

65

00:11:03.300 --> 00:11:12.840

Richard Corsi: With no possibility of going beyond that and about 20% of their classrooms have no mechanical ventilation and have inoperable windows, so they are struggling.

66

00:11:13.470 --> 00:11:18.210

Richard Corsi: With what to do and it's ventilations important because this is an airborne infectious disease.

67

00:11:18.750 --> 00:11:23.580

Richard Corsi: It started as an everyone infectious disease that has been throughout, it is now and it will be in the future.

68

00:11:24.180 --> 00:11:31.440

Richard Corsi: In factors emit particles that rapidly shrink and aerosol particles when they breathe speak cough and these aerosol particles are essentially the.

69

00:11:31.770 --> 00:11:37.470

Richard Corsi: The rideshare or the conveyors of infectious viruses and indoor air and these aerosol particles are small enough.

70

00:11:38.010 --> 00:11:44.910

Richard Corsi: That they can travel long distances, they can accumulate indoors to relatively high levels if there's an inspector, in the space over time.

71

00:11:45.510 --> 00:11:51.000

Richard Corsi: And they may be inhaled and deposited in various parts of our respiratory system, this is an airborne infectious disease.

72

00:11:51.540 --> 00:12:02.220

Richard Corsi: And therefore inhalation ghosts is really important, and we should spend more time talking about inhalation dose and I want to just take a brief moment here to define what that means, because ventilation is critical.

73

00:12:02.730 --> 00:12:08.490

Richard Corsi: for reducing ventilation those inhalation dose is the product of four numbers for things multiplied by one another.

74

00:12:09.000 --> 00:12:21.000

Richard Corsi: The first is the concentration of say virus laden particles per liter of air right we multiply that by our respiratory minute volume, which is essentially the amount of air we bring in in a minute.

75

00:12:21.630 --> 00:12:28.470

Richard Corsi: and multiply that by the time we're in a space with an inspector and then multiply that by the fraction of particles that deposit in our respiratory system.

76

00:12:28.920 --> 00:12:38.490

Richard Corsi: We have control, a lot of control over those first three variables concentration levels and Eric can be dramatically reduced by appropriate ventilation.

77

00:12:39.450 --> 00:12:46.620

Richard Corsi: breathing rates are important in schools, if children are going out and playing on the playground without masks or even with masks.

78

00:12:47.010 --> 00:12:52.770

Richard Corsi: And then they come back into the classroom and they're breathing heavily their respiratory minute volumes, maybe 10 times what it is at rest.

79

00:12:53.340 --> 00:12:57.660

Richard Corsi: So it's good to have a cool off period before kid children come back into the classroom.

80

00:12:58.440 --> 00:13:05.430

Richard Corsi: Time is important right, so if we take a mask break every two hours and everybody leaves the classroom and goes outside.

81

00:13:05.760 --> 00:13:16.380

Richard Corsi: And we continue to ventilate ventilations important and maybe even use filtration we can drop any virus laden particle levels in the classroom and 20 minutes down to 10% or 5%.

82

00:13:16.890 --> 00:13:26.670

Richard Corsi: Of what they were when you're in the classroom and then, when you come back in it takes time for that to build back up when you integrate over the school day that gives you a pretty dramatic reduction in your inhalation dose.

83

00:13:27.150 --> 00:13:31.470

Richard Corsi: inhalation dose occurs when you're in close contact with somebody in the near field.

84

00:13:31.800 --> 00:13:40.440

Richard Corsi: And it happens when you're away from somebody in the same indoor space and the near field, the best way to reduce inhalation dose is universal mask wearing and physical distancing.

85

00:13:40.890 --> 00:13:48.960

Richard Corsi: In the far field universal mask wearing it's important because it reduces the emissions from the infector but also reduces the concentration inside your mask.

86

00:13:49.200 --> 00:13:57.000

Richard Corsi: In your breathing zone reduced inhalation doses but proper ventilation can dramatically reduce those particle concentrations, as can things like.

87

00:13:57.330 --> 00:14:06.090

Richard Corsi: single zone habit filtration systems, etc, with the right combinations of these factors, we can get 10 to 20 fold reduction.

88

00:14:06.450 --> 00:14:14.220

Richard Corsi: In inhalation dose 90 to 95% and I want to say this, this is really important it's easy it's not complex to do this right.

89

00:14:15.030 --> 00:14:17.730

Richard Corsi: Starting with mediocre universal mass you know.

90

00:14:18.000 --> 00:14:28.260

Richard Corsi: mediocre math if everybody's wearing them you're going to get a 70% inhalation dose reduction right there if you supplement that with increased ventilation, maybe a portable a half a filter where you can get effectively.

91

00:14:28.530 --> 00:14:35.550

Richard Corsi: from two to six or seven interchanges per hour we're up over 90 90% over 90% inflation dose reduction there so.

92

00:14:36.030 --> 00:14:40.170

Richard Corsi: We can do these things it's not rocket science and I want to say one more thing, before I end.

93

00:14:40.620 --> 00:14:51.780

Richard Corsi: And I want to implore everyone, not to venture into unproven technologies that have slick marketing right ventilation, we know reduces inhalation doses increased ventilation.

94

00:14:52.290 --> 00:14:59.760

Richard Corsi: Port about half of filtration systems are approved and technology and can supplement ventilation ventilation is difficult to increase.

95

00:15:00.240 --> 00:15:07.830

Richard Corsi: A portable habits and system with the Clean Air delivery rate of say 300 cubic feet per minute in a typical K through a classroom gives you sort of the equivalent of.

96

00:15:08.160 --> 00:15:12.630

Richard Corsi: three to four equivalent air changes per hour if we wanted to put it in ventilation terms.

97

00:15:13.020 --> 00:15:21.570

Richard Corsi: That is, in many classrooms up to 5060 70% reduction in relation dose just by switching that machine on that portable have a filtration system.

98

00:15:22.020 --> 00:15:32.160

Richard Corsi: I recently did a cost analysis for the benefit of these systems capital cost recurring filter replacement costs energy costs, it turns out over a three year period.

99

00:15:32.670 --> 00:15:43.410

Richard Corsi: The cost is less than \$11 per student per year for that amount of ventilation dose reduction that's not per day or per week or per month that's per year.

100

00:15:44.160 --> 00:15:52.110

Richard Corsi: So this is huge benefit and lowering ventilation dose by ventilation and equivalent ventilation with things like portable air cleaners, and I want to stress.

101

00:15:52.470 --> 00:16:07.530

Richard Corsi: Less than \$11 per student per year, that is, about two grand a frappuccino is per student per year for a dramatic reduction in relation to those with the technology that's already proven that already exist, why wouldn't we do this, thank you.

102

00:16:12.360 --> 00:16:22.920

Paula Olsiewski: And now we're going to turn back over to bill so bill gets to be a moderator as well as a panelist our final panelist is Dr William bonfire.

103

00:16:23.430 --> 00:16:32.310

Paula Olsiewski: So professor of architectural engineering at penn state his research interests include indoor environmental control topics.

104

00:16:32.640 --> 00:16:47.580

Paula Olsiewski: Protection of building occupants from indoor air bio aerosol releases and ultraviolet germicide ul irradiation systems bill is also the Chair of ashtrays epidemic Task Force fail over to you.

105

00:16:48.870 --> 00:16:49.920

William Bahnfleth: Thank you very much Paula.

106

00:16:51.120 --> 00:16:58.230

William Bahnfleth: The late David foster wallace began his 2005 kenyon college commencement address by retelling an old parable.

107

00:16:59.010 --> 00:17:09.780

William Bahnfleth: To young fish encounter and older fish who greets them by saying more than boys how's the water after swimming on for a bit one young fish truth, the other and asked what the hell is water.

108

00:17:10.740 --> 00:17:20.550

William Bahnfleth: The story exemplifies one of the enduring difficulties based by those who understand the importance of indoor air quality they're concerned about the level of air quality in our buildings, including schools.

109

00:17:21.090 --> 00:17:28.590

William Bahnfleth: As well as commented, the point of the story is that the most obvious important realities are often the ones that are the hardest to see and talk about.

110

00:17:29.670 --> 00:17:34.410

William Bahnfleth: We know a number of important facts about indoor air quality, schools and covert 19.

111

00:17:34.860 --> 00:17:42.180

William Bahnfleth: But unless we connect them and take appropriate action our schools will not be the safe, healthy, high quality learning environments, that we want them to be.

112

00:17:42.900 --> 00:17:50.670

William Bahnfleth: The first fact is an indoor air quality has profound, albeit subtle impact on us evidence for the benefits of good indoor air quality.

113

00:17:51.090 --> 00:18:00.990

William Bahnfleth: has been accumulating for decades, the cost of avoidable health and productivity losses in the US has been estimated to be hundreds of billions of dollars annually before coated.

114

00:18:01.710 --> 00:18:08.820

William Bahnfleth: They can be measured in longer life lower incidence of chronic disease increased productivity and better performance of children in schools.

115

00:18:09.660 --> 00:18:14.130

William Bahnfleth: Among the simplest and interventions good ventilation is associated with all of these benefits.

116

00:18:14.610 --> 00:18:23.460

William Bahnfleth: Nevertheless, ventilation requirements for buildings, continue to be set at levels, based on perceived air quality essentially odor control, rather than health and performance.

117

00:18:23.940 --> 00:18:29.550

William Bahnfleth: Many older school buildings are ventilated unpredictably only by opening windows and by air leakage.

118

00:18:30.210 --> 00:18:36.720

William Bahnfleth: The second important fact is that the condition of school infrastructure as it relates to indoor air quality leaves much to be desired.

119

00:18:37.320 --> 00:18:47.010

William Bahnfleth: A 2020 US Government Accountability Office study with the plain spoken title school districts frequently identified multiple building systems needing updates or replacement.

120

00:18:47.490 --> 00:18:53.460

William Bahnfleth: found that about 54% of public school districts needed multiple system updates replacements.

121

00:18:54.060 --> 00:19:02.940

William Bahnfleth: At the top of the list we're heating ventilation and air conditioning systems, with at least half of systems and the the updated replacement and 41% of US school districts.

122

00:19:03.420 --> 00:19:10.980

William Bahnfleth: A situation like this does not develop overnight it's been a long time in the making and is unfortunately typical of many types of buildings.

123

00:19:12.270 --> 00:19:19.590

William Bahnfleth: The third fact is that the pandemic has revealed the rule rule that our buildings, including the schools can play an airborne infectious disease transmission.

124

00:19:20.250 --> 00:19:25.170

William Bahnfleth: And that are existing indoor air quality standards do not address infection risk mitigation effectively.

125

00:19:25.800 --> 00:19:31.770

William Bahnfleth: Numerous investigations of super spreading incidence of identified in adequate ventilation rates as a significant factor.

126

00:19:32.220 --> 00:19:38.100

William Bahnfleth: And the mechanistic arguments for the importance of aerosol exposure are also in supportive this conclusion.

127

00:19:38.730 --> 00:19:50.670

William Bahnfleth: Yet guidance on risk mitigation often focuses on testing contact tracing masking distancing invest vaccination and says little about basic engineering controls ventilation and filtration.

128

00:19:51.120 --> 00:19:58.860

William Bahnfleth: This is particularly disturbing, given the levels of ventilation and filtration and many schools to fall short of recommendations for covert risk reduction.

129

00:20:00.120 --> 00:20:07.680

William Bahnfleth: indoor air quality is highly important by many metrics are buildings, including schools aspire to a modest level of air quality that many failed to achieve.

130

00:20:08.370 --> 00:20:14.400

William Bahnfleth: During the pandemic, we are reaping the consequences of that situation as we try to reopen our schools and other building safely.

131

00:20:15.090 --> 00:20:21.450

William Bahnfleth: All effective risk control should be promoted implemented, including building upgrades to ensure good ventilation and filtration.

132

00:20:21.960 --> 00:20:29.910

William Bahnfleth: Yes, there may be significant costs involved in some cases, but not as high as some might think, and the cost of not making that investment as much higher.

133

00:20:30.510 --> 00:20:39.840

William Bahnfleth: Extensive guidance for school ventilation and filtration developed by ashtray and others provides a firm basis for developing risk mitigation strategies and should be implemented widely.

134

00:20:40.950 --> 00:20:47.700

William Bahnfleth: I hope that our discussions today can contribute to bring into focus the need to upgrade air quality in our schools now and for the future.

135

00:20:48.120 --> 00:20:56.070

William Bahnfleth: clarifying the cost effective technical approaches that are available for doing it and outlining and approach to support their widespread and equitable implementation.

136

00:20:56.490 --> 00:21:03.120

William Bahnfleth: If we can accomplish those three things, this will have been time well spent, thank you for your participation in this important conversation.

137

00:21:05.040 --> 00:21:05.940

Paula Olsiewski: Thank you bill.

138

00:21:07.050 --> 00:21:21.780

Paula Olsiewski: And thank you to Claire and rich for these very thoughtful comments, I know that there are lots of questions coming in in the Q amp a box and Margaret Miller is going to start bringing them up.

139

00:21:22.140 --> 00:21:35.310

Margaret Miller: Work great Thank you so much, so our first question is from Emily COP from roll call from Mrs barnett, why was the EPA project or unhealthy schools you funded Could you elaborate on how this has impacted schools ability to respond to the pandemic.

140

00:21:37.980 --> 00:21:41.730

Claire Barnett: We don't know why they were defunded it was zeroed out in 2012.

141

00:21:43.050 --> 00:21:52.770

Claire Barnett: And we tried to get money restored, we really could not get a clear answer it may be, they felt that, when they had read EPA had reached a point of.

142

00:21:53.910 --> 00:22:04.290

Claire Barnett: About 45 to 50% of schools self reporting, they have adopted the indoor air quality tools for schools program that 50% was enough.

143

00:22:04.980 --> 00:22:11.220

Claire Barnett: So one of the ways that impacts, it is because it eliminates the conversation so when EPA is out.

144

00:22:12.090 --> 00:22:27.690

Claire Barnett: Both with national cooperative agreements and regional and local grants to schools and communities and universities, there is a continuous conversation going on about indoor air indoor air is not something that you flip off and on again as you as you were hearing.

145

00:22:29.010 --> 00:22:35.340

Claire Barnett: there's not just one thing you do and walk away you don't have to touch it again so it's important to.

146

00:22:36.060 --> 00:22:46.260

Claire Barnett: Keep people apprised of what's going on, so the lack of conversation has really had a not a great effect, I think that's that's really been a huge problem.

147

00:22:46.590 --> 00:22:58.710

Claire Barnett: And the buildings have been aging of there has not been a lot of money, since the 2008 2009 recession in fact that states and federal agencies.

148

00:22:59.310 --> 00:23:12.630

Claire Barnett: Except for the stimulus to act have reduced to contributions to public education so there's no question there's a need for money in public education, there is has been for a very long time, a great need for money on school facilities.

