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00:00:03.247 --> 00:00:04.330 - Alrighty.

00:00:04.330 --> 00:00:07.663 So, welcome to the launch

00:00:08.570 --> 00:00:12.250 of the 2019 Report of The Lancet Countdown

00:00:12.250 --> 00:00:14.324 on Climate Change and Health.

00:00:14.324 --> 00:00:16.580 I'm Robert Dubrow,

00:00:16.580 --> 00:00:19.088 I'm a professor of epidemiology in the department

00:00:19.088 --> 00:00:20.875 of environmental health sciences

00:00:20.875 --> 00:00:23.163 and I'm also the Faculty Director of the

00:00:23.163 --> 00:00:25.923 Yale Climate Change and Health Initiative.

00:00:25.923 --> 00:00:30.356 And so, let me introduce the two other participants.

00:00:30.356 --> 00:00:33.433 First I'll introduce Jodi Sherman,

00:00:34.470 --> 00:00:39.270 who is an associate professor

00:00:39.270 --> 00:00:41.140 of anesthesiology

00:00:41.140 --> 00:00:43.800 and she has a joint appointment with our department

00:00:43.800 --> 00:00:45.630 of environmental health sciences.

00:00:45.630 --> 00:00:47.699 She's an affiliated faculty member of the

00:00:47.699 --> 00:00:49.790 Climate Change and Health Initiative.

00:00:49.790 --> 00:00:51.574 And she's actually one of our most active

00:00:51.574 --> 00:00:53.493 affiliated faculty.

00:00:55.460 --> 00:00:57.705 Yale is really fortunate to have Jodi,

00:00:57.705 --> 00:01:00.421 because she's the world leader in the field of

00:01:00.421 --> 00:01:04.285 environmental sustainability in the health care sector

00:01:04.285 --> 00:01:06.770 which as you'll hear a little bit later

00:01:06.770 --> 00:01:08.860 is very important.

00:01:08.860 --> 00:01:11.010 So, that's Jodi.

00:01:11.010 --> 00:01:14.575 And then, we're also fortunate, very fortunate

00:01:14.575 --> 00:01:17.220 to have Dr. Nick Watts,

00:01:17.220 --> 00:01:19.543 who I'm gonna, make this screen larger now,

00:01:22.147 --> 00:01:23.483 (laughter)

00:01:23.483 --> 00:01:24.820 This is Dr. Watts.

00:01:24.820 --> 00:01:26.807 So, he's the Executive Director,

00:01:26.807 --> 00:01:28.300 oh, I should mention of course,

00:01:28.300 --> 00:01:30.588 Jodi is a co-author on the report.

00:01:30.588 --> 00:01:34.820 And Nick is the Executive Director and lead author

00:01:34.820 --> 00:01:37.220 of The Lancet Countdown.

00:01:37.220 --> 00:01:40.210 And, one of the pleasures of being part

00:01:40.210 --> 00:01:44.320 of the Lancet Countdown network for me has been

00:01:44.320 --> 00:01:47.620 working with like minded people from all over the world

00:01:47.620 --> 00:01:49.111 who are dedicated to this issue

00:01:49.111 --> 00:01:51.273 of climate change and public health.

00:01:51.273 --> 00:01:53.797 So, Nick really epitomizes that

00:01:53.797 --> 00:01:57.061 and it's been such a pleasure to get to know Nick

00:01:57.061 --> 00:02:01.061 and work with Nick over the last year and a half or so.

00:02:01.061 --> 00:02:04.772 He's really the heart and soul of the Lancet Countdown.

00:02:04.772 --> 00:02:08.417 And it's amazing to me, how he's able to work

00:02:08.417 --> 00:02:11.810 with sixty-eight other co-authors on this project

00:02:11.810 --> 00:02:14.250 who also have strong opinions

00:02:14.250 --> 00:02:18.956 and he's able to pull together a coherent document

00:02:18.956 --> 00:02:21.645 that's really written in a single voice.

00:02:21.645 --> 00:02:24.520 And if you've ever tried to do something like that,

00:02:24.520 --> 00:02:26.026 it's extremely difficult.

00:02:26.026 --> 00:02:28.890 And he does it with calmness and with grace.

00:02:28.890 --> 00:02:33.890 And so, I'd like to thank Nick for working tirelessly

00:02:33.890 --> 00:02:36.880 for the Countdown and for the cause

00:02:36.880 --> 00:02:39.650 of climate change and health.

00:02:39.650 --> 00:02:42.473 And so, Nick is gonna give a few words.

00:02:45.716 --> 00:02:47.799 Okay, so, we're actually,
00:02:48.849 --> 00:02:52.430 there are plenty of seats if people want to come
in,
00:02:52.430 --> 00:02:56.063 you know, seats over there, over here,
00:02:57.250 --> 00:02:58.450 you don't want to stand.
00:03:03.174 --> 00:03:05.330 (shuffling of seats)
00:03:05.330 --> 00:03:09.172 Okay, so, yeah, we're really honored to be one of
three
00:03:09.172 --> 00:03:11.344 U.S. regional launch sites
00:03:11.344 --> 00:03:14.440 for the Lancet Countdown.
00:03:14.440 --> 00:03:18.560 And so, let me first give you a little more back-
ground
00:03:18.560 --> 00:03:19.918 about The Countdown.
00:03:19.918 --> 00:03:23.120 The Lancet has had a long history of involvement
00:03:23.120 --> 00:03:24.560 with climate change.
00:03:24.560 --> 00:03:26.868 Dating back to its first report,
00:03:26.868 --> 00:03:30.250 it was commissioned in 2009,
00:03:30.250 --> 00:03:32.270 that was a published report
00:03:32.270 --> 00:03:36.210 which identified climate change as the leading
threat
00:03:36.210 --> 00:03:39.456 to public health in the 21st century.
00:03:39.456 --> 00:03:41.970 Then they formed a second commission
00:03:41.970 --> 00:03:44.005 that produced a report in 2015
00:03:44.005 --> 00:03:48.010 that kind of shifted gears and identified climate
change
00:03:48.010 --> 00:03:51.757 as being the greatest public health opportunity
00:03:51.757 --> 00:03:54.270 in the 21st century
00:03:54.270 --> 00:03:55.833 if we address it properly.
00:03:56.780 --> 00:03:59.254 There are enormous health benefits that can occur
00:03:59.254 --> 00:04:01.813 by addressing climate change over and above
00:04:01.813 --> 00:04:05.200 the health benefits of stopping climate change
00:04:05.200 --> 00:04:07.889 which we'll get into a little bit later.

00:04:07.889 --> 00:04:10.397 And so, since that report in 2015,
00:04:10.397 --> 00:04:13.240 which Nick was actually the lead author on that
report,
00:04:13.240 --> 00:04:16.233 and as he remains being the executive director,
00:04:16.233 --> 00:04:18.480 there's been an annual report
00:04:18.480 --> 00:04:21.870 and it was named in 2016
00:04:21.870 --> 00:04:22.860 The Lancet Countdown.
00:04:22.860 --> 00:04:25.240 The reason it was called the Lancet Countdown
is that
00:04:25.240 --> 00:04:28.160 the intent is to do a countdown every year
00:04:28.160 --> 00:04:30.060 until 2030.
00:04:30.060 --> 00:04:33.230 And maybe by that time, things will be great
00:04:33.230 --> 00:04:36.493 or we may need the countdown to go past 2030.
00:04:38.036 --> 00:04:41.976 So, just briefly, about the organization,
00:04:41.976 --> 00:04:44.135 I'll gloss over some of this,
00:04:44.135 --> 00:04:45.479 cause Nick covered some of it, but
00:04:45.479 --> 00:04:48.485 there are thirty-five academic institutions
00:04:48.485 --> 00:04:51.740 and UN agencies that are part of the collaboration.
00:04:51.740 --> 00:04:52.992 It's a fluid collaboration.
00:04:52.992 --> 00:04:57.350 Central office is based in University College, Lon-
don.
00:04:57.350 --> 00:04:59.333 That's where Nick was speaking from.
00:04:59.333 --> 00:05:01.880 The Lancet, of course, was convened
00:05:01.880 --> 00:05:05.520 funded by the Wellcome Trust
00:05:05.520 --> 00:05:07.380 and that was actually a big...
00:05:10.090 --> 00:05:12.780 This was being operated out of a basement
00:05:13.619 --> 00:05:16.590 in Nick's apartment
00:05:16.590 --> 00:05:20.960 until last year when major funding was obtained
00:05:20.960 --> 00:05:22.840 from the Weldon Trust.
00:05:22.840 --> 00:05:24.153 So that was really big.
00:05:26.070 --> 00:05:29.869 The Countdown is organized into five working
groups

00:05:29.869 --> 00:05:32.870 which I'll name in a minute.

00:05:32.870 --> 00:05:37.690 And the report is organized according to indicators.

00:05:37.690 --> 00:05:41.550 And in the 2019 report there were forty-one indicators

00:05:41.550 --> 00:05:43.010 and in a few minutes, I'll give you a flavor

00:05:43.010 --> 00:05:44.223 about the indicators.

00:05:45.800 --> 00:05:48.000 And it's important to know that the indicators

00:05:48.000 --> 00:05:50.260 are based on observational data,

00:05:50.260 --> 00:05:51.880 not on projections.

00:05:51.880 --> 00:05:53.370 And both of those things are important.

00:05:53.370 --> 00:05:55.970 With climate change we do a lot of projections.

00:05:55.970 --> 00:05:58.260 But everything that I'm gonna show you today

00:05:58.260 --> 00:06:01.080 isn't guess work or what's gonna happen in the future,

00:06:01.080 --> 00:06:02.880 it's what has happened so far

00:06:02.880 --> 00:06:04.453 with regards to climate change.

00:06:05.640 --> 00:06:08.360 And each year, the indicators are updated and approved

00:06:08.360 --> 00:06:10.380 and some new indicators are added

00:06:10.380 --> 00:06:13.373 and some that weren't so good are taken away.

00:06:17.670 --> 00:06:19.839 Okay, next I'll show this,

00:06:19.839 --> 00:06:21.180 these are the partners.

