

WEBVTT

NOTE duration:"00:54:22"

NOTE recognizability:0.849

NOTE language:en-us

NOTE Confidence: 0.710518698333333

00:00:00.000 --> 00:00:03.100 Epidemic of fentanyl and

NOTE Confidence: 0.710518698333333

00:00:03.100 --> 00:00:05.021 stimulated addiction overdose.

NOTE Confidence: 0.710518698333333

00:00:05.021 --> 00:00:07.618 These are two areas where we are

NOTE Confidence: 0.710518698333333

00:00:07.618 --> 00:00:10.210 really in need of improved treatments

NOTE Confidence: 0.710518698333333

00:00:10.210 --> 00:00:12.868 and and we have underserved needs.

NOTE Confidence: 0.710518698333333

00:00:12.870 --> 00:00:14.790 So with this let me turn it over to Tom.

NOTE Confidence: 0.710518698333333

00:00:14.790 --> 00:00:18.010 Thank you. Thank you very much, Stephanie.

NOTE Confidence: 0.710518698333333

00:00:18.010 --> 00:00:19.844 I just wish my mother was still

NOTE Confidence: 0.710518698333333

00:00:19.844 --> 00:00:22.182 alive so that she could hear that

NOTE Confidence: 0.710518698333333

00:00:22.182 --> 00:00:24.165 wonderful introduction and say, oh,

NOTE Confidence: 0.710518698333333

00:00:24.165 --> 00:00:27.630 you finally made it as a doctor.

NOTE Confidence: 0.710518698333333

00:00:27.630 --> 00:00:29.338 Hello. I have to say her and

NOTE Confidence: 0.710518698333333

00:00:29.338 --> 00:00:30.357 my grandmother preferred that

NOTE Confidence: 0.710518698333333

00:00:30.357 --> 00:00:31.779 I would have become a minister,  
NOTE Confidence: 0.710518698333333  
00:00:31.780 --> 00:00:34.237 but she can't have everything in life.  
NOTE Confidence: 0.710518698333333  
00:00:34.240 --> 00:00:36.790 Closest I got with a psychiatrist.  
NOTE Confidence: 0.710518698333333  
00:00:36.790 --> 00:00:39.870 So again, let me move forward with this.  
NOTE Confidence: 0.710518698333333  
00:00:39.870 --> 00:00:41.976 I do have a fair amount of stuff I'm  
NOTE Confidence: 0.710518698333333  
00:00:41.976 --> 00:00:44.180 going to try to go over and but one of  
NOTE Confidence: 0.710518698333333  
00:00:44.180 --> 00:00:45.930 those things I've learned over time  
NOTE Confidence: 0.710518698333333  
00:00:45.930 --> 00:00:48.055 is don't get too wedded to your slides  
NOTE Confidence: 0.710518698333333  
00:00:48.055 --> 00:00:49.840 that you need to present all of them.  
NOTE Confidence: 0.710518698333333  
00:00:49.840 --> 00:00:53.730 So I'll still be mindful of what time it is.  
NOTE Confidence: 0.710518698333333  
00:00:53.730 --> 00:00:55.893 This is just a little overview of  
NOTE Confidence: 0.710518698333333  
00:00:55.893 --> 00:00:58.459 what I'm going to be talking about  
NOTE Confidence: 0.710518698333333  
00:00:58.459 --> 00:01:00.424 today about fentanyl in particular.  
NOTE Confidence: 0.710518698333333  
00:01:00.430 --> 00:01:02.732 Uh, these are the disclosures, which,  
NOTE Confidence: 0.710518698333333  
00:01:02.732 --> 00:01:05.148 uh, I think the bottom line is that,  
NOTE Confidence: 0.710518698333333  
00:01:05.150 --> 00:01:05.692 you know,

NOTE Confidence: 0.710518698333333  
00:01:05.692 --> 00:01:07.860 none of these are have anything to do  
NOTE Confidence: 0.710518698333333  
00:01:07.921 --> 00:01:10.224 with vaccines or what I'm talking about.  
NOTE Confidence: 0.710518698333333  
00:01:10.230 --> 00:01:13.020 The the people who make a lot of money  
NOTE Confidence: 0.710518698333333  
00:01:13.020 --> 00:01:15.468 generally aren't interested in addictions.  
NOTE Confidence: 0.710518698333333  
00:01:15.470 --> 00:01:18.014 So that that has been a an advantage  
NOTE Confidence: 0.710518698333333  
00:01:18.014 --> 00:01:19.710 and a disadvantage.  
NOTE Confidence: 0.710518698333333  
00:01:19.710 --> 00:01:21.061 One of the goals that I'm going  
NOTE Confidence: 0.710518698333333  
00:01:21.061 --> 00:01:22.119 to try to do today,  
NOTE Confidence: 0.710518698333333  
00:01:22.120 --> 00:01:24.584 I'm going to try to do well  
NOTE Confidence: 0.710518698333333  
00:01:24.584 --> 00:01:26.070 before I just get.  
NOTE Confidence: 0.710518698333333  
00:01:26.070 --> 00:01:28.023 I mean thank you very much for inviting me,  
NOTE Confidence: 0.710518698333333  
00:01:28.030 --> 00:01:28.825 Stephanie and John.  
NOTE Confidence: 0.710518698333333  
00:01:28.825 --> 00:01:30.680 I think that that was really a.  
NOTE Confidence: 0.710518698333333  
00:01:30.680 --> 00:01:31.600 A nice.  
NOTE Confidence: 0.710518698333333  
00:01:31.600 --> 00:01:32.980 I don't know.  
NOTE Confidence: 0.710518698333333

00:01:32.980 --> 00:01:35.698 It always feels good to go back to your  
NOTE Confidence: 0.710518698333333  
00:01:35.698 --> 00:01:38.188 old homestead where I've been for,  
NOTE Confidence: 0.710518698333333  
00:01:38.190 --> 00:01:40.465 let's say, Stephanie, you asked 27 years,  
NOTE Confidence: 0.710518698333333  
00:01:40.470 --> 00:01:41.463 to be exact.  
NOTE Confidence: 0.710518698333333  
00:01:41.463 --> 00:01:44.340 I'm working on 16 now here in Texas.  
NOTE Confidence: 0.710518698333333  
00:01:44.340 --> 00:01:47.160 So, but I still don't say y'all my kids do,  
NOTE Confidence: 0.710518698333333  
00:01:47.160 --> 00:01:48.495 but I don't.  
NOTE Confidence: 0.710518698333333  
00:01:48.495 --> 00:01:50.275 As to the goals,  
NOTE Confidence: 0.710518698333333  
00:01:50.280 --> 00:01:52.160 we would like to try to describe the  
NOTE Confidence: 0.710518698333333  
00:01:52.160 --> 00:01:54.240 ways of the opiate overdose epidemic.  
NOTE Confidence: 0.710518698333333  
00:01:54.240 --> 00:01:56.328 There's certainly began with  
NOTE Confidence: 0.710518698333333  
00:01:56.328 --> 00:01:57.894 MD's overprescribing opiates.  
NOTE Confidence: 0.710518698333333  
00:01:57.900 --> 00:01:59.797 There was then a switch to heroin.  
NOTE Confidence: 0.710518698333333  
00:01:59.800 --> 00:02:00.800 There then was a switch.  
NOTE Confidence: 0.710518698333333  
00:02:00.800 --> 00:02:03.164 Fentanyl and what's happened most recently  
NOTE Confidence: 0.710518698333333  
00:02:03.164 --> 00:02:06.549 is a switch to fentanyl plus stimulants,

NOTE Confidence: 0.710518698333333  
00:02:06.550 --> 00:02:08.725 which has been a significant  
NOTE Confidence: 0.710518698333333  
00:02:08.725 --> 00:02:10.465 problem in many ways.  
NOTE Confidence: 0.710518698333333  
00:02:10.470 --> 00:02:12.310 I'd like to be sure that we learn  
NOTE Confidence: 0.710518698333333  
00:02:12.310 --> 00:02:14.323 some new therapies for cocaine and  
NOTE Confidence: 0.710518698333333  
00:02:14.323 --> 00:02:15.815 stimulants including some little  
NOTE Confidence: 0.710518698333333  
00:02:15.815 --> 00:02:17.884 bit about pharmacogenetics and about  
NOTE Confidence: 0.710518698333333  
00:02:17.884 --> 00:02:20.410 vaccines and then learn why buprenorphine,  
NOTE Confidence: 0.710518698333333  
00:02:20.410 --> 00:02:22.228 which is our without a doubt  
NOTE Confidence: 0.710518698333333  
00:02:22.228 --> 00:02:23.980 our best treatment for opiates,  
NOTE Confidence: 0.710518698333333  
00:02:23.980 --> 00:02:27.372 why it fails to block fentanyl and how  
NOTE Confidence: 0.710518698333333  
00:02:27.372 --> 00:02:31.730 an anti fentanyl vaccine can in fact succeed.  
NOTE Confidence: 0.710518698333333  
00:02:31.730 --> 00:02:34.229 This is when the the thing started.  
NOTE Confidence: 0.710518698333333  
00:02:34.230 --> 00:02:37.029 This is wave one started about 20 years ago.  
NOTE Confidence: 0.710518698333333  
00:02:37.030 --> 00:02:38.785 And these are just some  
NOTE Confidence: 0.710518698333333  
00:02:38.785 --> 00:02:40.189 quotes from Barack Obama,  
NOTE Confidence: 0.710518698333333

00:02:40.190 --> 00:02:43.997 which was when he was giving his sort of  
NOTE Confidence: 0.710518698333333  
00:02:43.997 --> 00:02:47.428 summary of it all ways into the epidemic.  
NOTE Confidence: 0.710518698333333  
00:02:47.430 --> 00:02:49.070 They were being described addiction  
NOTE Confidence: 0.710518698333333  
00:02:49.070 --> 00:02:51.130 to painkillers as the great threat,  
NOTE Confidence: 0.710518698333333  
00:02:51.130 --> 00:02:54.690 as terrorism, which is astounding.  
NOTE Confidence: 0.710518698333333  
00:02:54.690 --> 00:02:56.015 That they were seeing more  
NOTE Confidence: 0.710518698333333  
00:02:56.015 --> 00:02:57.340 people killed because of the  
NOTE Confidence: 0.836622650666667  
00:02:57.396 --> 00:02:59.276 opioid overdose than traffic accidents.  
NOTE Confidence: 0.836622650666667  
00:02:59.280 --> 00:03:01.940 They were going to make the government  
NOTE Confidence: 0.836622650666667  
00:03:01.940 --> 00:03:03.775 health insurance policies cover mental  
NOTE Confidence: 0.836622650666667  
00:03:03.775 --> 00:03:05.980 health and substance abuse on a par  
NOTE Confidence: 0.836622650666667  
00:03:05.980 --> 00:03:08.197 with treatment for physical illness.  
NOTE Confidence: 0.836622650666667  
00:03:08.200 --> 00:03:12.976 Well, they tried as to a grassroots approach.  
NOTE Confidence: 0.836622650666667  
00:03:12.980 --> 00:03:15.164 It was really needed to train physicians  
NOTE Confidence: 0.836622650666667  
00:03:15.164 --> 00:03:17.100 while they're still residents and how,  
NOTE Confidence: 0.836622650666667  
00:03:17.100 --> 00:03:18.820 when, why to prescribe opiates

NOTE Confidence: 0.836622650666667  
00:03:18.820 --> 00:03:20.540 and and using buprenorphine for  
NOTE Confidence: 0.836622650666667  
00:03:20.603 --> 00:03:22.159 treatment of this addiction.  
NOTE Confidence: 0.836622650666667  
00:03:22.160 --> 00:03:23.424 So there was this,  
NOTE Confidence: 0.836622650666667  
00:03:23.424 --> 00:03:25.570 this is the history that's behind us.  
NOTE Confidence: 0.836622650666667  
00:03:25.570 --> 00:03:28.732 Which is summarized by this talk  
NOTE Confidence: 0.836622650666667  
00:03:28.732 --> 00:03:32.218 that Barack Obama gave back in 2016.  
NOTE Confidence: 0.836622650666667  
00:03:32.218 --> 00:03:36.474 It it did start with opiate over  
NOTE Confidence: 0.836622650666667  
00:03:36.474 --> 00:03:39.019 prescription from 1991 to 2013,  
NOTE Confidence: 0.836622650666667  
00:03:39.019 --> 00:03:43.080 it went from 76 to 207 million prescriptions.  
NOTE Confidence: 0.836622650666667  
00:03:43.080 --> 00:03:46.023 So it it really went up quite a bit.  
NOTE Confidence: 0.836622650666667  
00:03:46.030 --> 00:03:49.070 Um, back at around 2013,  
NOTE Confidence: 0.836622650666667  
00:03:49.070 --> 00:03:52.034 you were seeing 15 million opiate  
NOTE Confidence: 0.836622650666667  
00:03:52.034 --> 00:03:54.929 prescriptions just from primary care alone.  
NOTE Confidence: 0.836622650666667  
00:03:54.930 --> 00:03:56.565 2,000,000 Americans had  
NOTE Confidence: 0.836622650666667  
00:03:56.565 --> 00:03:59.290 prescription opiate abuse in 2013.  
NOTE Confidence: 0.836622650666667

00:03:59.290 --> 00:04:01.288 Physicians were being blamed for the  
NOTE Confidence: 0.836622650666667

00:04:01.288 --> 00:04:03.249 epidemic of opiate addiction as much  
NOTE Confidence: 0.836622650666667

00:04:03.249 --> 00:04:04.977 as individuals who abuse the opiates.  
NOTE Confidence: 0.836622650666667

00:04:04.980 --> 00:04:06.430 Important keep that in mind  
NOTE Confidence: 0.836622650666667

00:04:06.430 --> 00:04:08.270 because that can come up again.  
NOTE Confidence: 0.836622650666667

00:04:08.270 --> 00:04:10.580 The FDA was talking about forbidding the  
NOTE Confidence: 0.836622650666667

00:04:10.580 --> 00:04:12.550 marketing of opiates for chronic pain.  
NOTE Confidence: 0.836622650666667

00:04:12.550 --> 00:04:14.746 Now that obviously never entirely happened,  
NOTE Confidence: 0.836622650666667

00:04:14.750 --> 00:04:16.360 but there was a lot of movement.  
NOTE Confidence: 0.836622650666667

00:04:16.360 --> 00:04:17.101 To do that,  
NOTE Confidence: 0.836622650666667

00:04:17.101 --> 00:04:18.830 and the CDC was going to limit  
NOTE Confidence: 0.836622650666667

00:04:18.893 --> 00:04:20.939 opiates to just three days for  
NOTE Confidence: 0.836622650666667

00:04:20.939 --> 00:04:22.303 short term pain management.  
NOTE Confidence: 0.836622650666667

00:04:22.310 --> 00:04:23.492 Once again,  
NOTE Confidence: 0.836622650666667

00:04:23.492 --> 00:04:26.447 that did not entirely happen,  
NOTE Confidence: 0.836622650666667

00:04:26.450 --> 00:04:29.985 but there was real guidelines for decreasing



NOTE Confidence: 0.836622650666667

00:04:29.985 --> 00:04:33.677 the amount of opiates being given out.

NOTE Confidence: 0.836622650666667

00:04:33.680 --> 00:04:35.336 Non medical pain reliever use at

NOTE Confidence: 0.836622650666667

00:04:35.336 --> 00:04:37.054 that point was 22 million people

NOTE Confidence: 0.836622650666667

00:04:37.054 --> 00:04:39.262 and you have you know a little over

NOTE Confidence: 0.836622650666667

00:04:39.324 --> 00:04:41.148 300 million in the United States.

NOTE Confidence: 0.836622650666667

00:04:41.150 --> 00:04:43.718 Gives you a little sense of how common

NOTE Confidence: 0.836622650666667

00:04:43.718 --> 00:04:45.962 this was 3,000,000 to use for the first

NOTE Confidence: 0.836622650666667

00:04:45.962 --> 00:04:47.813 time with the past 12 months that

NOTE Confidence: 0.836622650666667

00:04:47.813 --> 00:04:49.839 was at that point in aging in 2013

NOTE Confidence: 0.836622650666667

00:04:49.839 --> 00:04:54.230 you were looking 8000 new users per day.

NOTE Confidence: 0.836622650666667

00:04:54.230 --> 00:04:56.926 Most of these uh illicit drug users started

NOTE Confidence: 0.836622650666667

00:04:56.926 --> 00:04:59.766 now at that point with pain relievers.

NOTE Confidence: 0.836622650666667

00:04:59.770 --> 00:05:01.480 One would never believe that it

NOTE Confidence: 0.836622650666667

00:05:01.480 --> 00:05:03.725 over did you know marijuana as how

NOTE Confidence: 0.836622650666667

00:05:03.725 --> 00:05:05.470 people would start using drugs.

NOTE Confidence: 0.836622650666667

00:05:05.470 --> 00:05:08.038 I mean the the days of heroin were  
NOTE Confidence: 0.836622650666667

00:05:08.038 --> 00:05:10.890 over by that time most of the abusers,  
NOTE Confidence: 0.836622650666667

00:05:10.890 --> 00:05:13.138 which was more 56% of them were  
NOTE Confidence: 0.836622650666667

00:05:13.138 --> 00:05:14.890 younger than 18 and were females.  
NOTE Confidence: 0.836622650666667

00:05:14.890 --> 00:05:17.417 But once again a very different demographic  
NOTE Confidence: 0.836622650666667

00:05:17.417 --> 00:05:19.950 than it had been with heroin use.  
NOTE Confidence: 0.836622650666667

00:05:19.950 --> 00:05:21.718 This is just a little graph of that  
NOTE Confidence: 0.836622650666667

00:05:21.718 --> 00:05:23.386 data that I was telling you about.  
NOTE Confidence: 0.836622650666667

00:05:23.390 --> 00:05:25.610 This is back.  
NOTE Confidence: 0.836622650666667

00:05:25.610 --> 00:05:26.350 From.  
NOTE Confidence: 0.836622650666667

00:05:26.350 --> 00:05:28.790 205 and in fact it only got worse over time.  
NOTE Confidence: 0.836622650666667

00:05:28.790 --> 00:05:31.190 But you can see pain relievers.  
NOTE Confidence: 0.836622650666667

00:05:31.190 --> 00:05:33.818 Pain relievers were the more common  
NOTE Confidence: 0.836622650666667

00:05:33.818 --> 00:05:37.029 initiates for drug abuse than was marijuana.  
NOTE Confidence: 0.836622650666667

00:05:37.030 --> 00:05:38.794 And of course anything else that  
NOTE Confidence: 0.836622650666667

00:05:38.794 --> 00:05:40.660 you can see on this list.

NOTE Confidence: 0.836622650666667  
00:05:40.660 --> 00:05:43.639 And this continued on for a number of years  
NOTE Confidence: 0.836622650666667  
00:05:43.639 --> 00:05:46.590 and of course was blamed on many things.  
NOTE Confidence: 0.836622650666667  
00:05:46.590 --> 00:05:49.502 And the the Reaper has now hit  
NOTE Confidence: 0.836622650666667  
00:05:49.502 --> 00:05:51.287 many pharmaceutical companies where  
NOTE Confidence: 0.836622650666667  
00:05:51.287 --> 00:05:53.577 they're getting billions of dollars  
NOTE Confidence: 0.836622650666667  
00:05:53.577 --> 00:05:56.040 in settlements that they have to.  
NOTE Confidence: 0.836622650666667  
00:05:56.040 --> 00:05:57.412 Hand out.  
NOTE Confidence: 0.836622650666667  
00:05:57.412 --> 00:06:00.156 From 1999 to 2014,  
NOTE Confidence: 0.836622650666667  
00:06:00.160 --> 00:06:02.570 the opiate overdose deaths were  
NOTE Confidence: 0.836622650666667  
00:06:02.570 --> 00:06:05.576 quite profound on this was started  
NOTE Confidence: 0.836622650666667  
00:06:05.576 --> 00:06:08.136 with the MD over prescribing,  
NOTE Confidence: 0.831131808333333  
00:06:08.140 --> 00:06:10.198 but there was a fourfold increase.  
NOTE Confidence: 0.831131808333333  
00:06:10.200 --> 00:06:12.944 The Reds represent high areas of opiate  
NOTE Confidence: 0.831131808333333  
00:06:12.944 --> 00:06:14.808 overdoses, the blue relatively lower.  
NOTE Confidence: 0.831131808333333  
00:06:14.808 --> 00:06:17.010 Hopefully you can easily see there's  
NOTE Confidence: 0.831131808333333

00:06:17.072 --> 00:06:18.984 a lot more red on the right than  
NOTE Confidence: 0.831131808333333

00:06:18.984 --> 00:06:21.132 there is on the left, and you'll see  
NOTE Confidence: 0.831131808333333

00:06:21.132 --> 00:06:22.956 that there are concentrations of it.  
NOTE Confidence: 0.831131808333333

00:06:22.960 --> 00:06:24.940 The most important concentration that  
NOTE Confidence: 0.831131808333333

00:06:24.940 --> 00:06:27.739 became of interest was in the Midwest.  
NOTE Confidence: 0.831131808333333

00:06:27.740 --> 00:06:29.888 And in the Adirondack, I'm sorry,  
NOTE Confidence: 0.831131808333333

00:06:29.890 --> 00:06:32.704 the Appalachian Mountain area where there  
NOTE Confidence: 0.831131808333333

00:06:32.704 --> 00:06:35.580 was just tremendous amounts of overdoses  
NOTE Confidence: 0.831131808333333

00:06:35.580 --> 00:06:37.910 and deaths from prescribed opiates,  
NOTE Confidence: 0.831131808333333

00:06:37.910 --> 00:06:39.626 mercy, these were not urban areas  
NOTE Confidence: 0.831131808333333

00:06:39.626 --> 00:06:41.379 where they were selling this stuff.  
NOTE Confidence: 0.89963331

00:06:43.620 --> 00:06:47.092 All right, so by 2010, the prescription  
NOTE Confidence: 0.89963331

00:06:47.092 --> 00:06:50.354 drug epidemic was plateauing 10 to 16.  
NOTE Confidence: 0.89963331

00:06:50.360 --> 00:06:53.909 Wave two started of the opioid epidemic  
NOTE Confidence: 0.89963331

00:06:53.909 --> 00:06:57.520 as doctors began prescribing less and less  
NOTE Confidence: 0.89963331

00:06:57.520 --> 00:07:00.720 and the overdoses from heroin came back

NOTE Confidence: 0.89963331

00:07:00.720 --> 00:07:04.480 again as an issue that plateaued in 2016.