149

00:23:14.610 --> 00:23:15.480

Claire Barnett: I hope that helps.

150

00:23:17.250 --> 00:23:22.650

Margaret Miller: Great Thank you and bill i'm going to help you help me assign this next one, so here's a question from Dorothy wigmore.

151

00:23:23.130 --> 00:23:30.900

Margaret Miller: it's great to talk about children in schools schools or workplaces to what about the staff, whether it's teachers maintenance admin staff or others.

152

00:23:31.230 --> 00:23:41.430

Margaret Miller: And then can bicker and just also asked a follow up about you know it's been reported that there are critical spreaders of school system so How does that change at all this discussion.

153

00:23:42.210 --> 00:23:53.460

William Bahnfleth: yeah, I think, maybe that feeds into the earlier discussion on exposures that rich course he was was giving and you could probably elaborate on those differences in members of the school population.

154

00:23:54.720 --> 00:23:58.140

Richard Corsi: yeah I don't think it changes the strategy at all everything that I said.

155

00:23:58.350 --> 00:24:06.840

Richard Corsi: For a classroom applies outside of the classroom and other parts of the school it applies to children applies to staff members, it applies to teachers replies to visitors to the school it applies to custodian.

156

00:24:07.410 --> 00:24:14.070

Richard Corsi: And applies to everybody, so what we want to do is reduce inhalation dose for every, the lower the inhalation goes to lower the probability of infection.

157

00:24:14.460 --> 00:24:28.980

Richard Corsi: A lower the inhalation dose it appears from from from emerging evidence, the lower the the the least less worse, the health outcomes, even if you're infected so lowering inhalation doses key for everybody in the school community.

158

00:24:31.350 --> 00:24:42.000

Claire Barnett: I would add one more comment to the question that just came in, with respect to worker protection CDC does have a hierarchy of controls that it relies on through niosh.

159

00:24:42.390 --> 00:24:46.980

Claire Barnett: And, apparently, this did not influence what was happening and giving guidelines to schools.

160

00:24:47.580 --> 00:24:58.710

Claire Barnett: So that would explain why we're not talking about ventilation, but we're going to be talking about a little bit of distancing but personal protective gear is lowest priority on the hierarchy of controls.

161

00:25:00.540 --> 00:25:12.060

Margaret Miller: here's a question from will Jay is there a recommended resting time interval between classes as it relates to air changes per hour example 60 minutes resting time between occupying the same classroom given X air changes per hour.

162

00:25:14.730 --> 00:25:29.370

William Bahnfleth: Well, it depends on what you're trying to accomplish but we've considered that perhaps three or changes uncontaminated here will remove most of the residual contamination, so if you're trying to clear the space between.

163

00:25:30.000 --> 00:25:37.560

William Bahnfleth: One class leaving and another one entering and how long it takes to do that really depends on how much ventilation your system provides and.

164

00:25:37.920 --> 00:25:52.020

William Bahnfleth: And what kind of supplementary filtration and air cleaning you have so it couldn't be as little as 20 minutes if you have a really high performance system, but it could be over an hour, if you have minimum ventilation by the kinds of standards that I was talking about earlier.

165

00:25:54.300 --> 00:26:04.830

Margaret Miller: Great Here are two questions for Dr corsi is your ventilation cost analysis available online and where's the evidence that you are using for the decrease in dose reduction from face coverings.

166

00:26:06.150 --> 00:26:16.890

Richard Corsi: Oh so on the first one i'm speaking to 400 school superintendents and Oregon tomorrow and i'm still working in my presentation, but that analysis will be in that presentation.

167

00:26:17.220 --> 00:26:30.150

Richard Corsi: I will post that tomorrow afternoon on my website, which is www dot corsi X ERS IQ COM, so you can download the slides and get the analysis there on the second question, in terms of.

168

00:26:31.080 --> 00:26:34.440

Richard Corsi: In terms of dose reduction from wearing face now so that was the question was.

169

00:26:34.920 --> 00:26:43.470

Richard Corsi: yeah so I mean there's there's been so much research, one of the things that's really come out of this pandemic is the value of facemasks tremendous research on the.

170

00:26:43.980 --> 00:26:51.750

Richard Corsi: The efficiency and the effectiveness of well fitting facemasks and so there's just been a lot of publications on this that show that even.

171

00:26:52.260 --> 00:27:02.850

Richard Corsi: You know even homemade cloth masks can get you 40% removal of efficiency for aerosol particles of the of the sides that are conveyors of the.

172

00:27:03.300 --> 00:27:15.210

Richard Corsi: source code to buyers So if you take, for example, 40% reduction from the emitter and then 40% reduction for the receptor going through their mask you take 40%.

173

00:27:15.630 --> 00:27:28.290

Richard Corsi: Times 40% of the remaining 60% that gets you 64% and that's a mediocre mask if we start getting the better mask it's pretty easy to get to 80% and even 90% reduction with this dual effect so.

174

00:27:28.740 --> 00:27:36.240

Richard Corsi: Lots been published on masks the numbers are there and what I did is I use the lower number to get that kind of ventilation dose reduction.

175

00:27:38.160 --> 00:27:45.540

Margaret Miller: Right and here's a question from Carrie Burke, is there any guidance available to informed decision making about the use of physical barriers, particularly in classrooms.

176

00:27:46.050 --> 00:27:52.500

Margaret Miller: What about the balance of investment as schools have limited funds example ventilation and filtration versus using barriers.

177

00:27:55.980 --> 00:27:59.670

Claire Barnett: A full plexiglass shield the sort of thing you see in the supermarket.

178

00:28:00.510 --> 00:28:10.620

Claire Barnett: um that's not going to help for long term exposure, I mean if you're at the supermarket line for five or 10 minutes that's one thing, but if you're sitting in a classroom across from somebody.

179

00:28:11.370 --> 00:28:20.820

Claire Barnett: it's really not workable, one of the one of the common descriptors is, if you can smell cigarette smoke from the other side of the plaques plexiglass you're also inhaling the virus.

180

00:28:22.080 --> 00:28:28.710

William Bahnfleth: yeah I did that their effect is going to be very unpredictable and once you know how they interact with.

181

00:28:29.160 --> 00:28:35.490

William Bahnfleth: Air movement in a space and i've also seen some studies have been closed versus open spaces that.

182

00:28:35.910 --> 00:28:48.390

William Bahnfleth: show that the any attempt to really enclose areas to protect occupants from one another, actually winds up concentrating the emissions from someone who happens to be infected so it's it's pretty risky to rely on them.

183

00:28:50.310 --> 00:29:01.200

Margaret Miller: Great here's a question from Greg lemon what does this say about the use of bipolar ionization system as part of the schools H back system curl particulars and effective countermeasure for 19.

184

00:29:05.790 --> 00:29:06.720

William Bahnfleth: You like that one rich.

185

00:29:08.910 --> 00:29:17.640

Richard Corsi: Sure, so here's what i'll say is that I believe in in rigorous peer reviewed publications on technology.

186

00:29:18.780 --> 00:29:32.700

Richard Corsi: for things like hipaa filtration and you know merv rated filters and mechanical systems there's decades and decades of peer reviewed literature good good research, etc, and that doesn't exist.

187

00:29:33.210 --> 00:29:44.010

Richard Corsi: For technologies like needlepoint bipolar ionization there are without mentioning any companies, there are there are certainly companies that show data that look really good.

188

00:29:44.490 --> 00:29:49.590

Richard Corsi: But when you break down that data it ends up being a lot, like the data, you see, for indoor plants.

189

00:29:50.100 --> 00:29:59.100

Richard Corsi: Were the conditions in which the experiments are done to get these nice decay curves when you actually look at the data and you dissect the data and you back out the data.

190

00:29:59.490 --> 00:30:10.380

Richard Corsi: you end up getting very low, what are called cleaner delivery rates on the order of 10 times less or 20 times less than you would get with a good old proven habit filtration system.

191

00:30:10.980 --> 00:30:19.050

Richard Corsi: And so, and so you know I believe in proven technologies that have been peer reviewed published and literature analyzed by lots of people.

192

00:30:19.470 --> 00:30:26.280

Richard Corsi: And that doesn't exist for a lot of the technologies that are being marketed schools, right now, and I will say I know one school district that has gone all in.

193

00:30:26.790 --> 00:30:36.030

Richard Corsi: On on that particular technology, and you know there's a big question mark as to whether they spent their money wisely and I I wouldn't have done it if I was them.

194

00:30:37.140 --> 00:30:49.530

William Bahnfleth: And I would add to that, beyond efficacy, these are all technologies that are putting things into the air that aren't ordinarily there and we have to be very careful about the potential health effects there, there is some research that shows.

195

00:30:51.060 --> 00:31:02.700

William Bahnfleth: oxidative stress from from high levels and production of secondary aerosols that could be hazardous so there's just a lot of work that needs to be done, we probably can really have a lot of confidence in that group of technologies.

196

00:31:04.230 --> 00:31:14.550

Claire Barnett: I want to add a comment because the new technologies, ideally work in laboratory settings fathers and ministers, for example, will work ideally in.

197

00:31:14.910 --> 00:31:23.940

Claire Barnett: In certain settings and can be used by scientific staff environmental cleaning staff and in large hospitals, who have some training and background on how to maintain that.

198

00:31:24.330 --> 00:31:33.240

Claire Barnett: But when you go into schools you're not looking at highly trained scientific staff to manage buildings, necessarily, you may be looking at.

199

00:31:33.720 --> 00:31:45.930

Claire Barnett: A Head custodian or a facility director who is remote, you may looking at a lot of people who are recently off the street without a lot of training, you may be looking at people who are handed.

200

00:31:46.620 --> 00:31:54.150

Claire Barnett: disinfecting chemicals to apply to surfaces, but they're not able to read the labels or understand the labels.

201

00:31:54.510 --> 00:32:01.290

Claire Barnett: So you need to think about schools very differently than you think about how products and high technology works in other kinds of settings.

202

00:32:01.710 --> 00:32:06.480

Claire Barnett: I think it's a it's a critical item, and I think it often it often gets missed.

203

00:32:06.930 --> 00:32:21.600

Claire Barnett: And people who do want to work around schools always insist on training and education for their staff it frankly it doesn't always happen and that's why there's a potential just an enormous potential for the misuse of high hazard chemicals in schools.

204

00:32:24.630 --> 00:32:32.580

Margaret Miller: Thank you here's a question as a concerned parent of two high school students, where their district has decided to reduce physical distancing to three feet, rather than six feet.

205

00:32:33.060 --> 00:32:40.860

Margaret Miller: What type of questions Should I be asking about indoor air quality, I don't know what has been done to improve air quality in the high school and how they're measuring the results.

206

00:32:41.610 --> 00:32:56.280

Claire Barnett: We published a list of questions back in the fall, we did a pandemic report that we released with about 22 organizations in July it's on the on our homepage that's healthy schools.org is the pandemic versus schools and.

207

00:32:58.110 --> 00:33:05.190

Claire Barnett: From that we extracted list of eight questions that we wanted any parent to ask their school and really.

208

00:33:05.760 --> 00:33:14.640

Claire Barnett: Taking from what some of the better states have been doing, and the first one is to ask your school for a written policy description of what it's doing on indoor air quality.

209

00:33:15.240 --> 00:33:27.900

Claire Barnett: It can be in writing, it can be an adopted policy it's important you can ask for and receive that kind of information they may not have have it in writing, they can put it in writing.

210

00:33:28.410 --> 00:33:39.480

Claire Barnett: I think these you know, these things are important local schools are local public agencies, they are tech supported and it's perfectly fair to ask the question and to get a fair response.

211

00:33:41.550 --> 00:33:46.050

Margaret Miller: Great here's a question from a mall, how can we get this information to all schools quickly.

212

00:33:50.280 --> 00:33:58.140

William Bahnfleth: One thing I would say is that a lot of organizations that are produced useful guidance have have made it publicly available, so I referenced ashtrays.

213

00:33:58.560 --> 00:34:10.800

William Bahnfleth: Guidance it's on the X Ray website actually.org slash coven 19 with no dash Harvard School of Public Health has put up some really good resources on schools and her cleaners for school so.

214

00:34:11.940 --> 00:34:16.500

William Bahnfleth: it's there, I think that we need to get the message out about where it can be found.

215

00:34:17.940 --> 00:34:23.190

Richard Corsi: If I can add to that I i've been speaking with a lot of school districts in the state of Oregon.

216

00:34:24.210 --> 00:34:25.770

Richard Corsi: All of them look to CDC.

217

00:34:26.880 --> 00:34:29.670

Richard Corsi: So the way to disseminate quickly is to have CDC.

218

00:34:31.980 --> 00:34:33.600

Richard Corsi: Be more focused on this issue.

219

00:34:34.830 --> 00:34:43.470

Richard Corsi: And and there's just a lot of confusion from folks that look at their website, when I tell them, you need to ventilate more and they said that's they say that's not what CDC is saying.

220

00:34:44.610 --> 00:34:48.270

Richard Corsi: So the answer is CDC, the answer is CDC.

221

00:34:49.470 --> 00:34:55.590

Richard Corsi: i'm sorry but that's what schools are looking to and that's what state health authorities are mimicking it CDC and so.

222

00:34:56.220 --> 00:34:58.620

Claire Barnett: I began writing and if I hadn't written it, they would have.

223

00:34:58.620 --> 00:35:00.210

Claire Barnett: looked to the education department.

224

00:35:00.510 --> 00:35:01.530

Claire Barnett: Our answer actually is a.

225

00:35:01.530 --> 00:35:18.210

Claire Barnett: little bit different rich and i'll suggest that the complexities are such and the different agencies have different skill sets CDC has its own skill sets within several different offices EPA several different offices education several different offices actually need a.

226

00:35:19.560 --> 00:35:29.250

Claire Barnett: A federal Commission to take a hard look long term look at the strategies to get schools back on board with where their facilities, need to be.

227

00:35:29.910 --> 00:35:30.810

Claire Barnett: short term fix.

228

00:35:31.080 --> 00:35:40.320

Richard Corsi: So I completely agree i'm just telling you that right now schools are looking to CDC and they're not getting the answers to the kinds of things we're talking about they're simply not.

229

00:35:40.770 --> 00:35:46.770

Richard Corsi: And that's where they're going so that's the solution right now that's, the solution is tab CDC step up.

230

00:35:48.540 --> 00:35:51.630

William Bahnfleth: You agree that the sources are fragmented, that is the problem you need a.

231

00:35:51.630 --> 00:35:52.980

William Bahnfleth: Central source yeah.

232

00:35:54.360 --> 00:36:04.830

Margaret Miller: here's a question from Brenda vigil is adequate ventilation achieved by bringing an 18% fresh air with the fan going continuously into a classroom or which results in a complete Eric change and five hours.