00:06:21.180 --> 00:06:23.800 There are a good number of partners in the UK

00:06:23.800 --> 00:06:24.980 as you can see

00:06:24.980 --> 00:06:29.100 but, there's at least one partner from every continent

00:06:29.100 --> 00:06:30.333 except Antarctica.

00:06:31.779 --> 00:06:32.843 That's reasonable.

00:06:34.027 --> 00:06:34.860 (laughter)

00:06:34.860 --> 00:06:38.090 So, I'm not gonna go through these slides in detail

00:06:38.090 --> 00:06:39.030 but I just wanted to show you

00:06:39.030 --> 00:06:41.620 what the five working groups are.

00:06:41.620 --> 00:06:42.470 So, the first is

00:06:42.470 --> 00:06:46.151 Climate Change Impacts, Exposures and Vulnerability.

00:06:46.151 --> 00:06:50.910 Second is Adaptation Planning and Resilience for Health.

00:06:50.910 --> 00:06:55.903 Third is Mitigation Actions and Health Co-Benefits.

00:06:57.930 --> 00:07:00.593 Fourth is Economics and Finance.

00:07:01.590 --> 00:07:04.920 And the final one is Public and Political Engagement.

00:07:04.920 --> 00:07:07.163 So it tries to cover the whole gamut.

00:07:10.180 --> 00:07:11.420 So, Yale's role.

00:07:11.420 --> 00:07:14.066 We tried in the summer of 2018,

00:07:14.066 --> 00:07:17.230 we were not involved in the 2018 report

00:07:17.230 --> 00:07:20.840 but we are involved in the 2019 report.

00:07:20.840 --> 00:07:23.833 And we participated in two of the working groups.

00:07:24.940 --> 00:07:28.157 And as Nick alluded to, we've been responsible for

00:07:28.157 --> 00:07:31.120 two of the forty-one indicators.

00:07:31.120 --> 00:07:34.370 So one is Air Conditioning - Benefits and Harms

00:07:34.370 --> 00:07:38.080 and that's me, also Dr. Dung Phung

00:07:38.080 --> 00:07:40.930 who is at Griffith University in Australia

00:07:40.930 --> 00:07:44.560 but he was a visiting scientist here last year.

00:07:44.560 --> 00:07:46.990 And then the Mitigation in the Healthcare Sector

00:07:46.990 --> 00:07:49.570 is Jodi, along with Matt Eckelman

00:07:49.570 --> 00:07:51.773 who's at Northeastern University in Boston.

00:07:54.566 --> 00:07:58.670 So, these are the key messages of the 2019 report.

00:07:58.670 --> 00:08:00.320 And I'll be coming back to these.

00:08:01.270 --> 00:08:02.810 I'll just read through this

00:08:02.810 --> 00:08:05.186 because these are the key messages.

00:08:05.186 --> 00:08:08.162 The life of every child born today will be profoundly

00:08:08.162 --> 00:08:10.640 affected by climate change.

00:08:10.640 --> 00:08:14.390 Without accelerated intervention, this new era will come to

00:08:14.390 --> 00:08:17.413 define the health of people at every stage of their lives.

00:08:17.413 --> 00:08:19.810 That's the first message.

00:08:19.810 --> 00:08:21.000 Second one,

00:08:21.000 --> 00:08:24.490 and that's with the path that we're on now,

00:08:24.490 --> 00:08:27.030 which we could call a business as usual path

00:08:27.030 --> 00:08:29.310 this is what we expect to happen.

00:08:29.310 --> 00:08:31.160 However, there's an alternative.

00:08:31.160 --> 00:08:33.690 A second path- which limits the global

00:08:33.690 --> 00:08:36.837 average temperature rise to 'well below 2 degrees Celsius'-

00:08:36.837 --> 00:08:39.076 which is the Paris agreement goal,

00:08:39.076 --> 00:08:43.146 is possible, still possible, and would transform

00:08:43.146 --> 00:08:45.860 the health of a child born today for the better,

00:08:45.860 --> 00:08:47.510 right the way through their life.

00:08:48.860 --> 00:08:51.900 And then finally, it's possible, but it's not easy

00:08:51.900 --> 00:08:53.430 an unprecedented challenge

00:08:53.430 --> 00:08:56.340 demands an unprecedented response.

00:08:56.340 --> 00:08:59.350 It will take the work of the 7.5 billion people

00:08:59.350 --> 00:09:02.250 currently alive to ensure that the health of a child

00:09:02.250 --> 00:09:03.150 born today

00:09:03.150 --> 00:09:05.243 is not defined by a changing climate.

00:09:06.450 --> 00:09:08.380 So those are the three essential messages

00:09:08.380 --> 00:09:10.180 that the report is trying to convey.

00:09:13.052 --> 00:09:16.834 So, now the central office produced this

00:09:16.834 --> 00:09:21.483 three-minute video, that hopefully is gonna work.

00:09:23.330 --> 00:09:25.481 That I thought was worth showing.

00:09:25.481 --> 00:09:28.730 That summarizes things in a non-technical way

00:09:28.730 --> 00:09:31.453 in a much better way than I could possibly do.

00:09:34.490 --> 00:09:35.573 So let's see.

00:09:37.609 --> 00:09:39.280 - [Female Narrator] Our response to climate change today

00:09:39.280 --> 00:09:42.420 will determine the world we live in tomorrow.

00:09:42.420 --> 00:09:45.720 And will shape the health of children across the globe

00:09:45.720 --> 00:09:47.823 at every stage of their lives.

00:09:48.900 --> 00:09:51.940 The Lancet Countdown: Tracking Progress on

00:09:51.940 --> 00:09:53.460 Health and Climate Change

00:09:53.460 --> 00:09:56.421 monitors our choices, demonstrating what action

00:09:56.421 --> 00:10:00.373 or the failure to act, means for human health.

00:10:01.360 --> 00:10:03.850 There are many paths we can take

00:10:03.850 --> 00:10:06.505 from a world of extremes and uncertainty

00:10:06.505 --> 00:10:10.341 where a child has to fight simply to survive.

00:10:10.341 --> 00:10:13.320 To an environment that creates the conditions

00:10:13.320 --> 00:10:15.547 that allows them to thrive.

00:10:15.547 --> 00:10:18.615 If we continue down our current path

00:10:18.615 --> 00:10:22.360 a child born today will live through a world

00:10:22.360 --> 00:10:25.060 that is over four degrees warmer

00:10:25.060 --> 00:10:27.040 with a changing environment threatening

00:10:27.040 --> 00:10:29.655 the food they eat, the air they breathe

00:10:29.655 --> 00:10:32.433 and the communities they grow up in.

00:10:34.410 --> 00:10:38.330 Air pollution, already dangerously high in more than

00:10:38.330 --> 00:10:42.070 90% of cities, will worsen

00:10:42.070 --> 00:10:44.782 and further damage their hearts and lungs

00:10:44.782 --> 00:10:47.903 from the moment they take their first breath.

00:10:49.429 --> 00:10:52.508 As they grow, food insecurity will rise

00:10:52.508 --> 00:10:55.830 with children among the worst affected

00:10:55.830 --> 00:10:58.150 by the malnutrition and stunting

00:10:58.150 --> 00:11:01.543 that comes from crop failure in a more volatile climate.

00:11:02.498 --> 00:11:06.100 Throughout their adult lives, they will experience
00:11:06.100 --> 00:11:08.746 more heat waves, stronger storms,
00:11:08.746 --> 00:11:11.774 the spread of infectious disease
00:11:11.774 --> 00:11:16.200 and see climate change intensify mass migration
00:11:16.200 --> 00:11:19.373 extreme poverty, and mental illness.
00:11:20.260 --> 00:11:23.123 But the future doesn't have to look this way.
00:11:24.270 --> 00:11:27.210 A global response that limits temperature rise
00:11:27.210 --> 00:11:31.170 to well below two degrees will transform the life
00:11:31.170 --> 00:11:34.143 of a child born today for the better.
00:11:35.260 --> 00:11:38.710 Children in the UK will see an end to coal
00:11:38.710 --> 00:11:40.708 by their sixth birthday
00:11:40.708 --> 00:11:43.930 and the growth of solar and wind energy
00:11:43.930 --> 00:11:47.710 resulting in cleaner air across the country.
00:11:47.710 --> 00:11:51.610 In France, the last petrol car will be sold
00:11:51.610 --> 00:11:54.110 by the time they turn twenty-one.
00:11:54.110 --> 00:11:57.849 With cycleways and green spaces supporting safer
00:11:57.849 --> 00:12:00.658 and more livable cities
00:12:00.658 --> 00:12:04.070 and they will celebrate their thirty-first birthday
00:12:04.070 --> 00:12:07.641 as the world finally reaches net-zero emissions
00:12:07.641 --> 00:12:11.911 securing a healthier future for coming generations.
00:12:11.911 --> 00:12:15.190 Which of these two pathways the world travels
down
00:12:15.190 --> 00:12:18.367 will depend on the decisions of individuals,
00:12:18.367 --> 00:12:20.863 businesses, and governments.
00:12:22.690 --> 00:12:27.200 And only an ambitious response can ensure that
the health
00:12:27.200 --> 00:12:32.200 of a child born today isn't defined by a changing
climate.
00:12:34.030 --> 00:12:36.680 Visit The Lancet Countdown online to find
00:12:36.680 --> 00:12:39.565 the latest assessment of health and climate change
00:12:39.565 --> 00:12:41.253 in your country.
00:12:48.576 --> 00:12:51.009 (keys clicking)

00:12:51.009 --> 00:12:53.470 Okay, so, what I'd like to do next
00:12:53.470 --> 00:12:56.173 is focusing on the key messages.
00:12:57.272 --> 00:12:59.950 So select some indicators
00:12:59.950 --> 00:13:03.750 that support a key message.
00:13:03.750 --> 00:13:06.425 So first, the first mentions that
00:13:06.425 --> 00:13:08.550 this a pessimistic message.
00:13:08.550 --> 00:13:10.420 The life of every child born today
00:13:10.420 --> 00:13:12.557 will be profoundly affected by climate change
00:13:12.557 --> 00:13:14.858 without accelerated intervention, this new era
00:13:14.858 --> 00:13:18.237 will come to define the health of people at every
stage
00:13:18.237 --> 00:13:19.470 of their lives.
00:13:19.470 --> 00:13:22.040 So one of the trends in the indicators,
00:13:22.040 --> 00:13:23.020 why are we saying this.
00:13:23.020 --> 00:13:25.090 What are the trends of the indicators?
00:13:25.090 --> 00:13:27.240 And so I'll give a few illustrations.
00:13:27.240 --> 00:13:30.410 And so the first one, of course, the first thing
00:13:30.410 --> 00:13:33.537 a lot of people think about in regard to climate
change
00:13:33.537 --> 00:13:34.377 is heat.
00:13:34.377 --> 00:13:35.859 That makes a lot of sense,
00:13:35.859 --> 00:13:37.380 the world is warming, we're seeing more heat
waves.
00:13:37.380 --> 00:13:40.580 Heat waves kill people, and make people sick.
00:13:40.580 --> 00:13:42.494 And so, this indicator,
00:13:42.494 --> 00:13:46.171 Exposure of Vulnerable Populations to Heatwaves,
00:13:46.171 --> 00:13:49.743 first it defines a heatwave as four or more days
with
00:13:49.743 --> 00:13:52.450 minimum daily temperature greater than
00:13:52.450 --> 00:13:55.968 the ninety-ninth percentile for summer months of
1986-2005.
00:13:55.968 --> 00:13:59.890 That's what it, different ways to define a heatwave.