NOTE Confidence: 0.89963331

00:07:04.480 --> 00:07:06.951 And in 2014, wave three of the

NOTE Confidence: 0.89963331

00:07:06.951 --> 00:07:08.700 epidemic started with fentanyl.

NOTE Confidence: 0.89963331

00:07:08.700 --> 00:07:11.316 It rapidly escalate escalated to pass

NOTE Confidence: 0.89963331

00:07:11.316 --> 00:07:13.530 heroin and the prescription drugs.

NOTE Confidence: 0.89963331

00:07:13.530 --> 00:07:16.570 And this fentanyl epidemic continues.

NOTE Confidence: 0.89963331

00:07:16.570 --> 00:07:19.307 What's happened since 2016 is Wave 4,

NOTE Confidence: 0.89963331

00:07:19.310 --> 00:07:21.145 the epidemic and that started

NOTE Confidence: 0.89963331

00:07:21.145 --> 00:07:22.613 with cocaine and amphetamine,

NOTE Confidence: 0.89963331

00:07:22.620 --> 00:07:26.267 with fentanyl being mixed in with these

NOTE Confidence: 0.89963331

00:07:26.267 --> 00:07:29.342 white powders and therefore the combination

NOTE Confidence: 0.89963331

00:07:29.342 --> 00:07:31.882 becoming causes of drug overdose.

NOTE Confidence: 0.89963331

00:07:31.890 --> 00:07:34.746 And this is continued again and escalated

NOTE Confidence: 0.89963331

00:07:34.746 --> 00:07:38.008 and escalated in some rather surprising ways.

NOTE Confidence: 0.89963331

00:07:38.010 --> 00:07:39.894 So this is simply the same

NOTE Confidence: 0.89963331

00:07:39.894 --> 00:07:41.150 kinds of graphs again,  
NOTE Confidence: 0.89963331

00:07:41.150 --> 00:07:43.670 the red line or orange.  
NOTE Confidence: 0.89963331

00:07:43.670 --> 00:07:46.742 Depending on how color blind you  
NOTE Confidence: 0.89963331

00:07:46.742 --> 00:07:49.024 are that's shown on the left is  
NOTE Confidence: 0.89963331

00:07:49.024 --> 00:07:50.760 fentanyl going up through the roof.  
NOTE Confidence: 0.89963331

00:07:50.760 --> 00:07:53.430 And what you can see on the right is the  
NOTE Confidence: 0.89963331

00:07:53.498 --> 00:07:57.146 comparison from 2003 to 2017 and a map  
NOTE Confidence: 0.89963331

00:07:57.146 --> 00:08:01.357 that has mostly just sort of Gray in it 2003.  
NOTE Confidence: 0.89963331

00:08:01.357 --> 00:08:02.848 But by 2017,  
NOTE Confidence: 0.89963331

00:08:02.848 --> 00:08:05.830 the fentanyl deaths have got red  
NOTE Confidence: 0.89963331

00:08:05.934 --> 00:08:08.326 areas all over the Midwest being  
NOTE Confidence: 0.89963331

00:08:08.326 --> 00:08:10.378 one of the more surprising areas.  
NOTE Confidence: 0.89963331

00:08:10.380 --> 00:08:12.072 At least that because that was  
NOTE Confidence: 0.89963331

00:08:12.072 --> 00:08:13.680 not from the big cities.  
NOTE Confidence: 0.89963331

00:08:13.680 --> 00:08:14.130 Necessarily,  
NOTE Confidence: 0.89963331

00:08:14.130 --> 00:08:16.830 these were in fact often rural

NOTE Confidence: 0.89963331

00:08:16.830 --> 00:08:19.266 areas that we're having this

NOTE Confidence: 0.89963331

00:08:19.266 --> 00:08:21.270 fentanyl epidemic of deaths.

NOTE Confidence: 0.89963331

00:08:21.270 --> 00:08:22.538 So what about fentanyl,

NOTE Confidence: 0.89963331

00:08:22.538 --> 00:08:23.489 which is again,

NOTE Confidence: 0.89963331

00:08:23.490 --> 00:08:26.880 this is wave 3 synthetic opiate,

NOTE Confidence: 0.89963331

00:08:26.880 --> 00:08:29.824 50 to 100 times more potent than morphine,

NOTE Confidence: 0.89963331

00:08:29.830 --> 00:08:32.525 30 to 50 times greater than heroin.

NOTE Confidence: 0.89963331

00:08:32.530 --> 00:08:34.204 A lethal dose of fentanyl can

NOTE Confidence: 0.89963331

00:08:34.204 --> 00:08:36.190 be as little as 2 milligrams.

NOTE Confidence: 0.89963331

00:08:36.190 --> 00:08:37.990 It just not take very much,

NOTE Confidence: 0.89963331

00:08:37.990 --> 00:08:39.890 which means that, you know,

NOTE Confidence: 0.89963331

00:08:39.890 --> 00:08:41.798 you can import tiny amounts of

NOTE Confidence: 0.89963331

00:08:41.798 --> 00:08:43.700 this and make plenty of money.

NOTE Confidence: 0.89963331

00:08:43.700 --> 00:08:45.425 Selling it fentanyl analogs range

NOTE Confidence: 0.89963331

00:08:45.425 --> 00:08:47.557 of potency from 15 times more

NOTE Confidence: 0.89963331

00:08:47.557 --> 00:08:49.282 potent than morphine to 10,000  
NOTE Confidence: 0.89963331

00:08:49.282 --> 00:08:51.260 times more potent than morphine.  
NOTE Confidence: 0.89963331

00:08:51.260 --> 00:08:52.808 That is carfentanyl.  
NOTE Confidence: 0.89963331

00:08:52.808 --> 00:08:55.388 And this epidemic again starts  
NOTE Confidence: 0.89963331

00:08:55.388 --> 00:08:58.240 at around 2014.  
NOTE Confidence: 0.89963331

00:08:58.240 --> 00:08:59.920 So what did we have to treat this?  
NOTE Confidence: 0.89963331

00:08:59.920 --> 00:09:00.185 Well,  
NOTE Confidence: 0.89963331

00:09:00.185 --> 00:09:01.775 these are the FDA approved treatments.  
NOTE Confidence: 0.89963331

00:09:01.780 --> 00:09:04.200 There's the naltrexone and particularly  
NOTE Confidence: 0.89963331

00:09:04.200 --> 00:09:06.620 the long acting injectable naltrexone.  
NOTE Confidence: 0.89963331

00:09:06.620 --> 00:09:09.316 There's buprenorphine or buprenorphine  
NOTE Confidence: 0.89963331

00:09:09.316 --> 00:09:09.990 naloxone.  
NOTE Confidence: 0.89963331

00:09:09.990 --> 00:09:13.578 At that point they were initially  
NOTE Confidence: 0.89963331

00:09:13.578 --> 00:09:16.272 using the sublingual form that often  
NOTE Confidence: 0.89963331

00:09:16.272 --> 00:09:19.442 with the film and then later on of  
NOTE Confidence: 0.89963331

00:09:19.442 --> 00:09:21.582 course an injectable became available



NOTE Confidence: 0.89963331

00:09:21.582 --> 00:09:24.157 and methadone which is a full agonist.

NOTE Confidence: 0.89963331

00:09:24.160 --> 00:09:27.100 So this is the three mainstays

NOTE Confidence: 0.89963331

00:09:27.100 --> 00:09:29.398 buprenorphine came the closest to being.

NOTE Confidence: 0.89963331

00:09:29.400 --> 00:09:31.755 Essentially a way that you

NOTE Confidence: 0.89963331

00:09:31.755 --> 00:09:33.168 could combat fentanyl.

NOTE Confidence: 0.89963331

00:09:33.170 --> 00:09:34.640 Fentanyl easily overrides

NOTE Confidence: 0.89963331

00:09:34.640 --> 00:09:36.110 methadone for analgesia,

NOTE Confidence: 0.89963331

00:09:36.110 --> 00:09:38.742 so it was very unlikely to protect

NOTE Confidence: 0.89963331

00:09:38.742 --> 00:09:40.590 against a fentanyl overdose.

NOTE Confidence: 0.89963331

00:09:40.590 --> 00:09:42.234 Buprenorphine may protect against

NOTE Confidence: 0.89963331

00:09:42.234 --> 00:09:43.467 the fentanyl overdose,

NOTE Confidence: 0.89963331

00:09:43.470 --> 00:09:45.566 though clinically the buprenorphine

NOTE Confidence: 0.89963331

00:09:45.566 --> 00:09:48.710 blood level of five nanograms per

NOTE Confidence: 0.89963331

00:09:48.786 --> 00:09:51.291 milliliter was found to prevent

NOTE Confidence: 0.89963331

00:09:51.291 --> 00:09:53.295 respiratory distress from about

NOTE Confidence: 0.89963331

00:09:53.295 --> 00:09:55.619 .7 milligrams of fentanyl.  
NOTE Confidence: 0.89963331

00:09:55.620 --> 00:09:56.688 This was in.  
NOTE Confidence: 0.89963331

00:09:56.688 --> 00:09:58.468 It's twice the apnea dose  
NOTE Confidence: 0.89963331

00:09:58.468 --> 00:10:00.690 in non tolerant patients,  
NOTE Confidence: 0.89963331

00:10:00.690 --> 00:10:03.336 so this was this was done in an actual  
NOTE Confidence: 0.89963331

00:10:03.336 --> 00:10:05.723 human study that got published however.  
NOTE Confidence: 0.89963331

00:10:05.723 --> 00:10:07.788 You've been orphine blood levels  
NOTE Confidence: 0.89963331

00:10:07.788 --> 00:10:10.000 at 24 hours after dosing.  
NOTE Confidence: 0.89963331

00:10:10.000 --> 00:10:12.156 Assuming you're giving it once a day,  
NOTE Confidence: 0.89963331

00:10:12.160 --> 00:10:15.220 16 milligrams of sublingual buprenorphine,  
NOTE Confidence: 0.8997030175

00:10:15.220 --> 00:10:17.509 which is the usual dose for addiction  
NOTE Confidence: 0.8997030175

00:10:17.509 --> 00:10:19.868 treatments, produces a level of  
NOTE Confidence: 0.8997030175

00:10:19.868 --> 00:10:21.896 .67 nanograms per milliliter.  
NOTE Confidence: 0.8997030175

00:10:21.900 --> 00:10:23.844 You'll notice that that's at least  
NOTE Confidence: 0.8997030175

00:10:23.844 --> 00:10:25.878 10 fold lower than what you're  
NOTE Confidence: 0.8997030175

00:10:25.878 --> 00:10:27.894 going to need to block fentanyl.

NOTE Confidence: 0.8997030175

00:10:27.900 --> 00:10:30.644 If you give 44 milligrams of buprenorphine,

NOTE Confidence: 0.8997030175

00:10:30.650 --> 00:10:33.584 which is above the 24 milligram

NOTE Confidence: 0.8997030175

00:10:33.584 --> 00:10:35.540 milligram maximum FDA dose,

NOTE Confidence: 0.8997030175

00:10:35.540 --> 00:10:37.545 you still only get up to 1.7.

NOTE Confidence: 0.8997030175

00:10:37.545 --> 00:10:38.760 That agreements familiar,

NOTE Confidence: 0.8997030175

00:10:38.760 --> 00:10:40.520 so you're still, you know,

NOTE Confidence: 0.8997030175

00:10:40.520 --> 00:10:43.020 less than half of what you're going to need.

NOTE Confidence: 0.8997030175

00:10:43.020 --> 00:10:46.492 If you give the 300 milligram Suboxone

NOTE Confidence: 0.8997030175

00:10:46.492 --> 00:10:48.600 suplicate injectable dose though,

NOTE Confidence: 0.8997030175

00:10:48.600 --> 00:10:51.625 you can attain a blood level of 6.54

NOTE Confidence: 0.8997030175

00:10:51.625 --> 00:10:53.695 nanograms per milliliter and you could

NOTE Confidence: 0.8997030175

00:10:53.695 --> 00:10:55.580 maintain that for about 30 days.

NOTE Confidence: 0.8997030175

00:10:55.580 --> 00:10:57.729 This is giving the 300 milligram dose,

NOTE Confidence: 0.8997030175

00:10:57.730 --> 00:10:59.536 which is not typical to give

NOTE Confidence: 0.8997030175

00:10:59.536 --> 00:11:01.532 that every month, but if you do,

NOTE Confidence: 0.8997030175

00:11:01.532 --> 00:11:04.143 you can in fact get close to a level  
NOTE Confidence: 0.8997030175

00:11:04.143 --> 00:11:06.243 at which you're going to at least  
NOTE Confidence: 0.8997030175

00:11:06.320 --> 00:11:08.440 block any respiratory distress.  
NOTE Confidence: 0.8997030175

00:11:08.440 --> 00:11:09.571 From the usual,  
NOTE Confidence: 0.8997030175

00:11:09.571 --> 00:11:12.210 let's call it therapeutic dose of fentanyl,  
NOTE Confidence: 0.8997030175

00:11:12.210 --> 00:11:14.705 obviously overdoses are using dosages  
NOTE Confidence: 0.8997030175

00:11:14.705 --> 00:11:18.109 that are not the therapeutic dose of .7,  
NOTE Confidence: 0.8997030175

00:11:18.110 --> 00:11:20.720 but are usually twice or three  
NOTE Confidence: 0.8997030175

00:11:20.720 --> 00:11:22.025 times that dose.  
NOTE Confidence: 0.8997030175

00:11:22.030 --> 00:11:23.790 So it's still not perfect,  
NOTE Confidence: 0.8997030175

00:11:23.790 --> 00:11:26.062 but it if you want to get buprenorphine  
NOTE Confidence: 0.8997030175

00:11:26.062 --> 00:11:28.029 to work the best for fentanyl,  
NOTE Confidence: 0.8997030175

00:11:28.030 --> 00:11:31.350 this is probably as good as you can hope for.  
NOTE Confidence: 0.8997030175

00:11:31.350 --> 00:11:34.926 So as the epidemic moves along  
NOTE Confidence: 0.8997030175

00:11:34.930 --> 00:11:37.955 and wave 42016 which is when the  
NOTE Confidence: 0.8997030175

00:11:37.955 --> 00:11:38.810 opiates and stimulants.

NOTE Confidence: 0.8997030175  
00:11:38.810 --> 00:11:41.708 Umm, the red line that I have,  
NOTE Confidence: 0.8997030175  
00:11:41.710 --> 00:11:43.630 as you can see on this graph at the bottom,  
NOTE Confidence: 0.8997030175  
00:11:43.630 --> 00:11:46.430 that's starting to rise and around 2015,  
NOTE Confidence: 0.8997030175  
00:11:46.430 --> 00:11:49.256 that's wave four and wave 4  
NOTE Confidence: 0.8997030175  
00:11:49.256 --> 00:11:51.140 psychostimulants combined with the  
NOTE Confidence: 0.8997030175  
00:11:51.220 --> 00:11:54.490 opiates and that has gone up and up and up.  
NOTE Confidence: 0.8997030175  
00:11:54.490 --> 00:11:58.424 And this data obviously stops at 2019,  
NOTE Confidence: 0.8997030175  
00:11:58.430 --> 00:12:00.670 but the data that comes through with  
NOTE Confidence: 0.8997030175  
00:12:00.670 --> 00:12:03.561 2021 with 2022 data not yet being  
NOTE Confidence: 0.8997030175  
00:12:03.561 --> 00:12:05.800 available continues that upward trend.  
NOTE Confidence: 0.899162484545455  
00:12:08.750 --> 00:12:11.060 So I think some questions for  
NOTE Confidence: 0.899162484545455  
00:12:11.060 --> 00:12:13.110 the physicians to think about,  
NOTE Confidence: 0.899162484545455  
00:12:13.110 --> 00:12:14.550 which was something that we,  
NOTE Confidence: 0.899162484545455  
00:12:14.550 --> 00:12:16.305 you know, pressed physicians about  
NOTE Confidence: 0.899162484545455  
00:12:16.305 --> 00:12:18.729 for the last 15 or 20 years,  
NOTE Confidence: 0.899162484545455

00:12:18.730 --> 00:12:21.195 is our physician prescribers on  
NOTE Confidence: 0.899162484545455

00:12:21.195 --> 00:12:23.660 ethically contributing to the wave  
NOTE Confidence: 0.899162484545455

00:12:23.742 --> 00:12:26.508 four of this ongoing lethal epidemic.  
NOTE Confidence: 0.899162484545455

00:12:26.510 --> 00:12:28.300 They certainly contributed to the  
NOTE Confidence: 0.899162484545455

00:12:28.300 --> 00:12:30.690 first phase of this opiate epidemic,  
NOTE Confidence: 0.899162484545455

00:12:30.690 --> 00:12:33.770 but there's been a market increase in  
NOTE Confidence: 0.899162484545455

00:12:33.770 --> 00:12:35.090 amphetamine prescribing specifically  
NOTE Confidence: 0.899162484545455

00:12:35.149 --> 00:12:37.284 for adult ADHD patients in the past.  
NOTE Confidence: 0.899162484545455

00:12:37.290 --> 00:12:39.200 Five years.  
NOTE Confidence: 0.899162484545455

00:12:39.200 --> 00:12:40.632 The abuse of pharmaceutical  
NOTE Confidence: 0.899162484545455

00:12:40.632 --> 00:12:42.064 amphetamine has become widespread  
NOTE Confidence: 0.899162484545455

00:12:42.064 --> 00:12:43.630 in adolescents and young adults.  
NOTE Confidence: 0.899162484545455

00:12:43.630 --> 00:12:45.800 I'll show you some of that data,  
NOTE Confidence: 0.899162484545455

00:12:45.800 --> 00:12:49.100 and much is from physician prescribing.  
NOTE Confidence: 0.899162484545455

00:12:49.100 --> 00:12:51.020 But recently there have been sales  
NOTE Confidence: 0.899162484545455

00:12:51.020 --> 00:12:53.526 on the Internet and on the street

NOTE Confidence: 0.899162484545455  
00:12:53.526 --> 00:12:55.456 of counterfeit Adderall pills that  
NOTE Confidence: 0.899162484545455  
00:12:55.456 --> 00:12:57.358 contain fentanyl at lethal dosages.  
NOTE Confidence: 0.899162484545455  
00:12:57.360 --> 00:12:59.257 And about 1/4 to 1/3 of the  
NOTE Confidence: 0.899162484545455  
00:12:59.257 --> 00:13:01.039 pills that are on the street,  
NOTE Confidence: 0.899162484545455  
00:13:01.040 --> 00:13:03.768 it's because they're it's not that the drug  
NOTE Confidence: 0.899162484545455  
00:13:03.768 --> 00:13:06.099 dealers want to have a lot of fentanyl.  
NOTE Confidence: 0.899162484545455  
00:13:06.100 --> 00:13:07.956 They want to have enough that you'd have  
NOTE Confidence: 0.899162484545455  
00:13:07.956 --> 00:13:10.096 a good time not necessarily to kill you.  
NOTE Confidence: 0.899162484545455  
00:13:10.100 --> 00:13:12.648 But their quality control  
NOTE Confidence: 0.899162484545455  
00:13:12.648 --> 00:13:15.196 is not exactly precise.  
NOTE Confidence: 0.899162484545455  
00:13:15.200 --> 00:13:17.630 This is the adolescent data  
NOTE Confidence: 0.899162484545455  
00:13:17.630 --> 00:13:19.728 from 2008 through 2011.  
NOTE Confidence: 0.854050466666667  
00:13:22.140 --> 00:13:25.020 The adolescents age 13 to 18,  
NOTE Confidence: 0.854050466666667  
00:13:25.020 --> 00:13:27.959 what you can see in 2011 is that  
NOTE Confidence: 0.854050466666667  
00:13:27.959 --> 00:13:32.660 the rate of of doctors giving out.  
NOTE Confidence: 0.854050466666667

00:13:32.660 --> 00:13:34.022 Adolescence amphetamines  
NOTE Confidence: 0.854050466666667

00:13:34.022 --> 00:13:36.746 has more than doubled,  
NOTE Confidence: 0.854050466666667

00:13:36.750 --> 00:13:38.950 so that's what that red line is showing.  
NOTE Confidence: 0.854050466666667

00:13:38.950 --> 00:13:40.917 The opiates haven't changed that much and  
NOTE Confidence: 0.854050466666667

00:13:40.917 --> 00:13:42.590 the depressants haven't changed that much.  
NOTE Confidence: 0.854050466666667

00:13:42.590 --> 00:13:43.295 They they're more,  
NOTE Confidence: 0.854050466666667

00:13:43.295 --> 00:13:44.470 more or less flat lines,  
NOTE Confidence: 0.854050466666667

00:13:44.470 --> 00:13:45.894 but going down somewhat.  
NOTE Confidence: 0.854050466666667

00:13:45.894 --> 00:13:46.606 If anything,  
NOTE Confidence: 0.854050466666667

00:13:46.610 --> 00:13:50.370 when you look at the young adults 19 to 25.  
NOTE Confidence: 0.854050466666667

00:13:50.370 --> 00:13:53.178 By 2014, you're seeing a significant  
NOTE Confidence: 0.854050466666667

00:13:53.178 --> 00:13:55.050 divergence that's occurring between  
NOTE Confidence: 0.854050466666667

00:13:55.115 --> 00:13:57.390 prescribing opiates to them and  
NOTE Confidence: 0.854050466666667