233

00:36:09.510 --> 00:36:13.890

Richard Corsi: No a complete air exchange and five hours is a very low air exchange rate.

234

00:36:14.910 --> 00:36:17.220

Richard Corsi: That is woefully insufficient.

235

00:36:18.750 --> 00:36:21.000

William Bahnfleth: More like five per hour that's.

236

00:36:23.130 --> 00:36:25.320

William Bahnfleth: accounting for ventilation and filtration.

237

00:36:26.550 --> 00:36:26.820

Margaret Miller: Great.

238

00:36:26.880 --> 00:36:28.320

William Bahnfleth: Of course, it depends on the room to.

239

00:36:29.790 --> 00:36:36.000

Margaret Miller: Can you comment on the use of CO2 monitoring help decide whether supplements to existing ventilation are recommended for infection control.

240

00:36:38.280 --> 00:36:44.700

Margaret Miller: Then just more is it is it easier to just call for portable air purifiers in every space, what about districts that cannot afford this.

241

00:36:45.780 --> 00:36:48.300

William Bahnfleth: Is there a proponent of CO2 measurement here.

242

00:36:51.120 --> 00:36:56.250

William Bahnfleth: I, I have to say that my own experiences that CO2 can be a very misleading indicator.

243

00:36:56.760 --> 00:37:05.160

William Bahnfleth: of air quality, particularly when we're operating buildings with low fractions of their intended occupancy so you may have a low CO2.

244

00:37:05.430 --> 00:37:19.110

William Bahnfleth: Concentration because there's simply aren't many CO2 sources there, but it may have been a badly ventilated space to begin with, so i'm not very keen on that approach and that's X Ray has not recommended the way some have either.

245

00:37:23.070 --> 00:37:31.320

Margaret Miller: Great we have a couple questions on what are your thoughts on using portable heap of pepper filters or upper room UV G I as a strategy to improve ventilation.

246

00:37:32.670 --> 00:37:34.590

Margaret Miller: This was for a bell but others as well.

247

00:37:35.100 --> 00:37:43.830

William Bahnfleth: Well i'll just speak to the UV piece of it, you know if you have particular spaces, where you need a high degree of protection.

248

00:37:45.000 --> 00:37:57.240

William Bahnfleth: upper room UV is hard to beat it's been measured, to give the equivalent of 10s of interchanges per hour of uncontaminated air, on the other hand, it might cost.

249

00:37:57.780 --> 00:38:06.330

William Bahnfleth: Many dollars per square foot and perhaps two and a half and and up so it's it's expensive to do a whole building that way, but I think it has some very good.

250

00:38:06.690 --> 00:38:19.620

William Bahnfleth: applications in high you spaces, where where people may be in a high density situations, the rich was talking about hipaa filters before I think he may have address that and maybe you have something else to add.

251

00:38:20.850 --> 00:38:28.560

Richard Corsi: ya know so again for a standard 600 square foot classroom 2024 students and it's something like that a good.

252

00:38:29.190 --> 00:38:38.280

Richard Corsi: portable habit filtration system with a cleaner delivery rate of 300 cubic feet per minute adds the equivalent about about three air changes per hour.

253

00:38:38.790 --> 00:38:47.130

Richard Corsi: To the classroom sort of the equivalent of bringing in that much clean outdoor air so they can work really effectively and if they supplement.

254

00:38:47.850 --> 00:38:54.690

Richard Corsi: ventilation and you're already at two or three air changes per hour for ventilation and you have one of these devices suddenly you're at five or six.

255

00:38:55.140 --> 00:39:06.900

Richard Corsi: If you're in a classroom that doesn't have operable windows and doesn't have centralized some you know mechanical system portable habit filtration system can be golden for reducing installation so proven technology.

256

00:39:08.280 --> 00:39:10.140

Richard Corsi: \$11 per student per year.

257

00:39:11.910 --> 00:39:22.650

Margaret Miller: Great and how do we reduce infection in school buses hallways during class change and cafeteria lunch and tables we've been talking a lot about the actual classrooms here, but how do you improve quality air quality in those spaces.

258

00:39:24.000 --> 00:39:24.870

William Bahnfleth: In buses.

259

00:39:25.710 --> 00:39:27.660

William Bahnfleth: Yes, that that's difficult to.

260

00:39:28.770 --> 00:39:38.130

William Bahnfleth: testify to the host transportation infrastructure committee a couple of weeks ago and buses are a big problem they're not like your craft that are highly maintained and in really.

261

00:39:38.700 --> 00:39:51.390

William Bahnfleth: Top line in terms of their ventilation and filtration systems, they can have very low ever change rates and poor filters and it's just difficult opening windows in a bus and having.

262

00:39:52.440 --> 00:40:07.170

William Bahnfleth: Good distancing and wearing masks in some cases may be the only workable solution with the fleet's that we have now I think that's a big topic for the future, as some of this investment needs to go into transport school transportation as well.

263

00:40:09.780 --> 00:40:11.670

Margaret Miller: and any thoughts on cafeteria spaces.

264

00:40:16.350 --> 00:40:17.550

William Bahnfleth: i'm telling them that rich right.

265

00:40:18.510 --> 00:40:31.200

Richard Corsi: Well, I mean, I think that large spaces like cafeterias is where you, you know, perhaps, looking at upper room you'd be GI makes more sense than trying to apply it in every single classroom it's smaller levels so large spaces like cafeterias and.

266

00:40:31.890 --> 00:40:37.950

Richard Corsi: gyms were theater arts classrooms in high school, you know those large rooms that makes more sense than.

267

00:40:39.240 --> 00:40:40.410

Richard Corsi: than it would in the classroom.

268

00:40:41.820 --> 00:40:53.520

Margaret Miller: Okay, great and i'm gonna ask one more question and then there's there's a ton of questions, so we will hopefully get through some of these others in the panel, but then i'll also continue to ask from this list, but um what can be used to measure indoor air quality.

269

00:40:55.260 --> 00:40:56.790

Margaret Miller: what's the best way to measure it.

270

00:40:59.190 --> 00:41:06.150

William Bahnfleth: But I would say, a flow meter would be a good place to start make sure that you've got the amount of outdoor air that the space is.

271

00:41:06.510 --> 00:41:12.390

William Bahnfleth: supposed to have you can't do that instantaneously you know other things you can measure our particular levels.

272

00:41:13.350 --> 00:41:20.190

William Bahnfleth: And and measures of specific contaminants but if we're trying to measure our quality and from the point of view of.

273

00:41:20.790 --> 00:41:29.130

William Bahnfleth: The infection control that's pretty difficult to do right now we really have to I think pencil out whether or ventilation and filtration or providing a level of.

274

00:41:29.490 --> 00:41:37.260

William Bahnfleth: protection that we want to have and then that I think is the best we can do rich may have other thoughts about better ways to do it.

275

00:41:37.470 --> 00:41:43.110

Richard Corsi: Now, I think that everything it says correct, though I think one important point is a.

276

00:41:44.760 --> 00:41:49.530

Richard Corsi: Measuring indoor air quality well is really expensive and it's complicated.

277

00:41:49.860 --> 00:42:00.330

Richard Corsi: it's a lot easier to measure energy use than it is to measure indoor air quality in my work with schools over the last 20 years they get energy use, they can see it in their bills, they can see the kilowatt hours.

278

00:42:00.990 --> 00:42:11.310

Richard Corsi: They have no clue how to measure indoor air quality and they certainly don't have the resources, nowhere close to the resources to do it appropriately, so I agree with bill I think we're stuck with sort of these bulk.

279

00:42:12.300 --> 00:42:18.330

Richard Corsi: Bulk measures, which is just the amount of airflow to a classroom the you know the the ventilation rates of classrooms.

280

00:42:24.300 --> 00:42:26.550

Margaret Miller: Great now we can transition over to the second panel.

281

00:42:28.560 --> 00:42:29.490

Margaret Miller: i'll hand it to you.

282

00:42:30.000 --> 00:42:30.540

Paula Olsiewski: Okay well.

283

00:42:31.980 --> 00:42:49.200

Paula Olsiewski: thanks again to our panel from session one we now turn to us a second session so first of all I want to thank all of the people we have 53 questions in that in the Q amp a i've been looking at the chat there's a lot of.

284

00:42:50.370 --> 00:43:06.810

Paula Olsiewski: lot of comments in there that maybe but long in the Q amp a but I i'm really grateful that to our whole the whole day of panelists because clearly a conversation on indoor air in schools is necessary, so now let's turn over to panel to.

285

00:43:07.710 --> 00:43:18.210

Paula Olsiewski: Technical solutions to improve indoor air quality in schools, Dr Anna rule assistant professor of environmental, health and engineering at Johns Hopkins Bloomberg public.

286

00:43:19.320 --> 00:43:23.520

Paula Olsiewski: Bloomberg School of Public Health will moderate this panel and over to you.

287

00:43:25.620 --> 00:43:26.520

Ana Rule: Thank you Paula.

288

00:43:27.570 --> 00:43:35.220

Ana Rule: In these panel so in the panel, we will discuss if portable a hipaa air filters can be used to improve indoor air quality.

289

00:43:36.150 --> 00:43:50.250

Ana Rule: What is the potential role of carbon dioxide monitor in the classroom so I guess, we will continue the discussion How can he operates improve indoor air quality, why are energy efficient buildings, not necessarily the best for indoor air quality.

290

00:43:51.390 --> 00:43:58.080

Ana Rule: Why is there such a strong focus on hygiene products, instead of integration solutions what actions should.

291

00:43:58.710 --> 00:44:08.220

Ana Rule: should be the nation's top priorities in the short term and the long term, to achieve the goal of healthy indoor air in schools, we will take questions.

292

00:44:09.060 --> 00:44:16.560

Ana Rule: Again, from the audience after the three panelists have given, given their remarks, please keep putting your questions in the Q amp a box.

293

00:44:17.280 --> 00:44:33.300

Ana Rule: Our first panelist is Dr Brent Stevens department, Chair of Professor of civil like architectural and environmental engineering at Illinois Institute of Technology he's an expert in indoor air quality and building science Brent over to you.

294

00:44:34.500 --> 00:44:43.440

Brent Stephens: Great, thank you for the introduction and so to answer some of these questions I think we've already touched on a lot of these things to rich and bill.

295

00:44:44.130 --> 00:44:54.150

Brent Stephens: so rich and bill already covered, you know, really, the importance of ventilation and air cleaning and schools Broadway for indoor air quality and, of course, including the transmission a coven.

296

00:44:55.560 --> 00:45:01.050

Brent Stephens: Also, the importance of understanding inhalation does have a pathogen ways to reduce it and so on.

297

00:45:01.470 --> 00:45:10.080

Brent Stephens: And I completely agree with rich that this is largely not a super complex issue, you know that we largely know what to do, from a technical standpoint.

298

00:45:10.740 --> 00:45:20.160

Brent Stephens: You know, we largely know that mask wearing and distancing even not very good masks can have a big impact on short range or near field transmission.

299

00:45:21.570 --> 00:45:29.370

Brent Stephens: And then we know that you know washing hands and periodic service cleaning can address contaminated services, to the extent that that's important in some environments.

300

00:45:30.360 --> 00:45:36.720

Brent Stephens: And then, of course, we know that we can additionally address aerosol or small droplet transmission by wearing masks as well.

301

00:45:37.530 --> 00:45:47.820

Brent Stephens: We can wear better mass way to improve ventilation, improve air cleaning or filtration, and so one thing that I think is really key to point out here is that to think of all the solutions as part of.

302

00:45:48.870 --> 00:45:59.160

Brent Stephens: You know, a layered approach to risk reduction as it's often called if you haven't seen sort of the Swiss cheese model, which was written up in the New York Times several weeks ago.

303

00:46:00.660 --> 00:46:07.110

Brent Stephens: it's a really good way to think about this, I think, where you have these layers of control or layers of potential risk reduction.

304

00:46:08.280 --> 00:46:16.950

Brent Stephens: in place, and most of those are technical solutions, some are not but that's important because risk reduction for one can be additive like like rich talked about.

305

00:46:18.030 --> 00:46:28.440

Brent Stephens: And then, for two if you lose a layer you lose a slice, if you will, the whole system doesn't fail right, so this is true and infection controls and it's it's true in civil engineering it's true in lots of areas.

306

00:46:29.550 --> 00:46:37.440

Brent Stephens: And so, when I think about this, you know, for example, kids and teachers to that to you know as well you know can't keep their mass on necessarily all the time.

307

00:46:38.520 --> 00:46:47.040

Brent Stephens: And although I would I would mention that, personally, my my kids are age two and four they've been in daycare since July.

308

00:46:47.940 --> 00:46:56.040

Brent Stephens: And i'd be happy to talk about some of the personal decisions we've made there, but i'm amazed at how well they can actually keep their mass on better than.

309

00:46:56.520 --> 00:46:59.340

Brent Stephens: Most most of us adults actually it's kind of a game to them.

310

00:47:00.060 --> 00:47:06.540

Brent Stephens: But anyway, so kids and teachers can't keep their mass on all the time right so cafeteria spaces were mentioned, for example, if you got to eat you've got to drink.

311

00:47:07.080 --> 00:47:13.260

Brent Stephens: When you're at school, so ventilation and air cleaning on top of mass on top of distancing.

312

00:47:13.860 --> 00:47:20.010

Brent Stephens: is important for an additive risk reduction and also for just when you can't you know when one of those layers fails.

313

00:47:20.520 --> 00:47:28.110

Brent Stephens: So, speaking of ventilation, I think another really key thing to think about is that we've heard a lot about target rates and we've.

314

00:47:29.040 --> 00:47:43.050

Brent Stephens: heard a lot about air changes per hour, so if you're not super familiar with these terms you've heard three air changes per hour 600 changes per hour it's just the rate of turnover or dilution of a pollutant in space, and so I think what's important is that.

315

00:47:44.580 --> 00:47:51.390

Brent Stephens: You can achieve this by ventilation, bringing an outside air uncontaminated air, you can achieve it by air cleaner filtration.

316

00:47:51.690 --> 00:47:58.080

Brent Stephens: And those these can be added this right, so if you're in a space that has a central you know classroom where the central system.

317

00:47:58.380 --> 00:48:08.340

Brent Stephens: Do what actually recommends upgrade the filter to move 13 or as high as you can get you know i've done a lot of filter testing in my career and if you can get that in a classroom that's great, we also know.

318

00:48:08.580 --> 00:48:14.520

Brent Stephens: From what we heard earlier, that a lot of classrooms are not centrally heated and cooled or ventilated and you have much.

319

00:48:16.020 --> 00:48:21.480

Brent Stephens: Less capability to make impacts, with a central system and so.

320

00:48:22.440 --> 00:48:31.410

Brent Stephens: You know, then comes you know portable air cleaners, and the like, and so what are what are good target rates, you know you can look to health care facilities 12 interchanges per hour is like a.