00:13:59.890 --> 00:14:01.139 This is one of them.

00:14:01.139 --> 00:14:04.757 And then it defines a heatwave exposure event,

00:14:04.757 --> 00:14:08.419 which is one heatwave experienced by one person greater than

00:14:08.419 --> 00:14:10.450 age sixty-five years.

00:14:10.450 --> 00:14:12.620 So, why greater than age sixty-five years?

00:14:12.620 --> 00:14:14.933 Turns out that older people are more vulnerable

00:14:14.933 --> 00:14:17.860 to the adverse health effects of heat.

00:14:17.860 --> 00:14:21.250 And that's for a number of reasons, both physiological

00:14:21.250 --> 00:14:22.770 and social.

00:14:22.770 --> 00:14:26.784 And so, what this indicator takes into account

00:14:26.784 --> 00:14:30.183 is both the exposure, because if there were no heatwaves

00:14:30.183 --> 00:14:31.670 there's no exposure,

00:14:31.670 --> 00:14:35.867 and so the number of heatwave exposure events would be zero

00:14:35.867 --> 00:14:38.940 as well as vulnerability.

00:14:38.940 --> 00:14:42.326 So the more people over age sixty-five,

00:14:42.326 --> 00:14:45.680 the more heatwave exposure events there are.

00:14:45.680 --> 00:14:49.120 So it takes both exposure and vulnerability into account.

00:14:49.120 --> 00:14:51.190 And you can see the trend

00:14:51.190 --> 00:14:56.045 in comparison with the 1986 and 2005 average

00:14:56.045 --> 00:14:59.700 and the bottom line is that

00:14:59.700 --> 00:15:00.767 in 2018

00:15:00.767 --> 00:15:04.540 220 million additional vulnerable people

00:15:04.540 --> 00:15:06.050 were exposed to heatwaves

00:15:06.050 --> 00:15:07.720 over that baseline

00:15:07.720 --> 00:15:10.100 which is eleven million more than the previous record

00:15:10.100 --> 00:15:11.760 set in 2005.

00:15:11.760 --> 00:15:15.040 You can see that, as you know from experience

00:15:15.040 --> 00:15:17.470 with the weather, there's a lot of noise

00:15:17.470 --> 00:15:18.600 in all of these.

00:15:18.600 --> 00:15:21.024 But you can also see the upward trends

00:15:21.024 --> 00:15:24.970 and again, this is observational data

00:15:24.970 --> 00:15:28.207 it's not like, making projections into the future.

00:15:28.207 --> 00:15:29.770 Okay, second thing,

00:15:29.770 --> 00:15:30.603 wildfires.

00:15:30.603 --> 00:15:32.490 I need to have a good graphic for this

00:15:32.490 --> 00:15:36.003 but, we all know that wildfire is increasing

00:15:36.003 --> 00:15:38.550 in the western part of our country.

00:15:38.550 --> 00:15:41.370 I mean, you just know that from watching the news

00:15:41.370 --> 00:15:42.203 year after year.

00:15:42.203 --> 00:15:44.610 But, this was a more formal analysis

00:15:44.610 --> 00:15:48.570 that looked at the number of people exposed to wildfires

00:15:48.570 --> 00:15:51.810 expressing it in person-days.

00:15:51.810 --> 00:15:55.812 So one person exposed to a wildfire for one day

00:15:55.812 --> 00:15:58.052 is one person-day.

00:15:58.052 --> 00:16:03.052 And so, they found that 152 out of 196 countries

00:16:03.446 --> 00:16:07.510 saw increases in populations exposed to wildfires

00:16:07.510 --> 00:16:11.440 between a baseline year, or period

00:16:11.440 --> 00:16:13.453 of 2001-2004

00:16:13.453 --> 00:16:17.093 compared to 2015-2018.

00:16:19.000 --> 00:16:23.280 And so the mean increase per year of this exposure

00:16:23.280 --> 00:16:27.180 was almost a half a million person-days per year

00:16:27.180 --> 00:16:28.590 of exposure to wildfires.

00:16:28.590 --> 00:16:31.030 So, why are wildfires a health issue?

00:16:31.030 --> 00:16:32.490 So, for a number of reasons.

00:16:32.490 --> 00:16:35.820 One is it produces a tremendous amount of air pollution

00:16:35.820 --> 00:16:38.780 that doesn't just stay where the fire is, but it kind of,

00:16:38.780 --> 00:16:41.681 like, in Australia right now, there are record wild-fires

00:16:41.681 --> 00:16:45.011 that were in Sydney, Australia, which is

00:16:45.011 --> 00:16:47.563 a city of five million people.

00:16:49.080 --> 00:16:51.643 I just heard this on the news yesterday,

00:16:52.663 --> 00:16:54.770 that the pollution levels for particulate matters,

00:16:54.770 --> 00:16:58.319 PM2.5, for those of you who know about this, is ten times

00:16:58.319 --> 00:17:01.550 the limit right now, in Sydney, Australia.

00:17:01.550 --> 00:17:04.543 So that's a huge public health issue.

00:17:06.226 --> 00:17:09.110 Secondly, remember what happened

00:17:09.110 --> 00:17:10.720 in Paradise, last year

00:17:10.720 --> 00:17:14.058 where all the the homes that were destroyed

00:17:14.058 --> 00:17:18.867 happened to be, mainly of homes of people that were retired.

00:17:18.867 --> 00:17:22.108 And what does homelessness do to people?

00:17:22.108 --> 00:17:23.800 In terms of health.

00:17:23.800 --> 00:17:26.381 It's really bad for people's health.

00:17:26.381 --> 00:17:28.810 Remember, in that situation

00:17:28.810 --> 00:17:31.650 people had to flee their houses, like, within minutes.

00:17:31.650 --> 00:17:33.670 These are older people,

00:17:33.670 --> 00:17:35.526 a lot of them are taking multiple medications,

00:17:35.526 --> 00:17:38.440 didn't have time to grab their medications when they left

00:17:38.440 --> 00:17:39.273 right?

00:17:39.273 --> 00:17:41.720 And then couldn't necessarily get to a pharmacy

00:17:41.720 --> 00:17:44.737 within the next week or two to refill their medications

00:17:44.737 --> 00:17:47.270 if they even remembered what their medications were.

00:17:47.270 --> 00:17:49.378 A lot of people don't remember those things.

00:17:49.378 --> 00:17:51.600 So those are health issues.

00:17:51.600 --> 00:17:56.600 And finally, mental health is being

00:17:56.731 --> 00:17:59.070 increasingly appreciated

00:17:59.070 --> 00:18:02.400 as a climate change and health issue.

00:18:02.400 --> 00:18:05.839 So, if you think about the stress that would be involved

00:18:05.839 --> 00:18:07.568 if you're sixty-eight years old,

00:18:07.568 --> 00:18:09.320 your home has just burned down

00:18:09.320 --> 00:18:11.550 you don't know where you're gonna go.

00:18:11.550 --> 00:18:16.550 So that creates long-term mental health concerns.

00:18:17.570 --> 00:18:19.083 So that's wildfires.

00:18:22.690 --> 00:18:25.240 Infectious diseases are also a concern

00:18:26.467 --> 00:18:29.480 and so, we don't have time to really go through the details

00:18:29.480 --> 00:18:30.740 of some of these graphs

00:18:30.740 --> 00:18:34.011 but what this Vibrio is a type of bacteria

00:18:34.011 --> 00:18:38.807 that causes gastro-intestinal illness, wound infections

00:18:38.807 --> 00:18:41.428 and sometimes lung infections.

00:18:41.428 --> 00:18:44.000 And actually, you've probably heard of cholera, of course

00:18:44.000 --> 00:18:47.596 Vibrio cholera is one species of Vibrio that's probably

00:18:47.596 --> 00:18:49.220 the most important one.

00:18:49.220 --> 00:18:51.714 But there are other pathogenic species as well

00:18:51.714 --> 00:18:53.210 of Vibrio.

00:18:53.210 --> 00:18:57.210 And, what this shows is for both the Baltic area

00:18:57.210 --> 00:18:59.813 and the United States North East.

00:19:00.670 --> 00:19:04.090 We're looking at tracking climate suitability

00:19:04.090 --> 00:19:06.910 for Vibrio infections.

00:19:06.910 --> 00:19:08.510 Or for growth of Vibrio.

00:19:08.510 --> 00:19:13.155 And the simple thing is that Vibrio grow better in

00:19:13.155 --> 00:19:17.940 warmer, they live in the water, they live in the ocean.

00:19:17.940 --> 00:19:21.000 And they especially like coastal waters,

00:19:21.000 --> 00:19:22.730 brackish water.

00:19:22.730 --> 00:19:26.430 And they grow better when the water is warmer.