00:13:57.390 --> 00:13:59.210 prescribing stimulants to them.  
NOTE Confidence: 0.854050466666667

00:13:59.210 --> 00:14:00.278 It is again,  
NOTE Confidence: 0.854050466666667

00:14:00.278 --> 00:14:02.770 it's reached a plateau again at about



NOTE Confidence: 0.854050466666667  
00:14:02.847 --> 00:14:05.766 the same time as the younger adolescents,  
NOTE Confidence: 0.854050466666667  
00:14:05.770 --> 00:14:08.521 but the drop off in the opiate  
NOTE Confidence: 0.854050466666667  
00:14:08.521 --> 00:14:10.171 prescription has clearly had  
NOTE Confidence: 0.854050466666667  
00:14:10.171 --> 00:14:12.136 a much more traumatic effect.  
NOTE Confidence: 0.854050466666667  
00:14:12.140 --> 00:14:15.404 So doctors are prescribing a  
NOTE Confidence: 0.854050466666667  
00:14:15.404 --> 00:14:16.959 lot of stimulants and they're  
NOTE Confidence: 0.854050466666667  
00:14:16.959 --> 00:14:18.637 out there all over the place.  
NOTE Confidence: 0.83945735  
00:14:20.720 --> 00:14:23.040 So that's the epidemic stuff.  
NOTE Confidence: 0.83945735  
00:14:23.040 --> 00:14:24.790 I'm now going to start trying to  
NOTE Confidence: 0.83945735  
00:14:24.790 --> 00:14:26.642 cover a couple of other things that  
NOTE Confidence: 0.83945735  
00:14:26.642 --> 00:14:28.530 are I think are important in this.  
NOTE Confidence: 0.83945735  
00:14:28.530 --> 00:14:31.105 So what about using stimulants  
NOTE Confidence: 0.83945735  
00:14:31.105 --> 00:14:32.650 for a pharmacotherapy?  
NOTE Confidence: 0.83945735  
00:14:32.650 --> 00:14:34.029 What kind did you want to use?  
NOTE Confidence: 0.83945735  
00:14:34.030 --> 00:14:36.080 Well, slow onset and slow  
NOTE Confidence: 0.83945735

00:14:36.080 --> 00:14:37.310 release long acting.  
NOTE Confidence: 0.83945735

00:14:37.310 --> 00:14:39.750 That would be the qualities you'd like with  
NOTE Confidence: 0.83945735

00:14:39.750 --> 00:14:42.208 that kind of a substitution type therapy.  
NOTE Confidence: 0.83945735

00:14:42.210 --> 00:14:44.702 I'll then talk a little bit about  
NOTE Confidence: 0.83945735

00:14:44.702 --> 00:14:45.770 single gene pharmacogenetics,  
NOTE Confidence: 0.83945735

00:14:45.770 --> 00:14:49.890 again in specifics with DOXAZOSIN,  
NOTE Confidence: 0.83945735

00:14:49.890 --> 00:14:53.824 which is A1 blocker and the dopamine  
NOTE Confidence: 0.83945735

00:14:53.824 --> 00:14:55.510 beta hydroxylase polymorphism.  
NOTE Confidence: 0.83945735

00:14:55.510 --> 00:14:57.318 And then finally I'll try to have some  
NOTE Confidence: 0.83945735

00:14:57.318 --> 00:14:59.160 time to talk about immunotherapies.  
NOTE Confidence: 0.83945735

00:14:59.160 --> 00:15:02.249 With the anti cocaine vaccine and  
NOTE Confidence: 0.83945735

00:15:02.249 --> 00:15:03.694 then the anti fentanyl vaccine  
NOTE Confidence: 0.83945735

00:15:03.694 --> 00:15:05.000 which we've developed as a.  
NOTE Confidence: 0.854076325714286

00:15:07.370 --> 00:15:09.001 I guess you could say a daughter  
NOTE Confidence: 0.854076325714286

00:15:09.001 --> 00:15:11.127 or a son of that cocaine vaccine.  
NOTE Confidence: 0.854076325714286

00:15:11.130 --> 00:15:13.342 So what about the slow onset and

NOTE Confidence: 0.854076325714286

00:15:13.342 --> 00:15:15.100 fentanes for stimulant use disorder?

NOTE Confidence: 0.854076325714286

00:15:15.100 --> 00:15:17.122 Well is a Swedish registry study

NOTE Confidence: 0.854076325714286

00:15:17.122 --> 00:15:19.302 that was brought to my attention

NOTE Confidence: 0.854076325714286

00:15:19.302 --> 00:15:21.207 actually by Stephanie and this

NOTE Confidence: 0.854076325714286

00:15:21.207 --> 00:15:24.890 was in a recent presentation 2022.

NOTE Confidence: 0.854076325714286

00:15:24.890 --> 00:15:26.668 They did it with lots of patients,

NOTE Confidence: 0.854076325714286

00:15:26.670 --> 00:15:29.034 you know 14,000 patients that were

NOTE Confidence: 0.854076325714286

00:15:29.034 --> 00:15:31.944 they had a mean age at 3470% were men

NOTE Confidence: 0.854076325714286

00:15:31.944 --> 00:15:34.145 and it was during the period from 2006

NOTE Confidence: 0.854076325714286

00:15:34.145 --> 00:15:37.305 to 2018 and it was a within subjects.

NOTE Confidence: 0.854076325714286

00:15:37.310 --> 00:15:40.540 Comparing on versus off medications

NOTE Confidence: 0.854076325714286

00:15:40.540 --> 00:15:44.395 and lisdexamfetamine which is a form

NOTE Confidence: 0.854076325714286

00:15:44.395 --> 00:15:47.398 of amphetamine that is has to be

NOTE Confidence: 0.854076325714286

00:15:47.398 --> 00:15:48.622 metabolized before the amphetamine

NOTE Confidence: 0.854076325714286

00:15:48.622 --> 00:15:49.960 could have its effect.

NOTE Confidence: 0.854076325714286

00:15:49.960 --> 00:15:51.616 So you're not going to get immediate effect,  
NOTE Confidence: 0.854076325714286

00:15:51.620 --> 00:15:53.100 it's going to be slow.  
NOTE Confidence: 0.854076325714286

00:15:53.100 --> 00:15:55.386 But what they showed were positive  
NOTE Confidence: 0.854076325714286

00:15:55.386 --> 00:15:57.693 outcomes and relative risk for the  
NOTE Confidence: 0.854076325714286

00:15:57.693 --> 00:15:59.829 people who got list Essick phetamine  
NOTE Confidence: 0.854076325714286

00:15:59.829 --> 00:16:02.448 versus those who were given any kind of  
NOTE Confidence: 0.854076325714286

00:16:02.448 --> 00:16:04.742 stimulant and that and what they were  
NOTE Confidence: 0.854076325714286

00:16:04.742 --> 00:16:08.200 looking at was on versus off the medications.  
NOTE Confidence: 0.854076325714286

00:16:08.200 --> 00:16:10.531 What they found was that there was  
NOTE Confidence: 0.854076325714286

00:16:10.531 --> 00:16:12.280 less hospitalization for substance use  
NOTE Confidence: 0.854076325714286

00:16:12.280 --> 00:16:14.688 disorders when they were on the medication  
NOTE Confidence: 0.854076325714286

00:16:14.688 --> 00:16:17.018 then when they were off the medication.  
NOTE Confidence: 0.854076325714286

00:16:17.020 --> 00:16:20.324 Overall there was less of any type of  
NOTE Confidence: 0.854076325714286

00:16:20.324 --> 00:16:22.842 hospitalization when they were on the  
NOTE Confidence: 0.854076325714286

00:16:22.842 --> 00:16:24.867 medication versus off the medication  
NOTE Confidence: 0.854076325714286

00:16:24.867 --> 00:16:27.740 and there was less all cause mortality

NOTE Confidence: 0.854076325714286

00:16:27.740 --> 00:16:30.354 from the periods when people were on

NOTE Confidence: 0.854076325714286

00:16:30.354 --> 00:16:32.382 the medication then periods when they

NOTE Confidence: 0.854076325714286

00:16:32.382 --> 00:16:34.768 were off the medication that that

NOTE Confidence: 0.854076325714286

00:16:34.768 --> 00:16:36.753 odds ratio obviously relatively large.

NOTE Confidence: 0.854076325714286

00:16:36.760 --> 00:16:38.660 So that's these are important.

NOTE Confidence: 0.854076325714286

00:16:38.660 --> 00:16:40.564 Considerations that these treatments

NOTE Confidence: 0.854076325714286

00:16:40.564 --> 00:16:44.062 can in fact be useful even in

NOTE Confidence: 0.854076325714286

00:16:44.062 --> 00:16:46.294 substance abusing populations if

NOTE Confidence: 0.854076325714286

00:16:46.294 --> 00:16:47.968 they're carefully done.

NOTE Confidence: 0.854076325714286

00:16:47.970 --> 00:16:49.638 What about the randomized

NOTE Confidence: 0.854076325714286

00:16:49.638 --> 00:16:51.306 clinical trials using stimulants?

NOTE Confidence: 0.854076325714286

00:16:51.310 --> 00:16:53.230 Have they shown some efficacy?

NOTE Confidence: 0.854076325714286

00:16:53.230 --> 00:16:53.583 Well,

NOTE Confidence: 0.854076325714286

00:16:53.583 --> 00:16:56.054 the because this other was of course

NOTE Confidence: 0.854076325714286

00:16:56.054 --> 00:16:57.870 an epidemiological study from Sweden.

NOTE Confidence: 0.854076325714286

00:16:57.870 --> 00:16:58.989 The clinical trials,  
NOTE Confidence: 0.854076325714286

00:16:58.989 --> 00:17:01.600 there are reviews of them in 2019  
NOTE Confidence: 0.854076325714286

00:17:01.670 --> 00:17:03.190 and other one in 2016.  
NOTE Confidence: 0.854076325714286

00:17:03.190 --> 00:17:05.854 There are 26 different studies that  
NOTE Confidence: 0.854076325714286

00:17:05.854 --> 00:17:08.414 have been done involving over.  
NOTE Confidence: 0.854076325714286

00:17:08.414 --> 00:17:12.086 2000 subjects and what those studies  
NOTE Confidence: 0.854076325714286

00:17:12.086 --> 00:17:16.025 show is that the cocaine abstinence  
NOTE Confidence: 0.854076325714286

00:17:16.025 --> 00:17:19.790 relative risk ratio was 1.36 which is good.  
NOTE Confidence: 0.854076325714286

00:17:19.790 --> 00:17:21.530 I mean it's better than one.  
NOTE Confidence: 0.854076325714286

00:17:21.530 --> 00:17:23.540 And then the necessary number  
NOTE Confidence: 0.854076325714286

00:17:23.540 --> 00:17:25.148 to treat of patients,  
NOTE Confidence: 0.854076325714286

00:17:25.150 --> 00:17:26.698 you treat 14 patients to expect  
NOTE Confidence: 0.854076325714286

00:17:26.698 --> 00:17:28.730 to get one of them that might  
NOTE Confidence: 0.854076325714286

00:17:28.730 --> 00:17:30.602 have a positive response to this.  
NOTE Confidence: 0.854076325714286

00:17:30.610 --> 00:17:33.402 So if it's still that that's not a, you know,  
NOTE Confidence: 0.854076325714286

00:17:33.402 --> 00:17:35.229 number needed to treat is not great,

NOTE Confidence: 0.854076325714286  
00:17:35.230 --> 00:17:36.892 but it indicates that there can  
NOTE Confidence: 0.854076325714286  
00:17:36.892 --> 00:17:39.020 in fact be a role for these.  
NOTE Confidence: 0.854076325714286  
00:17:39.020 --> 00:17:42.380 Slow onset look much lower.  
NOTE Confidence: 0.854076325714286  
00:17:42.380 --> 00:17:43.886 Abuse liability stimulants,  
NOTE Confidence: 0.854076325714286  
00:17:43.886 --> 00:17:45.894 the short onset ones,  
NOTE Confidence: 0.854076325714286  
00:17:45.900 --> 00:17:47.838 which is what the patients want,  
NOTE Confidence: 0.854076325714286  
00:17:47.840 --> 00:17:50.159 not so good.  
NOTE Confidence: 0.854076325714286  
00:17:50.160 --> 00:17:53.409 So I've tried to cover a balanced view of,  
NOTE Confidence: 0.854076325714286  
00:17:53.410 --> 00:17:54.887 you know, how stimulants can be used,  
NOTE Confidence: 0.854076325714286  
00:17:54.890 --> 00:17:56.498 but they have to be used very carefully.  
NOTE Confidence: 0.854076325714286  
00:17:56.500 --> 00:17:59.848 They're clearly a very useful treatment  
NOTE Confidence: 0.854076325714286  
00:17:59.848 --> 00:18:02.080 for attention deficit disorder.  
NOTE Confidence: 0.854076325714286  
00:18:02.080 --> 00:18:03.532 But a lot of people with  
NOTE Confidence: 0.854076325714286  
00:18:03.532 --> 00:18:04.258 attention deficit disorder,  
NOTE Confidence: 0.854076325714286  
00:18:04.260 --> 00:18:07.300 when they develop it somehow at age 25,  
NOTE Confidence: 0.854076325714286

00:18:07.300 --> 00:18:08.776 and they now want, you know,  
NOTE Confidence: 0.854076325714286

00:18:08.780 --> 00:18:10.364 methamphetamine to or  
NOTE Confidence: 0.854076325714286

00:18:10.364 --> 00:18:12.476 amphetamine to treat it,  
NOTE Confidence: 0.854076325714286

00:18:12.480 --> 00:18:15.078 one should be a little suspicious.  
NOTE Confidence: 0.854076325714286

00:18:15.080 --> 00:18:17.048 So now let's shift to a  
NOTE Confidence: 0.854076325714286

00:18:17.048 --> 00:18:18.032 totally different thing,  
NOTE Confidence: 0.783931143333333

00:18:18.040 --> 00:18:20.098 which is let's talk about pharmacogenetics.  
NOTE Confidence: 0.783931143333333

00:18:20.100 --> 00:18:22.728 This is one of my interests.  
NOTE Confidence: 0.783931143333333

00:18:22.730 --> 00:18:24.070 This will be with Doxazosin,  
NOTE Confidence: 0.783931143333333

00:18:24.070 --> 00:18:25.790 which is an A1 blocker.  
NOTE Confidence: 0.783931143333333

00:18:25.790 --> 00:18:27.800 And the polymorphism that I'm looking  
NOTE Confidence: 0.783931143333333

00:18:27.800 --> 00:18:29.910 at is dopamine beta hydroxylase,  
NOTE Confidence: 0.783931143333333

00:18:29.910 --> 00:18:32.892 which is a gene that converts  
NOTE Confidence: 0.783931143333333

00:18:32.892 --> 00:18:34.383 dopamine to norepinephrine.  
NOTE Confidence: 0.783931143333333

00:18:34.390 --> 00:18:36.470 This is just a little picture of that.  
NOTE Confidence: 0.783931143333333

00:18:36.470 --> 00:18:38.270 So you're seeing dopamine and norepinephrine,



NOTE Confidence: 0.783931143333333  
00:18:38.270 --> 00:18:41.750 and this is the enzyme that  
NOTE Confidence: 0.783931143333333  
00:18:41.750 --> 00:18:43.378 makes that conversion possible.  
NOTE Confidence: 0.783931143333333  
00:18:43.378 --> 00:18:45.820 And so if you have very  
NOTE Confidence: 0.783931143333333  
00:18:45.900 --> 00:18:47.528 little of that enzyme,  
NOTE Confidence: 0.783931143333333  
00:18:47.530 --> 00:18:49.575 you're going to have dopamine  
NOTE Confidence: 0.783931143333333  
00:18:49.575 --> 00:18:50.802 released from norepinephrine  
NOTE Confidence: 0.783931143333333  
00:18:50.802 --> 00:18:52.679 neurons instead of norepinephrine.  
NOTE Confidence: 0.783931143333333  
00:18:52.680 --> 00:18:54.678 And if you have a lot of that enzyme,  
NOTE Confidence: 0.783931143333333  
00:18:54.680 --> 00:18:56.732 you're going to convert a lot  
NOTE Confidence: 0.783931143333333  
00:18:56.732 --> 00:18:58.100 of things to norepinephrine.  
NOTE Confidence: 0.783931143333333  
00:18:58.100 --> 00:19:00.476 Now, clearly not out of the dopamine neurons,  
NOTE Confidence: 0.783931143333333  
00:19:00.480 --> 00:19:01.936 because the dopamine neurons  
NOTE Confidence: 0.783931143333333  
00:19:01.936 --> 00:19:03.756 themselves don't contain this enzyme.  
NOTE Confidence: 0.783931143333333  
00:19:03.760 --> 00:19:06.880 It's in the norepinephrine neurons.  
NOTE Confidence: 0.783931143333333  
00:19:06.880 --> 00:19:08.580 And norepinephrine, by the way,  
NOTE Confidence: 0.783931143333333

00:19:08.580 --> 00:19:12.059 is part of a reinforcing system also,  
NOTE Confidence: 0.783931143333333

00:19:12.060 --> 00:19:15.570 and it can, and it of course contributes to.  
NOTE Confidence: 0.783931143333333

00:19:15.570 --> 00:19:18.060 Craving and stress induced reinstatement.  
NOTE Confidence: 0.902426198888889

00:19:20.600 --> 00:19:23.155 So there's a genetic variant  
NOTE Confidence: 0.902426198888889

00:19:23.155 --> 00:19:25.199 of this particular gene,  
NOTE Confidence: 0.902426198888889

00:19:25.200 --> 00:19:28.540 and it's the location is  
NOTE Confidence: 0.902426198888889

00:19:28.540 --> 00:19:31.880 in fact before the actual.  
NOTE Confidence: 0.902426198888889

00:19:31.880 --> 00:19:34.764 Gene itself that codes for the protein,  
NOTE Confidence: 0.902426198888889

00:19:34.770 --> 00:19:37.970 so it's a regulatory polymorphism.  
NOTE Confidence: 0.902426198888889

00:19:37.970 --> 00:19:39.530 It's in the promoter region,  
NOTE Confidence: 0.902426198888889

00:19:39.530 --> 00:19:41.174 it's critically involved in  
NOTE Confidence: 0.902426198888889

00:19:41.174 --> 00:19:42.818 the activity of DBH.  
NOTE Confidence: 0.902426198888889

00:19:42.820 --> 00:19:45.494 There's a total of about 6 mutations  
NOTE Confidence: 0.902426198888889

00:19:45.494 --> 00:19:48.384 that have been found to cause this  
NOTE Confidence: 0.902426198888889

00:19:48.384 --> 00:19:50.464 DBH deficiency and the normal,  
NOTE Confidence: 0.902426198888889

00:19:50.470 --> 00:19:51.841 which is ATT,

NOTE Confidence: 0.902426198888889

00:19:51.841 --> 00:19:54.126 produces about 100 times more

NOTE Confidence: 0.902426198888889

00:19:54.126 --> 00:19:56.931 norepinephrine than if you have one of

NOTE Confidence: 0.902426198888889

00:19:56.931 --> 00:19:59.510 these polymorphisms and the the CC and

NOTE Confidence: 0.902426198888889

00:19:59.510 --> 00:20:01.932 this particular one is the one that.

NOTE Confidence: 0.902426198888889

00:20:01.940 --> 00:20:03.240 This is the lowest levels,

NOTE Confidence: 0.902426198888889

00:20:03.240 --> 00:20:05.478 but it's also the most common.

NOTE Confidence: 0.902426198888889

00:20:05.480 --> 00:20:07.622 And it's been linked to a range

NOTE Confidence: 0.902426198888889

00:20:07.622 --> 00:20:08.540 of psychiatric disorders,

NOTE Confidence: 0.902426198888889

00:20:08.540 --> 00:20:10.540 from psychosis to conduct disorders.

NOTE Confidence: 0.902426198888889

00:20:10.540 --> 00:20:13.048 It's one of the genetic polymorphisms

NOTE Confidence: 0.902426198888889

00:20:13.048 --> 00:20:15.587 that's probably been the most widely

NOTE Confidence: 0.902426198888889

00:20:15.587 --> 00:20:17.963 studied in psychiatry for 30 years.

NOTE Confidence: 0.902426198888889

00:20:17.970 --> 00:20:20.717 So we looked at a drug, doxazosin,

NOTE Confidence: 0.902426198888889

00:20:20.717 --> 00:20:22.902 for cocaine abuse and found

NOTE Confidence: 0.902426198888889

00:20:22.902 --> 00:20:25.320 that indeed that the placebo,

NOTE Confidence: 0.902426198888889

00:20:25.320 --> 00:20:27.656 which you can see in the solid line,  
NOTE Confidence: 0.902426198888889

00:20:27.660 --> 00:20:30.516 if anything there, cocaine use is going up.  
NOTE Confidence: 0.902426198888889

00:20:30.520 --> 00:20:31.948 And the people who got the ducks.  
NOTE Confidence: 0.902426198888889

00:20:31.950 --> 00:20:35.894 Places in there, cocaine use is going down.  
NOTE Confidence: 0.902426198888889

00:20:35.900 --> 00:20:38.360 This is a profound effect.  
NOTE Confidence: 0.902426198888889

00:20:38.360 --> 00:20:39.209 Of course not.  
NOTE Confidence: 0.902426198888889

00:20:39.209 --> 00:20:41.190 We we have very few medications in  
NOTE Confidence: 0.902426198888889

00:20:41.254 --> 00:20:43.798 cocaine abuse that produce profound effects.  
NOTE Confidence: 0.902426198888889

00:20:43.800 --> 00:20:47.166 But you're getting about a 25%  
NOTE Confidence: 0.902426198888889

00:20:47.166 --> 00:20:49.190 difference between the placebo  
NOTE Confidence: 0.902426198888889

00:20:49.190 --> 00:20:51.214 and the active medication,  
NOTE Confidence: 0.902426198888889

00:20:51.220 --> 00:20:55.308 and it's fairly sustained after the 5th week.  
NOTE Confidence: 0.902426198888889

00:20:55.310 --> 00:20:57.630 And let's see next one.  
NOTE Confidence: 0.885811125

00:21:00.230 --> 00:21:02.526 So we then looked at these genetic  
NOTE Confidence: 0.885811125

00:21:02.526 --> 00:21:04.188 polymorphisms, that is, you know,  
NOTE Confidence: 0.885811125

00:21:04.188 --> 00:21:06.658 how much of the enzyme was actually

NOTE Confidence: 0.885811125

00:21:06.658 --> 00:21:09.437 there and did that have an effect?