321

00:48:31.740 --> 00:48:44.010

Brent Stephens: Is a is a is a pretty standard modern healthcare facility that that's a great goal if you could try to get that if you could get six air changes per hour, if you can get 500 changes per hour or something near that you know I think those are still really.

322

00:48:44.820 --> 00:48:47.850

Brent Stephens: quite reasonable risk reduction numbers on top of.

323

00:48:48.900 --> 00:48:56.520

Brent Stephens: The other the other parts of the of the Swiss cheese layers and then I just want to reiterate, maybe two things one is that.

324

00:48:57.600 --> 00:49:05.550

Brent Stephens: I do think it's very important to avoid additive technic technical solutions for air cleaning or air purification or however it's marketed.

325

00:49:05.850 --> 00:49:12.540

Brent Stephens: there's a long history of problems in this space and there's plenty potential for the technologies being either ineffective.

326

00:49:12.870 --> 00:49:21.060

Brent Stephens: Or, causing harm through byproduct formation or both, and so you know we we have a paper hopefully coming out in the next few days.

327

00:49:21.510 --> 00:49:35.280

Brent Stephens: Testing one of these products that shows and minimal effectiveness and actually generation of some volatile organic compounds in a way that we suspected, and it was there and I also just kind of want to mention that look i'm an engineer.

328

00:49:36.510 --> 00:49:40.890

Brent Stephens: And I think like an engineer, but i'm also a parent and i'm in Chicago.

329

00:49:42.240 --> 00:49:47.640

Brent Stephens: In the middle of a fight between the mayor and the Chicago teachers Union on how to safely return and I get that it's.

330

00:49:48.240 --> 00:50:03.870

Brent Stephens: complicated and I feel like what has happened in in this in this last year is that, whatever your baseline level of anxiety or risk perception is it seems amplified like in the direction it was already in and so there's a lot of decisions, people are tired of making decisions.

331

00:50:04.980 --> 00:50:14.490

Brent Stephens: I would really hope to see you know I find myself encouraged when I see things like the hairdresser study in Missouri from the summer that were a hairdresser was.

332

00:50:14.970 --> 00:50:23.580

Brent Stephens: cold positive but wore masks the whole time and so 100 clients, or whatever and and so on, so I think we need to see more like success stories and failure stories.

333

00:50:23.820 --> 00:50:33.150

Brent Stephens: You know our own university reopened and I was pretty skeptical this fall how it would go frankly it went a little it went better than I thought you know.

334

00:50:33.900 --> 00:50:41.610

Brent Stephens: Why is that what can we learn from these you know where's the where's the national grocery store workers study right that that that.

335

00:50:42.690 --> 00:50:50.250

Brent Stephens: explores you know these these central spaces that have been open for for such long times what can we learn from those I hope to see more on that.

336

00:50:51.450 --> 00:50:54.480

Brent Stephens: So with that i'll close and handed over.

337

00:50:55.620 --> 00:50:56.370

Ana Rule: Thank you Brent.

338

00:50:57.450 --> 00:51:06.420

Ana Rule: Our next panelist is Mr Simon Turner Simon CEO of building cognition a consulting firm specializing in inner quality.

339

00:51:07.050 --> 00:51:17.550

Ana Rule: Simon has a background in biology and his interest for the past few years has been the impact of buildings under features on human cognition and health Simon over to you.

340

00:51:18.210 --> 00:51:30.990

Simon Turner: Thank you and thank you Paula for setting this whole event up it's been very interesting so far so appreciate it, yes, I spent 30 years working for, and eventually leading an indoor environmental consulting firm.

341

00:51:32.340 --> 00:51:37.110

Simon Turner: focusing very much an indoor air quality 30 years in the trenches, if you like.

342

00:51:37.620 --> 00:51:53.970

Simon Turner: working for a who's who of commercial real estate owners and operators, as well as school universities theaters all kinds of different built environments, but I sold the company now so, to be honest, I have no skin in the game shorter some advisory board roles.

343

00:51:55.530 --> 00:52:04.230

Simon Turner: Safe traces for us as a diagnostic technique, but, basically, I can tell you what I think what no one telling me what what I should say.

344

00:52:05.070 --> 00:52:16.530

Simon Turner: And so you know i'll tell it like it is to extend that I can, let me start by saying we're fighting a war here, obviously it's a while we haven't for a long time, probably Spanish flu in.

345

00:52:17.490 --> 00:52:23.550

Simon Turner: 1918 was the biggest large war, we fought in this regard, although there have been other outbreaks, obviously.

346

00:52:24.030 --> 00:52:36.210

Simon Turner: But, like the military, we tend to fight the last war with the tools and techniques and the challenges we face, rather than the next one, so you know next time we have a pandemic, maybe the.

347

00:52:36.990 --> 00:52:47.910

Simon Turner: Worst victims are the biggest victims will be young people rather than older people, maybe next time it'll be phone lights, rather than aerosol transmission, we have to worry about we just don't know.

348

00:52:48.270 --> 00:52:53.250

Simon Turner: So you know I thought, what I would talk about a little bit about what I would do if I was a policymaker.

349

00:52:53.820 --> 00:53:04.050

Simon Turner: Because if I was i'm always grateful i'm not frankly right understand i'd have to work, the odds here that i'm dealing with millions of people and their lives.

350

00:53:04.320 --> 00:53:15.120

Simon Turner: And I can't control them all, especially in a country as diverse as United States and to understand that really the you know the perfect is the enemy of the good of good you can only.

351

00:53:15.660 --> 00:53:26.700

Simon Turner: Do, so much so, what policies we do end up with should be broad strategic themes which have been proven to be successful program to be robust and resilient.

352

00:53:27.330 --> 00:53:44.730

Simon Turner: But give us the biggest bang for the buck, and of course this is why we come down to ventilation in particular it's really a question of playing the odds a triage maximizing the odds of success, and so in that regard, I agree with a lot of what Richard cause he said in particular here.

353

00:53:45.990 --> 00:53:51.780

Simon Turner: But here's a few nuggets to take away from this based on my experience at least over three decades.

354

00:53:52.830 --> 00:54:01.440

Simon Turner: Buildings are very complicated and generally by and large, with the exception of school trailers probably they're all different they're always like each one is an experiment.

355

00:54:01.740 --> 00:54:14.790

Simon Turner: They change by the hour by the day, depends on how they oriented it depends on internal and external eat loads, especially in schools where you have you know, an empty classroom we know internal heat load and then.

356

00:54:15.090 --> 00:54:24.420

Simon Turner: 2530 kids running i'm a heater and it's very difficult for inexpensive air conditioning system to manage those rapidly changing he blows.

357

00:54:25.500 --> 00:54:28.470

Simon Turner: And, as both been a challenge for schools, unless they're the.

358

00:54:28.950 --> 00:54:40.350

Simon Turner: district has a budget that can really throw a lot of money and healthy control systems, how they're configured, and in particular the complexities of turbulence and add movement inside schools.

359

00:54:40.620 --> 00:54:53.640

Simon Turner: or any room for that matter is is a real challenge so coming back to actually do what Richard Richard said there's an old industrial hygiene maxim, and that is it's the dose makes the poison.

360

00:54:54.750 --> 00:55:00.150

Simon Turner: The more you're exposed and the more time you're exposed to that level, the more likely it will hurt you.

361

00:55:00.450 --> 00:55:06.090

Simon Turner: dependent, at the same whether you're dealing with a chemical contaminants in a room or you're dealing with an infectious contamination.

362

00:55:06.420 --> 00:55:16.320

Simon Turner: So, really, what we need to aim for is the lowest concentration that's feasible for the shortest period of time, the inhalation dose as, as we heard from from rich causey.

363

00:55:17.880 --> 00:55:29.670

Simon Turner: We can't produce a sterile environment and actually nor should we but and there's probably a threshold number of viral particles, that if you can get below you won't have to worry so much about infection.

364

00:55:30.060 --> 00:55:39.330

Simon Turner: We don't really know what that threshold is and it's going to vary depending on the individual obviously so again if I was a policymaker it's about playing the odds.

365

00:55:40.440 --> 00:55:50.490

Simon Turner: So imagine imagine there is an infectious person person in the room, and there are really two components to consider one is the background concentration.

366

00:55:50.970 --> 00:55:56.670

Simon Turner: of infectious particles in the surrounding air assuming it was perfectly next which course it never is.

367

00:55:57.120 --> 00:56:01.230

Simon Turner: But the second and probably most important one that can make the biggest difference.

368

00:56:01.500 --> 00:56:13.380

Simon Turner: Is the concentration of infectious particles in the expelled plume from that infected person right here in front of their mouths and right there in in your breathing zone, and this is why you see so much.

369

00:56:14.400 --> 00:56:30.060

Simon Turner: infections really from people in close quarters, especially important ventilated spaces, going from their breathing zone to your it's all about your local breathing zone and that's where you want to get infectious particles out so that local ventilation is critical.

370

00:56:31.200 --> 00:56:39.120

Simon Turner: There are two main benefits to ventilation, first of all, it gets beneficial components of outdoor and indoor spaces.

371

00:56:39.480 --> 00:56:49.890

Simon Turner: And it dilutes the bad indoor internally generated pollutants that that build up in the indoor space Okay, but there's another big benefit we actually haven't touched on yet.

372

00:56:50.340 --> 00:56:53.790

Simon Turner: Today, and that is there are and have been over some years.

373

00:56:54.540 --> 00:57:07.410

Simon Turner: clear and convincing studies that show that bringing outside air into a space and lowering carbon dioxide levels improves cognitive function and the ability of people of all ages to learn.

374

00:57:08.190 --> 00:57:19.290

Simon Turner: it's a really important thing we have very clear evidence of that now and that really was a game changer as I became more public knowledge about how it can improve cognitive function.

375

00:57:20.340 --> 00:57:29.220

Simon Turner: So the ventilation strategies, I believe, in which work in order of cost would be first where you can where you have a climate and the ability to do it.

376

00:57:29.580 --> 00:57:39.810

Simon Turner: Open windows and create and doors and create cross flows across rooms, to the extent that you can and no it's not possible in some rooms and in some climates depends on the time of year.

377

00:57:40.410 --> 00:57:51.420

Simon Turner: Second thing indoor fans and mixing I a believer in just mixing the room, the room air up if because it's a cheap inexpensive way of doing it and it helps to disperse that.

378

00:57:51.810 --> 00:57:58.950

Simon Turner: Infectious droplet plume in front of infected people next, of course, is mechanical outdoor air delivery.

379

00:57:59.550 --> 00:58:06.840

Simon Turner: Which is one of the things that's missing from hung's a lot of people, to my surprise don't understand how poorly ventilated homes are.

380

00:58:07.350 --> 00:58:16.650

Simon Turner: and, obviously, the more outside air, you can bring in the better it is now there's an energy penalty associated with that which is very going to be very interesting in the years to come, because.

381

00:58:17.160 --> 00:58:27.390

Simon Turner: we've done as we heard earlier, everyone knows what it costs to bring outside Aaron and there's been all this effort to reduce the energy consumption of buildings.

382

00:58:27.810 --> 00:58:41.430

Simon Turner: But what we're going to end up with is an ethical debate about the value of reducing energy costs if it means and compromising the cognitive ability of the people who work in those spaces and learning those spaces.

383

00:58:41.880 --> 00:58:47.220

Simon Turner: And that's something which will be interesting to see how that pans out turns out over the coming years.

384

00:58:47.760 --> 00:58:56.220

Simon Turner: And then the last and most expensive strategy for ventilation, which i'm a big believer in is a concept called thermal displacement ventilation.

385

00:58:56.730 --> 00:59:08.820

Simon Turner: Now it's not something you could just retrofit into an existing building, because it really means turning the whole ventilation system upside down the concept just briefly is you bleed air into the into of.

386

00:59:10.740 --> 00:59:23.820

Simon Turner: floor space or room at low level, you have big diffusers a poor Aaron about 65 degrees and they form a pool of cooler on the floor and they rely on the thermal clunes from equipment and kids and teachers.

387

00:59:24.150 --> 00:59:31.830

Simon Turner: come up around the individual delivering clean air conditioned air into the breathing zones of the individuals and then.

388

00:59:32.220 --> 00:59:40.680

Simon Turner: Out of the breathing zone into the into the returner or exhaust system it's highly energy efficient and it's really good and limiting that cross.

389

00:59:40.980 --> 00:59:50.700

Simon Turner: Contamination from one individual to another, and there are examples of thermal displacement all over the country but it's not anywhere near as popular in this country, as it is in Europe.

390

00:59:51.120 --> 01:00:09.030

Simon Turner: I think one of the things we could do is try to encourage thermal displacement systems in new construction again it's difficult to do an existing buildings, again I got no dog in the thermal displacement hunt, but I think it's a very effective method, if we can use it where we can.

391

01:00:10.350 --> 01:00:22.830

Simon Turner: So, finally, my personal research recommendations in this field are comes back to an old business maxim that I used to use when I was running a business you can't manage what you don't measure.

392

01:00:24.240 --> 01:00:34.740

Simon Turner: So i'm a big believer in using the science of epidemiology, the power of statistics over large sample sizes to pick out the best of these engineering techniques.

393

01:00:35.160 --> 01:00:50.160

Simon Turner: and understand what really does work, what does limit infections and what you know, maybe sounds nice by our gut but we don't really know so then we don't squander these billions potentially available dollars to us to get it right, thank you.

394

01:00:50.850 --> 01:00:51.840

Ana Rule: Thank you, Simon.

395

01:00:53.610 --> 01:00:59.550

Ana Rule: Our final panelist is Dr tofino farmer associate professor of chemistry at Colorado State University.

396

01:01:00.150 --> 01:01:15.750

Ana Rule: Research focuses on outdoor atmospheric and indoor chemistry, with an emphasis on understanding the sources and sinks of reactive trace gases and particles and their effects on climate, ecosystems and human health Sophie over to you.

397

01:01:16.440 --> 01:01:23.130

Delphine Farmer: Thank you, thank you and I want to thank all the panelists who spoken before me, who, I think it really laid a fantastic.

398

01:01:23.490 --> 01:01:30.990

Delphine Farmer: piece of groundwork and explaining the need for ventilation masking and distancing and I think that's really well established.

399

01:01:31.320 --> 01:01:38.550

Delphine Farmer: So what I want to use my next few minutes to do is to provide my perspective, as a chemist on some of these issues.

400

01:01:39.090 --> 01:01:42.840

Delphine Farmer: So I think the first, the first thing that we've sort of alluded to over the last.

401

01:01:43.230 --> 01:01:53.280

Delphine Farmer: The last hour or so is that there there's there's an established need to ventilate but there's also a lot of focus on surface, cleaning and on hygiene.

402

01:01:53.760 --> 01:02:01.110

Delphine Farmer: And so I want to talk about the cat the challenge of that first and then I want to talk about chemical the challenges of chemical approaches to airplane.