00:19:26.430 --> 00:19:30.230 And the oceans have been warming, and so you can see

00:19:30.230 --> 00:19:32.090 that where we're tracking here,

00:19:32.090 --> 00:19:34.770 are both the percentage of coastal area

00:19:34.770 --> 00:19:37.390 suitable for Vibrio infections,

00:19:37.390 --> 00:19:40.990 you can see it has increased about 30% in both areas.

00:19:40.990 --> 00:19:43.800 And the number of suitable days per year

00:19:43.800 --> 00:19:45.040 in the Baltic

00:19:45.040 --> 00:19:48.668 for Vibrio infections and that approximately doubled

00:19:48.668 --> 00:19:53.454 between the early 1980's and 2018.

00:19:53.454 --> 00:19:55.113 And in fact,

00:19:57.430 --> 00:20:00.250 the number of Vibrio infections diagnosed

00:20:00.250 --> 00:20:02.360 in both the North East United States

00:20:03.318 --> 00:20:04.151 and in the Baltic region

00:20:04.151 --> 00:20:06.170 has been increasing over the years.

00:20:06.170 --> 00:20:08.210 Now, there's some question, always,

00:20:08.210 --> 00:20:10.420 whenever you see those kinds of increasing trends

00:20:10.420 --> 00:20:11.730 in a disease,

00:20:11.730 --> 00:20:15.057 whether it's due to increased reporting of the disease

00:20:15.057 --> 00:20:17.310 or due to a real increase in the disease.

00:20:17.310 --> 00:20:18.420 But nevertheless,

00:20:18.420 --> 00:20:19.253 you know,

00:20:19.253 --> 00:20:20.086 it has been increasing.

00:20:24.350 --> 00:20:26.690 Okay, I'm gonna skip some things
00:20:26.690 --> 00:20:30.379 just because, I wanna make sure we cover every-
thing.
00:20:30.379 --> 00:20:35.140 So, food insecurity, as was mentioned in the video
00:20:35.140 --> 00:20:38.310 is a really important concern about climate change
00:20:38.310 --> 00:20:42.730 leading to under-nutrition, malnutrition, etc.
00:20:42.730 --> 00:20:45.211 And so, this shows trends
00:20:45.211 --> 00:20:47.630 in global yield potential
00:20:47.630 --> 00:20:51.367 which is measured by crop growth season duration.
00:20:51.367 --> 00:20:54.953 And that for four major crops:
00:20:59.868 --> 00:21:02.779 maize, winter wheat, soybeans, and rice.
00:21:02.779 --> 00:21:06.450 There's been approximately 2-4% decrease from
the 1960's
00:21:06.450 --> 00:21:07.890 to the present day.
00:21:07.890 --> 00:21:12.050 Now, this doesn't, these graphs per se don't prove
00:21:12.050 --> 00:21:13.760 that's due to climate change
00:21:13.760 --> 00:21:17.263 but there's other kind of, independent analysis
00:21:17.263 --> 00:21:19.462 that do link decreases in yield
00:21:19.462 --> 00:21:21.183 to climate change.
00:21:28.280 --> 00:21:30.180 So this is an important indicator.
00:21:30.180 --> 00:21:33.230 So, coal is bad for two reasons.
00:21:33.230 --> 00:21:35.029 Of the fossil fuels,
00:21:35.029 --> 00:21:39.129 when you burn coal, it emits more CO₂
00:21:39.129 --> 00:21:40.750 than the other fossil fuels,
00:21:40.750 --> 00:21:43.400 that being oil and natural gas.
00:21:43.400 --> 00:21:46.100 So, coal's really bad for the climate.
00:21:46.100 --> 00:21:49.696 And when you burn coal, you produce particulate
matter,
00:21:49.696 --> 00:21:53.890 sulfur dioxide, pollutants, more so than when you
burn oil
00:21:53.890 --> 00:21:55.573 and natural gas
00:21:55.573 --> 00:21:57.560 and those pollutants kill people.

00:21:57.560 --> 00:21:58.810 That's the air pollution.

00:22:00.000 --> 00:22:02.922 And so, we're trying to track

00:22:02.922 --> 00:22:05.386 what we hope will be a coal phase out

00:22:05.386 --> 00:22:07.310 but if you just look at the bars

00:22:07.310 --> 00:22:08.410 just to keep it simple

00:22:09.910 --> 00:22:14.138 this is global total primary energy supply

00:22:14.138 --> 00:22:16.520 from coal.

00:22:16.520 --> 00:22:20.920 And you can see that there was an increase from

00:22:21.985 --> 00:22:26.985 around 2000-2010 or so, let's say 12.

00:22:28.068 --> 00:22:30.950 But then there was some encouraging signs of a decrease

00:22:30.950 --> 00:22:32.570 but now it's kind of leveled off

00:22:32.570 --> 00:22:34.010 and it's increasing again.

00:22:34.010 --> 00:22:35.513 So that's another bad sign.

00:22:39.540 --> 00:22:41.320 So this is related to the coal.

00:22:41.320 --> 00:22:44.780 Premature mortality from ambient air pollution by sector,

00:22:44.780 --> 00:22:46.190 let's not worry about the sector,

00:22:46.190 --> 00:22:49.117 so the main point here is that in 2016

00:22:49.117 --> 00:22:52.026 there were about 3 million premature deaths

00:22:52.026 --> 00:22:54.810 due to ambient particulate matter.

00:22:54.810 --> 00:22:55.643 Pollution.

00:22:56.874 --> 00:23:00.440 And the comparison here isn't a long-term comparison.

00:23:00.440 --> 00:23:03.560 It's between 2015 and 2016,

00:23:03.560 --> 00:23:05.933 but they're all only very slight improvements.

00:23:16.910 --> 00:23:19.430 Those are some of the pessimistic trends

00:23:19.430 --> 00:23:22.700 and there are others that, just due to time, I had to skip.

00:23:22.700 --> 00:23:25.100 And there were others that I wasn't even planning on

00:23:25.100 --> 00:23:27.790 covering to begin with that are pessimistic.

00:23:27.790 --> 00:23:31.365 So, just a minute on some of the more optimistic.
00:23:31.365 --> 00:23:34.860 So, now we're on to the second key message.
00:23:34.860 --> 00:23:36.280 A second path, which limits
00:23:36.280 --> 00:23:38.350 the global average temperature rise
00:23:38.350 --> 00:23:41.067 to well below two degrees centigrade is possible
00:23:41.067 --> 00:23:44.434 and would transform the health of a child born
today
00:23:44.434 --> 00:23:46.283 for the better, right the way through their life.
00:23:47.551 --> 00:23:50.740 So these give a glimmer of hope.
00:23:50.740 --> 00:23:53.370 So first of all, what do we need to do?
00:23:53.370 --> 00:23:54.740 This is what we need to do.
00:23:54.740 --> 00:23:56.394 And this is from last year's
00:23:56.394 --> 00:23:59.922 Intergovernmental Panel on Climate Change Special Report.
00:23:59.922 --> 00:24:03.210 To limit warming to 1.5 degrees centigrade
00:24:03.210 --> 00:24:07.110 which is the aspirational goal of the Paris agreement.
00:24:07.110 --> 00:24:10.960 We need a 45% decline of greenhouse gas emissions
00:24:10.960 --> 00:24:14.250 from 2010 levels by 2030
00:24:14.250 --> 00:24:15.940 so about half
00:24:16.830 --> 00:24:18.553 and net zero by 2050.
00:24:19.900 --> 00:24:23.140 And obviously, this is not my words,
00:24:23.140 --> 00:24:24.593 it's the conclusion of the report,
00:24:24.593 --> 00:24:26.150 that will require rapid
00:24:26.150 --> 00:24:28.910 and far reaching transitions in energy, land use,
00:24:28.910 --> 00:24:31.893 transportation, buildings, and industrial systems.
00:24:34.270 --> 00:24:38.680 Okay, so a few examples of the hopeful indicators.
00:24:38.680 --> 00:24:42.770 So this is zero-carbon emission electricity.
00:24:42.770 --> 00:24:45.720 So that would be renewables, and would also include
00:24:45.720 --> 00:24:48.083 nuclear and hydro.
00:24:48.083 --> 00:24:51.390 So, in 2018 renewable energy counted towards

00:24:51.390 --> 00:24:55.000 45% of growth in electricity generation.

00:24:55.000 --> 00:24:58.420 That's still a very small share of electricity generation

00:24:58.420 --> 00:25:01.403 but at least it's counting for a big share of the growth.

00:25:03.006 --> 00:25:05.508 Okay, this is really,

00:25:05.508 --> 00:25:08.150 we are really grasping at straws here

00:25:08.150 --> 00:25:12.993 but, as you know, fossil fuels dominate transportation.

00:25:12.993 --> 00:25:17.434 So this graph is showing from 1971 to the present

00:25:17.434 --> 00:25:21.219 the fuels that are used for transportation

00:25:21.219 --> 00:25:24.619 and you can see that the gray is fossil fuels

00:25:24.619 --> 00:25:27.600 and the green is bio fuels.

00:25:27.600 --> 00:25:30.187 And I don't know if you can see the top one,

00:25:30.187 --> 00:25:31.980 but there's a little bit of black

00:25:31.980 --> 00:25:33.830 and that's electricity.

00:25:33.830 --> 00:25:35.310 But then the bottom graph

00:25:37.260 --> 00:25:40.250 separates out the bio fuels and electricity

00:25:40.250 --> 00:25:43.710 and you can kind of see how the electricity is growing.

00:25:43.710 --> 00:25:46.633 And so, between 2015 and 16

00:25:46.633 --> 00:25:49.515 the latest years where data were available

00:25:49.515 --> 00:25:52.200 there was about a 21% rise

00:25:52.200 --> 00:25:54.300 in fuel from electricity.

00:25:54.300 --> 00:25:57.550 So obviously, we need to greatly accelerate this,

00:25:57.550 --> 00:26:00.979 we really need to transform the transportation system

00:26:00.979 --> 00:26:03.730 to electricity.

00:26:03.730 --> 00:26:07.780 And it's kind of just a glimmer of this starting to happen.