NOTE Confidence: 0.885811125

00:21:09.440 --> 00:21:11.928 Well, what's shown at the top is the

NOTE Confidence: 0.885811125

00:21:11.928 --> 00:21:14.856 one the people that have the genetic

NOTE Confidence: 0.885811125

00:21:14.856 --> 00:21:17.086 polymorphism that in general would

NOTE Confidence: 0.885811125

00:21:17.158 --> 00:21:19.918 produce lower levels of norepinephrine.

NOTE Confidence: 0.885811125

00:21:19.920 --> 00:21:22.494 And what we found is with these lower levels,

NOTE Confidence: 0.885811125

00:21:22.500 --> 00:21:24.880 there really was no significant

NOTE Confidence: 0.885811125

00:21:24.880 --> 00:21:26.784 difference between the placebo

NOTE Confidence: 0.885811125

00:21:26.784 --> 00:21:28.920 and the active medication.

NOTE Confidence: 0.885811125

00:21:28.920 --> 00:21:29.880 On the other hand,

NOTE Confidence: 0.885811125

00:21:29.880 --> 00:21:31.080 shown in the bottom there,

NOTE Confidence: 0.885811125

00:21:31.080 --> 00:21:33.936 which is the people that had this

NOTE Confidence: 0.885811125

00:21:33.936 --> 00:21:36.032 polymorphism and therefore had a

NOTE Confidence: 0.885811125

00:21:36.032 --> 00:21:38.432 reduction in the amount of genetically

NOTE Confidence: 0.885811125

00:21:38.432 --> 00:21:40.412 produced norepinephrine that their

NOTE Confidence: 0.885811125

00:21:40.412 --> 00:21:42.508 cocaine use significantly dropped  
NOTE Confidence: 0.885811125

00:21:42.508 --> 00:21:45.930 over the 12 weeks of the trial and  
NOTE Confidence: 0.885811125

00:21:45.930 --> 00:21:48.459 was in fact showing drops as you  
NOTE Confidence: 0.885811125

00:21:48.459 --> 00:21:50.832 can see beginning at about week five  
NOTE Confidence: 0.885811125

00:21:50.832 --> 00:21:53.100 or six and continuing to go down  
NOTE Confidence: 0.885811125

00:21:53.100 --> 00:21:55.184 while the placebo group really just  
NOTE Confidence: 0.885811125

00:21:55.184 --> 00:21:57.039 bounced around and if anything,  
NOTE Confidence: 0.885811125

00:21:57.040 --> 00:21:59.080 increasing their cocaine use.  
NOTE Confidence: 0.885811125

00:21:59.080 --> 00:22:01.630 So that the positive urns  
NOTE Confidence: 0.885811125

00:22:01.630 --> 00:22:03.789 are reduced about 40%.  
NOTE Confidence: 0.885811125

00:22:03.790 --> 00:22:05.980 From the baseline in these people  
NOTE Confidence: 0.885811125

00:22:05.980 --> 00:22:08.370 that had this genetic polymorphism,  
NOTE Confidence: 0.885811125

00:22:08.370 --> 00:22:10.332 we then you know repeated this  
NOTE Confidence: 0.885811125

00:22:10.332 --> 00:22:12.729 in a couple of other studies.  
NOTE Confidence: 0.885811125

00:22:12.730 --> 00:22:15.047 So it looks like it's something there.  
NOTE Confidence: 0.885811125

00:22:15.050 --> 00:22:17.444 I didn't bring the data along to show you,

NOTE Confidence: 0.885811125

00:22:17.450 --> 00:22:19.928 but we've also found that a polymorphism

NOTE Confidence: 0.885811125

00:22:19.928 --> 00:22:22.025 in the alpha noradrenergic receptor

NOTE Confidence: 0.885811125

00:22:22.025 --> 00:22:24.911 which leads to less sensitivity and

NOTE Confidence: 0.885811125

00:22:24.911 --> 00:22:27.660 or difference in sensitivity in that

NOTE Confidence: 0.885811125

00:22:27.660 --> 00:22:30.228 receptor that that's also associated with

NOTE Confidence: 0.885811125

00:22:30.230 --> 00:22:33.744 response to this blocker that that is.

NOTE Confidence: 0.885811125

00:22:33.750 --> 00:22:38.228 The AA1 blocker and those,

NOTE Confidence: 0.885811125

00:22:38.228 --> 00:22:41.580 the DBH and that other polymorphism

NOTE Confidence: 0.885811125

00:22:41.580 --> 00:22:44.030 in the receptor for norepinephrine

NOTE Confidence: 0.885811125

00:22:44.030 --> 00:22:47.935 that they do act together to have a an

NOTE Confidence: 0.885811125

00:22:47.935 --> 00:22:50.479 additive effect in reducing cocaine use.

NOTE Confidence: 0.885811125

00:22:50.480 --> 00:22:51.719 It's it's unfortunate.

NOTE Confidence: 0.885811125

00:22:51.719 --> 00:22:54.610 It's been hard to convince that the

NOTE Confidence: 0.885811125

00:22:54.689 --> 00:22:56.864 powers to be that Pharmacogenetics

NOTE Confidence: 0.885811125

00:22:56.864 --> 00:22:59.540 has any role for substance abuse,

NOTE Confidence: 0.885811125

00:22:59.540 --> 00:23:02.195 but we've found it with a variety of drugs.

NOTE Confidence: 0.885811125

00:23:02.200 --> 00:23:03.984 This is for cocaine.

NOTE Confidence: 0.885811125

00:23:03.984 --> 00:23:05.768 So there's a pharmacogenetic

NOTE Confidence: 0.885811125

00:23:05.768 --> 00:23:07.911 hypothesis that I hope is obvious

NOTE Confidence: 0.885811125

00:23:07.911 --> 00:23:10.403 from this that the DBH is converting

NOTE Confidence: 0.885811125

00:23:10.403 --> 00:23:12.359 dopamine to norepinephrine.

NOTE Confidence: 0.885811125

00:23:12.360 --> 00:23:14.796 And then with Doxazosin which is

NOTE Confidence: 0.885811125

00:23:14.796 --> 00:23:17.140 actually blocking the A1 receptor,

NOTE Confidence: 0.885811125

00:23:17.140 --> 00:23:20.952 that if there's less norepinephrine there

NOTE Confidence: 0.885811125

00:23:20.952 --> 00:23:24.864 that we find that in fact the block by

NOTE Confidence: 0.885811125

00:23:24.864 --> 00:23:27.860 doxazosin then has a more profound effect.

NOTE Confidence: 0.885811125

00:23:27.860 --> 00:23:32.426 And this is again I think.

NOTE Confidence: 0.885811125

00:23:32.430 --> 00:23:35.231 A function that makes at least some

NOTE Confidence: 0.885811125

00:23:35.231 --> 00:23:37.997 sense that the doxazosin would work

NOTE Confidence: 0.885811125

00:23:37.997 --> 00:23:41.823 better in the cocaine use puppet patients

NOTE Confidence: 0.885811125

00:23:41.823 --> 00:23:45.357 that have this polymorphism that they're.



NOTE Confidence: 0.885811125

00:23:45.360 --> 00:23:46.485 Norepinephrine levels are

NOTE Confidence: 0.885811125

00:23:46.485 --> 00:23:48.735 in fact it says higher GPH.

NOTE Confidence: 0.885811125

00:23:48.740 --> 00:23:51.640 That's that that's not true.

NOTE Confidence: 0.885811125

00:23:51.640 --> 00:23:54.139 Lower TBH and it's and they're norepinephrine

NOTE Confidence: 0.885811125

00:23:54.139 --> 00:23:56.209 levels would be therefore lower,

NOTE Confidence: 0.885811125

00:23:56.210 --> 00:23:58.238 and therefore blocking it with Doxazosin

NOTE Confidence: 0.885811125

00:23:58.238 --> 00:24:00.449 would probably be much more effective.

NOTE Confidence: 0.869943317333334

00:24:02.590 --> 00:24:04.262 All right. I'll see if I can manage

NOTE Confidence: 0.869943317333334

00:24:04.262 --> 00:24:05.905 to have a couple of other slides

NOTE Confidence: 0.869943317333334

00:24:05.905 --> 00:24:07.372 where I write the stuff correctly

NOTE Confidence: 0.869943317333334

00:24:07.372 --> 00:24:09.356 and that is we're now going to talk

NOTE Confidence: 0.869943317333334

00:24:09.356 --> 00:24:11.262 about the immunotherapies which is

NOTE Confidence: 0.869943317333334

00:24:11.262 --> 00:24:13.740 the anti drug vaccines to protect.

NOTE Confidence: 0.869943317333334

00:24:13.740 --> 00:24:15.474 Really to prevent overdose is what

NOTE Confidence: 0.869943317333334

00:24:15.474 --> 00:24:17.246 we're thinking about and how that

NOTE Confidence: 0.869943317333334

00:24:17.246 --> 00:24:18.646 mechanism of action might work.  
NOTE Confidence: 0.869943317333334

00:24:18.650 --> 00:24:20.652 And we're going to start with the  
NOTE Confidence: 0.869943317333334

00:24:20.652 --> 00:24:22.803 cocaine because we've done a lot of work  
NOTE Confidence: 0.869943317333334

00:24:22.803 --> 00:24:25.820 with the cocaine vaccine in general.  
NOTE Confidence: 0.869943317333334

00:24:25.820 --> 00:24:28.984 We've been using a variety of different  
NOTE Confidence: 0.869943317333334

00:24:28.984 --> 00:24:31.544 proteins as carriers because the drugs  
NOTE Confidence: 0.869943317333334

00:24:31.544 --> 00:24:34.176 of abuse are too small to induce  
NOTE Confidence: 0.869943317333334

00:24:34.258 --> 00:24:36.820 a an action of making an antibody.  
NOTE Confidence: 0.869943317333334

00:24:36.820 --> 00:24:40.570 So that we've been recently using  
NOTE Confidence: 0.869943317333334

00:24:40.570 --> 00:24:43.740 cream which is derived from.  
NOTE Confidence: 0.869943317333334

00:24:43.740 --> 00:24:45.228 Let's see, diphtheria toxoid,  
NOTE Confidence: 0.869943317333334

00:24:45.228 --> 00:24:47.460 but we've also used cholera toxoid,  
NOTE Confidence: 0.869943317333334

00:24:47.460 --> 00:24:48.260 tetanus toxoid.  
NOTE Confidence: 0.869943317333334

00:24:48.260 --> 00:24:51.060 And this cram is one that's been  
NOTE Confidence: 0.869943317333334

00:24:51.060 --> 00:24:53.798 used in vaccines by Pfizer and GSK.  
NOTE Confidence: 0.869943317333334

00:24:53.800 --> 00:24:56.820 So it's got a lot of safety data on it.

NOTE Confidence: 0.869943317333334  
00:24:56.820 --> 00:24:58.692 And the fentanyl can be attached  
NOTE Confidence: 0.869943317333334  
00:24:58.692 --> 00:25:01.024 to the code by either succinyl  
NOTE Confidence: 0.869943317333334  
00:25:01.024 --> 00:25:03.060 linkages or glycerol linkages.  
NOTE Confidence: 0.869943317333334  
00:25:03.060 --> 00:25:05.447 And it attaches to what are the  
NOTE Confidence: 0.869943317333334  
00:25:05.447 --> 00:25:07.691 12 lysine amino acids on the  
NOTE Confidence: 0.869943317333334  
00:25:07.691 --> 00:25:09.596 outside of the creme protein.  
NOTE Confidence: 0.869943317333334  
00:25:09.600 --> 00:25:10.376 With tetanus,  
NOTE Confidence: 0.869943317333334  
00:25:10.376 --> 00:25:13.092 there's many more lysines on the outside.  
NOTE Confidence: 0.869943317333334  
00:25:13.100 --> 00:25:15.068 Tetanus is a much bigger protein.  
NOTE Confidence: 0.869943317333334  
00:25:15.070 --> 00:25:17.968 But Cream is a much cheaper protein  
NOTE Confidence: 0.869943317333334  
00:25:17.968 --> 00:25:21.090 in terms of using it as a carrier.  
NOTE Confidence: 0.869943317333334  
00:25:21.090 --> 00:25:23.365 So we're looking to make  
NOTE Confidence: 0.869943317333334  
00:25:23.365 --> 00:25:25.185 inexpensive versions of vaccines,  
NOTE Confidence: 0.869943317333334  
00:25:25.190 --> 00:25:26.666 and this is how they work.  
NOTE Confidence: 0.869943317333334  
00:25:26.670 --> 00:25:28.548 If you give the drug ordinarily,  
NOTE Confidence: 0.869943317333334

00:25:28.550 --> 00:25:29.786 you take your drug of abuse,  
NOTE Confidence: 0.869943317333334

00:25:29.790 --> 00:25:31.380 it concentrates in the brain because  
NOTE Confidence: 0.869943317333334

00:25:31.380 --> 00:25:32.897 there are receptors in the brain  
NOTE Confidence: 0.869943317333334

00:25:32.897 --> 00:25:34.513 for it to bind to give the vaccine.  
NOTE Confidence: 0.869943317333334

00:25:34.520 --> 00:25:36.285 The vaccine makes these antibodies  
NOTE Confidence: 0.869943317333334

00:25:36.285 --> 00:25:38.050 that stay in the bloodstream.  
NOTE Confidence: 0.869943317333334

00:25:38.050 --> 00:25:39.586 They don't go into the brain.  
NOTE Confidence: 0.869943317333334

00:25:39.590 --> 00:25:41.452 And so when you then take the  
NOTE Confidence: 0.869943317333334

00:25:41.452 --> 00:25:43.503 drug plus you have the vaccine  
NOTE Confidence: 0.869943317333334

00:25:43.503 --> 00:25:45.478 there already with the antibodies.  
NOTE Confidence: 0.869943317333334

00:25:45.480 --> 00:25:48.280 You keep the drug in the bloodstream.  
NOTE Confidence: 0.869943317333334

00:25:48.280 --> 00:25:49.974 Some of it gets into the brain,  
NOTE Confidence: 0.869943317333334

00:25:49.980 --> 00:25:52.124 but in fact if you had a higher  
NOTE Confidence: 0.869943317333334

00:25:52.124 --> 00:25:53.279 concentration in the brain,  
NOTE Confidence: 0.869943317333334

00:25:53.280 --> 00:25:55.194 the antibodies would pull the drug  
NOTE Confidence: 0.869943317333334

00:25:55.194 --> 00:25:58.386 out of the brain and into and onto the

NOTE Confidence: 0.869943317333334  
00:25:58.386 --> 00:26:00.231 antibodies where they then circulate.  
NOTE Confidence: 0.869943317333334  
00:26:00.240 --> 00:26:03.576 And the cocaine or whatever the drug is,  
NOTE Confidence: 0.869943317333334  
00:26:03.580 --> 00:26:06.184 is eliminated through liver  
NOTE Confidence: 0.869943317333334  
00:26:06.184 --> 00:26:10.090 metabolism and also in the urine.  
NOTE Confidence: 0.869943317333334  
00:26:10.090 --> 00:26:12.346 You didn't like that particular picture,  
NOTE Confidence: 0.869943317333334  
00:26:12.350 --> 00:26:13.160 how it's working.  
NOTE Confidence: 0.869943317333334  
00:26:13.160 --> 00:26:15.340 Here's another picture of how it might work.  
NOTE Confidence: 0.869943317333334  
00:26:15.340 --> 00:26:18.052 And this is particularly  
NOTE Confidence: 0.869943317333334  
00:26:18.052 --> 00:26:20.086 relevant to monoclonals.  
NOTE Confidence: 0.869943317333334  
00:26:20.090 --> 00:26:24.520 For a monoclonal against fentanyl  
NOTE Confidence: 0.869943317333334  
00:26:24.520 --> 00:26:26.420 or against cocaine or whatever,  
NOTE Confidence: 0.869943317333334  
00:26:26.420 --> 00:26:27.940 they would actually pull the  
NOTE Confidence: 0.869943317333334  
00:26:27.940 --> 00:26:29.460 drug out of the brain.  
NOTE Confidence: 0.869943317333334  
00:26:29.460 --> 00:26:32.946 And so this could be a very  
NOTE Confidence: 0.869943317333334  
00:26:32.946 --> 00:26:34.440 rapid overdose treatment.  
NOTE Confidence: 0.869943317333334

00:26:34.440 --> 00:26:35.457 And by injecting,  
NOTE Confidence: 0.869943317333334

00:26:35.457 --> 00:26:37.491 but you'd have to inject the  
NOTE Confidence: 0.869943317333334

00:26:37.491 --> 00:26:38.850 monoclonal into the person,  
NOTE Confidence: 0.869943317333334

00:26:38.850 --> 00:26:40.894 there are some monoclonals.  
NOTE Confidence: 0.869943317333334

00:26:40.894 --> 00:26:43.449 That can be given subcutaneously.  
NOTE Confidence: 0.869943317333334

00:26:43.450 --> 00:26:45.484 That have been developed for Alzheimer's  
NOTE Confidence: 0.869943317333334

00:26:45.484 --> 00:26:47.421 disease and they're ones that even  
NOTE Confidence: 0.869943317333334

00:26:47.421 --> 00:26:49.248 look like you can give them orally,  
NOTE Confidence: 0.869943317333334

00:26:49.250 --> 00:26:51.695 but obviously if someone's passed  
NOTE Confidence: 0.869943317333334

00:26:51.695 --> 00:26:54.668 out you would probably give them  
NOTE Confidence: 0.869943317333334

00:26:54.668 --> 00:26:57.344 by injection and subq as possible.  
NOTE Confidence: 0.869943317333334

00:26:57.350 --> 00:26:59.740 So these are competitive antagonists.  
NOTE Confidence: 0.869943317333334

00:26:59.740 --> 00:27:01.445 So can someone smoke enough  
NOTE Confidence: 0.869943317333334

00:27:01.445 --> 00:27:02.809 to overcome these vaccines?  
NOTE Confidence: 0.869943317333334

00:27:02.810 --> 00:27:04.202 Well, yes, they can,  
NOTE Confidence: 0.869943317333334

00:27:04.202 --> 00:27:06.290 but it would take some effort.

NOTE Confidence: 0.869943317333334  
00:27:06.290 --> 00:27:08.850 This is not someone who's taking the vaccine,  
NOTE Confidence: 0.783211143333333  
00:27:08.850 --> 00:27:11.208 obviously, but someone with a stunt.  
NOTE Confidence: 0.783211143333333  
00:27:11.210 --> 00:27:11.912 You'd have to,  
NOTE Confidence: 0.783211143333333  
00:27:11.912 --> 00:27:14.229 you'd have to take a lot of cocaine in,  
NOTE Confidence: 0.783211143333333  
00:27:14.230 --> 00:27:15.510 and in particular fentanyl,  
NOTE Confidence: 0.783211143333333  
00:27:15.510 --> 00:27:17.430 which we're going to get to.  
NOTE Confidence: 0.783211143333333  
00:27:17.430 --> 00:27:19.070 You really have to take  
NOTE Confidence: 0.783211143333333  
00:27:19.070 --> 00:27:20.382 massive amounts of fentanyl,  
NOTE Confidence: 0.783211143333333  
00:27:20.390 --> 00:27:21.530 which is not going to happen.  
NOTE Confidence: 0.783211143333333  
00:27:21.530 --> 00:27:24.030 So that's why with cocaine,  
NOTE Confidence: 0.783211143333333  
00:27:24.030 --> 00:27:25.623 we never could get it to work that well.  
NOTE Confidence: 0.783211143333333  
00:27:25.630 --> 00:27:26.785 And I'll show you some of those.  
NOTE Confidence: 0.783211143333333  
00:27:26.790 --> 00:27:29.574 Data because people take in so  
NOTE Confidence: 0.783211143333333  
00:27:29.574 --> 00:27:31.972 much cocaine compared to the  
NOTE Confidence: 0.783211143333333  
00:27:31.972 --> 00:27:34.720 amount that's taken in a fentanyl.  
NOTE Confidence: 0.783211143333333

00:27:34.720 --> 00:27:36.416 So what are the?  
NOTE Confidence: 0.7832111433333333

00:27:36.416 --> 00:27:38.536 These cocaine vaccines look like,  
NOTE Confidence: 0.7832111433333333

00:27:38.540 --> 00:27:40.052 well pharmacologically they looked  
NOTE Confidence: 0.7832111433333333

00:27:40.052 --> 00:27:42.320 sensible and that if you had  
NOTE Confidence: 0.7832111433333333

00:27:42.388 --> 00:27:44.188 a high antibody which we could  
NOTE Confidence: 0.7832111433333333

00:27:44.188 --> 00:27:46.066 develop by giving a larger dose  
NOTE Confidence: 0.7832111433333333

00:27:46.066 --> 00:27:47.902 of the vaccine or low antibodies  
NOTE Confidence: 0.7832111433333333

00:27:47.902 --> 00:27:50.850 from a lower dose of the vaccine.  
NOTE Confidence: 0.7832111433333333

00:27:50.850 --> 00:27:53.226 You would find that the blockage,  
NOTE Confidence: 0.7832111433333333

00:27:53.230 --> 00:27:55.024 which of the cocaine and then  
NOTE Confidence: 0.7832111433333333

00:27:55.024 --> 00:27:56.706 we gave either 25 milligrams  
NOTE Confidence: 0.7832111433333333

00:27:56.706 --> 00:27:58.776 or 50 milligrams of cocaine.  
NOTE Confidence: 0.7832111433333333

00:27:58.780 --> 00:28:01.380 This was smoked cocaine.  
NOTE Confidence: 0.7832111433333333

00:28:01.380 --> 00:28:03.912 And you could get an 80% blockage.  
NOTE Confidence: 0.7832111433333333

00:28:03.912 --> 00:28:06.024 So what is the the purple  
NOTE Confidence: 0.7832111433333333

00:28:06.024 --> 00:28:07.979 versus the Gray or not Gray?



