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

 $00:00:03.100 \longrightarrow 00:00:05.021$ stimulated addiction overdose.

NOTE Confidence: 0.710518698333333

 $00{:}00{:}05{.}021 \dashrightarrow 00{:}07{.}618$ These are two areas where we are

NOTE Confidence: 0.710518698333333

 $00:00:07.618 \longrightarrow 00:00:10.210$ really in need of improved treatments

NOTE Confidence: 0.710518698333333

 $00:00:10.210 \dashrightarrow 00:00:12.868$ and and we have underserved needs.

NOTE Confidence: 0.710518698333333

 $00{:}00{:}12.870 \dashrightarrow 00{:}00{:}14.790$ 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

 $00:00:19.844 \dashrightarrow 00:00:22.182$ alive so that she could hear that

NOTE Confidence: 0.710518698333333

 $00:00:22.182 \rightarrow 00:00:24.165$ wonderful introduction and say, oh,

NOTE Confidence: 0.710518698333333

 $00:00:24.165 \longrightarrow 00:00:27.630$ you finally made it as a doctor.

NOTE Confidence: 0.710518698333333

 $00{:}00{:}27.630 \dashrightarrow 00{:}00{:}29.338$ Hello. I have to say her and

NOTE Confidence: 0.710518698333333

 $00:00:29.338 \rightarrow 00:00:30.357$ my grandmother preferred that

00:00:30.357 --> 00:00:31.779 I would have become a minister,

NOTE Confidence: 0.710518698333333

 $00{:}00{:}31.780 \dashrightarrow 00{:}00{:}34.237$ but she can't have everything in life.

NOTE Confidence: 0.710518698333333

 $00:00:34.240 \rightarrow 00:00:36.790$ Closest I got with a psychiatrist.

NOTE Confidence: 0.710518698333333

 $00:00:36.790 \rightarrow 00:00:39.870$ So again, let me move forward with this.

NOTE Confidence: 0.710518698333333

00:00:39.870 $\operatorname{-->}$ 00:00:41.976 I do have a fair amount of stuff I'm

NOTE Confidence: 0.710518698333333

 $00:00:41.976 \longrightarrow 00:00:44.180$ going to try to go over and but one of NOTE Confidence: 0.710518698333333

 $00:00:44.180 \rightarrow 00:00:45.930$ those things I've learned over time

NOTE Confidence: 0.710518698333333

 $00:00:45.930 \rightarrow 00:00:48.055$ is don't get too wedded to your slides

NOTE Confidence: 0.710518698333333

 $00:00:48.055 \rightarrow 00:00:49.840$ that you need to present all of them.

NOTE Confidence: 0.710518698333333

 $00:00:49.840 \longrightarrow 00:00:53.730$ So I'll still be mindful of what time it is.

NOTE Confidence: 0.710518698333333

 $00:00:53.730 \longrightarrow 00:00:55.893$ This is just a little overview of

NOTE Confidence: 0.710518698333333

 $00:00:55.893 \rightarrow 00:00:58.459$ what I'm going to be talking about

NOTE Confidence: 0.710518698333333

 $00:00:58.459 \rightarrow 00:01:00.424$ today about fentanyl in particular.