403

01:02:01.890 --> 01:02:09.000

Delphine Farmer: So hiking products and surface cleaning are being widely used in schools, but they do have to serious problems.

404

01:02:09.390 --> 01:02:20.730

Delphine Farmer: The first of which is that surface cleaning isn't actually very useful in terms of bang for the buck in covert 19 surface transmission is not the dominant mode of transmission in most environments and so.

405

01:02:21.180 --> 01:02:28.260

Delphine Farmer: I think there's there's first, a question of money and how you choose to spend your your dollars um but the second.

406

01:02:28.860 --> 01:02:32.730

Delphine Farmer: challenge with surface cleaning, which lays the groundwork for some other things I want to mention.

407

01:02:33.060 --> 01:02:41.160

Delphine Farmer: Is that there are real problems with excessive cleaning in terms of health effects both from the cleaners themselves, but also the chemistry that they create.

408

01:02:41.610 --> 01:02:49.890

Delphine Farmer: As well as material damage, environmental issues, and then a series of chemical reactions that a lot of disinfectants start.

409

01:02:50.220 --> 01:02:57.030

Delphine Farmer: And this can create a very complex cocktail of different compounds and indoor air, many of which are toxic.

410

01:02:57.420 --> 01:03:05.490

Delphine Farmer: And so there's there's an array of comes through that will happen moment you bring a reactive compound into an environment, and I think we.

411

01:03:06.000 --> 01:03:10.740

Delphine Farmer: we're not talking about those chemical consequences enough when we talk about surface clean.

412

01:03:11.550 --> 01:03:21.960

Delphine Farmer: So, while some of the surface cleaners are certainly effective and have been proven by EPA testing to be effective in terms of destroying everything starts coming to virus on surfaces.

413

01:03:22.890 --> 01:03:36.570

Delphine Farmer: that's not the biggest problem in this pandemic right now, and so I think we, we need to consider the unintended chemical consequences of surface, cleaning and they're toxic byproducts, particularly for janitorial staff, as well as for children and adults.

414

01:03:37.590 --> 01:03:47.490

Delphine Farmer: So they're very real consequences of overclaiming but what I wanted to the other thing I wanted to bring about is that the same idea here of.

415

01:03:47.850 --> 01:03:55.350

Delphine Farmer: unintended chemical consequences also applies to a lot of new air cleaning devices so there's a.

416

01:03:55.740 --> 01:04:04.560

Delphine Farmer: series of new air cleaning devices that are being very aggressively promoted, some of them use accidents like ozone hydroxyl radicals you'll talk of see.

417

01:04:04.860 --> 01:04:20.610

Delphine Farmer: Discussions of photo catalytic devices what those really are doing is breaking down molecules and pathogens, but in doing so, they produce a series of oxidized organic compounds and this has been the study of decades of research and atmospheric chemistry.

418

01:04:21.120 --> 01:04:28.020

Delphine Farmer: You produce formaldehyde among other other toxic, and so I think we really need to think about that unintended chemistry.

419

01:04:28.860 --> 01:04:41.160

Delphine Farmer: spraying and fogging of disinfectants like hydrochloric acid hydrogen peroxide ethylene glycol is also bring that same level of new chemical reactions into an already complex indoor environment.

420

01:04:41.940 --> 01:04:48.660

Delphine Farmer: And then finally there's a set of products called Ionized or Ion generators, and these devices that again becoming.

421

01:04:49.110 --> 01:05:02.580

Delphine Farmer: quite common in the marketplace, but they they use chemistry that as a chemist as a physical chemist I understand i'm molecule reaction create oxidized organic compounds in the atmosphere.

422

01:05:03.060 --> 01:05:10.980

Delphine Farmer: And, and some of those are toxic and have unintended chemical consequences there's very little independent oversight and testing these.

423

01:05:11.460 --> 01:05:23.070

Delphine Farmer: Of these products and very little consideration of the secondary chemistry so as an environmental chemist, I would like to put for you, the idea of the precautionary principle.

424

01:05:23.490 --> 01:05:35.100

Delphine Farmer: And what we know works is ventilation infiltration and I think doctors corsi and fun fluff and and Stevens of all provided, among others, are provided excellent advice on on that.

425

01:05:35.460 --> 01:05:40.200

Delphine Farmer: So I think we need to also consider when we bring in chemical devices.

426

01:05:40.920 --> 01:05:51.780

Delphine Farmer: What are we exposing people, particularly children too and and why would we do that when we don't even need to when there are other much more benign and less expensive approaches.

427

01:05:52.140 --> 01:05:58.800

Delphine Farmer: So overall my team messages are first off skip the comments what anything chemical you don't need it.

428

01:05:59.370 --> 01:06:11.670

Delphine Farmer: And that's that's me coming into kind of and, secondly, clear the air with ventilation filtration source control with masking and social So those are my thoughts and i'll be be happy to participate in the discussion.

429

01:06:13.140 --> 01:06:15.870

Ana Rule: Thank you so much, Dr farmer Paula over to you.

430

01:06:21.690 --> 01:06:21.840

Ana Rule: Oh.

431

01:06:23.340 --> 01:06:29.730

Paula Olsiewski: Sorry, I was muted okay so Margaret I assume we looks like we're getting a lot more questions.

432

01:06:30.270 --> 01:06:39.210

Margaret Miller: Great so we have a lot of questions it'll be similar but they're kind of technical and specific, so I think it shows that there's still a lot of questions out here about this and guidance needed so.

433

01:06:40.230 --> 01:06:46.560

Margaret Miller: here's a question from Laura Palmer we have one campus housing and other older building with oil lucky and window air conditioning.

434

01:06:47.100 --> 01:07:00.060

Margaret Miller: Units they're on a limited budget from her understanding, should we upgrade to window AC units that bring an outdoor air upgrade filters and AC units invest in hipaa air purifiers and open windows to air outside space.

435

01:07:01.140 --> 01:07:11.610

Margaret Miller: How will we know we've done enough to mitigate risk and then prove indoor air quality and would you recommend the habit air filters and upgrading window AC units to bring in outdoor air to mitigate risks.

436

01:07:13.200 --> 01:07:23.670

Simon Turner: We can take a shot up that, if you like, the thing about window units will bang, as we call them in the industry is that they just don't have the power to run have a filters.

437

01:07:24.690 --> 01:07:31.260

Simon Turner: So you're going to have to if you're going to run half of filters through small window basically you're going to have to do all kinds of upgrades to.

438

01:07:31.530 --> 01:07:42.720

Simon Turner: A more powerful system that can handle the pressure drop pepper filters a big strong pressure drops, it is a myth that you can just install have a filters everywhere and every air handler.

439

01:07:43.500 --> 01:07:52.770

Simon Turner: You can't fake that as a limit So yes to a lot of the questions that she's asking about improve ventilation, improved for Tracy extent you can.

440

01:07:53.010 --> 01:08:08.580

Simon Turner: But any air handler is going to have a limit the amount of filtration you can put in it, and that was really intriguing question she just asked was a she right was when do you know when you've done enough that's a really good question.

441

01:08:09.930 --> 01:08:24.900

Simon Turner: I don't have the answer that, and this is why I said about managing what you measure we need more epidemiology to know what we really need to know what really works and what sounds good, but it doesn't really work, and that requires the study of disease that's what epidemiology means.

442

01:08:26.040 --> 01:08:36.030

Brent Stephens: I just want to add on a couple things on that because I I heard window unit to bring in more outside air and I just most of the window units that you can use.

443

01:08:36.900 --> 01:08:46.920

Brent Stephens: Either don't bring any outside air or they bring in just a tiny amount just a little amount, so it actually wouldn't increase ventilation, that much if you need it because the classroom is going to be hot, then they get it.

444

01:08:47.370 --> 01:09:03.030

Brent Stephens: And then, so, in addition to that, it sounds again to co sign it, it sounds like a solid use of a portable you know or standalone air cleaning unit and for I would say, for a lot of these if you're unsure what to what to.

445

01:09:04.050 --> 01:09:11.430

Brent Stephens: use their I want to point you to the US EPA is guide for air cleaners and filtration in the home.

446

01:09:12.330 --> 01:09:18.690

Brent Stephens: The in the home part could probably be erased from that document because it's very general and.

447

01:09:19.470 --> 01:09:37.320

Brent Stephens: So you'll learn things like what's it what's a what's a reasonable clean air delivery rate for what size space just take that number, you know what spaces it size for and and increase and increase it right, maybe double it for schools, something like that.

448

01:09:38.490 --> 01:09:39.390

Brent Stephens: And and.

449

01:09:40.740 --> 01:09:43.020

Brent Stephens: So yeah I think that's important add.

450

01:09:44.340 --> 01:09:57.750

Margaret Miller: Great and here's a question from Progress dokey and what is the panel's opinion on the relative importance of droplet transmission verse aerosol transmission such a situation where the people are close to each other, but the filters chugging away decide that.

451

01:09:57.780 --> 01:10:06.630

Simon Turner: that's something i'm concerned about in that you have you know you have to have a filter out there, lowering the background levels, but this was something I was trying to say during my talk that.

452

01:10:07.050 --> 01:10:16.470

Simon Turner: And a lot of the you know it really infectious episode infection episodes is probably happening face to face right there in front of people within a few feet.

453

01:10:16.980 --> 01:10:25.770

Simon Turner: And that you, although you're learning the background levels, with a hyper filters, this is why the ventilation component so important to try to disperse.

454

01:10:26.520 --> 01:10:31.410

Simon Turner: Those concentrations of heavier aerosols before they make it into your breathing zona.

455

01:10:31.980 --> 01:10:46.620

Simon Turner: At numbers which cause infection that's the challenge obviously it's, not to say you shouldn't reduce the background levels would happen filter in the corner, but we have to understand that a lot of this infection is happening face to face within a few feet of each other.

456

01:10:48.930 --> 01:10:59.160

Margaret Miller: Right now i'll do a little bit of a follow up on that one um can you speak to the impact of room airflow patterns on the ventilation effectiveness of in Room peppa filter units where should we be placing these filters.

457

01:11:00.240 --> 01:11:01.350

Simon Turner: Right, you will take that.

458

01:11:02.070 --> 01:11:12.420

Brent Stephens: yeah that's a hard one to generalize right unless you unless you offer such high level advice that it's almost meaningless and that you could have told me the answer right.

459

01:11:13.170 --> 01:11:21.690

Brent Stephens: Which is well it works better, when it's near the source, but well how do you know what your sources well you don't and so it's tricky.

460

01:11:22.500 --> 01:11:33.750

Brent Stephens: And again, I think it reiterates like the importance of this hierarchy of controls, because some of this stuff you just can't know without a really deep investigation and and where's that going to come from.

461

01:11:34.950 --> 01:11:44.700

Brent Stephens: And another sort of way to think about it in my mind is relatively evenly spaced among people is probably a reasonable approach.

462

01:11:45.990 --> 01:11:55.740

Brent Stephens: And then you know you I haven't seen any studies of this, but you may find comfort in units that.

463

01:11:56.820 --> 01:12:07.200

Brent Stephens: push air in a way that that that encourages mixing, for example, I you know again this is sort of assignments point like we probably need to learn more air but.

464

01:12:07.530 --> 01:12:13.770

Brent Stephens: You know, as it pulls air from below and pushes up to the top, for example, it may encourage mixing more so than like a directional airflow.

465

01:12:14.850 --> 01:12:18.750

Brent Stephens: But it's really hard to say much more than that.

466

01:12:20.280 --> 01:12:33.450

Simon Turner: becomes better what I was saying about every room is different, as how its configured pencils in it and it depends who's infected and who is infectious in it and that's going to vary room by room hour by hour, especially in schools.

467

01:12:35.250 --> 01:12:44.100

Margaret Miller: Great Thank you and here's a question for Dr farmer or they're growing concerns about over disinfection with sprays and floggings and the effect of the chemicals on respiratory health.

468

01:12:45.030 --> 01:12:45.420

yeah.

469

01:12:47.730 --> 01:12:58.860

Delphine Farmer: there's what we know about the chemistry, is it both a lot of these fogging and disinfection units, the compounds that are being used themselves will react with.

470

01:12:59.220 --> 01:13:11.100

Delphine Farmer: The tissues of your lungs and the cells inside to create an array of toxic byproducts that we know are dangerous so so we know that that is a problem, but what we also know is that when those.

471

01:13:11.640 --> 01:13:18.810

Delphine Farmer: bogging and disinfecting compounds like hydrochloric acid and hydrogen peroxide are released into a room, they will then react with.

472

01:13:19.080 --> 01:13:25.740

Delphine Farmer: gases in the air, you know all the things that we can smell, and we know are off gassing off with painter wood or we're just exhaling.

473

01:13:26.640 --> 01:13:42.000

Delphine Farmer: And and there again we create that array of toxic byproducts through chemical reactions and breathing, that is, is of great concern So yes, there are a lot of concerns about people breathing in.

474

01:13:43.140 --> 01:13:48.960

Delphine Farmer: During active disinfection or fogging events, but also what happens.

475

01:13:49.410 --> 01:13:58.260

Delphine Farmer: hours later, if people return into the room, and you have had chemical reactions occurring on all the surfaces inside your room, they will still continue to off gas.

476

01:13:58.590 --> 01:14:13.260

Delphine Farmer: Those toxic compounds, so we have a lot of concerns about those in the in the chemistry and indoor air communities and and a lot of concerns about the lack of oversight or capacity to really think about that chemistry.

477

01:14:14.790 --> 01:14:27.150

Margaret Miller: Great and are your recommendations regarding ozone emitting purifies roughly the same as I a new station devices, how to users of ozone program purifier sorry ensure they're not exceeding recommended indoor ozone levels.

478

01:14:27.720 --> 01:14:41.580

Delphine Farmer: So i'll flat out say there's no safe level of ozone to breathe in there's no safe level of any of those stones oxidizer to breathe, and they will all react again with the tissues in your lungs and.

479

01:14:42.060 --> 01:14:52.350

Delphine Farmer: and create not only do direct damage but also create toxic products so there's no safe level, so I cannot in any way, shape or form recommend anything that produces ozone.

480

01:14:52.710 --> 01:15:00.900

Delphine Farmer: They may be called air purifiers, but that does not actually mean that they are healthy or create healthier air that's that's a complete.

481

01:15:02.370 --> 01:15:10.980

Delphine Farmer: Complete difference in terminology and, similarly, I and either is, I think, also as as Dr bond fluff mentioned earlier.

482

01:15:12.000 --> 01:15:24.540

Delphine Farmer: And, and as well as Prince Stevens, and our session there's there's emerging evidence that they are dangerous to human health, and so I I again I don't think there is any any good level which she can use them.

483

01:15:25.380 --> 01:15:25.650

Simon Turner: I would.

