alixandra Rachman: which is nonlinear temperature, linear air pollution still exploiting the 3D relationship.

251 00:36:21.010 --> 00:36:23.600 Alixandra Rachman: but with some further constraint.

252 00:36:24.320 --> 00:36:30.860 Alixandra Rachman: And then we have usual co-founders, which are a long-term and seasonal time trends and day of okay.

253 00:36:31.300 --> 00:36:40.800 Alixandra Rachman: And it was not all cause. Mortality here didn't have cause specific mortality in this study, but we did cause specific mortality in another study

254 00:36:40.920 --> 00:36:42.540 Alixandra Rachman: from the Ncc.

255 00:36:43.230 --> 00:36:52.499 Alixandra Rachman: So here they're pollutants are expert. The relative risk of mortality are expressed per 10 microgram per qubrelled.

256 00:36:53.030 --> 00:37:02.979 Alixandra Rachman: Okay? And we express that overall to see what was the effect of revolution per se, and then by changing temperature levels from the first to the one on the

257 00:37:03.070 --> 00:37:06.020 Alixandra Rachman: 100% time. So we

258 00:37:06.060 --> 00:37:13.930 Alixandra Rachman: we're kind of more continuous here. And the reason was that the internal of the viewers told us, why are you just picking up

259 00:37:14.080 --> 00:37:17.599 Alixandra Rachman: a few percent. Why don't you explore the full

260 00:37:17.750 --> 00:37:20.289 Alixandra Rachman: range of of the effect modifier?

261 00:37:20.840 --> 00:37:22.349 Alixandra Rachman: And the same we did, for

262 00:37:23.050 --> 00:37:28.429 Alixandra Rachman: we express the relative risk for increments of our temperature software temperature

263 00:37:28.470 --> 00:37:32.980 Alixandra Rachman: on the 70 fifth to the 99% title of city specific distribution.

264 00:37:33.150 --> 00:37:47.149 Alixandra Rachman: But then we changed exposure levels from 10 to 150. But this is pollutant specific, and the range of the pollution was based on the common support of all the cities involved

265 00:37:47.320 --> 00:37:50.630 Alixandra Rachman: when temperature was between the 70, fifth and 99.

266 00:37:50.840 --> 00:38:04.389 Alixandra Rachman: So it's it's complicated. But the idea is that if we are expressing the effect of temperature by 70 fifth to 99. Maybe in that range you never had air pollution below some values or above some like values.

267 00:38:05.080 --> 00:38:14.900 Alixandra Rachman: you are restricting. Your effect modifier range. And so we try to find ranges which accommodated most of the cities in the analysis.

268 00:38:15.970 --> 00:38:18.350 Alixandra Rachman: Is that clear for us?

269 00:38:22.010 --> 00:38:36.660 Alixandra Rachman: Okay, so these are the main effects. So before going into the effect modification. Let's just see what kind of main effect we found. So this top part is temperature. So in the main model, we analyze the 620 cities.

270 00:38:36.960 --> 00:38:51.329 Alixandra Rachman: we found that when temperature increased from the 70 fifth to the 99% time of city specific distribution on average, globally of the 620 cities, mortality increased by 8.8%,

271 00:38:52.020 --> 00:39:00.300 Alixandra Rachman: which is quite a strong association, which is very similar to what is found in the literature also from the Mcc.

272 00:39:00.930 --> 00:39:05.330 Alixandra Rachman: And this is what happens where we start adjusting for air pollutants.

273 00:39:05.950 --> 00:39:15.659 Alixandra Rachman: So if we adjust for. And you see the number of cities changes, because not all of them, not all the 620 cities and data on all meetings.

274 00:39:16.140 --> 00:39:30.209 Alixandra Rachman: So in total, we had 620 cities, but the combinations were different, depending on the availability of one

for the other. But, interestingly, despite you know, the different mix of cities the results required

275 00:39:30.230 --> 00:39:32.009 Alixandra Rachman: who must upset

276 00:39:32.290 --> 00:39:41.209 Alixandra Rachman: here we have to use Lauxido for piano 2.5, because Pm. 2.5 pm. 2.5 was mostly contributed by the Us.

277 00:39:41.730 --> 00:39:47.699 Alixandra Rachman: But unfortunately, the Us. Doesn't provide them. It provides data every third day

278 00:39:47.740 --> 00:39:50.360 Alixandra Rachman: for most of the years, including in the data center.