00:26:07.780 --> 00:26:09.770 This is another really important indicator

00:26:09.770 --> 00:26:11.770 that coal is critical.

00:26:11.770 --> 00:26:13.824 And so this is looking at investment

00:26:13.824 --> 00:26:15.942 in new coal capacity.

00:26:15.942 --> 00:26:20.000 So you can see, just focus on the blue line.

00:26:20.000 --> 00:26:22.760 You can see that there's been a decline in investment

00:26:22.760 --> 00:26:26.590 in new coal-fired power plants since about 2011.

00:26:26.590 --> 00:26:28.303 That's an optimistic sign.

00:26:32.246 --> 00:26:36.070 Okay, this is maybe more controversial one,

00:26:36.070 --> 00:26:37.890 but it's one of the indicators.

00:26:37.890 --> 00:26:41.530 So the Lancet Countdown thinks that divestment's important

00:26:41.530 --> 00:26:42.970 for two reasons.

00:26:42.970 --> 00:26:46.489 One is that it removes the social license

00:26:46.489 --> 00:26:48.240 of the fossil fuel industry.

00:26:48.240 --> 00:26:50.180 So, saying, you know, we don't think

00:26:50.180 --> 00:26:52.092 that the fossil fuel industry

00:26:52.092 --> 00:26:53.920 is just like every other industry.

00:26:53.920 --> 00:26:56.420 There are special problems with the fossil fuel industry.

00:26:56.420 --> 00:26:57.730 And the second reason,

00:26:57.730 --> 00:27:00.070 that's kind of a more practical reason...

00:27:00.070 --> 00:27:03.802 So at some point, hopefully sooner rather than later

00:27:03.802 --> 00:27:07.937 fossil fuel reserves that are in the ground

00:27:07.937 --> 00:27:09.810 are gonna be worthless.

00:27:09.810 --> 00:27:12.770 Because we're not gonna use fossil fuels anymore.

00:27:12.770 --> 00:27:15.906 And so therefore, they're worth a lot of money.

00:27:15.906 --> 00:27:18.122 But there's the concern

00:27:18.122 --> 00:27:21.497 about investments of fossil fuels, at a certain point,

00:27:21.497 --> 00:27:23.047 really tanking.

00:27:23.047 --> 00:27:26.745 And so that's kind of a practical reason for divestment.

00:27:26.745 --> 00:27:31.253 And so, there were 2.1 trillion dollars in new funds

00:27:31.253 --> 00:27:32.670 around the world

00:27:32.670 --> 00:27:35.730 that were committed to fossil fuel divestment in 2018.

00:27:41.958 --> 00:27:44.184 So, another optimistic one

00:27:44.184 --> 00:27:47.870 is the revenues from carbon pricing.

00:27:47.870 --> 00:27:50.740 So these are revenues from what are called

00:27:50.740 --> 00:27:52.890 cap and trade schemes

00:27:52.890 --> 00:27:55.243 which are basically a way of making

00:27:55.243 --> 00:27:57.070 fossil fuels more expensive.

00:27:57.070 --> 00:27:59.670 And also direct carbon taxes.

00:27:59.670 --> 00:28:03.066 And so revenues increases by 10 billion

00:28:03.066 --> 00:28:08.066 between 2017 and 2018, reaching 43 billion dollars.

00:28:08.570 --> 00:28:11.720 And more than half of that was allocated to climate change

00:28:11.720 --> 00:28:13.170 mitigation activities.

00:28:13.170 --> 00:28:14.913 So that's a positive sign.

00:28:17.150 --> 00:28:19.140 Okay, so now

00:28:19.140 --> 00:28:21.787 I'm gonna turn it over to Jodi

00:28:21.787 --> 00:28:23.890 to talk about the third indicator

00:28:24.800 --> 00:28:28.020 and then I'll be coming back to kind of finish up

00:28:28.020 --> 00:28:29.503 with some final words.

00:28:52.593 --> 00:28:54.220 - Well, good afternoon

00:28:54.220 --> 00:28:58.040 so, as Dr. Dubrow said, I'm an anesthesiologist

00:28:58.040 --> 00:29:00.370 practicing down at Yale across the street.

00:29:00.370 --> 00:29:03.995 And the things that motivate me to work on this issue

00:29:03.995 --> 00:29:07.305 are every time I take care of a patient,

00:29:07.305 --> 00:29:10.250 I suffer immoral injury

00:29:10.250 --> 00:29:12.880 because I know I'm causing indirect harm

00:29:12.880 --> 00:29:14.440 at the same time

00:29:14.440 --> 00:29:15.590 through the pollution I'm generating

00:29:16.452 --> 00:29:17.285 through the care that I'm giving.

00:29:18.170 --> 00:29:19.340 And so, I feel motivated to try and help
00:29:19.340 --> 00:29:21.200 clean up the health care industry itself
00:29:21.200 --> 00:29:22.850 and also to engage health professionals
00:29:22.850 --> 00:29:27.850 because not only is this issue not taught at medical
schools
00:29:28.028 --> 00:29:30.191 not taught in nursing schools,
00:29:30.191 --> 00:29:34.890 but health professionals are dedicated to their
patients
00:29:34.890 --> 00:29:35.900 and busy with their patients
00:29:35.900 --> 00:29:38.360 and so most of them may not feel motivated
00:29:38.360 --> 00:29:40.510 to be engaged with trying to affect policy
00:29:40.510 --> 00:29:43.370 or even administrative changes in their own facil-
ities.
00:29:43.370 --> 00:29:44.900 But if you can enlighten them
00:29:44.900 --> 00:29:46.680 about the pollution that they're generating
00:29:46.680 --> 00:29:48.370 through the care that they're giving
00:29:48.370 --> 00:29:50.006 I think that this is how we
00:29:50.006 --> 00:29:52.689 can help engage health professionals
00:29:52.689 --> 00:29:54.921 which are trusted members of society
00:29:54.921 --> 00:29:57.490 like everyone in this room here
00:29:57.490 --> 00:30:00.740 to help make the transition in short order.
00:30:00.740 --> 00:30:03.000 And so, the questions I ask have to be
00:30:03.000 --> 00:30:05.150 what does climate change have to do with health
care?
00:30:05.150 --> 00:30:06.620 Well, you just heard some
00:30:06.620 --> 00:30:08.800 about what it has to do with health.
00:30:08.800 --> 00:30:10.850 What it has to do with health care includes
00:30:10.850 --> 00:30:12.570 increasing demands for services
00:30:12.570 --> 00:30:14.840 increasing costs, and then a positive feedback loop
00:30:14.840 --> 00:30:16.847 also increasing pollution.
00:30:16.847 --> 00:30:20.513 And also, what does health care have to do
00:30:20.513 --> 00:30:22.040 with climate change itself?

00:30:22.040 --> 00:30:24.300 And how much pollution are we generating?
00:30:24.300 --> 00:30:27.150 And these were all unknowns when I was just starting
00:30:27.150 --> 00:30:28.840 and so it motivated me to collaborate
00:30:28.840 --> 00:30:32.000 with environmental engineers such as Matt Huck-
leman
00:30:32.000 --> 00:30:34.160 to try and put some numbers behind
00:30:34.160 --> 00:30:35.520 and guide
00:30:35.520 --> 00:30:36.770 help us understand what we can do
00:30:36.770 --> 00:30:38.800 and that's really what started this whole path.
00:30:38.800 --> 00:30:40.640 So here in Connecticut,
00:30:40.640 --> 00:30:43.290 Yale New Haven health system is all along the coast
00:30:43.290 --> 00:30:46.530 along the coastline between here and Providence.
00:30:46.530 --> 00:30:49.440 We are very vulnerable to weather related events.
00:30:49.440 --> 00:30:53.056 And if you talk to our disaster management
00:30:53.056 --> 00:30:56.200 and emergency preparedness division
00:30:56.200 --> 00:30:57.466 which is very robust
00:30:57.466 --> 00:31:00.704 and they're in agreement, it is not a matter of if
00:31:00.704 --> 00:31:05.704 but when we are going to be suffering these events.
00:31:08.800 --> 00:31:12.057 And so, Hurricane Sandy
00:31:12.057 --> 00:31:16.830 which mostly impacted New Jersey
00:31:16.830 --> 00:31:18.216 and New York
00:31:18.216 --> 00:31:22.004 kind of quickly disrupted health hospitals
00:31:22.004 --> 00:31:24.480 and health systems that never thought
00:31:24.480 --> 00:31:26.725 they would have to deal with such a thing.
00:31:26.725 --> 00:31:29.500 On the right, you see hundreds
00:31:29.500 --> 00:31:31.620 of patients were evacuated down the stairs
00:31:31.620 --> 00:31:33.190 by flashlight
00:31:33.190 --> 00:31:35.652 including nineteen patients
00:31:35.652 --> 00:31:38.040 out of the neonatal intensive care unit

00:31:38.040 --> 00:31:41.400 requiring hand ventilation down several flights of stairs.

00:31:41.400 --> 00:31:43.195 That made international news.

00:31:43.195 --> 00:31:46.472 On the left, you already heard from Dr. Dubrow

00:31:46.472 --> 00:31:49.361 about the campfire in Paradise,

00:31:49.361 --> 00:31:53.508 you see evacuation occurring out of Feather Meadow Hospital.

00:31:53.508 --> 00:31:55.830 That was completed just before

00:31:55.830 --> 00:31:57.167 the hospital burned to the ground.

00:31:57.167 --> 00:32:00.114 And so, this is also already impacting,

00:32:00.114 --> 00:32:02.460 disrupting our health care services.

00:32:02.460 --> 00:32:04.690 Now, with health care Maria, I have to be honest

00:32:05.774 --> 00:32:07.133 I didn't know until then

00:32:07.133 --> 00:32:08.120 that the majority of several of our drugs

00:32:09.534 --> 00:32:10.367 and bags of fluid saline

00:32:11.257 --> 00:32:14.640 were actually manufactured on the island of Puerto Rico.

00:32:14.640 --> 00:32:16.950 So when Hurricane Maria hit

00:32:16.950 --> 00:32:19.410 it very much disrupted the supply chain

00:32:19.410 --> 00:32:22.520 affecting care even here in New Haven, Connecticut

00:32:22.520 --> 00:32:24.960 where we feel probably immune to it.