484

01:15:26.700 --> 01:15:38.310

Simon Turner: I would echo what delfin said that about ozone generators, in fact I think last time I looked there is a weathering critique of ozone generators on the EPA website somewhere, which should put that the match of the rest.

485

01:15:40.920 --> 01:15:47.940

Margaret Miller: Right here's a question from John Cox, who oversees the claims assertions of commercial indoor air quality products in the United States.

486

01:15:51.240 --> 01:15:53.220

Simon Turner: I'm going to say no one Brent.

487

01:15:57.840 --> 01:16:15.210

Brent Stephens: I see Bill and Rich here if you guys want to chime in at all at the short of a loose that EPA doesn't do a lot there's a number of industry industry or professional societies that they do some but frankly there's not enough that they can do at this point in my opinion.

488

01:16:18.150 --> 01:16:24.150

Delphine Farmer: Yeah I'd like to see organizations like the Food and Drug Administration be involved, but I.

489

01:16:25.320 --> 01:16:29.730

Delphine Farmer: The the regulatory world is beyond beyond my understanding on that.

490

01:16:32.610 --> 01:16:41.310

Margaret Miller: Okay, great um here's a question from Carrie Burke, can you discuss the impact of humidity in the north, east, the relative humidity in our buildings can fall to the 20s or the teens.

491

01:16:43.950 --> 01:17:01.440

Simon Turner: Well, I mean we see, I mean humidity varies from place to place in the country and, from the time of year, and one of the things I will counsel against is installing humidifiers into indoor air to try to raise humidity it's bad idea, but they can bring their own problems.

492

01:17:03.750 --> 01:17:14.880

Simon Turner: You know, air conditioning systems tend to control humidity in in hot summer environments and it's all about letting them do their job, having the right vapor barrier to place.

493

01:17:15.930 --> 01:17:27.780

Simon Turner: And the right, so you don't create mold issues, in particular, that this is what comes of humidity if it's not controlled properly you end up with with with mold issues and conversation leading to more so.

494

01:17:29.640 --> 01:17:38.010

Simon Turner: yeah I don't think you can go too overboard trying to control humanity, ideally, want to keep it between 30 and 60%.

495

01:17:40.800 --> 01:17:48.120

Margaret Miller: rate is changing a habit filters by an untrained person does that carry any risk to contaminate the area, the classroom.

496

01:17:50.940 --> 01:17:58.350

Brent Stephens: I think that there's relatively minimal risk and changing filters I do like the idea of.

497

01:17:58.890 --> 01:18:04.980

Brent Stephens: i've seen that I think it was destined popping didn't get nist mentioned this idea of like changing them on a Monday morning after.

498

01:18:05.880 --> 01:18:19.500

Brent Stephens: Any captured viruses, you know, had was rich had time to decay, you know, over the weekend and then it's a pretty simple process to place you know where where people in place into.

499

01:18:20.580 --> 01:18:24.570

Brent Stephens: A trash bag and get it out of there, so I don't think it's much more complex than that.

500

01:18:26.940 --> 01:18:43.380

Margaret Miller: Okay, great I have a few more questions for the session and then we'll push them to the next session um how effective is an outward facing box fan and an outside open door for reducing pollution dose and are their potential negative implications are each back system or inside air pressure.

501

01:18:45.030 --> 01:18:52.710

Simon Turner: But by and large, in it, I mean assuming you're talking about a main built school building rather than a than a trailer building.

502

01:18:53.910 --> 01:18:58.560

Simon Turner: It what we generally do not want to do is create a negative pressure in a building.

503

01:18:59.160 --> 01:19:14.790

Simon Turner: You want the air conditioning system to generate a mild positive pressure that the air the outside air come in through the air handler so the building is under a positive pressure the downside of putting exhaust at throwing in additional exhaust fans.

504

01:19:15.810 --> 01:19:21.060

Simon Turner: Country to the design intent of the building is that you create negative pressure now you're calling in.

505

01:19:21.840 --> 01:19:32.190

Simon Turner: outdoor air from uncontrolled sources, which could include parking lots trash compactor as loading docks all kinds of them uncontrolled sources so.

506

01:19:32.880 --> 01:19:47.760

Simon Turner: Again it's best to let the air handlers do that job, make sure using ashtray these affray recommendations that are now out there that are excellent, by the way to maximize ventilation, using the mechanical equipment that you have.

507

01:19:48.900 --> 01:20:02.100

Simon Turner: And, by all means use natural ventilation, where you can but I wouldn't install this water sounds like he's talking about negative and machines, to create a negative pressure inside the school bad idea.

508

01:20:03.540 --> 01:20:05.430

Margaret Miller: Okay, great um two more questions so.

509

01:20:06.900 --> 01:20:16.320

Margaret Miller: I don't think most of us understand upper room UV GI How should we start researching this ventilation strategy and what are the criteria, in addition to cost to consider before implementation.

510

01:20:17.700 --> 01:20:21.120

Simon Turner: Once you take that Brent i've got a common attitude, but when you guys take it.

511

01:20:23.580 --> 01:20:28.830

Brent Stephens: Are we okay with crossing paths here because bill bomb classes on here, but his video he should do this yeah.

512

01:20:28.920 --> 01:20:32.100

Paula Olsiewski: It feels available world's experts on.

513

01:20:32.100 --> 01:20:34.320

Brent Stephens: This, I can tell you a bill would say.

514

01:20:36.330 --> 01:20:51.090

William Bahnfleth: Surely Where would you get started, or two chapters in the ashtray handbook on upper room and CDC approves upper maybe GI for tuberculosis controls was actually a whole niosh technical guide on applying.

515

01:20:52.260 --> 01:21:04.530

William Bahnfleth: upper room system so that that's a good place to start you know if you're not going to dig into the literature and there's an ashtray best practices article as well, so there's there's a lot of infrared information around and mainly comes from.

516

01:21:05.670 --> 01:21:19.260

William Bahnfleth: The sources and Harvard has done most of the research that i'm aware of on on upper room systems over the years and to make a lesser extent Colorado Those are all good places to search for information.

517

01:21:23.010 --> 01:21:25.260

Margaret Miller: Great and then anybody else on that comment.

518

01:21:27.450 --> 01:21:27.750

Simon Turner: Right I.

519

01:21:27.840 --> 01:21:31.260

Margaret Miller: think you had one more comment and then i'll go to our last question for the session.

520

01:21:32.070 --> 01:21:41.820

Brent Stephens: yeah thanks I also just wanted to make sure that I was in the question about where do I put a portable air cleaner in a classroom or a portable air cleaners in a classroom.

521

01:21:43.290 --> 01:21:52.800

Brent Stephens: I want to revisit that because I think what I said was too complex, the answer is, I don't really know the answer is put it anywhere, you can place it in the classroom and it will.

588

01:31:55.020 --> 01:32:05.640

Chris Pyke: And concerns about the costs and technical challenges of technology, so we, we are making progress, and we still have challenges so i'm going to close with three action items one is.

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01:32:06.000 --> 01:32:13.110

Chris Pyke: I believe there are if we treat this like a management problem we have tools resources and case studies available today and no cost to.

590

01:32:13.710 --> 01:32:19.200

Chris Pyke: I would encourage you, we need more information, and I would encourage folks who are listening to take a survey.

591

01:32:19.950 --> 01:32:27.990

Chris Pyke: The Center for green schools and ashtray have have an open survey on IQ practices in K 12 schools is open, through the end of the week.

592

01:32:28.320 --> 01:32:33.180

Chris Pyke: visit the Center for green school's website, you will find a link to take the survey and tell us what's going on.

593

01:32:33.510 --> 01:32:39.480

Chris Pyke: And and in partnership with asteroid we will share that back, and if you can't get enough, the last hour and a half, have not been enough.

594

01:32:39.750 --> 01:32:49.590

Chris Pyke: The Green school summit for facilities and sustainability leaders is having a forum on this on Thursday and i'm happy to share more so, I appreciate the time and i'm looking forward to the discussion thanks.

595

01:32:51.060 --> 01:32:51.270

Chris Pyke: Oh.

596

01:32:51.570 --> 01:32:55.530

Ken Bernard: Thank you very much, that leaves a lot lot for us to cover and.

597

01:32:58.530 --> 01:33:14.700

Ken Bernard: it's interesting that the technology on clean air in schools is clear the cost is manageable and the problem here is in fact policy implementation of policy changing the policy to reflect what we already know, would make a difference.

598

01:33:15.210 --> 01:33:22.260

Ken Bernard: For the next presentation, I want to introduce Joel Solomon he's a senior policy.

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01:33:22.260 --> 01:33:24.750

Ken Bernard: analyst at the national education association.

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01:33:25.290 --> 01:33:26.550

Ken Bernard: Joel currently leads.

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01:33:26.580 --> 01:33:28.140

Ken Bernard: Any as cross departmental.

602

01:33:28.140 --> 01:33:29.460

Ken Bernard: Safety and Health team.

603

01:33:29.670 --> 01:33:38.910

Ken Bernard: which guides any a safety and health response to the covert 19 pandemic in this capacity easter's efforts to review and enhance in person learning.

604

01:33:39.240 --> 01:33:53.460

Ken Bernard: Plans for schools and institutions of higher education, develop guidance provide strategic advice and advanced members, safety and health interest within the Biden Harris administration and US government agencies Joel over to you.

605

01:33:54.630 --> 01:34:05.220

Joel Solomon: Thank you very much, and thank you for inviting national education association to be with you, so far, this has been a very interesting and very helpful.

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01:34:05.520 --> 01:34:15.300

Joel Solomon: conversation, and we look forward to the outcome and further research and publications from these conversations so.

607

01:34:16.050 --> 01:34:36.330

Joel Solomon: The national education association is United States largest Union we have 3 million members and 14,000 local associations around the country so when we talk about the experience of our folks and what's happening on a local level it's it's impossible to generalize.

608

01:34:37.380 --> 01:34:45.000

Joel Solomon: And we also represent all categories of education employees from pre K through higher education.

609

01:34:45.240 --> 01:34:59.100

Joel Solomon: Not just teachers and i'm very happy early on to hear that the conversation clearly referred to, teachers and staff we represent, of course, that PR professionals that custodial and maintenance workers school nurses and so many more.

610

01:35:00.180 --> 01:35:07.320

Joel Solomon: And what I want to do today is talk about how we've approached this issue in practice.

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01:35:07.920 --> 01:35:22.110

Joel Solomon: And some of what we're, seeing as the complications of getting it done Chris you laid out some really good really important categories of analysis and folks have talked about science and what's needed.

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01:35:22.410 --> 01:35:38.790

Joel Solomon: And I want to share a little bit about what we are seeing in practice what what can be done what works well and where do we find problems, and let me just start that conversation about the what what happens on the ground.

613

01:35:39.870 --> 01:35:42.840

Joel Solomon: There was discussion earlier about.

614

01:35:44.040 --> 01:35:48.720

Joel Solomon: Decreasing the inhalation dose and it's important for everyone, and it is absolutely.

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01:35:49.740 --> 01:36:00.630

Joel Solomon: But we also have different types of activities that cause different types of risk in different types of indoor environments, so when we step back, we have to be very careful to say.

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01:36:00.870 --> 01:36:14.190

Joel Solomon: What are the risks in a particular area, and what are the strategies we need for that particular area, given its size, given what's happening, given what its ventilation system looks like.

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01:36:15.270 --> 01:36:24.750

Joel Solomon: We have folks that have returned to in person destruction in certain buildings, because those buildings have better ventilation.

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01:36:25.470 --> 01:36:41.820

Joel Solomon: But if we want to scale that up what's happening with those other buildings and how do we make sure they are as safe as possible as well, so this is some of some of the types of real world implications that I want to talk about.

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01:36:46.290 --> 01:36:55.500

Joel Solomon: we approach this with five basic pregnancies, first as been talked about here, but from the beginning airborne transmission is a crucial problem.

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01:36:56.490 --> 01:37:13.770

Joel Solomon: To we're not going to solve that problem on a local level immediately by upgrading or replacing hba system htc systems we don't have the time you don't have the money, and we need to be making changes now to mitigate risk.

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01:37:14.550 --> 01:37:23.100

Joel Solomon: Third, our Members are rightly very concerned about ventilation they're asking about it they're seeking solutions because.

622

01:37:23.370 --> 01:37:38.760

Joel Solomon: They work in buildings, some of them were built in the 1800s some don't have windows that work, although the windows are supposed to work they're working in spaces that weren't intended for that type of work they're doing.

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01:37:39.810 --> 01:37:47.880

Joel Solomon: Outside air conditions can be really bad in places So even if you can open the windows opening them is not a good idea.

624

01:37:52.650 --> 01:38:12.960

Joel Solomon: Also, the The other issue that we focused on here is, as I said, there are particularly high risk activities nursing what has to happen in nurses offices or coven isolation rooms, where we really need to think more strategically about solutions.

625

01:38:16.860 --> 01:38:26.460

Joel Solomon: One of the other things, and I think this is what Chris was talking about that that we've focused on is that Union and Member engagement.

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01:38:27.630 --> 01:38:39.810

Joel Solomon: Staff teachers all stakeholders is crucial, but ventilation and ventilation solutions are seen as daunting so we have to find ways to translate.

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01:38:40.170 --> 01:39:04.110

Joel Solomon: The conversation here into manageable doable activities, not just for outside experts who come in the engineers, there has to be engagement training, education for educators of all types and the facilities staff who are working on these issues, so we can't we can't leave that out.

628

01:39:06.120 --> 01:39:15.780

Joel Solomon: And I guess maybe I would add a six thing that we have taken into consideration as we've done our work, and that is.

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01:39:18.240 --> 01:39:20.280

Joel Solomon: That we found in practice.

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01:39:21.240 --> 01:39:36.060

Joel Solomon: deploying studies, however good, however important crucial for us to help us understand what's going on, and we are working with a team of industrial hygienists and other experts to help us understand the science.

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01:39:36.330 --> 01:39:47.790

Joel Solomon: So when we're working with folks on a local level, it is based on the science, but when it comes to a local level saying here's a study that shows it really doesn't work crucial information.

632

01:39:48.900 --> 01:40:00.570

Joel Solomon: So our approach, there was to find what people would understand as authoritative sources, and this was part of the discussion from their first panel, what does CDC say.

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01:40:00.990 --> 01:40:13.740

Joel Solomon: What has ashtray say and how can we distill what they're saying into usable pieces that allow people on a local level to say hey look school administration we need.

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01:40:14.250 --> 01:40:36.330

Joel Solomon: More outside air and here's why here's what CDC says about it is what ashtray says so, we have focused on those issues outside air improving filtration and also high risk areas, and how to overcome problems when mechanical ventilation systems aren't sufficient and.

635

01:40:37.350 --> 01:40:51.510

Joel Solomon: Another thing we focused on and this came up a couple times, I just want to highlight it and that's the equity issue, we know that school resources and ventilation are linked, and we know that.