279 00:39:50.380 --> 00:40:06.190 Alixandra Rachman: and so it was impossible to have a 0 one package. I mean, we could have it, but at the cost of losing a lot of information. so we prefer to use to preserve as much information as possible.

280 00:40:06.420 --> 00:40:11.909 Alixandra Rachman: But still you see similar results. And then these are sensitivity, analysis, different

281 00:40:12.020 --> 00:40:17.389 Alixandra Rachman: ways of so seasonal, defined as the 3 warmest months seems more effective.

282 00:40:17.490 --> 00:40:22.209 Alixandra Rachman: Time trends analyzed with different degrees of freedom. I mean, these are details.

283 00:40:22.360 --> 00:40:26.929 Alixandra Rachman: You can see here that when you start expanding the lug

284 00:40:27.130 --> 00:40:29.060 Alixandra Rachman: the the effect

285 00:40:29.320 --> 00:40:44.340 Alixandra Rachman: drops, and this is expected. As I was saying before, it is, the very most of the effect is concentrated in very first days, if you dilute it, using a more delayed time window, the effect will go down.

286 00:40:45.270 --> 00:40:52.650 Alixandra Rachman: And yeah, this is, instead of using the 70 fifth as as reference. What if we use the fiftieth person type

287 00:40:52.690 --> 00:40:54.039 Alixandra Rachman: and the results?

288 00:40:54.050 --> 00:41:01.750 Alixandra Rachman: It's a little bit bigger, because the 70 fifth is already in this increasing part of the curve.

289 00:41:02.740 --> 00:41:11.139 Alixandra Rachman: and these are the effects of pm. 10. Time micro rapper to a bit of increments. Pian 2.5 ozone and and talk.

290 00:41:11.430 --> 00:41:18.470 Alixandra Rachman: The magnitude of the association is much smaller. Again, this is totally in line with the literature.

291 00:41:18.920 --> 00:41:29.600 Alixandra Rachman: but we we found value the results which are very much line. We bought as we published by the Ncc collaborative network, very important papers around.

292 00:41:29.690 --> 00:41:38.449 Alixandra Rachman: So 0 point 4 0 point 6 0 point 6. So small effects. But you can see very precise. So very narrow confidence.

293 00:41:40.370 --> 00:41:41.769 Alixandra Rachman: Okay, so

294 00:41:41.990 --> 00:41:52.079 Alixandra Rachman: that this is very simple. A a example of what happens when we start investigating the effect of temperature by 11 s.

295 00:41:52.090 --> 00:41:53.510 Alixandra Rachman: Of pollutants.

296 00:41:53.760 --> 00:42:10.990 Alixandra Rachman: And what we see here is that basically apart, some functioning here, but with very large confidence intervals we see quite a clear, increasing gradient of the effect. So effect of temperature is more and more high, more

297 00:42:11.320 --> 00:42:21.130 Alixandra Rachman: high foot higher level of Pn. 2.5 4 pm. 10 at the flattening seats. Kind of more for now. So maybe the disability something going on.

298 00:42:21.370 --> 00:42:24.650 Alixandra Rachman: So at some point you have some maximum effect in that.

299 00:42:24.850 --> 00:42:30.760 Alixandra Rachman: It's also to be said that at this point the number of cities start to become very small.

300 00:42:30.990 --> 00:42:34.069 Alixandra Rachman: So the case mix of cities included in which

301 00:42:34.140 --> 00:42:41.829 Alixandra Rachman: I knew of you know, different concentrations is different. So that is also why you see larger competency problems.

302 00:42:42.900 --> 00:42:47.490 Alixandra Rachman: Olson and Panoto, so pretty much the same, the same feature.

303 00:42:50.250 --> 00:43:00.110 Alixandra Rachman: while when we see the other way around. So these are the effects of different air pollutants by levels of air temperature.

304 00:43:01.270 --> 00:43:10.749 Alixandra Rachman: we are still in the world season. So even at the 0 10% time, it's not very cold. We are still in the 6 warmest months.

305 00:43:11.090 --> 00:43:20.350 Alixandra Rachman: But what we can see here is that art sum up and down. There is a sharp increase. In the effect of a pollutants when

306 00:43:20.650 --> 00:43:35.379 Alixandra Rachman: temperature person ties are the highest. So it's not an increasing gradient. It's kind of kept on some up and down, or maybe some more or less stable effect, and then there is a sharp increase at the experience.