NOTE Confidence: 0.710518698333333

 $00:01:00.430 \rightarrow 00:01:02.732$ Uh, these are the disclosures, which,

NOTE Confidence: 0.710518698333333

 $00:01:02.732 \rightarrow 00:01:05.148$ 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
- $00{:}01{:}05.692 \dashrightarrow 00{:}01{:}07.860$ none of these are have anything to do
- NOTE Confidence: 0.710518698333333
- $00{:}01{:}07{.}921 \dashrightarrow 00{:}01{:}10{.}224$ with vaccines or what I'm talking about.
- NOTE Confidence: 0.710518698333333
- $00{:}01{:}10.230 \dashrightarrow 00{:}01{:}13.020$ 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
- $00{:}01{:}15{.}470 \dashrightarrow 00{:}01{:}18{.}014$ So that that has been a an advantage
- NOTE Confidence: 0.710518698333333
- $00:01:18.014 \rightarrow 00:01:19.710$ 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
- $00:01:21.061 \longrightarrow 00:01:22.119$ to try to do today,
- NOTE Confidence: 0.710518698333333
- $00:01:22.120 \longrightarrow 00:01:24.584$ 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
- $00{:}01{:}26.070 \dashrightarrow 00{:}01{:}28.023$ I mean thank you very much for inviting me,
- NOTE Confidence: 0.710518698333333
- $00{:}01{:}28{.}030 \dashrightarrow 00{:}01{:}28{.}825$ Stephanie and John.
- NOTE Confidence: 0.710518698333333
- $00{:}01{:}28.825 \dashrightarrow 00{:}01{:}30.680$ 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

 $00{:}01{:}35.698 \dashrightarrow 00{:}01{:}38.188$ 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

 $00:01:40.470 \longrightarrow 00:01:41.463$ 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

 $00:01:47.160 \longrightarrow 00:01:48.495$ but I don't.

NOTE Confidence: 0.710518698333333

 $00:01:48.495 \longrightarrow 00:01:50.275$ As to the goals,

NOTE Confidence: 0.710518698333333

 $00:01:50.280 \longrightarrow 00:01:52.160$ we would like to try to describe the

NOTE Confidence: 0.710518698333333

 $00:01:52.160 \rightarrow 00:01:54.240$ ways of the opiate overdose epidemic.

NOTE Confidence: 0.710518698333333

 $00:01:54.240 \longrightarrow 00:01:56.328$ 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

 $00:01:57.900 \dashrightarrow 00:01:59.797$ There was then a switch to heroin.

NOTE Confidence: 0.710518698333333

 $00:01:59.800 \longrightarrow 00:02:00.800$ There then was a switch.

NOTE Confidence: 0.710518698333333

 $00:02:00.800 \rightarrow 00:02:03.164$ Fentanyl and what's happened most recently

NOTE Confidence: 0.710518698333333

 $00:02:03.164 \rightarrow 00:02:06.549$ is a switch to fentanyl plus stimulants,

- NOTE Confidence: 0.710518698333333
- $00:02:06.550 \longrightarrow 00:02:08.725$ which has been a significant

 $00:02:08.725 \longrightarrow 00:02:10.465$ problem in many ways.

NOTE Confidence: 0.710518698333333

 $00:02:10.470 \longrightarrow 00:02:12.310$ I'd like to be sure that we learn

NOTE Confidence: 0.710518698333333

 $00:02:12.310 \rightarrow 00:02:14.323$ some new therapies for cocaine and

NOTE Confidence: 0.710518698333333

 $00:02:14.323 \rightarrow 00:02:15.815$ stimulants including some little

NOTE Confidence: 0.710518698333333

 $00{:}02{:}15.815 \dashrightarrow 00{:}02{:}17.884$ bit about pharma cogenetics and about

NOTE Confidence: 0.710518698333333

00:02:17.884 --> 00:02:20.410 vaccines and then learn why buprenorphine,

NOTE Confidence: 0.710518698333333

 $00{:}02{:}20{.}410 \dashrightarrow 00{:}02{:}22{.}228$ which is our without a doubt

NOTE Confidence: 0.710518698333333

 $00{:}02{:}22{.}228 \dashrightarrow 00{:}02{:}23{.}980$ our best treatment for opiates,

NOTE Confidence: 0.710518698333333

 $00:02:23.980 \longrightarrow 00:02:27.372$ why it fails to block fentanyl and how

NOTE Confidence: 0.710518698333333

 $00:02:27.372 \rightarrow 00:02:31.730$ an anti fentanyl vaccine can in fact succeed.

NOTE Confidence: 0.710518698333333

 $00{:}02{:}31.730 \dashrightarrow 00{:}02{:}34.229$ This is when the thing started.