NOTE Confidence: 0.783211143333333

00:28:07.980 --> 00:28:11.320 I guess brown blocks or bars there

NOTE Confidence: 0.783211143333333

00:28:11.320 --> 00:28:14.092 illustrate how much of a high you got

NOTE Confidence: 0.783211143333333

00:28:14.092 --> 00:28:16.416 or a whole different set of ratings,

NOTE Confidence: 0.783211143333333

00:28:16.420 --> 00:28:17.413 good drug effect.

NOTE Confidence: 0.783211143333333

00:28:17.413 --> 00:28:18.737 In this particular case,

NOTE Confidence: 0.783211143333333

00:28:18.740 --> 00:28:20.460 you get an 80% reduction.

NOTE Confidence: 0.783211143333333

00:28:20.460 --> 00:28:22.679 So the the purple was that week

NOTE Confidence: 0.783211143333333

00:28:22.679 --> 00:28:24.720 three before we had vaccinated,

NOTE Confidence: 0.783211143333333

00:28:24.720 --> 00:28:27.352 week 13 was after we had put in

NOTE Confidence: 0.783211143333333

00:28:27.352 --> 00:28:29.140 three vaccinations into the people.

NOTE Confidence: 0.783211143333333

00:28:29.140 --> 00:28:30.996 If you then doubled the dose of cocaine,

NOTE Confidence: 0.783211143333333

00:28:31.000 --> 00:28:31.960 which is shown again.

NOTE Confidence: 0.783211143333333

00:28:31.960 --> 00:28:35.070 On this left side, you get a 50% reduction.

NOTE Confidence: 0.783211143333333

00:28:35.070 --> 00:28:36.958 If you had a low level of antibodies,

NOTE Confidence: 0.783211143333333

00:28:36.960 --> 00:28:39.394 you only got a 23% reduction with

NOTE Confidence: 0.783211143333333

00:28:39.394 --> 00:28:41.986 the 25 milligram dose of cocaine,  
NOTE Confidence: 0.7832111433333333

00:28:41.990 --> 00:28:43.478 and if you doubled the dose of cocaine,  
NOTE Confidence: 0.7832111433333333

00:28:43.480 --> 00:28:45.321 you only got a 13% reduction.  
NOTE Confidence: 0.7832111433333333

00:28:45.321 --> 00:28:47.876 Neither of those were statistically  
NOTE Confidence: 0.7832111433333333

00:28:47.876 --> 00:28:48.387 significant.  
NOTE Confidence: 0.7832111433333333

00:28:48.390 --> 00:28:49.955 Both of them were significant  
NOTE Confidence: 0.7832111433333333

00:28:49.955 --> 00:28:51.960 though at the high antibody levels,  
NOTE Confidence: 0.7832111433333333

00:28:51.960 --> 00:28:54.095 which simply meant giving a  
NOTE Confidence: 0.7832111433333333

00:28:54.095 --> 00:28:56.230 high dosage of the vaccine.  
NOTE Confidence: 0.7832111433333333

00:28:56.230 --> 00:28:59.345 So this was good pharmacological  
NOTE Confidence: 0.7832111433333333

00:28:59.345 --> 00:29:02.460 demonstration of dose response effect.  
NOTE Confidence: 0.7832111433333333

00:29:02.460 --> 00:29:04.770 So how did this turn out when we did the  
NOTE Confidence: 0.7832111433333333

00:29:04.837 --> 00:29:07.037 randomized controls outpatient trials,  
NOTE Confidence: 0.7832111433333333

00:29:07.040 --> 00:29:08.310 I'm not going to review  
NOTE Confidence: 0.7832111433333333

00:29:08.310 --> 00:29:09.580 these studies in any detail,  
NOTE Confidence: 0.7832111433333333

00:29:09.580 --> 00:29:11.660 but these are double-blind

NOTE Confidence: 0.783211143333333  
00:29:11.660 --> 00:29:12.180 placebo-controlled.  
NOTE Confidence: 0.783211143333333  
00:29:12.180 --> 00:29:14.298 We vaccinated without actually 5 dosages  
NOTE Confidence: 0.783211143333333  
00:29:14.298 --> 00:29:16.777 of the vaccine over a 12 week period.  
NOTE Confidence: 0.783211143333333  
00:29:16.780 --> 00:29:18.440 We did urine toxicology.  
NOTE Confidence: 0.783211143333333  
00:29:18.440 --> 00:29:20.515 We measured antibody levels and  
NOTE Confidence: 0.783211143333333  
00:29:20.515 --> 00:29:23.082 we had calculated that a single  
NOTE Confidence: 0.783211143333333  
00:29:23.082 --> 00:29:25.157 cocaine dose could probably be  
NOTE Confidence: 0.783211143333333  
00:29:25.233 --> 00:29:28.187 blocked by 20 micro 20 micrograms per  
NOTE Confidence: 0.783211143333333  
00:29:28.187 --> 00:29:30.693 milliliter of antibody and we could  
NOTE Confidence: 0.783211143333333  
00:29:30.693 --> 00:29:33.159 block probably 3 doses of cocaine.  
NOTE Confidence: 0.783211143333333  
00:29:33.160 --> 00:29:35.430 Um, with 42 or more,  
NOTE Confidence: 0.783211143333333  
00:29:35.430 --> 00:29:37.320 because that was blinding about  
NOTE Confidence: 0.783211143333333  
00:29:37.320 --> 00:29:41.560 80% of cocaine by our calculations.  
NOTE Confidence: 0.783211143333333  
00:29:41.560 --> 00:29:41.884 Well,  
NOTE Confidence: 0.783211143333333  
00:29:41.884 --> 00:29:44.476 what happened was only a third of the  
NOTE Confidence: 0.783211143333333

00:29:44.476 --> 00:29:46.616 people reached our threshold of 43  
NOTE Confidence: 0.7832111433333333

00:29:46.616 --> 00:29:49.080 and that's what's shown in blue here.  
NOTE Confidence: 0.7832111433333333

00:29:49.080 --> 00:29:51.592 And what you can see is as we  
NOTE Confidence: 0.7832111433333333

00:29:51.592 --> 00:29:52.880 repeatedly immunized them over  
NOTE Confidence: 0.7832111433333333

00:29:52.880 --> 00:29:54.650 the first looks like 16 weeks  
NOTE Confidence: 0.7832111433333333

00:29:54.650 --> 00:29:56.760 but was actually only 12 weeks.  
NOTE Confidence: 0.7832111433333333

00:29:56.760 --> 00:29:58.965 The antibody levels steadily rose  
NOTE Confidence: 0.7832111433333333

00:29:58.965 --> 00:30:01.170 and then the antibody levels  
NOTE Confidence: 0.7832111433333333

00:30:01.250 --> 00:30:03.458 steadily go back down again but  
NOTE Confidence: 0.7832111433333333

00:30:03.460 --> 00:30:05.896 for the people in the high.  
NOTE Confidence: 0.7832111433333333

00:30:05.900 --> 00:30:06.854 Antibody group,  
NOTE Confidence: 0.7832111433333333

00:30:06.854 --> 00:30:08.762 their average antibody levels  
NOTE Confidence: 0.7832111433333333

00:30:08.762 --> 00:30:11.512 by week eight were in fact up  
NOTE Confidence: 0.7832111433333333

00:30:11.512 --> 00:30:13.480 above 40 and they stayed up  
NOTE Confidence: 0.840266933125

00:30:13.565 --> 00:30:15.395 above 40 out to week 24,  
NOTE Confidence: 0.840266933125

00:30:15.400 --> 00:30:16.680 which would be six months,

NOTE Confidence: 0.840266933125

00:30:16.680 --> 00:30:18.660 which meant about three months of

NOTE Confidence: 0.840266933125

00:30:18.660 --> 00:30:20.545 protection you could get and then

NOTE Confidence: 0.840266933125

00:30:20.545 --> 00:30:22.545 you'd have to give a booster and we

NOTE Confidence: 0.840266933125

00:30:22.611 --> 00:30:24.641 did give boosters to a number of

NOTE Confidence: 0.840266933125

00:30:24.641 --> 00:30:26.507 these patients and a single booster

NOTE Confidence: 0.840266933125

00:30:26.507 --> 00:30:28.481 would push their antibody levels back

NOTE Confidence: 0.840266933125

00:30:28.481 --> 00:30:30.777 up to the peak that they had before.

NOTE Confidence: 0.840266933125

00:30:30.780 --> 00:30:33.223 So you'd probably be with this vaccine

NOTE Confidence: 0.840266933125

00:30:33.223 --> 00:30:35.709 be giving it to responders about.

NOTE Confidence: 0.840266933125

00:30:35.710 --> 00:30:37.200 Every three to four months,

NOTE Confidence: 0.840266933125

00:30:37.200 --> 00:30:38.916 the newer vaccines we've got now,

NOTE Confidence: 0.840266933125

00:30:38.920 --> 00:30:42.042 it looks like we can go six

NOTE Confidence: 0.840266933125

00:30:42.042 --> 00:30:43.380 months between vaccinations.

NOTE Confidence: 0.840266933125

00:30:43.380 --> 00:30:44.640 But you can see you're looking

NOTE Confidence: 0.840266933125

00:30:44.640 --> 00:30:45.480 at 2/3 of them.

NOTE Confidence: 0.840266933125

00:30:45.480 --> 00:30:47.622 That didn't make it at all  
NOTE Confidence: 0.840266933125

00:30:47.622 --> 00:30:50.099 as far as what you needed.  
NOTE Confidence: 0.840266933125

00:30:50.100 --> 00:30:51.956 So we then looked at these three groups,  
NOTE Confidence: 0.840266933125

00:30:51.960 --> 00:30:53.400 the people who got the placebo,  
NOTE Confidence: 0.840266933125

00:30:53.400 --> 00:30:54.863 the people who had the low levels  
NOTE Confidence: 0.840266933125

00:30:54.863 --> 00:30:55.939 of antibodies and the people  
NOTE Confidence: 0.840266933125

00:30:55.939 --> 00:30:57.346 that had the high levels of the  
NOTE Confidence: 0.840266933125

00:30:57.346 --> 00:30:58.617 levels that we thought you need.  
NOTE Confidence: 0.840266933125

00:30:58.620 --> 00:31:01.063 And what we found is the proportion  
NOTE Confidence: 0.840266933125

00:31:01.063 --> 00:31:03.585 of drug free urones during the period  
NOTE Confidence: 0.840266933125

00:31:03.585 --> 00:31:06.441 of weeks 9 to 17 versus the baseline  
NOTE Confidence: 0.840266933125

00:31:06.441 --> 00:31:09.177 period that there was a 2 1/2 fold  
NOTE Confidence: 0.840266933125

00:31:09.180 --> 00:31:11.172 reduction in cocaine use for the  
NOTE Confidence: 0.840266933125

00:31:11.172 --> 00:31:13.199 people that had attained our levels.  
NOTE Confidence: 0.840266933125

00:31:13.200 --> 00:31:14.736 For those that didn't attain them,  
NOTE Confidence: 0.840266933125

00:31:14.740 --> 00:31:17.921 which was you know, 60% of the vaccinated,

NOTE Confidence: 0.840266933125  
00:31:17.921 --> 00:31:20.109 they got some reduction.  
NOTE Confidence: 0.840266933125  
00:31:20.110 --> 00:31:21.150 1 1/2 or so,  
NOTE Confidence: 0.840266933125  
00:31:21.150 --> 00:31:22.630 50% reduction and the placebo  
NOTE Confidence: 0.840266933125  
00:31:22.630 --> 00:31:24.155 really didn't show any change  
NOTE Confidence: 0.840266933125  
00:31:24.155 --> 00:31:25.627 from what the baseline was.  
NOTE Confidence: 0.840266933125  
00:31:25.630 --> 00:31:27.450 So this was a nice gun stair  
NOTE Confidence: 0.840266933125  
00:31:27.450 --> 00:31:29.070 step dose response kind of thing.  
NOTE Confidence: 0.840266933125  
00:31:29.070 --> 00:31:30.912 Also not enough to convince the  
NOTE Confidence: 0.840266933125  
00:31:30.912 --> 00:31:32.650 FDA that this was useful,  
NOTE Confidence: 0.840266933125  
00:31:32.650 --> 00:31:34.900 but enough to give us money  
NOTE Confidence: 0.840266933125  
00:31:34.900 --> 00:31:36.025 for another study.  
NOTE Confidence: 0.840266933125  
00:31:36.030 --> 00:31:38.892 And this was looking at all the  
NOTE Confidence: 0.840266933125  
00:31:38.892 --> 00:31:40.216 different levels of antibody  
NOTE Confidence: 0.840266933125  
00:31:40.216 --> 00:31:42.759 that we had in the study versus  
NOTE Confidence: 0.840266933125  
00:31:42.759 --> 00:31:44.669 the percent of cocaine urones.  
NOTE Confidence: 0.840266933125

00:31:44.670 --> 00:31:47.309 And we found you could reach a  
NOTE Confidence: 0.840266933125

00:31:47.309 --> 00:31:49.610 level of antibody at which people  
NOTE Confidence: 0.840266933125

00:31:49.610 --> 00:31:50.765 just simply stopped.  
NOTE Confidence: 0.840266933125

00:31:50.770 --> 00:31:53.236 Using cocaine altogether because it wasn't.  
NOTE Confidence: 0.840266933125

00:31:53.240 --> 00:31:54.540 They didn't have enough money  
NOTE Confidence: 0.840266933125

00:31:54.540 --> 00:31:56.040 or it just wasn't worth it.  
NOTE Confidence: 0.840266933125

00:31:56.040 --> 00:31:57.664 When we asked them why did they stop,  
NOTE Confidence: 0.840266933125

00:31:57.670 --> 00:31:58.303 they said, well,  
NOTE Confidence: 0.840266933125

00:31:58.303 --> 00:32:00.100 they just couldn't find a good enough dealer,  
NOTE Confidence: 0.840266933125

00:32:00.100 --> 00:32:01.840 so nobody seemed to believe  
NOTE Confidence: 0.840266933125

00:32:01.840 --> 00:32:03.580 that the vaccine did anything,  
NOTE Confidence: 0.840266933125

00:32:03.580 --> 00:32:05.740 even though when we asked them  
NOTE Confidence: 0.840266933125

00:32:05.740 --> 00:32:08.099 who thought they got the vaccine,  
NOTE Confidence: 0.840266933125

00:32:08.100 --> 00:32:09.684 80% of the people thought they  
NOTE Confidence: 0.840266933125

00:32:09.684 --> 00:32:10.740 got the active vaccine,  
NOTE Confidence: 0.840266933125

00:32:10.740 --> 00:32:13.818 even though only 50% actually did.



NOTE Confidence: 0.840266933125

00:32:13.820 --> 00:32:15.578 I think that was because our

NOTE Confidence: 0.840266933125

00:32:15.578 --> 00:32:17.599 placebo had some alum in it and

NOTE Confidence: 0.840266933125

00:32:17.599 --> 00:32:18.914 the alumnae your arm hurt,

NOTE Confidence: 0.840266933125

00:32:18.920 --> 00:32:20.560 so they assumed that was the real thing.

NOTE Confidence: 0.90277069

00:32:22.880 --> 00:32:24.320 So what do we conclude?

NOTE Confidence: 0.90277069

00:32:24.320 --> 00:32:26.736 That the vaccine was better than a placebo,

NOTE Confidence: 0.90277069

00:32:26.740 --> 00:32:29.038 that the cocaine free Urnes increased

NOTE Confidence: 0.90277069

00:32:29.038 --> 00:32:31.280 as the antibody levels increased.

NOTE Confidence: 0.90277069

00:32:31.280 --> 00:32:33.005 40% of the patients had

NOTE Confidence: 0.90277069

00:32:33.005 --> 00:32:34.040 effective antibody response.

NOTE Confidence: 0.90277069

00:32:34.040 --> 00:32:35.580 That's 40% of vaccinated.

NOTE Confidence: 0.90277069

00:32:35.580 --> 00:32:37.120 It was medically safe.

NOTE Confidence: 0.90277069

00:32:37.120 --> 00:32:39.280 There was increases in cocaine

NOTE Confidence: 0.90277069

00:32:39.280 --> 00:32:41.965 use above baseline levels that we

NOTE Confidence: 0.90277069

00:32:41.965 --> 00:32:44.210 could find intermittently in their.

NOTE Confidence: 0.90277069

00:32:44.210 --> 00:32:45.275 There are benzoylecgonine,  
NOTE Confidence: 0.90277069

00:32:45.275 --> 00:32:47.405 well urine levels where we found  
NOTE Confidence: 0.90277069

00:32:47.405 --> 00:32:49.988 a number of people that had urine  
NOTE Confidence: 0.90277069

00:32:49.988 --> 00:32:51.432 benzoylecgonine levels that if  
NOTE Confidence: 0.90277069

00:32:51.491 --> 00:32:53.176 they would not been vaccinated  
NOTE Confidence: 0.90277069

00:32:53.176 --> 00:32:55.259 they probably would be dead from  
NOTE Confidence: 0.90277069

00:32:55.259 --> 00:32:57.593 an overdose at least would have  
NOTE Confidence: 0.90277069

00:32:57.593 --> 00:32:59.230 been seriously damaged by it.  
NOTE Confidence: 0.90277069

00:32:59.230 --> 00:33:00.980 But they in fact describe  
NOTE Confidence: 0.90277069

00:33:00.980 --> 00:33:02.730 really no effects at all.  
NOTE Confidence: 0.90277069

00:33:02.730 --> 00:33:05.054 A few people described that their heart  
NOTE Confidence: 0.90277069

00:33:05.054 --> 00:33:07.040 went pitter patter a bit but very  
NOTE Confidence: 0.90277069

00:33:07.040 --> 00:33:09.910 unimpressive as far as they were concerned.  
NOTE Confidence: 0.90277069

00:33:09.910 --> 00:33:12.416 So this LED us to a multi  
NOTE Confidence: 0.90277069

00:33:12.416 --> 00:33:14.149 site cocaine study it was.  
NOTE Confidence: 0.90277069

00:33:14.150 --> 00:33:17.040 National study.

NOTE Confidence: 0.90277069

00:33:17.040 --> 00:33:17.408 OK.

NOTE Confidence: 0.90277069

00:33:17.408 --> 00:33:19.984 Basically the same dosage of the vaccine,

NOTE Confidence: 0.90277069

00:33:19.990 --> 00:33:21.760 the urine toxicology was 300

NOTE Confidence: 0.90277069

00:33:21.760 --> 00:33:23.176 outpatients and we measured

NOTE Confidence: 0.90277069

00:33:23.176 --> 00:33:25.281 the same kind of outcomes and

NOTE Confidence: 0.90277069

00:33:25.281 --> 00:33:26.966 unfortunately got the same kind

NOTE Confidence: 0.90277069

00:33:27.025 --> 00:33:28.680 of outcome from the vaccine,

NOTE Confidence: 0.90277069

00:33:28.680 --> 00:33:31.438 which is if you're looking at 40,

NOTE Confidence: 0.90277069

00:33:31.440 --> 00:33:32.960 we at best did that.

NOTE Confidence: 0.90277069

00:33:32.960 --> 00:33:34.358 We got maybe half of them,

NOTE Confidence: 0.90277069

00:33:34.360 --> 00:33:36.928 but some of them now because

NOTE Confidence: 0.90277069

00:33:36.928 --> 00:33:38.640 we rejuvenated the vaccine,

NOTE Confidence: 0.90277069

00:33:38.640 --> 00:33:42.304 we we made new batch of it got up

NOTE Confidence: 0.90277069

00:33:42.304 --> 00:33:44.476 to antibody levels of over 250,

NOTE Confidence: 0.90277069

00:33:44.480 --> 00:33:48.360 which is astounding so that there's quite a.

NOTE Confidence: 0.90277069

00:33:48.360 --> 00:33:50.094 Quite a amount of antibody that  
NOTE Confidence: 0.90277069

00:33:50.094 --> 00:33:52.009 can be produced in some people,  
NOTE Confidence: 0.90277069

00:33:52.010 --> 00:33:54.082 and the trick of course is to either  
NOTE Confidence: 0.90277069

00:33:54.082 --> 00:33:55.687 get everybody to move up there or  
NOTE Confidence: 0.90277069

00:33:55.687 --> 00:33:57.583 to be able to select ahead of time  
NOTE Confidence: 0.90277069

00:33:57.583 --> 00:33:59.466 which people are not going to respond.  
NOTE Confidence: 0.83209703

00:34:01.620 --> 00:34:03.323 Well, what we did find is, again,  
NOTE Confidence: 0.83209703

00:34:03.323 --> 00:34:07.490 this is just the average data from the study.  
NOTE Confidence: 0.83209703

00:34:07.490 --> 00:34:09.800 And 59 was our average of  
NOTE Confidence: 0.83209703

00:34:09.800 --> 00:34:11.690 peak effect at week 16,  
NOTE Confidence: 0.83209703

00:34:11.690 --> 00:34:14.450 which was better than in the other study.  
NOTE Confidence: 0.83209703

00:34:14.450 --> 00:34:16.045 There was no simple correlation  
NOTE Confidence: 0.83209703

00:34:16.045 --> 00:34:17.640 this time with the antibody  
NOTE Confidence: 0.83209703

00:34:17.694 --> 00:34:19.369 levels with cocaine for urones,  
NOTE Confidence: 0.83209703

00:34:19.370 --> 00:34:22.034 although we just published a paper  
NOTE Confidence: 0.83209703

00:34:22.034 --> 00:34:24.868 that this was looking at IG levels

NOTE Confidence: 0.83209703

00:34:24.868 --> 00:34:27.860 and we had a paper in nature vaccines

NOTE Confidence: 0.83209703

00:34:27.860 --> 00:34:29.911 at the beginning of this year showing

NOTE Confidence: 0.83209703

00:34:29.911 --> 00:34:32.616 that it looks like it's IGA, not IG.