636

01:40:52.680 --> 01:41:08.430

Joel Solomon: communities that are traditionally disadvantaged communities predominantly of color have fewer resources and we cannot let solutions be determined by finances that are not equitably distributed.

637

01:41:09.450 --> 01:41:17.610

Joel Solomon: I just want to end by pointing out a couple of things that we are finding as important things that we would need moving forward.

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01:41:18.690 --> 01:41:27.090

Joel Solomon: One we can always use stronger clear guidance on airborne transmission I think everyone has identified that.

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01:41:27.480 --> 01:41:37.530

Joel Solomon: As a need, but I do want to say that, by and large, people on a local level in schools do know that ventilation is important so proving that point.

640

01:41:37.920 --> 01:41:43.590

Joel Solomon: is not what we are doing on a local level what we are doing on a local level is providing.

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01:41:44.250 --> 01:41:56.550

Joel Solomon: doable low cost or no cost solutions for increasing outdoor air for making sure mechanical systems are functioning properly and those types of actions.

642

01:41:56.910 --> 01:42:15.000

Joel Solomon: We also don't want to lose momentum now to ensure that necessary maintenance, which has lagged for years and necessary upgrades are made, we need to come out of this better place, not just for the next pandemic, but for better indoor air quality.

643

01:42:15.480 --> 01:42:29.700

Joel Solomon: Because it in and of itself is important we want to make sure that whatever happens on a local level is integrating the outside experts, the technical experts, the engineers with in school experts.

644

01:42:30.120 --> 01:42:43.950

Joel Solomon: More than just the infection control folks folks working on hbc systems in schools, educators unions parents students, so those who know what's happening in in buildings.

645

01:42:45.090 --> 01:42:55.050

Joel Solomon: data gathering and research also reaching out to those people, very important to learn as as Chris was saying what's their experience what did they know.

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01:42:57.840 --> 01:42:59.280

Joel Solomon: And one of the things that I.

647

01:43:00.840 --> 01:43:11.940

Joel Solomon: We are seeing the need for greatly right now also part of the discussion here is more authoritative guidance on emerging.

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01:43:12.750 --> 01:43:27.750

Joel Solomon: Technologies we're seeing a lot of schools purchasing systems that I think people on this panel would be deeply troubled by the money is being spent, setting aside the fact that they're not always installed correctly.

649

01:43:28.770 --> 01:43:36.810

Joel Solomon: on their own, but but, as I said before, having that authoritative sources that people will understand that go beyond.

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01:43:37.530 --> 01:43:46.380

Joel Solomon: A very good academic study is going to be very important for helping schools understand what they should and shouldn't be spending their money on so.

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01:43:46.950 --> 01:43:54.630

Joel Solomon: CDC and others really can play an important role in there, let me stop there, and turn it back and again, thank you very much for having us.

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01:43:56.880 --> 01:44:07.920

Ken Bernard: Thanks Joel um since time is getting short let's move quickly to our final panelist destiny amen a behavioral science and risk communication specialist with experienced.

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01:44:08.250 --> 01:44:14.670

Ken Bernard: in translating science into practical solutions to increase resilience in individual Community and national levels.

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01:44:14.970 --> 01:44:24.960

Ken Bernard: Currently, she splits her time between our own consulting practice J point collaborative and supporting the International Association for bio science and environmental criteria.

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01:44:25.260 --> 01:44:38.160

Ken Bernard: b IB EC a nonprofit focused on developing and promoting creative adoptions to the ongoing global pandemic, I might add at this point that haven't been involved with the anthrax epidemic.

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01:44:39.180 --> 01:44:42.930

Ken Bernard: The anthrax problem back in 2001 and the.

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01:44:44.160 --> 01:45:00.360

Ken Bernard: You know Ebola in 2014 in the hot wash the after action reports on both of those the principal problem and mistakes that were made, as always seen as communications, in fact, for the anthrax.

658

01:45:01.770 --> 01:45:13.350

Ken Bernard: Public powder episodes communications was seen as the number one, two and three problem with our response so with pleasure, I pass this over to destiny.

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01:45:14.520 --> 01:45:15.540

Destiny Aman: Thank you so much can.

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01:45:16.800 --> 01:45:27.090

Destiny Aman: So, while the rest of these incredible folks today have been in focus primarily on the more technical elements of this problem and on its solutions.

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01:45:27.510 --> 01:45:40.170

Destiny Aman: Both from the molecular level to the policy level as a risk communications person I am interested in how we can build energy and momentum behind the solutions that they have offered here today.

662

01:45:40.740 --> 01:45:48.840

Destiny Aman: How we can align understanding, where needed and drive decision making at the right levels to have the impact that we need in the right places.

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01:45:49.410 --> 01:45:57.690

Destiny Aman: First, of course, it's important to understand the barriers that we have to action from a communication standpoint, here, to begin with.

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01:45:58.350 --> 01:46:05.640

Destiny Aman: I think, as my colleagues have made very clear indoor air quality is a complex issue it's a long standing.

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01:46:05.910 --> 01:46:14.850

Destiny Aman: issue that has roots in a lot of other problems we have old buildings we have aging infrastructure we have socio economic disparities.

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01:46:15.090 --> 01:46:24.060

Destiny Aman: We have changes in federal funding we have public health deficiencies as Claire pointed out indoor air takes constant work it's not a one and done kind of solution.

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01:46:24.750 --> 01:46:30.450

Destiny Aman: That there are complexities, even down to the individual classroom space as far as what needs to be considered.

668

01:46:30.720 --> 01:46:41.880

Destiny Aman: there's just a lot there and the impact of that problem results in many of our kids teachers in our school staff being exposed to unhealthy conditions, day after day.

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01:46:42.480 --> 01:46:54.210

Destiny Aman: And that was before the pandemic honestly this whole thing, taken as a whole can seem rather bleak and intractable if you're looking at it all at once.

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01:46:54.990 --> 01:47:02.400

Destiny Aman: From a comms perspective, I see the opportunity for overwhelm as very high here in this particular space.

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01:47:03.120 --> 01:47:10.050

Destiny Aman: We know from years of research that in order to get folks to act to reduce their risk.

672

01:47:10.470 --> 01:47:20.880

Destiny Aman: People need to not only feel like they understand their risk, but they need to feel like there is something that they can do about it, and that that something will actually work.

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01:47:21.510 --> 01:47:32.310

Destiny Aman: it's a psychological principle called self efficacy and for decision making, it can be as important, or even more important than risk perception in terms of how it affects action.

674

01:47:32.790 --> 01:47:42.510

Destiny Aman: Without a sense of self efficacy around the problem people tend to downplay or discount or discredit the message, sometimes giving up altogether.

675

01:47:42.840 --> 01:47:55.470

Destiny Aman: or instead choosing options that seems simpler, or maybe just more visible or, in some cases flashier or more actionable on the surface, even if those options are not as effective.

676

01:47:56.340 --> 01:48:05.610

Destiny Aman: This means that, in order to address the issues presented here around indoor air quality and schools, we need to make sure that people not only understand the issue.

677

01:48:05.850 --> 01:48:17.250

Destiny Aman: And the risk per presented by poor air quality, but they also need to understand the opportunity space presented by this moment, and what they can do in that opportunity space.

678

01:48:18.000 --> 01:48:31.170

Destiny Aman: Unlike the interesting thing is, I think, as a frame of inquiry, unlike individual measures like masking or handwashing or vaccination or social distancing potting.

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01:48:31.680 --> 01:48:47.070

Destiny Aman: Environmental mitigation actions like ventilation and filtration they're less political they're less reliant on personal decision making and more easily implemented through existing maintenance structures building policy channels all.

680

01:48:48.360 --> 01:48:59.790

Destiny Aman: Any one of us has only to talk with a family member or a rogue Facebook friend about masks or vaccines to know how entrenched the beliefs already are around these particular individual behaviors.

681

01:49:00.390 --> 01:49:07.170

Destiny Aman: And well teachers across the country are working hard to enforce masking requirements and encouraging kids to wash their hands.

682

01:49:07.410 --> 01:49:22.500

Destiny Aman: and maintain social distance, these are difficult behaviors even for adults to maintain and teachers have a ton on their plates with balancing hybrid teaching on top of in person teaching figuring out new technologies in their classrooms and new schedules in the class.

683

01:49:23.670 --> 01:49:36.030

Destiny Aman: Some of these schools are also physically not able to maintain social distance I actually interviewed a public school music teacher in Arizona, this weekend, who described some of these detailed surface cleaning routines.

684

01:49:36.300 --> 01:49:44.730

Destiny Aman: With what she called scary toxic chemicals sprayed by students at the end of each class to wipe down their area their seating areas.

685

01:49:45.090 --> 01:49:58.830

Destiny Aman: Fathers in the in the school and the school and all of this in a classroom with 28 students in a room no social distancing and singing i'll be at mast but singing by the choir.

686

01:49:59.460 --> 01:50:08.100

Destiny Aman: She also described contract contact tracing as an imaginary circle drawn around the infected student and the six or so students seated around them.

687

01:50:08.370 --> 01:50:17.130

Destiny Aman: being asked to quarantine but not the rest of the classroom of 28 students or the students sitting shoulder to shoulder in the cafeteria with no masks.

688

01:50:17.880 --> 01:50:22.410

Destiny Aman: This is a great example of what happens when we overly focus on the individual frame.

689

01:50:22.770 --> 01:50:28.470

Destiny Aman: And we don't focus enough on the environmental frame because there's quite a lot of solution in that space.

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01:50:28.770 --> 01:50:35.700

Destiny Aman: That can be helpful, regardless of what folks are doing internally now, of course, that means we want to still support all of those individual decisions.

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01:50:35.910 --> 01:50:42.660

Destiny Aman: And we want to promote them because they're important but this can act as a background the environmental work, the environmental measures can act as.

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01:50:42.900 --> 01:50:49.590

Destiny Aman: A way to reduce risk in the background, regardless of what all is going on in the classroom and there's a lot going on in the classroom.

693

01:50:50.220 --> 01:50:57.540

Destiny Aman: So this is why I focus needs to be balanced, the individual focus needs to be balanced with a focus on indoor environment, especially air.

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01:50:58.140 --> 01:51:12.300

Destiny Aman: Because even with those entrenched issues that I mentioned, we can safely and effectively implement many of these actions with the tools we have now, and they will work to reduce the risks in our schools.

695

01:51:13.020 --> 01:51:25.980

Destiny Aman: Increasing ventilation and filtration is not first not going to do arm, which we certainly can't say about the things that we're using now as this panel session has brought to light.

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01:51:27.180 --> 01:51:37.560

Destiny Aman: Now beyond, of course, the initial triage measures that we may want to advocate at the individual school level, we certainly do want to address some of the underlying issues in schools.

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01:51:38.220 --> 01:51:48.870

Destiny Aman: You know, we really need to if we want to ensure a good learning environment for our kids and we have an opportunity to help address some of those disparities by prioritizing air quality in schools, moving forward.

698

01:51:49.740 --> 01:52:06.990

Destiny Aman: With many schools set to reopen in the next few months, there is good work to be done now, and a lot of smart science behind it and by targeting schools, we actually target the arteries of communities, we raise Community health by addressing health and schools.

699

01:52:08.100 --> 01:52:16.530

Destiny Aman: All of you can help at lots of different levels we know we have teachers and administrators who are can push for these kinds of improvements in their schools.

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01:52:16.800 --> 01:52:25.380

Destiny Aman: We have parents that can agitate and are often very successful at the school level and agitating for improvements and all kinds of different school policies.

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01:52:25.770 --> 01:52:37.440

Destiny Aman: and members of the public can contact the representatives and share this information, call upon the administration to appropriately recognize the power of these options and the good science behind them in their policymaking.

702

01:52:38.400 --> 01:52:43.680

Destiny Aman: Honestly, in the wake of other national crises that we've seen over the course of history.

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01:52:44.130 --> 01:52:53.670

Destiny Aman: US has always realized certain kinds of advancements to science infrastructure, education and they've carried us through the crisis and into the future.

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01:52:54.120 --> 01:53:00.780

Destiny Aman: The pandemic offers a slew of opportunities to build back better and to improve national resilience long term.

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01:53:01.500 --> 01:53:08.460

Destiny Aman: just getting back to normal is not good enough, in fact, it was normal that led us to the pandemic in the first place.

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01:53:08.850 --> 01:53:19.650

Destiny Aman: We have the tools to do better, and this is a great place to start i'm happy to talk more about how we can support decision making on the part of policymakers and others in a position to make a difference, thank you.

707

01:53:21.570 --> 01:53:22.530

Ken Bernard: Thank you very much.

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01:53:23.640 --> 01:53:26.100

Ken Bernard: Margaret are you going to pick some questions here.

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01:53:26.520 --> 01:53:37.710

Margaret Miller: Yes, thank you so much, and so this question is for Joel, I believe, are you seeing schools applying for federal coven cares grant funding to improve their indoor air quality, or maybe somebody else can answer that but.

710

01:53:40.080 --> 01:54:05.340

Joel Solomon: We do know of schools that have done that, and we certainly hope there will be more funding available, but as Claire said targeting funding toward the right things and making sure funding is not misused for some bells and whistles are flashing your technologies that aren't proven.

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01:54:06.390 --> 01:54:08.940

Joel Solomon: is going to be really important as we go forward.

712

01:54:10.590 --> 01:54:13.500

Margaret Miller: Great thanks and we're still.

713

01:54:13.920 --> 01:54:24.660

Margaret Miller: This question is, I still cannot see how all this information gets translated to the level of persuading and decision making school board or administration, are there any school superintendents or school boards who model these strategies.

714

01:54:24.930 --> 01:54:27.480

Margaret Miller: That could advocate to other districts across the country.

715

01:54:31.020 --> 01:54:33.180

Chris Pyke: Is that, for me, I can I can.

716

01:54:33.450 --> 01:54:34.290

Joel Solomon: answer you know.

717

01:54:35.670 --> 01:54:37.320

Joel Solomon: The things that we've done.

718

01:54:37.680 --> 01:54:47.310

Joel Solomon: In trying to take CDC and ashtray and EPA guidance and put it in two very clear distilled language.

719

01:54:47.430 --> 01:54:50.430

Joel Solomon: When our folks sit down with school districts and say hey.

720

01:54:50.910 --> 01:55:04.800

Joel Solomon: This is this is important we do that, not because we think anyone sitting at a table having those conversations is going to walk into a classroom and be able to measure the air changes taking place.

721

01:55:05.010 --> 01:55:17.850

Joel Solomon: But in order to facilitate a discussion about what being done around indoor air quality to mitigate coven and, yes, there are a lot of schools where they they understand that and those conversations.

722

01:55:18.090 --> 01:55:20.760

Chris Pyke: are constructive sometimes it's a.