00:32:24.960 --> 00:32:29.093 So, the vast majority of hospitals across the country

00:32:29.093 --> 00:32:33.547 reported that they were suffering major supply shortages

00:32:33.547 --> 00:32:35.970 changing the care that they deliver

00:32:35.970 --> 00:32:37.970 which actually increasing the risk in the care

00:32:37.970 --> 00:32:39.463 that we deliver.

00:32:39.463 --> 00:32:40.390 Things like medication substitution,

00:32:40.390 --> 00:32:41.470 different concentration,

00:32:41.470 --> 00:32:43.690 different drugs can have different impacts

00:32:43.690 --> 00:32:45.540 and result in errors.

00:32:45.540 --> 00:32:47.470 Inappropriate substitutions of drugs,
00:32:47.470 --> 00:32:48.910 improper handling of drugs,
00:32:48.910 --> 00:32:50.800 so splitting vials between patients
00:32:50.800 --> 00:32:52.699 in non-sterile conditions
00:32:52.699 --> 00:32:56.260 and then shortages when there's no substitution
available.
00:32:56.260 --> 00:32:57.690 And then this odd phenomena
00:32:57.690 --> 00:32:59.880 where actually, we saw some increased drug waste.
00:32:59.880 --> 00:33:00.920 So for example,
00:33:00.920 --> 00:33:03.490 here is a two ml vial of a local anesthetic
00:33:03.490 --> 00:33:06.220 named Mepivacaine that we use for spinal anes-
thetics
00:33:06.220 --> 00:33:07.450 when that was absent,
00:33:07.450 --> 00:33:10.170 we actually had to substitute a 30 ml vial
00:33:10.170 --> 00:33:13.494 and because of concerns for cross-contamination
00:33:13.494 --> 00:33:17.220 of microbial risk, that had to be thrown away.
00:33:17.220 --> 00:33:19.610 And until we create an infrastructure
00:33:19.610 --> 00:33:21.471 for pharmacy to split these drugs.
00:33:21.471 --> 00:33:23.653 So this odd phenomenon of increasing waste.
00:33:25.460 --> 00:33:27.690 So health care is an enormous industry,
00:33:27.690 --> 00:33:30.500 here in the U.S. 3.65 trillion dollars
00:33:30.500 --> 00:33:32.690 near 20% of our gross domestic product
00:33:32.690 --> 00:33:33.950 goes toward health care.
00:33:33.950 --> 00:33:38.815 It's a very energy intensive industry,
00:33:38.815 --> 00:33:41.360 not only the manufacturing of all the things,
00:33:41.360 --> 00:33:43.470 but with the energy we use to run the hospitals
00:33:43.470 --> 00:33:45.422 which are two and half times
00:33:45.422 --> 00:33:48.710 as energy intensive as the average commercial
building.
00:33:48.710 --> 00:33:50.865 They operate 24/7, they have complex
00:33:50.865 --> 00:33:52.861 medical devices and equipment.
00:33:52.861 --> 00:33:55.630 We have unique requirements to prevent

00:33:55.630 --> 00:33:58.060 the risk of cross-contamination,
00:33:58.060 --> 00:34:00.120 so infection prevention.
00:34:00.120 --> 00:34:01.960 And so we use more chemicals
00:34:01.960 --> 00:34:04.104 and we use disposables.
00:34:04.104 --> 00:34:07.130 And there's this really disturbing trend
00:34:07.130 --> 00:34:08.800 in some of these disposable devices
00:34:08.800 --> 00:34:10.800 because a lot of it's not evidence-based
00:34:10.800 --> 00:34:11.730 there just seems,
00:34:11.730 --> 00:34:13.590 if we can get to zero-risk we should go there
00:34:13.590 --> 00:34:17.409 but we're actually ignoring the secondary harm
00:34:17.409 --> 00:34:18.908 to public health.
00:34:18.908 --> 00:34:21.652 And so, we're at a balance there.
00:34:21.652 --> 00:34:24.364 There is a risk stratification of
00:34:24.364 --> 00:34:26.550 what things need to be sterile,
00:34:26.550 --> 00:34:28.300 what things don't need to be sterile
00:34:28.300 --> 00:34:31.140 and yet we're going toward more and more disposables.
00:34:31.140 --> 00:34:34.300 And so conservative estimate by Health Care Without Harm
00:34:34.300 --> 00:34:38.000 said that there was about six million tons of solid waste
00:34:38.000 --> 00:34:40.836 generated from hospitals in the United States annually.
00:34:40.836 --> 00:34:42.990 This is a very conservative estimate.
00:34:42.990 --> 00:34:46.090 So many years ago now, we're doing more and more disposables
00:34:46.090 --> 00:34:49.542 so surely that number is much bigger now.
00:34:49.542 --> 00:34:51.856 And then we have so much regulatory complexity
00:34:51.856 --> 00:34:53.763 and complex business models.
00:34:53.763 --> 00:34:56.982 All these things contribute to systematic waste.
00:34:56.982 --> 00:34:59.025 And finally, culture.
00:34:59.025 --> 00:35:00.940 We're a rich society.

00:35:00.940 --> 00:35:03.546 So we are excessive
00:35:03.546 --> 00:35:06.410 in the resources
00:35:06.410 --> 00:35:07.800 that we use and have
00:35:07.800 --> 00:35:09.770 and this disposability is normalized.
00:35:09.770 --> 00:35:12.810 So there's a real need for a culture change
00:35:12.810 --> 00:35:15.030 to help engage around cleaning up health care
00:35:15.030 --> 00:35:16.760 and engaging health care professionals.
00:35:16.760 --> 00:35:18.906 This is an image of a robotic surgery.
00:35:18.906 --> 00:35:20.890 Some things to notice,
00:35:20.890 --> 00:35:22.500 there's a lot of disposables here
00:35:22.500 --> 00:35:23.900 including all the linens
00:35:23.900 --> 00:35:26.030 and the complex medical devices.
00:35:26.030 --> 00:35:28.130 All of these instruments here that are attached
00:35:28.130 --> 00:35:28.970 to the robot arms
00:35:28.970 --> 00:35:31.123 are single-use disposable.
00:35:31.123 --> 00:35:34.247 There are options for reusing them
00:35:34.247 --> 00:35:38.103 but that is not the norm currently.
00:35:38.980 --> 00:35:42.048 And so, Rob mentioned Dr. Eckelman
00:35:42.048 --> 00:35:43.630 so he's an environmental engineer
00:35:43.630 --> 00:35:45.613 from Northeastern University and also has an
appointment
00:35:45.613 --> 00:35:48.290 here in environmental health sciences,
00:35:48.290 --> 00:35:50.057 specializes in life cycle assessment.
00:35:50.057 --> 00:35:53.000 We started collaborating several years now
00:35:53.000 --> 00:35:54.411 trying to understand
00:35:54.411 --> 00:35:58.020 what the footprint is of drugs and devices
00:35:58.020 --> 00:35:59.680 and entire health systems.
00:35:59.680 --> 00:36:01.857 And life cycle assessment is
00:36:01.857 --> 00:36:06.000 an internationally standardized scientific modeling
system.
00:36:06.000 --> 00:36:08.350 So it's not just all the stuff that you throw away,

00:36:08.350 --> 00:36:11.080 it's not just that we generate six million tones
00:36:11.080 --> 00:36:12.580 of solid waste annually.
00:36:12.580 --> 00:36:14.020 But there's emissions involved
00:36:14.020 --> 00:36:16.932 in raw material extraction, production, transportation
00:36:16.932 --> 00:36:19.010 as well as disposal.
00:36:19.010 --> 00:36:20.540 So unless you put all those pieces together
00:36:20.540 --> 00:36:22.440 we can't really understand where the hot spots
are
00:36:22.440 --> 00:36:24.510 and what the alternatives are.
00:36:24.510 --> 00:36:25.900 So a couple of different approaches to
00:36:25.900 --> 00:36:27.220 life cycle assessment,
00:36:27.220 --> 00:36:29.560 including a bottom up approach where you essentially
00:36:30.406 --> 00:36:31.473 look at all the materials that you're using,
00:36:32.979 --> 00:36:34.610 there are international data bases that tell you
00:36:34.610 --> 00:36:37.040 what the emissions are for those materials.
00:36:37.040 --> 00:36:38.890 And then you can add them up and understand
00:36:38.890 --> 00:36:41.430 where in the life cycle you're having your impacts.
00:36:41.430 --> 00:36:43.620 And another approach is sort of a top-down
00:36:43.620 --> 00:36:45.000 where you're looking at something
00:36:45.000 --> 00:36:46.680 like an entire health system
00:36:46.680 --> 00:36:48.720 you can't really measure any single material
00:36:48.720 --> 00:36:50.310 that's going into that system.
00:36:50.310 --> 00:36:52.843 So we use national statistics to help expenditure
data
00:36:52.843 --> 00:36:57.395 coupled with economic material flow analysis
00:36:57.395 --> 00:36:59.666 both nationally and multi-regionally.
00:36:59.666 --> 00:37:03.008 And then, that gets linked to environmental initiatives.
00:37:03.008 --> 00:37:05.040 So top-down and bottom-up approach
00:37:05.040 --> 00:37:06.799 to come to some understanding

00:37:06.799 --> 00:37:08.543 of what the footprint is.

00:37:08.543 --> 00:37:11.290 And I think it's worth highlighting

00:37:11.290 --> 00:37:14.820 one study that we did looking at different anesthetic drugs.

00:37:14.820 --> 00:37:18.001 There's a lot to absorb here, so if you allow me to tell you

00:37:18.001 --> 00:37:20.769 these are four different anesthetic drugs.

00:37:20.769 --> 00:37:23.584 The first three are gases, or actually four

00:37:23.584 --> 00:37:26.620 because Microsoft site is not moving the bars.

00:37:26.620 --> 00:37:28.258 These are inhale drugs,

00:37:28.258 --> 00:37:30.531 this is propofol, an intervenous drug.

00:37:30.531 --> 00:37:33.590 So we look at the life cycle footprint of an hour's worth

00:37:33.590 --> 00:37:35.527 of this drug to keep a patient asleep.