NOTE Confidence: 0.710518698333333

 $00{:}02{:}34{.}230 \dashrightarrow 00{:}02{:}37{.}029$ This is wave one started about 20 years ago.

NOTE Confidence: 0.710518698333333

 $00{:}02{:}37{.}030 \dashrightarrow 00{:}02{:}38{.}785$ And these are just some

NOTE Confidence: 0.710518698333333

00:02:38.785 --> 00:02:40.189 quotes from Barack Obama,

 $00{:}02{:}40{.}190 \dashrightarrow 00{:}02{:}43{.}997$ which was when he was giving his sort of

NOTE Confidence: 0.710518698333333

 $00{:}02{:}43{.}997 \dashrightarrow 00{:}02{:}47{.}428$ summary of it all ways into the epidemic.

NOTE Confidence: 0.710518698333333

 $00:02:47.430 \longrightarrow 00:02:49.070$ 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

 $00:02:51.130 \longrightarrow 00:02:54.690$ as terrorism, which is astounding.

NOTE Confidence: 0.710518698333333

 $00:02:54.690 \rightarrow 00:02:56.015$ That they were seeing more

NOTE Confidence: 0.710518698333333

 $00:02:56.015 \longrightarrow 00:02:57.340$ people killed because of the

NOTE Confidence: 0.8366226506666667

 $00{:}02{:}57{.}396 \dashrightarrow 00{:}02{:}59{.}276$ opioid overdose than traffic accidents.

NOTE Confidence: 0.8366226506666667

 $00:02:59.280 \rightarrow 00:03:01.940$ They were going to make the government

NOTE Confidence: 0.836622650666667

 $00:03:01.940 \longrightarrow 00:03:03.775$ health insurance policies cover mental

NOTE Confidence: 0.8366226506666667

00:03:03.775 --> 00:03:05.980 health and substance abuse on a par

NOTE Confidence: 0.8366226506666667

 $00:03:05.980 \rightarrow 00:03:08.197$ with treatment for physical illness.

NOTE Confidence: 0.8366226506666667

 $00:03:08.200 \rightarrow 00:03:12.976$ Well, they tried as to a grassroots approach.

NOTE Confidence: 0.8366226506666667

 $00:03:12.980 \longrightarrow 00:03:15.164$ It was really needed to train physicians

NOTE Confidence: 0.836622650666667

 $00:03:15.164 \rightarrow 00:03:17.100$ while they're still residents and how,

NOTE Confidence: 0.8366226506666667

00:03:17.100 - 00:03:18.820 when, why to prescribe opiates

- NOTE Confidence: 0.8366226506666667
- $00:03:18.820 \rightarrow 00:03:20.540$ and and using buprenorphine for
- NOTE Confidence: 0.8366226506666667
- $00{:}03{:}20.603 \dashrightarrow 00{:}03{:}22.159$ treatment of this addiction.
- NOTE Confidence: 0.8366226506666667
- $00:03:22.160 \longrightarrow 00:03:23.424$ So there was this,
- NOTE Confidence: 0.836622650666667
- $00:03:23.424 \rightarrow 00:03:25.570$ this is the history that's behind us.
- NOTE Confidence: 0.8366226506666667
- $00:03:25.570 \dashrightarrow 00:03:28.732$ Which is summarized by this talk
- NOTE Confidence: 0.836622650666667
- $00:03:28.732 \longrightarrow 00:03:32.218$ that Barack Obama gave back in 2016.
- NOTE Confidence: 0.8366226506666667
- $00:03:32.218 \longrightarrow 00:03:36.474$ 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: 0.8366226506666667
- $00:03:39.019 \dashrightarrow 00:03:43.080$ it went from 76 to 207 million prescriptions.
- NOTE Confidence: 0.8366226506666667
- $00:03:43.080 \longrightarrow 00:03:46.023$ So it it really went up quite a bit.
- NOTE Confidence: 0.8366226506666667
- 00:03:46.030 --> 00:03:49.070 Um, back at around 2013,
- NOTE Confidence: 0.836622650666667
- $00{:}03{:}49{.}070 \dashrightarrow 00{:}03{:}52{.}034$ you were seeing 15 million opiate
- NOTE Confidence: 0.8366226506666667
- $00:03:52.034 \rightarrow 00:03:54.929$ prescriptions just from primary care alone.
- NOTE Confidence: 0.8366226506666667
- 00:03:54.930 --> 00:03:56.565 2,000,000 Americans had
- NOTE Confidence: 0.8366226506666667
- $00:03:56.565 \rightarrow 00:03:59.290$ prescription opiate abuse in 2013.
- NOTE Confidence: 0.836622650666667