307 00:43:36.710 --> 00:43:40.350 Alixandra Rachman: This is also the case for ozone more pronounced

308 00:43:42.130 --> 00:43:54.709 Alixandra Rachman: while forever told. It's not that clear. Actually. So it goes down. But here it's pretty much similar. So we don't see. So we see interroginous effect effects across levels.

309 00:43:54.860 --> 00:43:58.370 Alixandra Rachman: But we don't really see trend that we can. Now

310 00:43:58.790 --> 00:44:00.320 Alixandra Rachman: that we can.

311 00:44:02.340 --> 00:44:04.010 Alixandra Rachman: Okay.

312 00:44:04.400 --> 00:44:17.560 Alixandra Rachman: these are just a few figures of what apps into different countries. We couldn't go much deeper into that, because it's a huge study. I mean, it would be interesting to investigate

313 00:44:17.610 --> 00:44:32.159 Alixandra Rachman: why there are these differences. What kind of a country or city specific characteristics are responsible for these different slopes. We didn't go into that panel of the dates, but what we see here is that there are some places

314 00:44:32.300 --> 00:44:44.059 Alixandra Rachman: Europe is kind of popping up, always very sharp, increases in the effect of of temperature by increasing level of our blue dots. So the red one

315 00:44:44.110 --> 00:44:57.399 Alixandra Rachman: and Australia is only 3 cities. It's not really Australia. So one of the limitations of the study is that it's not representative of the whole count representative of the cities contributing for that count.

316 00:44:57.570 --> 00:44:58.560 Alixandra Rachman: So.

317 00:44:58.800 --> 00:45:08.719 Alixandra Rachman: but we have to keep some labels here. So the 3 cities in Australia present these results, while in the Us. For example, which is here

318 00:45:08.890 --> 00:45:10.420 Alixandra Rachman: there is some

319 00:45:10.580 --> 00:45:15.739 Alixandra Rachman: increasing effect here, not much going on, so there are differences.

320 00:45:15.920 --> 00:45:19.749 Alixandra Rachman: and the same is true here for ozone and the admin.

321 00:45:20.300 --> 00:45:23.189 Alixandra Rachman: So this is interesting to launch.

322 00:45:24.960 --> 00:45:27.059 Alixandra Rachman: while yes, that's

323 00:45:27.130 --> 00:45:28.330 Alixandra Rachman: yes.

324 00:45:28.670 --> 00:45:31.139 Alixandra Rachman: So in conclusion, we

325 00:45:31.240 --> 00:45:47.219 Alixandra Rachman: deep fire find adverse effects of high temperatures, and and so we confirm what is known from the literature. We also saw stronger effects of attack, versions of days with high pollutant concentrations, and that was kind of

326 00:45:47.290 --> 00:45:53.069 Alixandra Rachman: sort of smooth, increasing, increasing gradients of effect for higher levels. For

327 00:45:53.910 --> 00:46:07.959 Alixandra Rachman: while we, we also found stronger effect of our pollutants when temperature was high, is that was highest, but with a totally different pattern. So the effect was totally concentrated. The very extreme days of damage.

328 00:46:08.730 --> 00:46:18.220 Alixandra Rachman: and also some high levels of interrogating of the originality. the results across regions and the cross-country.

329 00:46:20.160 --> 00:46:23.470 Alixandra Rachman: Yeah, I think that's that's all.

330 00:46:29.970 --> 00:46:34.309 Alixandra Rachman: Yeah, I think I would have have time for maybe 2 or 3 questions.

331 00:46:34.780 --> 00:46:40.569 Alixandra Rachman: I know. So you'll submit to questions through Congress. But that would be good time to ask.

332 00:46:44.030 --> 00:46:48.329 Alixandra Rachman: Was it clear with some part that I totally lost?

333 00:46:51.170 --> 00:47:00.320 Alixandra Rachman: Yeah, I guess one question I had for the seconds of both studies and the sensitivity analysis. You considered the lag from 0 for 10 days.

334 00:47:00.490 --> 00:47:01.570 Alixandra Rachman: potentially

335 00:47:01.650 --> 00:47:20.879 Alixandra Rachman: or accurate, in a sense, because it's maybe considering for mortality displacement of the first couple of days, or if that was less relevant to the study because you were looking at the association between heat and air pollutants rather than like the displacement. We haven't really analyzed that

336 00:47:21.020 --> 00:47:33.350 Alixandra Rachman: if it was true that after a peak in the effect. On the first days there is a drop, even a protective in the next days, because of the depletion of the susceptible population.