NOTE Confidence: 0.83209703

00:34:32.616 --> 00:34:34.050 That's really important.

NOTE Confidence: 0.83209703

00:34:34.050 --> 00:34:36.290 And part of that is because IGA,

NOTE Confidence: 0.83209703

00:34:36.290 --> 00:34:38.154 that type of antibody,

NOTE Confidence: 0.83209703

00:34:38.154 --> 00:34:40.484 not only lines mucous membranes,

NOTE Confidence: 0.83209703

00:34:40.490 --> 00:34:43.598 it also lines the blood brain barrier.

NOTE Confidence: 0.83209703

00:34:43.600 --> 00:34:46.000 And so what's happening it looks

NOTE Confidence: 0.83209703

00:34:46.000 --> 00:34:48.745 like is that the cocaine or that

NOTE Confidence: 0.83209703

00:34:48.745 --> 00:34:50.215 we don't have it for fentanyl.

NOTE Confidence: 0.83209703

00:34:50.220 --> 00:34:51.588 Yeah, actually we do in the

NOTE Confidence: 0.83209703

00:34:51.588 --> 00:34:52.272 animals for fentanyl,

NOTE Confidence: 0.83209703

00:34:52.280 --> 00:34:54.450 it's it's binding to the drug as

NOTE Confidence: 0.83209703

00:34:54.450 --> 00:34:56.699 it's trying to get into the brain,

NOTE Confidence: 0.83209703

00:34:56.700 --> 00:34:58.520 which is fantastic because now  
NOTE Confidence: 0.83209703

00:34:58.520 --> 00:35:00.742 what we've been chasing after is  
NOTE Confidence: 0.83209703

00:35:00.742 --> 00:35:02.412 adjuvants that will increase the  
NOTE Confidence: 0.83209703

00:35:02.412 --> 00:35:04.360 amount of IGA being produced.  
NOTE Confidence: 0.83209703

00:35:04.360 --> 00:35:06.676 And we so we duplicated this,  
NOTE Confidence: 0.83209703

00:35:06.680 --> 00:35:07.404 started the,  
NOTE Confidence: 0.83209703

00:35:07.404 --> 00:35:09.938 the mouse finding that was in nature.  
NOTE Confidence: 0.83209703

00:35:09.940 --> 00:35:11.991 We then just duplicated it in a  
NOTE Confidence: 0.83209703

00:35:11.991 --> 00:35:14.328 rat study and this was we went  
NOTE Confidence: 0.83209703

00:35:14.328 --> 00:35:16.063 back and reanalyzed this study.  
NOTE Confidence: 0.83209703

00:35:16.070 --> 00:35:18.806 I found the same thing was true in humans.  
NOTE Confidence: 0.83209703

00:35:18.810 --> 00:35:21.547 So this is very encouraging and an  
NOTE Confidence: 0.83209703

00:35:21.547 --> 00:35:23.685 exciting discovery that IGA is in  
NOTE Confidence: 0.83209703

00:35:23.685 --> 00:35:25.764 fact maybe the way this is working  
NOTE Confidence: 0.83209703

00:35:25.832 --> 00:35:27.787 and there are some adjuvants,  
NOTE Confidence: 0.83209703

00:35:27.790 --> 00:35:30.195 particularly some that could be

NOTE Confidence: 0.83209703

00:35:30.195 --> 00:35:32.600 given intranasally or orally that

NOTE Confidence: 0.83209703

00:35:32.680 --> 00:35:35.286 will markedly increase mucosal IGA.

NOTE Confidence: 0.83209703

00:35:35.286 --> 00:35:35.774 They're,

NOTE Confidence: 0.83209703

00:35:35.774 --> 00:35:38.214 they're being developed for COVID

NOTE Confidence: 0.83209703

00:35:38.214 --> 00:35:40.870 vaccines at the moment and that's,

NOTE Confidence: 0.83209703

00:35:40.870 --> 00:35:43.330 you know, as if I have nothing else to do.

NOTE Confidence: 0.83209703

00:35:43.330 --> 00:35:44.734 We actually have a COVID vaccine

NOTE Confidence: 0.83209703

00:35:44.734 --> 00:35:46.129 that we've come up with too.

NOTE Confidence: 0.83209703

00:35:46.130 --> 00:35:46.898 That's some.

NOTE Confidence: 0.83209703

00:35:46.898 --> 00:35:47.282 Again,

NOTE Confidence: 0.83209703

00:35:47.282 --> 00:35:50.570 focuses on this kind of IGA idea anyway.

NOTE Confidence: 0.83209703

00:35:50.570 --> 00:35:53.426 So what did we find in it?

NOTE Confidence: 0.83209703

00:35:53.430 --> 00:35:54.910 There was better treatment retention

NOTE Confidence: 0.83209703

00:35:54.910 --> 00:35:57.230 if you got these higher antibody levels.

NOTE Confidence: 0.83209703

00:35:57.230 --> 00:35:58.645 Three times more participants had

NOTE Confidence: 0.83209703

00:35:58.645 --> 00:36:00.412 at least two weeks of abstinence  
NOTE Confidence: 0.83209703

00:36:00.412 --> 00:36:02.200 if they had these higher levels  
NOTE Confidence: 0.83209703

00:36:02.200 --> 00:36:04.128 than either the placebo or the low.  
NOTE Confidence: 0.83209703

00:36:04.130 --> 00:36:06.422 And there were more cocaine for  
NOTE Confidence: 0.83209703

00:36:06.422 --> 00:36:07.950 urones compared to baseline.  
NOTE Confidence: 0.83209703

00:36:07.950 --> 00:36:10.110 But neither are investors nor the  
NOTE Confidence: 0.83209703

00:36:10.110 --> 00:36:12.309 FDA were impressed with these data.  
NOTE Confidence: 0.83209703

00:36:12.310 --> 00:36:13.642 They said, you know,  
NOTE Confidence: 0.83209703

00:36:13.642 --> 00:36:15.307 everybody you vaccinate has to  
NOTE Confidence: 0.83209703

00:36:15.307 --> 00:36:17.245 show a good response or it's a.  
NOTE Confidence: 0.83209703

00:36:17.250 --> 00:36:21.654 Lousy vaccine that led to all of the  
NOTE Confidence: 0.83209703

00:36:21.654 --> 00:36:22.930 major pharmaceutical companies who  
NOTE Confidence: 0.83209703

00:36:22.988 --> 00:36:24.668 got similar results with nicotine  
NOTE Confidence: 0.83209703

00:36:24.668 --> 00:36:26.740 from dropping out from the field.  
NOTE Confidence: 0.83209703

00:36:26.740 --> 00:36:29.320 And this is a while ago.  
NOTE Confidence: 0.83209703

00:36:29.320 --> 00:36:32.040 So did we learn something from these studies?



NOTE Confidence: 0.83209703

00:36:32.040 --> 00:36:32.338 Yeah,

NOTE Confidence: 0.83209703

00:36:32.338 --> 00:36:34.126 we changed our protein carrier from

NOTE Confidence: 0.83209703

00:36:34.126 --> 00:36:36.019 cholera B to a better protein.

NOTE Confidence: 0.83209703

00:36:36.020 --> 00:36:37.790 We got a better agent.

NOTE Confidence: 0.83209703

00:36:37.790 --> 00:36:40.534 We started using a TLR four and

NOTE Confidence: 0.83209703

00:36:40.534 --> 00:36:41.318 five adjuvants.

NOTE Confidence: 0.83209703

00:36:41.320 --> 00:36:44.005 These are toll like receptor

NOTE Confidence: 0.83209703

00:36:44.005 --> 00:36:46.690 type adjuvants and agonists that

NOTE Confidence: 0.83209703

00:36:46.785 --> 00:36:48.459 push these systems.

NOTE Confidence: 0.83209703

00:36:48.460 --> 00:36:50.455 And that we really needed to get

NOTE Confidence: 0.83209703

00:36:50.455 --> 00:36:52.035 more patients who attain these

NOTE Confidence: 0.83209703

00:36:52.035 --> 00:36:53.690 higher antibody levels and it

NOTE Confidence: 0.83209703

00:36:53.690 --> 00:36:55.699 would be better to get patients

NOTE Confidence: 0.83209703

00:36:55.699 --> 00:36:57.613 who at least can become abstinent

NOTE Confidence: 0.83209703

00:36:57.613 --> 00:36:59.505 before we start trying to vaccinate

NOTE Confidence: 0.83209703

00:36:59.505 --> 00:37:01.070 them so they have a  
NOTE Confidence: 0.893219046470588

00:37:01.138 --> 00:37:02.850 little motivation to want  
NOTE Confidence: 0.893219046470588

00:37:02.850 --> 00:37:04.134 to become abstinent.  
NOTE Confidence: 0.893219046470588

00:37:04.140 --> 00:37:05.748 And again, with fentanyl,  
NOTE Confidence: 0.893219046470588

00:37:05.748 --> 00:37:07.758 we need much less antibody.  
NOTE Confidence: 0.893219046470588

00:37:07.760 --> 00:37:09.569 So what's happening?  
NOTE Confidence: 0.893219046470588

00:37:09.569 --> 00:37:13.790 Why is the fentanyl epidemic turned into?  
NOTE Confidence: 0.893219046470588

00:37:13.790 --> 00:37:15.386 Stimulant epidemic well,  
NOTE Confidence: 0.893219046470588

00:37:15.386 --> 00:37:16.982 stimulants have limited  
NOTE Confidence: 0.893219046470588

00:37:16.982 --> 00:37:19.110 lethality compared to fentanyl.  
NOTE Confidence: 0.893219046470588

00:37:19.110 --> 00:37:20.676 I mean, it's hard to die.  
NOTE Confidence: 0.893219046470588

00:37:20.680 --> 00:37:22.130 I don't shouldn't say hard,  
NOTE Confidence: 0.893219046470588

00:37:22.130 --> 00:37:24.970 but deaths from just cocaine  
NOTE Confidence: 0.893219046470588

00:37:24.970 --> 00:37:27.810 or methamphetamine are not that  
NOTE Confidence: 0.893219046470588

00:37:27.906 --> 00:37:30.114 common compared to fentanyl.  
NOTE Confidence: 0.893219046470588

00:37:30.114 --> 00:37:33.138 The abusers had returned to stimulants,

NOTE Confidence: 0.893219046470588

00:37:33.140 --> 00:37:34.804 including amphetamines that were

NOTE Confidence: 0.893219046470588

00:37:34.804 --> 00:37:36.884 obtained from prescribers and in

NOTE Confidence: 0.893219046470588

00:37:36.884 --> 00:37:38.678 cocaine bought from the street.

NOTE Confidence: 0.893219046470588

00:37:38.680 --> 00:37:40.276 Because people were recognizing

NOTE Confidence: 0.893219046470588

00:37:40.276 --> 00:37:42.670 that taking opiates you were taking

NOTE Confidence: 0.893219046470588

00:37:42.732 --> 00:37:44.460 a big risk with the fentanyl.

NOTE Confidence: 0.893219046470588

00:37:44.460 --> 00:37:47.130 That's almost always an opiates now.

NOTE Confidence: 0.893219046470588

00:37:47.130 --> 00:37:48.780 So the distributor started mixing

NOTE Confidence: 0.893219046470588

00:37:48.780 --> 00:37:50.430 fentanyl with the stimulants like

NOTE Confidence: 0.893219046470588

00:37:50.484 --> 00:37:52.208 cocaine powder and methamphetamine.

NOTE Confidence: 0.893219046470588

00:37:52.210 --> 00:37:53.590 Why did they do that?

NOTE Confidence: 0.893219046470588

00:37:53.590 --> 00:37:55.930 You could take very inexpensive,

NOTE Confidence: 0.893219046470588

00:37:55.930 --> 00:37:57.825 crappy cocaine and methamphetamine and

NOTE Confidence: 0.893219046470588

00:37:57.825 --> 00:38:00.770 put a little bit of fentanyl in it,

NOTE Confidence: 0.893219046470588

00:38:00.770 --> 00:38:02.386 and it feels like it's a great drug,

NOTE Confidence: 0.893219046470588

00:38:02.390 --> 00:38:03.558 apparently to the patient,  
NOTE Confidence: 0.893219046470588

00:38:03.558 --> 00:38:05.018 so that they're not patients  
NOTE Confidence: 0.893219046470588

00:38:05.018 --> 00:38:06.408 but people on the street.  
NOTE Confidence: 0.893219046470588

00:38:06.410 --> 00:38:08.466 So that's the reason to put fentanyl in.  
NOTE Confidence: 0.893219046470588

00:38:08.470 --> 00:38:09.374 And fentanyl, of course,  
NOTE Confidence: 0.893219046470588

00:38:09.374 --> 00:38:11.540 a little bit of it goes a very long way,  
NOTE Confidence: 0.893219046470588

00:38:11.540 --> 00:38:13.876 so your marketing becomes  
NOTE Confidence: 0.893219046470588

00:38:13.876 --> 00:38:15.628 much more profitable.  
NOTE Confidence: 0.893219046470588

00:38:15.630 --> 00:38:17.702 Then, early in 2021,  
NOTE Confidence: 0.893219046470588

00:38:17.702 --> 00:38:19.256 counterfeit Adderall pills  
NOTE Confidence: 0.893219046470588

00:38:19.256 --> 00:38:21.599 containing fentanyl began to appear.  
NOTE Confidence: 0.893219046470588

00:38:21.600 --> 00:38:23.300 And this is a.  
NOTE Confidence: 0.893219046470588

00:38:23.300 --> 00:38:24.150 Big problem.  
NOTE Confidence: 0.893219046470588

00:38:24.150 --> 00:38:25.834 In March of 2021,  
NOTE Confidence: 0.893219046470588

00:38:25.834 --> 00:38:28.161 the DEA had seized 600,000  
NOTE Confidence: 0.893219046470588

00:38:28.161 --> 00:38:30.084 counterfeit pharmaceutical pills.

NOTE Confidence: 0.893219046470588  
00:38:30.084 --> 00:38:32.648 They all contain fentanyl.  
NOTE Confidence: 0.893219046470588  
00:38:32.650 --> 00:38:33.892 All of those at that time  
NOTE Confidence: 0.893219046470588  
00:38:33.892 --> 00:38:35.190 were being sold as Adderall.  
NOTE Confidence: 0.893219046470588  
00:38:35.190 --> 00:38:38.011 But there's now also been evidence that  
NOTE Confidence: 0.893219046470588  
00:38:38.011 --> 00:38:41.310 it's in Percocet and that it's also in Xanax.  
NOTE Confidence: 0.893219046470588  
00:38:41.310 --> 00:38:43.669 One in four of these pills had  
NOTE Confidence: 0.893219046470588  
00:38:43.669 --> 00:38:45.230 lethal fentanyl overdoses in them.  
NOTE Confidence: 0.893219046470588  
00:38:45.230 --> 00:38:46.920 Now that was not purposeful  
NOTE Confidence: 0.893219046470588  
00:38:46.920 --> 00:38:48.272 on the distributors part.  
NOTE Confidence: 0.893219046470588  
00:38:48.280 --> 00:38:50.686 There's no point in killing your  
NOTE Confidence: 0.893219046470588  
00:38:50.686 --> 00:38:53.609 customers but this new rising.  
NOTE Confidence: 0.893219046470588  
00:38:53.609 --> 00:38:55.274 Mortality from stimulants is due  
NOTE Confidence: 0.893219046470588  
00:38:55.274 --> 00:38:57.473 to the fentanyl disguised as a  
NOTE Confidence: 0.893219046470588  
00:38:57.473 --> 00:38:59.681 stimulant or mixed with the stimulant.  
NOTE Confidence: 0.893219046470588  
00:38:59.690 --> 00:39:01.525 The stimulant mortality rate with  
NOTE Confidence: 0.893219046470588

00:39:01.525 --> 00:39:04.175 this is now rising at twice the  
NOTE Confidence: 0.893219046470588

00:39:04.175 --> 00:39:06.413 opiate mortality rate due to just  
NOTE Confidence: 0.893219046470588

00:39:06.413 --> 00:39:08.770 the fentanyl adulteration of heroin.  
NOTE Confidence: 0.893219046470588

00:39:08.770 --> 00:39:10.330 Amphetamines fourfold mortality  
NOTE Confidence: 0.893219046470588

00:39:10.330 --> 00:39:12.930 rise only required five years  
NOTE Confidence: 0.893219046470588

00:39:12.930 --> 00:39:14.920 versus for the opiates.  
NOTE Confidence: 0.893219046470588

00:39:14.920 --> 00:39:16.654 With fentanyl it took ten years  
NOTE Confidence: 0.893219046470588

00:39:16.654 --> 00:39:18.370 to get this fourfold increase.  
NOTE Confidence: 0.893219046470588

00:39:18.370 --> 00:39:21.378 So the the the path of the epidemic  
NOTE Confidence: 0.893219046470588

00:39:21.378 --> 00:39:24.287 is now much more much steeper.  
NOTE Confidence: 0.893219046470588

00:39:24.290 --> 00:39:27.590 And much more dangerous.  
NOTE Confidence: 0.893219046470588

00:39:27.590 --> 00:39:31.214 This is what the counterfeit pills look like.  
NOTE Confidence: 0.893219046470588

00:39:31.220 --> 00:39:32.894 The authentic oxycodone,  
NOTE Confidence: 0.893219046470588

00:39:32.894 --> 00:39:36.242 the counterfeit one on the bottom  
NOTE Confidence: 0.893219046470588

00:39:36.242 --> 00:39:39.368 in the middle is the Adderall.  
NOTE Confidence: 0.893219046470588

00:39:39.370 --> 00:39:41.850 Adderall is the the real thing on the

NOTE Confidence: 0.893219046470588  
00:39:41.850 --> 00:39:44.688 top and the counterfeits on the bottom.  
NOTE Confidence: 0.893219046470588  
00:39:44.690 --> 00:39:46.280 If anything, the counterfeit pill  
NOTE Confidence: 0.893219046470588  
00:39:46.280 --> 00:39:48.450 looks like it's cleaner and nicer and,  
NOTE Confidence: 0.893219046470588  
00:39:48.450 --> 00:39:51.006 you know, Oh yeah, I'd rather have that more.  
NOTE Confidence: 0.893219046470588  
00:39:51.010 --> 00:39:52.810 And it's got a 30 on instead of 20,  
NOTE Confidence: 0.893219046470588  
00:39:52.810 --> 00:39:55.066 so it must be a more potent pill.  
NOTE Confidence: 0.893219046470588  
00:39:55.070 --> 00:39:56.670 Xanax, the same thing.  
NOTE Confidence: 0.893219046470588  
00:39:56.670 --> 00:39:58.270 That's the other counterfeit  
NOTE Confidence: 0.893219046470588  
00:39:58.270 --> 00:40:00.136 and the real one that.  
NOTE Confidence: 0.893219046470588  
00:40:00.136 --> 00:40:02.366 These are being, you know,  
NOTE Confidence: 0.893219046470588  
00:40:02.370 --> 00:40:04.342 distributed on the streets  
NOTE Confidence: 0.893219046470588  
00:40:04.342 --> 00:40:06.807 and on the Internet sites,  
NOTE Confidence: 0.893219046470588  
00:40:06.810 --> 00:40:08.870 virtually on the Internet sites,  
NOTE Confidence: 0.893219046470588  
00:40:08.870 --> 00:40:10.694 any of the the dark Internet  
NOTE Confidence: 0.893219046470588  
00:40:10.694 --> 00:40:11.910 for Adderall at least,  
NOTE Confidence: 0.893219046470588

00:40:11.910 --> 00:40:13.358 is Adderall with fentanyl.  
NOTE Confidence: 0.893219046470588

00:40:13.358 --> 00:40:15.168 Virtually none of them now,  
NOTE Confidence: 0.893219046470588

00:40:15.170 --> 00:40:16.894 or just really Adderall.  
NOTE Confidence: 0.893219046470588

00:40:16.894 --> 00:40:19.480 So this has become extremely big  
NOTE Confidence: 0.884379793636364

00:40:19.555 --> 00:40:21.296 problem. And what's the problem  
NOTE Confidence: 0.884379793636364

00:40:21.296 --> 00:40:23.570 is that if we as doctors are  
NOTE Confidence: 0.884379793636364

00:40:23.570 --> 00:40:25.440 prescribing Adderall, you know,  
NOTE Confidence: 0.884379793636364

00:40:25.440 --> 00:40:28.880 like water and that is happening with kids,  
NOTE Confidence: 0.884379793636364

00:40:28.880 --> 00:40:30.434 this is going to be a problem.  
NOTE Confidence: 0.884379793636364

00:40:30.440 --> 00:40:32.864 Because when you take the drug and you  
NOTE Confidence: 0.884379793636364

00:40:32.864 --> 00:40:35.317 take it and then a way to get high,  
NOTE Confidence: 0.884379793636364

00:40:35.320 --> 00:40:37.315 you're going to have to take escalating  
NOTE Confidence: 0.884379793636364

00:40:37.315 --> 00:40:39.180 dosages and those escalating dosages.  
NOTE Confidence: 0.884379793636364

00:40:39.180 --> 00:40:41.637 Sooner or later the doctor is going to say,  
NOTE Confidence: 0.884379793636364

00:40:41.640 --> 00:40:43.116 no, I'm not going to give  
NOTE Confidence: 0.884379793636364

00:40:43.116 --> 00:40:44.100 this to you anymore.