723

01:55:21.360 --> 01:55:21.840

Chris Pyke: fight.

724

01:55:22.110 --> 01:55:24.630

Joel Solomon: But they get it we've had places where.

725

01:55:26.130 --> 01:55:41.970

Joel Solomon: we've provided information on bipolar ionization and said before you move forward, you need to be looking for independent studies So yes, there are examples out there, it certainly does happen, but it happens most.

726

01:55:42.270 --> 01:55:42.990

Chris Pyke: When.

727

01:55:43.140 --> 01:55:45.000

Joel Solomon: We are using distilled.

728

01:55:45.360 --> 01:55:51.390

Joel Solomon: clear language, based on things that people recognize as authoritative.

729

01:55:52.710 --> 01:56:00.300

Chris Pyke: And let me, let me jump in after Joel I just think about two things so one is I had also shared as an answer several questions.

730

01:56:00.690 --> 01:56:07.920

Chris Pyke: We have clear examples of schools and school districts actually all around the world across the US who are using.

731

01:56:08.340 --> 01:56:21.480

Chris Pyke: The kinds of processes processes that I described so it's not an absence of exemplar examples, it is certainly an example of trying to get maybe the average school district to move certainly my own school district.

732

01:56:22.530 --> 01:56:30.120

Chris Pyke: These these are huge challenges so it's not the exemplary case study that we're lacking, we have those and i'm happy to share those.

733

01:56:30.390 --> 01:56:39.870

Chris Pyke: The other pieces, I think, in our experience, I wanted to kind of bring this into the conversation I think that schools have no idea what they can and should be communicating.

734

01:56:40.290 --> 01:56:47.940

Chris Pyke: They are really tied and not about whether they are whether they're creating liabilities for themselves whether there are risks.

735

01:56:48.240 --> 01:56:56.850

Chris Pyke: And we so we see a lot I guess what i'm trying to explain is, I think it looks like a duck with the feet going underwater and there's tons of activity going on underwater.

736

01:56:57.120 --> 01:57:03.840

Chris Pyke: But a real a real challenge sometimes people don't want to share sometimes they don't know what they can share.

737

01:57:04.050 --> 01:57:12.900

Chris Pyke: The bottom line is one of the reasons we don't see much communication, I believe I certainly see this in the hundreds of projects we're working with is they, they just don't know what they can share.

738

01:57:13.320 --> 01:57:19.050

Chris Pyke: And at the at the end of the day, that's one of the reasons in my remarks I tried to elevate this to the level of management problem.

739

01:57:19.350 --> 01:57:25.500

Chris Pyke: If you're dealing with the superintendent or the school board, this is a management problem, it is not a technology problem.

740

01:57:25.830 --> 01:57:32.670

Chris Pyke: It is equally effective in increasing outdoor air to open a window and have cross ventilation, as it is to install whatever.

741

01:57:33.150 --> 01:57:44.910

Chris Pyke: Your goal is to stop reading someone else's air as as Simon said, so the question is, I want to be clear that there's that that the struggle that folks are having is yes, we have good example, it can be done.

742

01:57:45.270 --> 01:57:50.340

Chris Pyke: Most folks don't know what they can say or should say and they're worried about getting sued in any number of ways.

743

01:57:50.730 --> 01:57:58.770

Chris Pyke: And they're scared of their stakeholders up one side and down the other and that was here before Kobe it as something destiny was saying and it's going to be here Africa of it.

744

01:57:59.130 --> 01:58:09.360

Chris Pyke: And we should talk about it and that did where we can help them, but we need to bring the right help to the right level of decision maker so two cents 50 cents.

745

01:58:13.200 --> 01:58:13.470

Simon Turner: You.

746

01:58:14.310 --> 01:58:14.730

Claire Barnett: From.

747

01:58:14.880 --> 01:58:17.160

Claire Barnett: You know, I have a comment, based on.

748

01:58:18.510 --> 01:58:24.840

Claire Barnett: A lot of the conversation is really, really helpful at a technical level for an individual school pandemic means everybody.

749

01:58:25.290 --> 01:58:36.000

Claire Barnett: And one of the things we have to be able to do is get all schools to behave, not just the lucky few that have to be that are part of the willing coalition that become exemplars because they happen to have.

750

01:58:36.390 --> 01:58:44.130

Claire Barnett: Low turnover and leadership or whatever, I think that there are a couple of examples from states that we've picked up through recent.

751

01:58:45.060 --> 01:58:55.080

Claire Barnett: Work one is Rhode island where the very progressive Governor of Rhode island actually convened the National Guard, along with school health professionals.

752

01:58:55.470 --> 01:59:03.540

Claire Barnett: and other groups and put together teams and they actually did school walk through through every single public school before the opening of schools.

753

01:59:04.140 --> 01:59:14.040

Claire Barnett: it's that's it's a real eye opener and I know john Hopkins participated in some of that that's one example, it was you know go through with a checklist it's not a formal inspection.

754

01:59:14.460 --> 01:59:21.090

Claire Barnett: Another was Vermont which I think dead project statewide project with Ashley I believe.

755

01:59:21.900 --> 01:59:31.980

Claire Barnett: To take a look at Vermont schools and help them with individual decisions, whether they were opening windows or installing box fans are maximizing their age hvac systems.

756

01:59:32.250 --> 01:59:39.270

Claire Barnett: There are so many different options it was helpful to have that technical assistance in place to make things a little bit simpler.

757

01:59:39.570 --> 01:59:50.280

Claire Barnett: Another was New York state where the governor took a position on terms of the pandemic that they wanted all schools to do the same thing they put together a list of things and said thou shalt create.

758

01:59:50.760 --> 02:00:04.290

Claire Barnett: A written policy around indoor air around cleaning around masking around distancing these you know long checklist you will submit them to the health department and we will look at them before you open another approach.

759

02:00:05.250 --> 02:00:16.950

Claire Barnett: So I think one of the things I worry about when I think about only local examples is the fact that this is a pandemic, it is all children and the children who are in the worst shape are in.

760

02:00:18.030 --> 02:00:25.920

Claire Barnett: Are the poorest children who are black Latino six and native American who are in the poorest communities that were already heard, to sit by coven.

761

02:00:26.370 --> 02:00:36.660

Claire Barnett: And the schools literally don't have the staff, the knowledge, the capacity or the funds actually to carry things out I think there's a crisis is is far greater.

762

02:00:37.110 --> 02:00:45.180

Claire Barnett: than perfect solutions, I think we really and I want all children back in school, I have grandchildren in Colorado, believe me, their parents want them in.

763

02:00:45.180 --> 02:00:45.450
school.

764

02:00:46.470 --> 02:00:47.220

Claire Barnett: So why.

765

02:00:48.360 --> 02:00:57.570

Ken Bernard: Can I make a comment on this, I think, somewhere CDC someone said earlier, I think, rich corsi that.

766

02:00:57.600 --> 02:00:58.080

Ken Bernard: CDC.

767

02:00:58.110 --> 02:01:00.300

Chris Pyke: People are looking to CDC for guidance, they just.

768

02:01:00.300 --> 02:01:01.440

Ken Bernard: put out a very long.

769

02:01:01.740 --> 02:01:07.740

Ken Bernard: School opening document and there's one small paragraph that mentions ventilation and it's just generic.

770

02:01:08.940 --> 02:01:21.450

Ken Bernard: I don't understand why I worked in policy in Washington for 30 years and usually it's money or power is the reason pick which one of those two things.

771

02:01:21.960 --> 02:01:32.430

Ken Bernard: proud of the problem with education and always has been, is the decentralization, the States and the local school districts have a huge amount of power, compared to.

772

02:01:33.030 --> 02:01:47.910

Ken Bernard: A lot of other federal issues, but I think CDC needs to actually take what has been said here and revise its recommendations and put in a section on that relation, I think that would help in a wet Claire just only.

773

02:01:48.060 --> 02:01:55.320

Claire Barnett: I want to add to that if you don't mind, though, can because my understanding of the layered approach inside CDC.

774

02:01:55.800 --> 02:02:09.120

Claire Barnett: Is there were quite a few medical professionals writing the guidance and in my own world i'm wondering how many of them have when was the last time they step foot in an inner city or rural, remote school.

775

02:02:09.480 --> 02:02:09.930

Ken Bernard: You don't want it.

776

02:02:10.680 --> 02:02:15.990

Claire Barnett: They don't know the patient right they've got it they haven't really quite diagnosed and gotten the right.

777

02:02:15.990 --> 02:02:16.800

Claire Barnett: prescription yet.

778

02:02:17.280 --> 02:02:27.900

Ken Bernard: And I think in this situation, somebody else mentioned, there should be a group in Washington, setting the policy that involves CDC the Department of Education EPA, etc.

779

02:02:28.200 --> 02:02:28.770

Claire Barnett: Commission.

780

02:02:29.370 --> 02:02:32.520

Ken Bernard: Absolutely some kind, I think that would be a very smart move also.

781

02:02:32.640 --> 02:02:33.570

Simon Turner: there's another element.

782

02:02:33.600 --> 02:02:39.150

Simon Turner: Here, can I throw in a comment is another element here regarding I mean test destiny said.

783

02:02:39.840 --> 02:02:47.820

Simon Turner: there's no politics in recommending improve ventilation infiltration courses politics and everything If only that were true there's no politics.

784

02:02:48.390 --> 02:02:57.870

Simon Turner: and politics around ventilation is energy codes that climate change warriors will really struggle to release their grip on energy codes they fought.

785

02:02:58.110 --> 02:03:06.810

Simon Turner: long and hard for them, and now we're saying you know what we'd really like to double your ventilation rates there's energy costs associated with that and.

786

02:03:07.860 --> 02:03:20.760

Simon Turner: I don't know if that's behind the CDC reluctance, I doubt it but there's plenty of people who are really going to resist changing energy codes and loosening them up after that the you know the years and years of fighting to tighten them.

787

02:03:23.010 --> 02:03:31.590

Richard Corsi: add my may I add to this, I think this is an important point that hasn't been brought up is that all of this points to the importance of interdisciplinary collaboration.

788

02:03:32.160 --> 02:03:38.790

Richard Corsi: You know epidemiologists are great at what they do medical doctors are great at what they do engineers can be great at what they do aerosol businesses.

789

02:03:39.240 --> 02:03:45.000

Richard Corsi: I think it was a destiny early mentioned something and I wrote down on a piece of paper human behavior lists.

790

02:03:45.690 --> 02:03:59.460

Richard Corsi: To understand all this stuff we need the social sciences, the in you know engineering physics microbiologist epidemiologist medical doctors working together, and that has not happened at all this past year and that's been a tragedy.

791

02:04:00.750 --> 02:04:01.950

Richard Corsi: You know, we should learn from that.

792

02:04:03.540 --> 02:04:04.410

Richard Corsi: It might think.

793

02:04:05.130 --> 02:04:12.750

William Bahnfleth: i'd like to follow on the energy versus IQ issue, because we have to get over that we have to to start looking for ways that we can.

794

02:04:13.200 --> 02:04:20.310

William Bahnfleth: have both if the only way to have energy efficiency is to have bad indoor air quality we're on the wrong track, so we have to.

795

02:04:20.730 --> 02:04:32.160

William Bahnfleth: overcome the adversarial approach, and I think we can, if you just Commission buildings, you would save as much energy as the increased ventilation would would cost, so there are lots of ways to deal with that issue.

796

02:04:33.180 --> 02:04:41.190

Chris Pyke: And just to build on what Joe said empirically this the notion of a yes in a model I can get there to be a big trade off between energy and indoor.

797

02:04:41.550 --> 02:04:48.570

Chris Pyke: Air and and However, if we look at thousands of buildings, as we do every single day and we published it every single day.

798

02:04:49.110 --> 02:05:01.770

Chris Pyke: The best lowest carbon buildings have the highest levels of IQ and occupant satisfaction, there is not a real world trade off that can't be surmounted by hundreds or thousands of buildings in the real world so that's.

799

02:05:03.060 --> 02:05:04.470

Chris Pyke: just want to support the whole lot of thinking.

800

02:05:06.480 --> 02:05:26.220

Joel Solomon: I just want to come back to the practical and the local and the immediate because part of what we're talking about is ventilation related mitigation strategies and I don't think the looking for.

801

02:05:27.600 --> 02:05:43.980

Joel Solomon: Solutions increasing outdoor air safely increasing filtration it's not getting hung up on broad policy debates and it's not getting hung up on.

802

02:05:44.880 --> 02:05:55.470

Joel Solomon: debate between different disciplines it's getting hung up on the practical as best we said and and we see this certainly at Nea.

803

02:05:56.280 --> 02:06:14.580

Joel Solomon: And, as I, as I said, people think it's daunting they don't know how to do it so giving them practical tools to engage when we talk with our affiliates, the first thing we do is explain why airborne transmission matters transmission matters.

804

02:06:15.300 --> 02:06:26.730

Joel Solomon: We talk about the practical things that can be done opening dampers and windows safely and and the things they need to think about and we talked about negative.

805

02:06:27.480 --> 02:06:40.950

Joel Solomon: positive pressure, but just opening a window isn't necessarily going to be a solution, people have to understand depends if there's a high risk area next door and the way the air flows between two rooms so.

806

02:06:41.400 --> 02:06:52.590

Joel Solomon: But getting people comfortable with what they need to be asking and making sure that people responsible for decision making, or working with stakeholders, including their unions.

807

02:06:53.010 --> 02:07:10.560

Joel Solomon: And and employees, there are practical solutions is getting hung up on process on understanding and i'm not sure and a local level and immediate level these these big debates which are very important or what's holding it up.

808

02:07:11.070 --> 02:07:11.640

Ken Bernard: I gotta go.

809

02:07:13.080 --> 02:07:15.000

Ken Bernard: Here, and you have to, we have to get off to.

810

02:07:16.470 --> 02:07:19.470

Ken Bernard: pass this off to Margaret or gigi to close this up.

811

02:07:20.070 --> 02:07:27.270

Gigi Gronvall: Yes, I was just gonna say that's a good note to leave this on this has been a really wonderful and rich discussion for the last couple of hours.

812

02:07:27.630 --> 02:07:36.090

Gigi Gronvall: I just want to thank Dr policies gave for her leadership on this issue and the panelists and the production team for everything that they've done to make this a success.

813

02:07:36.390 --> 02:07:43.920

Gigi Gronvall: And to let everyone know that we are going to have this webinar available to you, it will be up later on today.

814

02:07:44.280 --> 02:07:56.070

Gigi Gronvall: We are going to be writing a report that will be able to email all of the people who registered for this event, we will send you a copy so so be be prepared.

815

02:07:56.520 --> 02:08:13.860

Gigi Gronvall: and we look forward to hearing from you have other opportunities that we can we can engage on these issues and to educate people about what they can do about ventilation in school so with that Thank you all very much and we look forward to hearing from you take care, thank you.