337 00:47:33.740 --> 00:47:38.840 Alixandra Rachman: I could say that maybe a 0 10 is more realistic, you know feature.

338 00:47:39.080 --> 00:47:40.750 Alixandra Rachman: but that is not

339 00:47:41.630 --> 00:48:01.809 Alixandra Rachman: certain. It it can also happen that there is a very sharp increase at the beginning, and then the effect is not there anymore. It's flat and having a 0 10 will dilute. You would not see what's what's happening when there are peaks in air temperature for a few days, so to me it is more the second than the first.

340 00:48:01.970 --> 00:48:07.130 Alixandra Rachman: I wouldn't consider the 0 1 0 3 are more accurate

341 00:48:07.200 --> 00:48:30.299 Alixandra Rachman: picture of what's happening when it's hot, because of what literature tells us about. You know, heat waves and how mortality increase exponentially immediately. When you have such a triggering. You know environmental trigger rather than going. But of course, that it would be interesting to investigate the displacement, maybe even over a longer time period.

342 00:48:30.390 --> 00:48:36.450 Alixandra Rachman: In addition to that, yes, here the focus was on the interaction. and for revolution there is.

343 00:48:36.570 --> 00:48:45.749 Alixandra Rachman: I mean I. There is not much in the literature in terms of mortality displacement. while there is something to temperature. So I think that is.

344 00:48:45.820 --> 00:48:50.220 Alixandra Rachman: we had to keep it simple for the ease of interpretation

345 00:48:57.220 --> 00:49:14.339 Alixandra Rachman: question. Yes, I think if we're talk very clear and my question is in the Mcc project. Did you ever try to analysis. Analyze the relationship. I mean the interactive effect in different climate zones. I mean.

346 00:49:14.410 --> 00:49:21.610 Alixandra Rachman: maybe in some very hot areas, hot rooms, they may have different. You know the interactive effect.

347 00:49:21.690 --> 00:49:34.439 Alixandra Rachman: You know the hot area compared to the colder area. Maybe they have a different relationship. As far as I know, in the Ncc. The only project which dealt with the interaction with our temperature. The pollution is this one.

348 00:49:34.520 --> 00:49:38.179 Alixandra Rachman: because if there was another one, the steering committee would have put us

349 00:49:38.420 --> 00:49:50.700 Alixandra Rachman: an action, and we would have done that together in this one. We didn't go into that level of detail, but that would be definitely an interesting development. So we see the recent originating.

350 00:49:50.800 --> 00:50:02.949 Alixandra Rachman: why is that we have 620 cities. So ideally, we might collect for each city some city specific characteristics, for example, the climatic zone.

351 00:50:03.010 --> 00:50:11.950 Alixandra Rachman: or other characteristics that might explain that virginity, and see once you account for those, how much the virginity uses.

352 00:50:11.990 --> 00:50:20.180 Alixandra Rachman: or how they modify that. So that would be a good development. Yeah, like building off of that. That was one observation I had is that

353 00:50:20.700 --> 00:50:26.360 Alixandra Rachman: Europe is kind of a more homogeneous climate than

354 00:50:26.390 --> 00:50:34.209 Alixandra Rachman: Asia or North America or South America like, you can even see just by latitude where the cities are.

355 00:50:34.280 --> 00:50:40.680 Alixandra Rachman: Yeah. So I wonder if just sort of subgrouping within consonants, you could

356 00:50:41.360 --> 00:50:57.860 Alixandra Rachman: get a stronger signal there. Yeah, yeah, that is one of the reasons for the exhaustion. So we were in Europe. We had the Norway and Greece, and we tried to do found specific analysis, and we did see very large differences between the Norway and Italy, for example.

357 00:50:57.880 --> 00:51:00.170 Alixandra Rachman: Here we might do the same.

358 00:51:00.190 --> 00:51:10.259 Alixandra Rachman: one problem also is in the labels. Why, we say, you know Australia, 3 cities. even in Asia. It's mostly it's the Eastern Asia. So it's

359 00:51:10.710 --> 00:51:23.350 Alixandra Rachman: not very well represented. So that is one of the limitations that we don't have a lot of our representation of some areas to explore these kind of regions. But yes, we could do that.

360 00:51:23.840 --> 00:51:24.620 Thank you.

361 00:51:26.290 --> 00:51:29.919 Alixandra Rachman: Great. I think you were perfect on time. Thank you once about.

362 00:51:32.960 --> 00:51:47.130 Alixandra Rachman: Thank you.