NOTE Confidence: 0.884379793636364  
00:40:44.100 --> 00:40:46.386 The doctor shopping may work or may not work,  
NOTE Confidence: 0.884379793636364  
00:40:46.390 --> 00:40:47.804 which means you go to several different.  
NOTE Confidence: 0.884379793636364  
00:40:47.810 --> 00:40:48.700 Not just to get it,  
NOTE Confidence: 0.884379793636364  
00:40:48.700 --> 00:40:50.460 but sooner or later you're going to turn  
NOTE Confidence: 0.884379793636364  
00:40:50.460 --> 00:40:52.023 to either the Internet or the street  
NOTE Confidence: 0.884379793636364  
00:40:52.023 --> 00:40:53.679 and you're going to be getting you.  
NOTE Confidence: 0.884379793636364  
00:40:53.680 --> 00:40:56.070 I say you in a very general sense that the  
NOTE Confidence: 0.884379793636364  
00:40:56.134 --> 00:40:58.360 abuser is going to be getting Adderall,  
NOTE Confidence: 0.884379793636364  
00:40:58.360 --> 00:41:00.943 it's got fentanyl in it and that  
NOTE Confidence: 0.884379793636364  
00:41:00.943 --> 00:41:03.237 fentanyl has got a one in four  
NOTE Confidence: 0.884379793636364  
00:41:03.237 --> 00:41:05.890 chance is going to be a lethal dose.  
NOTE Confidence: 0.884379793636364  
00:41:05.890 --> 00:41:08.026 So fentanyl vaccine that's  
NOTE Confidence: 0.884379793636364  
00:41:08.026 --> 00:41:09.628 in current development,  
NOTE Confidence: 0.884379793636364  
00:41:09.630 --> 00:41:11.065 we're trying to apply the  
NOTE Confidence: 0.884379793636364  
00:41:11.065 --> 00:41:12.500 discoveries from an improved cocaine  
NOTE Confidence: 0.884379793636364

00:41:12.548 --> 00:41:14.028 vaccine to the fentanyl vaccine.

NOTE Confidence: 0.884379793636364

00:41:14.030 --> 00:41:16.186 We've been working on this for a

NOTE Confidence: 0.884379793636364

00:41:16.186 --> 00:41:19.740 few years now and this was from the

NOTE Confidence: 0.884379793636364

00:41:19.740 --> 00:41:23.410 paper that was in nature vaccines

NOTE Confidence: 0.884379793636364

00:41:23.410 --> 00:41:25.307 and this is a very complicated slide

NOTE Confidence: 0.884379793636364

00:41:25.307 --> 00:41:26.770 that's got much more information

NOTE Confidence: 0.884379793636364

00:41:26.770 --> 00:41:28.564 than you really need to know,

NOTE Confidence: 0.884379793636364

00:41:28.570 --> 00:41:31.460 but if you look at.

NOTE Confidence: 0.884379793636364

00:41:31.460 --> 00:41:33.486 The C&D,

NOTE Confidence: 0.884379793636364

00:41:33.486 --> 00:41:35.480 and you look at the one,

NOTE Confidence: 0.884379793636364

00:41:35.480 --> 00:41:37.736 the the bars that are purple and the

NOTE Confidence: 0.884379793636364

00:41:37.736 --> 00:41:39.871 bars that are dark blue all the way

NOTE Confidence: 0.884379793636364

00:41:39.871 --> 00:41:42.315 to the right on all of these four

NOTE Confidence: 0.884379793636364

00:41:42.315 --> 00:41:44.373 different graphs that are shown there.

NOTE Confidence: 0.884379793636364

00:41:44.380 --> 00:41:47.170 This is what's happening if you

NOTE Confidence: 0.884379793636364

00:41:47.170 --> 00:41:50.221 give fentanyl to mice that have

NOTE Confidence: 0.884379793636364

00:41:50.221 --> 00:41:52.976 been vaccinated or not vaccinated.

NOTE Confidence: 0.884379793636364

00:41:52.980 --> 00:41:55.129 The clear bar is the naive mice

NOTE Confidence: 0.884379793636364

00:41:55.129 --> 00:41:57.220 that have not been vaccinated,

NOTE Confidence: 0.884379793636364

00:41:57.220 --> 00:41:59.607 and the blue and the purple bars

NOTE Confidence: 0.884379793636364

00:41:59.607 --> 00:42:01.110 are to the mice.

NOTE Confidence: 0.884379793636364

00:42:01.110 --> 00:42:05.037 That have been vaccinated and given fentanyl.

NOTE Confidence: 0.884379793636364

00:42:05.040 --> 00:42:08.088 Now the fentanyl dose on the far left

NOTE Confidence: 0.884379793636364

00:42:08.088 --> 00:42:11.305 bottom which is the C part that's 30

NOTE Confidence: 0.884379793636364

00:42:11.305 --> 00:42:14.135 micrograms per kilogram that is a you

NOTE Confidence: 0.884379793636364

00:42:14.135 --> 00:42:16.851 might call a therapeutic dose of fentanyl.

NOTE Confidence: 0.884379793636364

00:42:16.860 --> 00:42:19.086 The 100 micrograms per kilogram which

NOTE Confidence: 0.884379793636364

00:42:19.086 --> 00:42:22.110 is the next set of bars over is in

NOTE Confidence: 0.884379793636364

00:42:22.110 --> 00:42:24.286 fact the lethal dose of fentanyl and

NOTE Confidence: 0.884379793636364

00:42:24.286 --> 00:42:27.095 what you can see is that the the

NOTE Confidence: 0.884379793636364

00:42:27.095 --> 00:42:31.120 blocking of of pain from that 100.

NOTE Confidence: 0.884379793636364

00:42:31.120 --> 00:42:32.497 Who is complete?  
NOTE Confidence: 0.884379793636364

00:42:32.497 --> 00:42:35.710 When you have the naive mice that  
NOTE Confidence: 0.884379793636364

00:42:35.806 --> 00:42:37.888 you just you, you can't get,  
NOTE Confidence: 0.884379793636364

00:42:37.888 --> 00:42:39.600 you know, you don't feel any pain.  
NOTE Confidence: 0.884379793636364

00:42:39.600 --> 00:42:41.984 I guess that's one way to put it  
NOTE Confidence: 0.884379793636364

00:42:41.984 --> 00:42:44.520 before you die on the blue bar,  
NOTE Confidence: 0.884379793636364

00:42:44.520 --> 00:42:46.180 blue and purple bars.  
NOTE Confidence: 0.884379793636364

00:42:46.180 --> 00:42:49.138 Those are with the vaccination with.  
NOTE Confidence: 0.884379793636364

00:42:49.140 --> 00:42:51.780 I'm not gonna go into the two different  
NOTE Confidence: 0.884379793636364

00:42:51.780 --> 00:42:54.100 types of adjuvants that we have,  
NOTE Confidence: 0.884379793636364

00:42:54.100 --> 00:42:56.420 the DLT and the LTA,  
NOTE Confidence: 0.884379793636364

00:42:56.420 --> 00:42:59.525 only to tell you that the LTA 1 adjuvant  
NOTE Confidence: 0.884379793636364

00:42:59.525 --> 00:43:02.901 is the one that produces much more IGA.  
NOTE Confidence: 0.884379793636364

00:43:02.901 --> 00:43:06.128 And it's very clear from this making  
NOTE Confidence: 0.884379793636364

00:43:06.128 --> 00:43:09.815 more IGA is what's the key to success.  
NOTE Confidence: 0.884379793636364

00:43:09.820 --> 00:43:10.732 So the left,

NOTE Confidence: 0.884379793636364  
00:43:10.732 --> 00:43:12.860 so the C's are the tail flick,  
NOTE Confidence: 0.884379793636364  
00:43:12.860 --> 00:43:15.172 the D's or the is the hot plate  
NOTE Confidence: 0.884379793636364  
00:43:15.172 --> 00:43:17.179 measure in these mice and it  
NOTE Confidence: 0.884379793636364  
00:43:17.179 --> 00:43:19.207 shows exactly the same sorts of  
NOTE Confidence: 0.867170720476191  
00:43:19.277 --> 00:43:21.200 things, the hot plate,  
NOTE Confidence: 0.867170720476191  
00:43:21.200 --> 00:43:22.640 perhaps more graphically,  
NOTE Confidence: 0.867170720476191  
00:43:22.640 --> 00:43:25.425 that the vaccines are really  
NOTE Confidence: 0.867170720476191  
00:43:25.425 --> 00:43:29.080 knocking down fentanyl's ability.  
NOTE Confidence: 0.867170720476191  
00:43:29.080 --> 00:43:30.830 To act as an analgesic  
NOTE Confidence: 0.867170720476191  
00:43:30.830 --> 00:43:32.466 and which is, you know,  
NOTE Confidence: 0.867170720476191  
00:43:32.466 --> 00:43:34.517 that's the simplest test one can do.  
NOTE Confidence: 0.867170720476191  
00:43:34.520 --> 00:43:36.615 So that's mostly what this  
NOTE Confidence: 0.867170720476191  
00:43:36.615 --> 00:43:38.710 slide shows in the mice.  
NOTE Confidence: 0.867170720476191  
00:43:38.710 --> 00:43:40.558 We then looked at the brain levels  
NOTE Confidence: 0.867170720476191  
00:43:40.558 --> 00:43:42.823 also and what you can see on the left  
NOTE Confidence: 0.867170720476191

00:43:42.823 --> 00:43:44.489 or the brain levels of fentanyl,  
NOTE Confidence: 0.867170720476191

00:43:44.490 --> 00:43:46.362 and on the right of the  
NOTE Confidence: 0.867170720476191

00:43:46.362 --> 00:43:47.610 blood levels of fentanyl.  
NOTE Confidence: 0.867170720476191

00:43:47.610 --> 00:43:50.886 The open bar is the one that's  
NOTE Confidence: 0.867170720476191

00:43:50.886 --> 00:43:53.814 got the naive mouse, the dock,  
NOTE Confidence: 0.867170720476191

00:43:53.814 --> 00:43:57.442 the blue and purple bars are the  
NOTE Confidence: 0.867170720476191

00:43:57.442 --> 00:44:00.197 ones that have the vaccinated.  
NOTE Confidence: 0.867170720476191

00:44:00.200 --> 00:44:03.091 And what you find is very little  
NOTE Confidence: 0.867170720476191

00:44:03.091 --> 00:44:05.758 fentanyl is getting in the brain now,  
NOTE Confidence: 0.867170720476191

00:44:05.760 --> 00:44:08.714 yet if you look in the bloodstream,  
NOTE Confidence: 0.867170720476191

00:44:08.720 --> 00:44:10.736 a lot of fentanyl is getting in the brain.  
NOTE Confidence: 0.867170720476191

00:44:10.740 --> 00:44:14.856 So it's going from about 10 nanograms per  
NOTE Confidence: 0.867170720476191

00:44:14.856 --> 00:44:18.211 milliliter in the blood up to about 130,  
NOTE Confidence: 0.867170720476191

00:44:18.211 --> 00:44:20.710 a 100 or I'm sorry about 170.  
NOTE Confidence: 0.867170720476191

00:44:20.710 --> 00:44:23.830 So we have clearly gotten the fentanyl to  
NOTE Confidence: 0.867170720476191

00:44:23.830 --> 00:44:27.282 stay in the blood and not go into the brain.

NOTE Confidence: 0.867170720476191  
00:44:27.290 --> 00:44:28.391 The brain levels,  
NOTE Confidence: 0.867170720476191  
00:44:28.391 --> 00:44:31.190 I hope you can see are virtually 0.  
NOTE Confidence: 0.867170720476191  
00:44:31.190 --> 00:44:34.490 So this is a big success.  
NOTE Confidence: 0.867170720476191  
00:44:34.490 --> 00:44:38.018 We then also looked at the type of antibody  
NOTE Confidence: 0.867170720476191  
00:44:38.018 --> 00:44:43.050 and this is with the anti fentanyl, IGA.  
NOTE Confidence: 0.867170720476191  
00:44:43.050 --> 00:44:45.490 What's on the left is the brain levels.  
NOTE Confidence: 0.867170720476191  
00:44:45.490 --> 00:44:48.594 The brain levels of,  
NOTE Confidence: 0.867170720476191  
00:44:48.594 --> 00:44:52.340 of and of the.  
NOTE Confidence: 0.867170720476191  
00:44:52.340 --> 00:44:56.192 The IG let's see the brain levels of the  
NOTE Confidence: 0.867170720476191  
00:44:56.192 --> 00:44:59.427 fentanyl with the anti fentanyl vaccine.  
NOTE Confidence: 0.867170720476191  
00:44:59.430 --> 00:45:01.770 The bigger the concentration of  
NOTE Confidence: 0.867170720476191  
00:45:01.770 --> 00:45:04.693 that antibody is which is what's  
NOTE Confidence: 0.867170720476191  
00:45:04.693 --> 00:45:07.651 the the collection of diamonds and  
NOTE Confidence: 0.867170720476191  
00:45:07.651 --> 00:45:10.596 and triangles that are up in the  
NOTE Confidence: 0.867170720476191  
00:45:10.596 --> 00:45:13.400 left hand corner on the left side.  
NOTE Confidence: 0.867170720476191

00:45:13.400 --> 00:45:17.050 That's the antibody there and  
NOTE Confidence: 0.867170720476191

00:45:17.050 --> 00:45:19.970 you're looking at the.  
NOTE Confidence: 0.867170720476191

00:45:19.970 --> 00:45:21.900 The anti fentanyl antibody and  
NOTE Confidence: 0.867170720476191

00:45:21.900 --> 00:45:24.670 the amount of IGA as the brain.  
NOTE Confidence: 0.867170720476191

00:45:24.670 --> 00:45:26.710 Fentanyl is it.  
NOTE Confidence: 0.867170720476191

00:45:26.710 --> 00:45:28.350 As it is. Uh,  
NOTE Confidence: 0.867170720476191

00:45:28.350 --> 00:45:32.119 those levels are going down of the antibody.  
NOTE Confidence: 0.867170720476191

00:45:32.120 --> 00:45:35.408 The brain levels of fentanyl are going up.  
NOTE Confidence: 0.867170720476191

00:45:35.410 --> 00:45:36.856 I said that that's all that  
NOTE Confidence: 0.867170720476191

00:45:36.856 --> 00:45:38.270 that's this is trying to show.  
NOTE Confidence: 0.867170720476191

00:45:38.270 --> 00:45:38.966 It's just it,  
NOTE Confidence: 0.867170720476191

00:45:38.966 --> 00:45:39.894 it would be a,  
NOTE Confidence: 0.867170720476191

00:45:39.900 --> 00:45:41.440 it would be a line except that  
NOTE Confidence: 0.867170720476191

00:45:41.440 --> 00:45:43.029 we really just have two clusters.  
NOTE Confidence: 0.867170720476191

00:45:43.030 --> 00:45:44.983 You either knock the fencing all out  
NOTE Confidence: 0.867170720476191

00:45:44.983 --> 00:45:46.601 completely from getting into the brain



NOTE Confidence: 0.867170720476191  
00:45:46.601 --> 00:45:48.295 or it completely gets into the brain.  
NOTE Confidence: 0.867170720476191  
00:45:48.300 --> 00:45:50.708 There's just you know nothing in between.  
NOTE Confidence: 0.867170720476191  
00:45:50.710 --> 00:45:53.286 We then looked at tail flick also and  
NOTE Confidence: 0.867170720476191  
00:45:53.286 --> 00:45:56.006 found the same association that when you  
NOTE Confidence: 0.867170720476191  
00:45:56.006 --> 00:45:59.049 have had these higher levels of the antibody,  
NOTE Confidence: 0.867170720476191  
00:45:59.050 --> 00:46:00.349 the anti fentanyl,  
NOTE Confidence: 0.867170720476191  
00:46:00.349 --> 00:46:00.782 IGA,  
NOTE Confidence: 0.867170720476191  
00:46:00.782 --> 00:46:02.947 the tail flick doesn't occur,  
NOTE Confidence: 0.867170720476191  
00:46:02.950 --> 00:46:05.358 although there there were a few exceptions.  
NOTE Confidence: 0.867170720476191  
00:46:05.360 --> 00:46:07.622 Of animals that we're still getting  
NOTE Confidence: 0.867170720476191  
00:46:07.622 --> 00:46:09.895 some tail flicker effect that is  
NOTE Confidence: 0.867170720476191  
00:46:09.895 --> 00:46:12.001 because the tail flick also involves  
NOTE Confidence: 0.867170720476191  
00:46:12.001 --> 00:46:14.330 spinal cord reflexes and we're not  
NOTE Confidence: 0.867170720476191  
00:46:14.330 --> 00:46:16.664 clear that this actually keeps fentanyl  
NOTE Confidence: 0.867170720476191  
00:46:16.670 --> 00:46:19.430 completely out of the spinal cord in some,  
NOTE Confidence: 0.867170720476191

00:46:19.430 --> 00:46:22.830 some animals will, but.  
NOTE Confidence: 0.867170720476191

00:46:22.830 --> 00:46:25.910 So this is brain levels and pain.  
NOTE Confidence: 0.867170720476191

00:46:25.910 --> 00:46:28.180 This is a rat study.  
NOTE Confidence: 0.867170720476191

00:46:28.180 --> 00:46:31.388 This in the RAT study is what we're  
NOTE Confidence: 0.867170720476191

00:46:31.388 --> 00:46:34.810 looking at is will rats self administer.  
NOTE Confidence: 0.867170720476191

00:46:34.810 --> 00:46:37.834 The fentanyl and what you can show is  
NOTE Confidence: 0.867170720476191

00:46:37.834 --> 00:46:41.110 that on the far left with no vaccine,  
NOTE Confidence: 0.867170720476191

00:46:41.110 --> 00:46:43.290 yes, the the rats will,  
NOTE Confidence: 0.867170720476191

00:46:43.290 --> 00:46:43.832 you know,  
NOTE Confidence: 0.867170720476191

00:46:43.832 --> 00:46:46.000 knock at the bar a million times to  
NOTE Confidence: 0.829660051

00:46:46.060 --> 00:46:48.770 get the fentanyl and as you push the dose up,  
NOTE Confidence: 0.829660051

00:46:48.770 --> 00:46:53.018 you know they get pushed the bar more.  
NOTE Confidence: 0.829660051

00:46:53.020 --> 00:46:54.700 Once you vaccinate them though,  
NOTE Confidence: 0.829660051

00:46:54.700 --> 00:46:59.020 you just completely knock out that ability.  
NOTE Confidence: 0.829660051

00:46:59.020 --> 00:47:01.771 We also looked at it in combination  
NOTE Confidence: 0.829660051

00:47:01.771 --> 00:47:03.586 with buprenorphine because we wanted

NOTE Confidence: 0.829660051

00:47:03.586 --> 00:47:05.968 to be sure that we weren't decreasing

NOTE Confidence: 0.829660051

00:47:05.968 --> 00:47:08.640 the efficacy of buprenorphine.

NOTE Confidence: 0.829660051

00:47:08.640 --> 00:47:10.159 And what we found is that no,

NOTE Confidence: 0.829660051

00:47:10.160 --> 00:47:11.835 we did not decrease the

NOTE Confidence: 0.829660051

00:47:11.835 --> 00:47:12.840 efficacy of buprenorphine.

NOTE Confidence: 0.829660051

00:47:12.840 --> 00:47:14.280 If anything, it's enhancing some

NOTE Confidence: 0.829660051

00:47:14.280 --> 00:47:15.720 of the efficacy of buprenorphine,

NOTE Confidence: 0.829660051

00:47:15.720 --> 00:47:17.520 which we're a little puzzled by,

NOTE Confidence: 0.829660051

00:47:17.520 --> 00:47:21.250 but you know that's OK.

NOTE Confidence: 0.829660051

00:47:21.250 --> 00:47:24.354 This is a high dose fentanyl and lethality,

NOTE Confidence: 0.829660051

00:47:24.360 --> 00:47:25.740 this is in the rats.

NOTE Confidence: 0.829660051

00:47:25.740 --> 00:47:28.128 Hopefully you can see that on

NOTE Confidence: 0.829660051

00:47:28.128 --> 00:47:30.740 the right side of this slide.

NOTE Confidence: 0.829660051

00:47:30.740 --> 00:47:32.748 That's not what a rat should look like

NOTE Confidence: 0.829660051

00:47:32.748 --> 00:47:34.456 that's that's rigor mortis in the rat.

NOTE Confidence: 0.829660051

00:47:34.460 --> 00:47:36.084 They are basically stiff.  
NOTE Confidence: 0.829660051

00:47:36.084 --> 00:47:38.520 They are basically dead from that  
NOTE Confidence: 0.829660051

00:47:38.592 --> 00:47:41.064 dose of fentanyl on the left or the  
NOTE Confidence: 0.829660051

00:47:41.064 --> 00:47:43.439 mice that were vaccinated and given  
NOTE Confidence: 0.829660051

00:47:43.439 --> 00:47:45.959 the same dose of fentanyl hopefully  
NOTE Confidence: 0.829660051

00:47:45.960 --> 00:47:47.913 you can tell that they're you know  
NOTE Confidence: 0.829660051

00:47:47.913 --> 00:47:49.266 they're they're walking around and  
NOTE Confidence: 0.829660051

00:47:49.266 --> 00:47:50.883 they look fine and they are you  
NOTE Confidence: 0.829660051

00:47:50.883 --> 00:47:52.657 would not be able to hold them stiff.  
NOTE Confidence: 0.829660051

00:47:52.660 --> 00:47:55.342 The way you can on the right side picture,  
NOTE Confidence: 0.829660051

00:47:55.350 --> 00:47:56.796 so this vaccine,  
NOTE Confidence: 0.829660051

00:47:56.796 --> 00:47:59.206 we've also measured respirations in  
NOTE Confidence: 0.829660051

00:47:59.206 --> 00:48:01.905 the rats and the the respirations  
NOTE Confidence: 0.829660051

00:48:01.905 --> 00:48:04.412 basically go down to 0 if you  
NOTE Confidence: 0.829660051

00:48:04.412 --> 00:48:05.959 don't have the vaccine and if you  
NOTE Confidence: 0.829660051

00:48:05.959 --> 00:48:07.519 do they don't change at all.