00:37:35.527 --> 00:37:40.170 And, first thing to pay attention to is the fact that

00:37:40.170 --> 00:37:41.945 you can't see propofol here at all.

00:37:41.945 --> 00:37:44.369 It's there, but its greenhouse gas emissions are

00:37:44.369 --> 00:37:47.670 four orders of magnitude less than inhalent anesthetics.

00:37:47.670 --> 00:37:49.330 So these drugs have different properties,

00:37:49.330 --> 00:37:51.700 why we would chose them under different conditions.

00:37:51.700 --> 00:37:53.900 But this is just to help guide environmentally

00:37:53.900 --> 00:37:56.170 preferable choices as a clinician.

00:37:56.170 --> 00:37:58.059 So if you have a choice

00:37:58.059 --> 00:37:59.500 between these,

00:37:59.500 --> 00:38:01.780 and often we do, chose the one that is least harmful

00:38:01.780 --> 00:38:03.230 for the environment.

00:38:03.230 --> 00:38:04.410 The other things to note are

00:38:04.410 --> 00:38:06.150 that if you just look at the pink

00:38:07.170 --> 00:38:10.930 that this drug desflurane has about twenty times the impact

00:38:10.930 --> 00:38:11.860 of isoflurane.

00:38:11.860 --> 00:38:14.016 And nitrous oxide, if you add it

00:38:14.016 --> 00:38:17.453 short story is if you add it, it makes everything worse.

00:38:17.453 --> 00:38:19.304 So take homes include:

00:38:19.304 --> 00:38:21.678 avoid desflurane and nitrous oxide

00:38:21.678 --> 00:38:24.040 when you have the ability to do so.

00:38:24.040 --> 00:38:25.527 And I should say,

00:38:25.527 --> 00:38:28.187 inhaled anesthetics are very potent

00:38:28.187 --> 00:38:29.246 greenhouse gases.

00:38:29.246 --> 00:38:32.244 Hundreds to thousands more potent than carbon dioxide

00:38:32.244 --> 00:38:35.468 and they're simply vented off of hospital rooftops.

00:38:35.468 --> 00:38:38.787 So, the blue here is the non-waste phase.

00:38:38.787 --> 00:38:43.787 So, the manufacturing, transportation, utilization phases.

00:38:44.367 --> 00:38:46.940 Everything else is the waste phase.

00:38:46.940 --> 00:38:48.298 So we can look at things like

00:38:48.298 --> 00:38:51.507 waste and anesthetic gas technologies which exists.

00:38:51.507 --> 00:38:53.132 That's another solution.

00:38:53.132 --> 00:38:56.290 And another study done by Sandra Thiel

00:38:56.290 --> 00:38:57.390 from New York University

00:38:57.390 --> 00:38:59.550 compared different surgical approaches.

00:38:59.550 --> 00:39:01.810 So again, there are different reasons why you'd choose

00:39:01.810 --> 00:39:05.310 an open technique versus a minimally invasive technique.

00:39:05.310 --> 00:39:08.460 The first techniques in a hysterectomy on the left are open.

00:39:08.460 --> 00:39:11.150 The two on the right are minimally invasive,

00:39:11.150 --> 00:39:13.138 one being laparoscopic and one robotic.

00:39:13.138 --> 00:39:15.750 Some take homes here include the purple

00:39:15.750 --> 00:39:17.550 which are inhaled anesthetics.

00:39:17.550 --> 00:39:18.990 So depending on the approach
00:39:18.990 --> 00:39:20.756 one third to two thirds the footprint of
00:39:20.756 --> 00:39:22.240 everything happening in the OR
00:39:22.240 --> 00:39:24.496 the energy to run the building, the equipment,
00:39:24.496 --> 00:39:26.934 all the disposable and reusable devices.
00:39:26.934 --> 00:39:29.496 Inhaled anesthetics are a pretty big piece of that.
00:39:29.496 --> 00:39:31.740 Another take home is this light green here
00:39:31.740 --> 00:39:34.540 which is all the single-use disposable instruments.
00:39:34.540 --> 00:39:37.040 And the error bar is because a couple of these
cases
00:39:37.040 --> 00:39:38.270 had propofol.
00:39:38.270 --> 00:39:41.160 So if we took this out the error bars would be
much smaller.
00:39:41.160 --> 00:39:44.697 So I showed you a picture of a robotic surgery for
a reason
00:39:44.697 --> 00:39:45.990 that's really interesting.
00:39:45.990 --> 00:39:47.720 Because there's this increasing trend
00:39:47.720 --> 00:39:49.770 to push toward robotic surgery.
00:39:49.770 --> 00:39:51.700 It is not has been shown to improve outcomes
00:39:51.700 --> 00:39:53.750 over a laparoscopic approach
00:39:53.750 --> 00:39:57.808 but it is becoming sexy to patients.
00:39:57.808 --> 00:40:00.780 They want to go to an institution that is doing
the most
00:40:00.780 --> 00:40:02.530 technologically advanced procedures.
00:40:02.530 --> 00:40:05.363 So now there's this competitiveness that we have
to be
00:40:05.363 --> 00:40:08.644 more and more technologically advanced.
00:40:08.644 --> 00:40:11.740 And so that is also contributing part of the prob-
lem.
00:40:11.740 --> 00:40:13.650 And so I mentioned that we do these
00:40:13.650 --> 00:40:15.540 national health sector studies
00:40:15.540 --> 00:40:17.554 so the first one we did was on the U.S.
00:40:17.554 --> 00:40:20.040 And so this was really not astonishing,

00:40:20.040 --> 00:40:22.650 we know we spend more per capita on health care
00:40:22.650 --> 00:40:24.910 than any other industrialized nation.
00:40:24.910 --> 00:40:27.709 And we found that the U.S. health sector in 2013
00:40:27.709 --> 00:40:30.585 was nearly 10% of our nation's greenhouse gases.
00:40:30.585 --> 00:40:32.825 Nearly 9% of our criteria air pollutants.
00:40:32.825 --> 00:40:35.595 If the U.S. health sector were a nation itself
00:40:35.595 --> 00:40:38.930 it would rank 13th in the world for greenhouse
gas emissions
00:40:38.930 --> 00:40:41.510 ahead of the entire United Kingdom.
00:40:41.510 --> 00:40:43.760 And we also looked at other emissions
00:40:43.760 --> 00:40:45.757 notably air pollutants as I mentioned.
00:40:45.757 --> 00:40:48.481 If we were to translate that into public health
damages
00:40:48.481 --> 00:40:51.501 614 disability-adjusted life years lost annually
00:40:51.501 --> 00:40:54.841 especially due to air pollution and also climate
change.
00:40:54.841 --> 00:40:58.730 And this is similar magnitude to deaths
00:40:58.730 --> 00:41:00.220 due to medical errors.
00:41:00.220 --> 00:41:02.077 This was first reported by the Institute of Medicine
00:41:02.077 --> 00:41:04.034 "To Err is Human" in 1999.
00:41:04.034 --> 00:41:07.136 Those deaths lost on average ten years of life.
00:41:07.136 --> 00:41:10.182 By calculations we're seeing the same magnitude.
00:41:10.182 --> 00:41:13.540 This was important, this IOM report "To Err is
Human"
00:41:13.540 --> 00:41:15.660 is a landmark report that sparked the
00:41:15.660 --> 00:41:17.600 whole patient safety movement.
00:41:17.600 --> 00:41:18.970 The fact that people are dying
00:41:18.970 --> 00:41:21.050 from preventable medical errors.
00:41:21.050 --> 00:41:23.844 So there are institutions that pay to see
00:41:23.844 --> 00:41:26.030 health care research and quality was formed and
funded.
00:41:26.030 --> 00:41:28.325 So it totally transformed every aspect

00:41:28.325 --> 00:41:30.348 of how we deliver care.

00:41:30.348 --> 00:41:33.647 Patient safety is formalized in how we deliver our care.

00:41:33.647 --> 00:41:36.050 And so what we are trying to say is

00:41:36.050 --> 00:41:38.094 pollution is just as big and just as important

00:41:38.094 --> 00:41:41.301 to how we deliver care.

00:41:41.301 --> 00:41:44.283 And that this is the new patient safety movement.

00:41:45.188 --> 00:41:47.500 I'm gonna go ahead and skip ahead to

00:41:47.500 --> 00:41:52.470 we then worked with The Lancet team

00:41:52.470 --> 00:41:54.230 and there's a new indicator

00:41:54.230 --> 00:41:57.277 we wanted to essentially make this an international metric.

00:41:57.277 --> 00:42:01.168 And so, surprisingly globally take homes here include

00:42:01.168 --> 00:42:05.043 that global health care greenhouse gas emissions

00:42:05.043 --> 00:42:07.822 are 4.6% of global emissions.

00:42:07.822 --> 00:42:10.869 I mean, I just like to let that sink in.

00:42:10.869 --> 00:42:14.703 The other takeaway here is that the United States

00:42:14.703 --> 00:42:16.034 is a top player.

00:42:16.034 --> 00:42:17.717 And not in a good way.

00:42:17.717 --> 00:42:20.099 So on the left we see,

00:42:20.099 --> 00:42:23.539 this is per capita gross domestic product

00:42:23.539 --> 00:42:27.310 by per capita health care emissions.

00:42:27.310 --> 00:42:30.270 And the bubble with those is the expenditure on health care.

00:42:30.270 --> 00:42:32.610 So again, we know we spend twice as much on health care

00:42:32.610 --> 00:42:34.470 in the U.S. as any other nation.

00:42:34.470 --> 00:42:35.790 And on the right is over time,

00:42:35.790 --> 00:42:37.030 so trending upward.

00:42:37.030 --> 00:42:39.550 So roughly a quarter of these emissions

00:42:39.550 --> 00:42:41.940 are coming from the U.S. alone.