NOTE Confidence: 0.73261615

00:48:09.640 --> 00:48:12.895 So who should take the fentanyl vaccine?

NOTE Confidence: 0.73261615

00:48:12.900 --> 00:48:15.440 What's the target patient population?

NOTE Confidence: 0.73261615

00:48:15.440 --> 00:48:17.396 Well certainly treatment seeking

NOTE Confidence: 0.73261615

00:48:17.396 --> 00:48:19.841 opioid who are inevitably fentanyl

NOTE Confidence: 0.73261615

00:48:19.841 --> 00:48:22.280 users maintained on buprenorphine,

NOTE Confidence: 0.73261615

00:48:22.280 --> 00:48:25.184 they clearly want treatment because but

NOTE Confidence: 0.73261615

00:48:25.184 --> 00:48:27.947 people morphine doesn't block fentanyl and

NOTE Confidence: 0.73261615

00:48:27.947 --> 00:48:30.971 so they all of them should be vaccinated.

NOTE Confidence: 0.73261615

00:48:30.980 --> 00:48:33.310 What about stimulant and benzodiazepine

NOTE Confidence: 0.73261615

00:48:33.310 --> 00:48:35.640 users because of this adulteration

NOTE Confidence: 0.73261615

00:48:35.704 --> 00:48:37.559 with fentanyl which is driven

NOTE Confidence: 0.73261615

00:48:37.559 --> 00:48:39.414 by St rebranding of fentanyl?

NOTE Confidence: 0.73261615

00:48:39.420 --> 00:48:41.596 Is a dangerous drug so that you know

NOTE Confidence: 0.73261615

00:48:41.596 --> 00:48:43.415 people don't want to take fentanyl

NOTE Confidence: 0.73261615

00:48:43.415 --> 00:48:45.245 and there's been an increased use

NOTE Confidence: 0.73261615

00:48:45.304 --> 00:48:47.332 in stimulants and the much lower  
NOTE Confidence: 0.73261615

00:48:47.332 --> 00:48:49.430 production and shipping cost of fentanyl.  
NOTE Confidence: 0.73261615

00:48:49.430 --> 00:48:51.650 We think the stimulant and benzodiazepine  
NOTE Confidence: 0.73261615

00:48:51.650 --> 00:48:53.369 abusers ought to be given some,  
NOTE Confidence: 0.73261615

00:48:53.370 --> 00:48:55.434 particularly the stimulant users  
NOTE Confidence: 0.73261615

00:48:55.434 --> 00:48:57.498 vaccinations for anti fentanyl  
NOTE Confidence: 0.73261615

00:48:57.498 --> 00:48:59.968 because they're going to die from it.  
NOTE Confidence: 0.73261615

00:48:59.970 --> 00:49:02.122 So we think there's a broad need for  
NOTE Confidence: 0.73261615

00:49:02.122 --> 00:49:03.805 this overdose and relapse prevention  
NOTE Confidence: 0.73261615

00:49:03.805 --> 00:49:05.610 vaccine beyond opioid users and  
NOTE Confidence: 0.73261615

00:49:05.610 --> 00:49:07.955 whether it's going to extend into  
NOTE Confidence: 0.73261615

00:49:07.955 --> 00:49:09.519 benzodiazepine abusers and virtually.  
NOTE Confidence: 0.73261615

00:49:09.520 --> 00:49:11.460 Anything else will depend upon  
NOTE Confidence: 0.73261615

00:49:11.460 --> 00:49:13.740 how the marketing goes with the,  
NOTE Confidence: 0.73261615

00:49:13.740 --> 00:49:14.404 you know,  
NOTE Confidence: 0.73261615

00:49:14.404 --> 00:49:16.728 the cartels in Mexico and the producers

NOTE Confidence: 0.73261615

00:49:16.728 --> 00:49:19.045 in China who are sending it here.

NOTE Confidence: 0.88797582117647

00:49:21.230 --> 00:49:23.024 Just a quick little summary of

NOTE Confidence: 0.88797582117647

00:49:23.024 --> 00:49:25.382 what I've tried to go over that

NOTE Confidence: 0.88797582117647

00:49:25.382 --> 00:49:26.846 the opioid overdose epidemic,

NOTE Confidence: 0.88797582117647

00:49:26.850 --> 00:49:29.818 it started with I think what I would

NOTE Confidence: 0.88797582117647

00:49:29.818 --> 00:49:32.189 consider unethical prescribing of opiates,

NOTE Confidence: 0.88797582117647

00:49:32.190 --> 00:49:34.032 the MD's are over prescribing opiates

NOTE Confidence: 0.88797582117647

00:49:34.032 --> 00:49:36.310 that led to the illicit fentanyl.

NOTE Confidence: 0.88797582117647

00:49:36.310 --> 00:49:38.134 It was something driven by a

NOTE Confidence: 0.88797582117647

00:49:38.134 --> 00:49:39.350 lot of pharmaceutical companies.

NOTE Confidence: 0.88797582117647

00:49:39.350 --> 00:49:40.698 There are pharmaceutical companies,

NOTE Confidence: 0.88797582117647

00:49:40.698 --> 00:49:43.504 I can tell you that are driving people

NOTE Confidence: 0.88797582117647

00:49:43.504 --> 00:49:45.304 to prescribe much more stimulants

NOTE Confidence: 0.88797582117647

00:49:45.304 --> 00:49:47.190 than they used to prescribe.

NOTE Confidence: 0.88797582117647

00:49:47.190 --> 00:49:49.310 Why? They're saying it's great

NOTE Confidence: 0.88797582117647

00:49:49.310 --> 00:49:51.006 for ADHD and adults.  
NOTE Confidence: 0.88797582117647

00:49:51.010 --> 00:49:52.810 Even adults that didn't seem to  
NOTE Confidence: 0.88797582117647

00:49:52.810 --> 00:49:54.910 have it as kids that it's in,  
NOTE Confidence: 0.88797582117647

00:49:54.910 --> 00:49:57.385 kids that the diagnosis has  
NOTE Confidence: 0.88797582117647

00:49:57.385 --> 00:49:58.870 been markedly increased,  
NOTE Confidence: 0.88797582117647

00:49:58.870 --> 00:50:01.678 and there the kids are given.  
NOTE Confidence: 0.88797582117647

00:50:01.680 --> 00:50:03.696 As I showed you from the data,  
NOTE Confidence: 0.88797582117647

00:50:03.700 --> 00:50:06.332 you know early on these early adolescents  
NOTE Confidence: 0.88797582117647

00:50:06.332 --> 00:50:08.737 are being given more substantial four  
NOTE Confidence: 0.88797582117647

00:50:08.737 --> 00:50:11.149 times the amount of amphetamine or  
NOTE Confidence: 0.88797582117647

00:50:11.149 --> 00:50:13.740 what they than they used to be given.  
NOTE Confidence: 0.88797582117647

00:50:13.740 --> 00:50:14.472 So this is.  
NOTE Confidence: 0.88797582117647

00:50:14.472 --> 00:50:16.884 And this is wave four and I think we  
NOTE Confidence: 0.88797582117647

00:50:16.884 --> 00:50:19.117 have to be very careful as physicians  
NOTE Confidence: 0.88797582117647

00:50:19.117 --> 00:50:21.568 that we don't get somehow blamed for  
NOTE Confidence: 0.88797582117647

00:50:21.568 --> 00:50:23.925 this epidemic that this is our doing.



NOTE Confidence: 0.88797582117647

00:50:23.925 --> 00:50:25.875 And I'm afraid it's it's not

NOTE Confidence: 0.88797582117647

00:50:25.875 --> 00:50:27.543 necessarily coming from psychiatrist

NOTE Confidence: 0.88797582117647

00:50:27.543 --> 00:50:29.678 it's coming from pediatricians and

NOTE Confidence: 0.88797582117647

00:50:29.678 --> 00:50:31.993 it's coming from internists who are

NOTE Confidence: 0.88797582117647

00:50:31.993 --> 00:50:34.087 or or general practice doctors who

NOTE Confidence: 0.88797582117647

00:50:34.090 --> 00:50:36.498 I see in Texas all the time that

NOTE Confidence: 0.88797582117647

00:50:36.498 --> 00:50:38.356 are thinking that they see ADHD

NOTE Confidence: 0.88797582117647

00:50:38.356 --> 00:50:40.530 in adults and they say Oh yeah,

NOTE Confidence: 0.88797582117647

00:50:40.530 --> 00:50:42.802 this is and when they ask for a

NOTE Confidence: 0.88797582117647

00:50:42.802 --> 00:50:44.608 stimulant they give them Adderall,

NOTE Confidence: 0.88797582117647

00:50:44.610 --> 00:50:47.039 that's the the one to give them.

NOTE Confidence: 0.88797582117647

00:50:47.040 --> 00:50:49.170 And the company that makes it

NOTE Confidence: 0.88797582117647

00:50:49.170 --> 00:50:50.960 obviously is not discouraging that.

NOTE Confidence: 0.88797582117647

00:50:50.960 --> 00:50:52.670 So what about amphetamine for treating

NOTE Confidence: 0.88797582117647

00:50:52.670 --> 00:50:54.546 stimulant use 30 yes there can be

NOTE Confidence: 0.88797582117647

00:50:54.546 --> 00:50:56.135 and it needs to be particular ones  
NOTE Confidence: 0.88797582117647

00:50:56.189 --> 00:50:57.714 though lisdexamphetamine would be 1  
NOTE Confidence: 0.88797582117647

00:50:57.714 --> 00:51:00.656 to think about others would be long  
NOTE Confidence: 0.88797582117647

00:51:00.656 --> 00:51:03.262 acting slow onset genetic matching.  
NOTE Confidence: 0.88797582117647

00:51:03.262 --> 00:51:05.480 I I think there's a real role for this.  
NOTE Confidence: 0.88797582117647

00:51:05.480 --> 00:51:08.259 I only showed it for doxazosin and  
NOTE Confidence: 0.88797582117647

00:51:08.259 --> 00:51:10.260 the DBH polymorphism but there's  
NOTE Confidence: 0.88797582117647

00:51:10.260 --> 00:51:12.836 in fact others that that are coming  
NOTE Confidence: 0.88797582117647

00:51:12.836 --> 00:51:14.963 out including for the the use  
NOTE Confidence: 0.88797582117647

00:51:14.963 --> 00:51:16.395 of buprenorphine to treat.  
NOTE Confidence: 0.88797582117647

00:51:16.395 --> 00:51:17.490 For pain abuse,  
NOTE Confidence: 0.88797582117647

00:51:17.490 --> 00:51:20.619 it ends up Dave Nielsen and I  
NOTE Confidence: 0.88797582117647

00:51:20.619 --> 00:51:23.177 published a paper recently showing  
NOTE Confidence: 0.88797582117647

00:51:23.177 --> 00:51:27.097 how a polymorphism in the the Kappa.  
NOTE Confidence: 0.88797582117647

00:51:27.100 --> 00:51:27.560 System.  
NOTE Confidence: 0.88797582117647

00:51:27.560 --> 00:51:29.860 It's in the actually dynorphin,

NOTE Confidence: 0.88797582117647  
00:51:29.860 --> 00:51:31.968 dynorphin polymorphism that produced  
NOTE Confidence: 0.88797582117647  
00:51:31.968 --> 00:51:34.076 that predicts treatment response.  
NOTE Confidence: 0.88797582117647  
00:51:34.080 --> 00:51:35.360 And then there's the vaccines.  
NOTE Confidence: 0.88797582117647  
00:51:35.360 --> 00:51:37.010 I didn't have time to talk  
NOTE Confidence: 0.88797582117647  
00:51:37.010 --> 00:51:37.835 about cholinesterase enzymes.  
NOTE Confidence: 0.88797582117647  
00:51:37.840 --> 00:51:40.120 These have been around now for a while.  
NOTE Confidence: 0.88797582117647  
00:51:40.120 --> 00:51:43.060 These are high activity colon esterases.  
NOTE Confidence: 0.88797582117647  
00:51:43.060 --> 00:51:46.040 We published a paper now it's about 810  
NOTE Confidence: 0.88797582117647  
00:51:46.040 --> 00:51:48.420 years ago where we took our vaccine.  
NOTE Confidence: 0.88797582117647  
00:51:48.420 --> 00:51:50.130 Even our crappy vaccine combined  
NOTE Confidence: 0.88797582117647  
00:51:50.130 --> 00:51:51.498 it with the Colonel,  
NOTE Confidence: 0.88797582117647  
00:51:51.500 --> 00:51:53.260 one of the Colonel esterases,  
NOTE Confidence: 0.88797582117647  
00:51:53.260 --> 00:51:55.400 and it was phenomenal in  
NOTE Confidence: 0.88797582117647  
00:51:55.400 --> 00:51:57.112 that it completely blocked.  
NOTE Confidence: 0.88797582117647  
00:51:57.120 --> 00:51:58.840 McCain use and the animals,  
NOTE Confidence: 0.88797582117647

00:51:58.840 --> 00:52:01.296 he just could not override it at all,  
NOTE Confidence: 0.88797582117647

00:52:01.300 --> 00:52:02.610 even though they could override  
NOTE Confidence: 0.88797582117647

00:52:02.610 --> 00:52:03.920 the vaccine and they could  
NOTE Confidence: 0.88797582117647

00:52:03.965 --> 00:52:05.229 override the colon esterase,  
NOTE Confidence: 0.88797582117647

00:52:05.230 --> 00:52:06.914 because the colony esterase  
NOTE Confidence: 0.88797582117647

00:52:06.914 --> 00:52:08.177 is relatively slow,  
NOTE Confidence: 0.88797582117647

00:52:08.180 --> 00:52:10.476 but when you put the two things together,  
NOTE Confidence: 0.88797582117647

00:52:10.480 --> 00:52:13.550 it's unstoppable.  
NOTE Confidence: 0.88797582117647

00:52:13.550 --> 00:52:14.858 And buprenorphine doesn't  
NOTE Confidence: 0.88797582117647

00:52:14.858 --> 00:52:16.166 block fentanyl abuse,  
NOTE Confidence: 0.88797582117647

00:52:16.170 --> 00:52:16.872 you know,  
NOTE Confidence: 0.88797582117647

00:52:16.872 --> 00:52:17.223 sorry,  
NOTE Confidence: 0.88797582117647

00:52:17.223 --> 00:52:19.680 but and a vaccine can block the  
NOTE Confidence: 0.88797582117647

00:52:19.757 --> 00:52:22.022 fentanyl abuse and the overdose  
NOTE Confidence: 0.88797582117647

00:52:22.022 --> 00:52:24.287 and the human fentanyl vaccine  
NOTE Confidence: 0.797460120357143

00:52:24.370 --> 00:52:25.741 we've just started

NOTE Confidence: 0.797460120357143  
00:52:25.741 --> 00:52:28.026 manufacturing as of this month.  
NOTE Confidence: 0.797460120357143  
00:52:28.030 --> 00:52:29.290 We're hoping to get it  
NOTE Confidence: 0.797460120357143  
00:52:29.290 --> 00:52:30.550 into people within a year.  
NOTE Confidence: 0.797460120357143  
00:52:30.550 --> 00:52:31.994 Depends on the FDA,  
NOTE Confidence: 0.797460120357143  
00:52:31.994 --> 00:52:33.799 but they've accelerated for COVID  
NOTE Confidence: 0.797460120357143  
00:52:33.799 --> 00:52:35.232 obviously the approval process  
NOTE Confidence: 0.797460120357143  
00:52:35.232 --> 00:52:37.260 and we're hoping to convince them  
NOTE Confidence: 0.797460120357143  
00:52:37.260 --> 00:52:39.270 that they should be doing the same  
NOTE Confidence: 0.797460120357143  
00:52:39.270 --> 00:52:40.944 thing for an anti fentanyl vaccine.  
NOTE Confidence: 0.797460120357143  
00:52:40.944 --> 00:52:42.726 We're not the only one working  
NOTE Confidence: 0.797460120357143  
00:52:42.726 --> 00:52:43.800 on this vaccine.  
NOTE Confidence: 0.797460120357143  
00:52:43.800 --> 00:52:45.474 But we're about at least probably  
NOTE Confidence: 0.797460120357143  
00:52:45.474 --> 00:52:47.233 two to three years ahead of  
NOTE Confidence: 0.797460120357143  
00:52:47.233 --> 00:52:48.683 the other three groups working  
NOTE Confidence: 0.797460120357143  
00:52:48.683 --> 00:52:50.260 on this around the country.  
NOTE Confidence: 0.797460120357143

00:52:50.260 --> 00:52:54.274 It's not like we're we're competing  
NOTE Confidence: 0.797460120357143

00:52:54.274 --> 00:52:55.678 with them in any real way.  
NOTE Confidence: 0.797460120357143

00:52:55.680 --> 00:52:57.012 We're collaborating with them.  
NOTE Confidence: 0.797460120357143

00:52:57.012 --> 00:52:58.677 We're trying to work together.  
NOTE Confidence: 0.797460120357143

00:52:58.680 --> 00:53:00.132 There's a group at Harvard that  
NOTE Confidence: 0.797460120357143

00:53:00.132 --> 00:53:01.396 we're working with another one  
NOTE Confidence: 0.797460120357143

00:53:01.396 --> 00:53:02.646 out at University of Washington,  
NOTE Confidence: 0.797460120357143

00:53:02.650 --> 00:53:05.130 another one and University of  
NOTE Confidence: 0.797460120357143

00:53:05.130 --> 00:53:07.748 Maryland and then together plus with  
NOTE Confidence: 0.797460120357143

00:53:07.748 --> 00:53:10.004 of course Niad and night etcetera  
NOTE Confidence: 0.797460120357143

00:53:10.004 --> 00:53:11.853 together we think that would come  
NOTE Confidence: 0.797460120357143

00:53:11.853 --> 00:53:13.718 up with this but our particular.  
NOTE Confidence: 0.797460120357143

00:53:13.718 --> 00:53:16.301 Group is is rather aggressive I guess  
NOTE Confidence: 0.797460120357143

00:53:16.301 --> 00:53:18.720 because I know how to do these kind  
NOTE Confidence: 0.797460120357143

00:53:18.720 --> 00:53:21.149 of clinical studies and nobody else involved.  
NOTE Confidence: 0.797460120357143

00:53:21.150 --> 00:53:22.570 It's done clinical studies

NOTE Confidence: 0.797460120357143

00:53:22.570 --> 00:53:23.990 with vaccines in addiction.

NOTE Confidence: 0.797460120357143

00:53:23.990 --> 00:53:26.454 So I think that is what's giving

NOTE Confidence: 0.797460120357143

00:53:26.454 --> 00:53:30.850 us an advantage, alright, so.

NOTE Confidence: 0.797460120357143

00:53:30.850 --> 00:53:31.970 It's always nice to say,

NOTE Confidence: 0.797460120357143

00:53:31.970 --> 00:53:32.534 you know,

NOTE Confidence: 0.797460120357143

00:53:32.534 --> 00:53:33.944 this is not everybody who's

NOTE Confidence: 0.797460120357143

00:53:33.944 --> 00:53:35.389 worked with me over time,

NOTE Confidence: 0.797460120357143

00:53:35.390 --> 00:53:36.150 including, uh,

NOTE Confidence: 0.797460120357143

00:53:36.150 --> 00:53:39.190 very few of the Yale people who worked

NOTE Confidence: 0.797460120357143

00:53:39.271 --> 00:53:42.287 with me on these vaccines are listed here.

NOTE Confidence: 0.797460120357143

00:53:42.290 --> 00:53:46.070 But, you know, there are some.

NOTE Confidence: 0.797460120357143

00:53:46.070 --> 00:53:47.910 And anyone who sees my wife in the

NOTE Confidence: 0.797460120357143

00:53:47.910 --> 00:53:49.890 young the next few months or whatever,

NOTE Confidence: 0.797460120357143

00:53:49.890 --> 00:53:50.294 you know,

NOTE Confidence: 0.797460120357143

00:53:50.294 --> 00:53:52.150 tell her to make sure that I did say,

NOTE Confidence: 0.797460120357143

00:53:52.150 --> 00:53:54.316 you know, thank you to my wife, Terry.  
NOTE Confidence: 0.797460120357143

00:53:54.316 --> 00:53:56.646 Costume and the collaborators are,  
NOTE Confidence: 0.797460120357143

00:53:56.650 --> 00:53:57.378 of course,  
NOTE Confidence: 0.797460120357143

00:53:57.378 --> 00:53:59.562 a bunch of different companies who've  
NOTE Confidence: 0.797460120357143

00:53:59.562 --> 00:54:01.999 worked with us and making these things.  
NOTE Confidence: 0.797460120357143

00:54:02.000 --> 00:54:05.198 And and the National Institute of  
NOTE Confidence: 0.797460120357143

00:54:05.198 --> 00:54:09.079 Health was both naida and the NIH NIAD,  
NOTE Confidence: 0.797460120357143

00:54:09.080 --> 00:54:10.643 the Allergy infectious  
NOTE Confidence: 0.797460120357143

00:54:10.643 --> 00:54:12.206 disease fouchy's group.  
NOTE Confidence: 0.797460120357143

00:54:12.210 --> 00:54:12.822 With that,  
NOTE Confidence: 0.797460120357143

00:54:12.822 --> 00:54:14.658 I think I've managed to burn  
NOTE Confidence: 0.797460120357143

00:54:14.658 --> 00:54:17.017 up as much time as I'm allowed  
NOTE Confidence: 0.797460120357143

00:54:17.017 --> 00:54:19.178 and I'm happy to address any  
NOTE Confidence: 0.797460120357143

00:54:19.178 --> 00:54:20.866 questions that people have.  
NOTE Confidence: 0.797460120357143

00:54:20.870 --> 00:54:22.000 So thank you very much.