00:42:41.940 --> 00:42:44.470 We are not number one in health outcomes
00:42:44.470 --> 00:42:48.649 in terms of outcomes such as
00:42:48.649 --> 00:42:51.231 maternal deaths,
00:42:51.231 --> 00:42:53.256 life expectancy,
00:42:53.256 --> 00:42:56.010 the money we're spending on health care is not
00:42:56.010 --> 00:42:57.540 being spent wisely.
00:42:57.540 --> 00:43:01.364 And so that's part of why
00:43:01.364 --> 00:43:05.800 there are a lot of opportunities here to save money
00:43:05.800 --> 00:43:06.770 as well as reduce pollution.
00:43:06.770 --> 00:43:10.160 We really need to look at globally how health care
sectors
00:43:10.160 --> 00:43:11.100 are performing,
00:43:11.100 --> 00:43:13.657 and obviously particularly in the U.S.
00:43:13.657 --> 00:43:15.610 And we wanna get some positive news, right?
00:43:15.610 --> 00:43:19.459 So Kaiser Permanente is a large non-profit health
system
00:43:19.459 --> 00:43:20.470 in the United States.
00:43:20.470 --> 00:43:21.929 12.3 million people.
00:43:21.929 --> 00:43:24.488 They have a very robust sustainability division
00:43:24.488 --> 00:43:27.525 looking at improving their entire organizations'
footprint
00:43:27.525 --> 00:43:29.689 between 2008 and 2017,
00:43:29.689 --> 00:43:32.389 they reduced their greenhouse gas emissions by
20%
00:43:32.389 --> 00:43:35.012 while increasing their membership by 36%.
00:43:35.012 --> 00:43:39.422 In 2018, they started hosting on-site solar panels
00:43:39.422 --> 00:43:44.422 and have a commitment by 2020 to have 100%
renewable energy.
00:43:46.520 --> 00:43:49.680 And 3% of their health sector emissions are coming
from
00:43:49.680 --> 00:43:51.080 inhaled anesthetics.
00:43:51.080 --> 00:43:54.557 That is consistent with national work out of the
U.K.

00:43:54.557 --> 00:43:55.940 and other health organization work.

00:43:55.940 --> 00:43:58.630 So inhaled anesthetics was a big part of its footprint.

00:43:58.630 --> 00:44:01.153 And I should say the U.S. numbers I gave you

00:44:01.153 --> 00:44:03.524 and also the global numbers I gave you

00:44:03.524 --> 00:44:06.043 do not include inhaled anesthetics.

00:44:06.043 --> 00:44:10.128 And so K.P. reduced this by 25% by progressive

00:44:10.128 --> 00:44:13.343 elimination of that one drug desflurane.

00:44:13.343 --> 00:44:17.040 And we're actually working on a campaign to reduce

00:44:17.040 --> 00:44:18.280 their nitrous oxide use.

00:44:18.280 --> 00:44:20.381 So we're working together on that.

00:44:20.381 --> 00:44:22.090 And the other one worth mentioning

00:44:22.090 --> 00:44:24.220 is the U.N. National Health Service.

00:44:24.220 --> 00:44:26.580 They're leading the world with the division

00:44:26.580 --> 00:44:27.710 of sustainable development

00:44:27.710 --> 00:44:31.026 and the division's dedicated to reducing the footprint

00:44:31.026 --> 00:44:31.960 of health care.

00:44:31.960 --> 00:44:33.529 And since their start,

00:44:33.529 --> 00:44:35.773 they've actually reduced their emissions

00:44:35.773 --> 00:44:37.666 measurably so

00:44:37.666 --> 00:44:41.769 by 18.5% between 2007-2017 while increasing their

00:44:41.769 --> 00:44:43.460 clinical activity.

00:44:43.460 --> 00:44:45.350 And they have a very robust action plan

00:44:45.350 --> 00:44:47.810 that is a global exemplar.

00:44:47.810 --> 00:44:51.910 And so, you talk about delivering health care

00:44:51.910 --> 00:44:53.700 which is delivering the maximum health gain

00:44:53.700 --> 00:44:55.030 or experience of care

00:44:55.967 --> 00:44:58.623 at the least cost, while adding value for the most people.

00:44:58.623 --> 00:45:01.590 And we're talking about that we need to add

00:45:01.590 --> 00:45:04.130 environmental and social benefits as well.

00:45:05.976 --> 00:45:08.976 (distant murmuring)

00:45:34.613 --> 00:45:36.063 - Okay, so just to finish up.

00:45:36.952 --> 00:45:39.381 So the third key message,

00:45:39.381 --> 00:45:41.630 an unprecedented challenge demands

00:45:41.630 --> 00:45:43.422 an unprecedented response.

00:45:43.422 --> 00:45:46.550 I thought it would be worth taking about that

00:45:46.550 --> 00:45:47.739 a little bit.

00:45:47.739 --> 00:45:51.487 So first, I think we really need optimism.

00:45:51.487 --> 00:45:56.487 Pessimism, and this is me talking,

00:45:56.594 --> 00:45:59.898 not the Lancet Countdown, but I think they'd agree

00:45:59.898 --> 00:46:01.551 with most of it.

00:46:01.551 --> 00:46:03.310 Pessimism is self-fulfilling prophecy.

00:46:03.310 --> 00:46:06.310 So it's really morally imperative that we be optimistic

00:46:06.310 --> 00:46:07.563 about achieving this.

00:46:08.910 --> 00:46:11.450 And there are some reasons for optimism.

00:46:11.450 --> 00:46:15.644 We see that solar and wind are actually happening.

00:46:15.644 --> 00:46:18.993 They're becoming economically competitive.

00:46:18.993 --> 00:46:22.510 They're technologically feasible.

00:46:22.510 --> 00:46:24.960 We can do solar and wind.

00:46:25.934 --> 00:46:28.313 Transition to renewable energy is possible.

00:46:31.350 --> 00:46:32.990 We have the Pope's encyclical,

00:46:32.990 --> 00:46:35.120 that was a powerful document.

00:46:35.120 --> 00:46:36.543 That's still resonating.

00:46:37.860 --> 00:46:39.570 With all of its flaws,

00:46:39.570 --> 00:46:41.800 we have the Paris Climate Agreement

00:46:41.800 --> 00:46:44.550 that right now, every nation on earth is part of

00:46:44.550 --> 00:46:46.030 the Paris Climate Agreement.

00:46:46.030 --> 00:46:48.502 There's one nation that's in the process of withdrawing

00:46:48.502 --> 00:46:49.550 (laughter)
00:46:49.550 --> 00:46:51.090 Unfortunately.
00:46:51.090 --> 00:46:53.689 But even so, we have states, cities,
00:46:53.689 --> 00:46:57.046 colleges and universities, businesses, etc.,
00:46:57.046 --> 00:46:59.738 that have said, "We are still in".
00:46:59.738 --> 00:47:02.073 So these are in the United States.
00:47:02.073 --> 00:47:05.529 They've pledged to do their part for the climate
00:47:05.529 --> 00:47:08.713 and essentially stay in the Paris agreement.
00:47:10.530 --> 00:47:12.270 There's ongoing divestment.
00:47:12.270 --> 00:47:16.403 New York City divested its entire pension fund
last year.
00:47:21.703 --> 00:47:24.280 One of the things we have to do is stop building
00:47:24.280 --> 00:47:26.370 new fossil fueled infrastructure.
00:47:26.370 --> 00:47:30.591 That's essential in order to achieve this transition.
00:47:30.591 --> 00:47:32.970 There have been a lot of defeats,
00:47:32.970 --> 00:47:34.730 but there have been some victories.
00:47:34.730 --> 00:47:38.661 Like this one victory here in New York state.
00:47:38.661 --> 00:47:43.661 The Juliana vs U.S. climate lawsuit is still alive.
00:47:43.698 --> 00:47:47.610 This is where young people are suing the United
States
00:47:47.610 --> 00:47:50.113 to do more about climate change.
00:47:52.660 --> 00:47:55.560 And young people around the world are rising up
00:47:55.560 --> 00:47:56.573 around this issue.
00:48:02.431 --> 00:48:03.348 In the U.K.
00:48:06.390 --> 00:48:08.573 Outside Speaker Pelosi's office.
00:48:11.760 --> 00:48:14.790 So to me, that's the most hopeful thing of all
00:48:14.790 --> 00:48:16.658 it's like, well the young people
00:48:16.658 --> 00:48:19.245 they understand that their future's at stake.
00:48:19.245 --> 00:48:21.086 Or, a lot of you are young people
00:48:21.086 --> 00:48:22.839 you understand that your future's at stake.
00:48:22.839 --> 00:48:23.672 (laughter)

00:48:23.672 --> 00:48:25.694 You understand that your future's at stake.
00:48:25.694 --> 00:48:27.590 And people are rising to the occasion.
00:48:27.590 --> 00:48:31.460 So I'd like to end with this quote from Martin Luther King.
00:48:31.460 --> 00:48:34.193 Which was not about climate change obviously
00:48:34.193 --> 00:48:37.157 but is applicable to climate change in my view.
00:48:37.157 --> 00:48:40.623 We are now faced with the fact that tomorrow is today.
00:48:40.623 --> 00:48:44.227 We are confronted with the fierce urgency of now.
00:48:44.227 --> 00:48:47.349 In this unfolding conundrum of life and history,
00:48:47.349 --> 00:48:50.142 there is such a thing as being too late.
00:48:50.142 --> 00:48:53.163 So time is not on our side, time is our enemy
00:48:53.163 --> 00:48:54.327 in this case.
00:48:54.327 --> 00:48:56.510 We have to do things faster.
00:48:56.510 --> 00:48:58.520 The transition's going to happen.
00:48:58.520 --> 00:48:59.620 Really, the question is
00:48:59.620 --> 00:49:01.220 what is the pace of the transition?
00:49:01.220 --> 00:49:04.438 There is no time for apathy or complacency.
00:49:04.438 --> 00:49:07.573 This is a time for vigorous and positive action.
00:49:09.880 --> 00:49:11.260 Okay so thank you.
00:49:11.260 --> 00:49:13.697 And if people are particularly interested
00:49:13.697 --> 00:49:16.629 and you do have some hard copies of the report here
00:49:16.629 --> 00:49:20.361 so if you're interested come up and get a hard copy.
00:49:20.361 --> 00:49:24.111 (clapping from the audience)
00:49:27.975 --> 00:49:31.808 (chatter throughout the room)