 $00:03:59.290 \longrightarrow 00:04:01.288$ Physicians were being blamed for the

NOTE Confidence: 0.8366226506666667

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

NOTE Confidence: 0.8366226506666667

 $00:04:03.249 \longrightarrow 00:04:04.977$ as individuals who abuse the opiates.

NOTE Confidence: 0.836622650666667

 $00:04:04.980 \longrightarrow 00:04:06.430$ Important keep that in mind

NOTE Confidence: 0.8366226506666667

 $00:04:06.430 \longrightarrow 00:04:08.270$ because that can come up again.

NOTE Confidence: 0.8366226506666667

 $00{:}04{:}08{.}270 \dashrightarrow 00{:}04{:}10{.}580$ The FDA was talking about forbidding the

NOTE Confidence: 0.8366226506666667

 $00:04:10.580 \rightarrow 00:04:12.550$ marketing of opiates for chronic pain.

NOTE Confidence: 0.8366226506666667

 $00:04:12.550 \rightarrow 00:04:14.746$ Now that obviously never entirely happened,

NOTE Confidence: 0.8366226506666667

 $00{:}04{:}14.750 \dashrightarrow 00{:}04{:}16.360$ but there was a lot of movement.

NOTE Confidence: 0.8366226506666667

 $00:04:16.360 \longrightarrow 00:04:17.101$ To do that,

NOTE Confidence: 0.8366226506666667

 $00{:}04{:}17{.}101 \dashrightarrow 00{:}04{:}18{.}830$ and the CDC was going to limit

NOTE Confidence: 0.8366226506666667

 $00:04:18.893 \longrightarrow 00:04:20.939$ opiates to just three days for

NOTE Confidence: 0.8366226506666667

 $00:04:20.939 \longrightarrow 00:04:22.303$ short term pain management.

NOTE Confidence: 0.8366226506666667

 $00:04:22.310 \longrightarrow 00:04:23.492$ Once again,

NOTE Confidence: 0.8366226506666667

 $00:04:23.492 \longrightarrow 00:04:26.447$ that did not entirely happen,

NOTE Confidence: 0.836622650666667

 $00:04:26.450 \dashrightarrow 00:04:29.985$ but there was real guidelines for decreasing

- NOTE Confidence: 0.8366226506666667
- $00:04:29.985 \longrightarrow 00:04:33.677$ the amount of opiates being given out.
- NOTE Confidence: 0.8366226506666667
- $00:04:33.680 \longrightarrow 00:04:35.336$ Non medical pain reliever use at
- NOTE Confidence: 0.8366226506666667
- $00:04:35.336 \longrightarrow 00:04:37.054$ that point was 22 million people
- NOTE Confidence: 0.8366226506666667
- $00:04:37.054 \rightarrow 00:04:39.262$ and you have you know a little over
- NOTE Confidence: 0.8366226506666667
- $00:04:39.324 \rightarrow 00:04:41.148$ 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: 0.8366226506666667
- $00:04:43.718 \longrightarrow 00:04:45.962$ this was 3,000,000 to use for the first
- NOTE Confidence: 0.836622650666667
- $00:04:45.962 \longrightarrow 00:04:47.813$ time with the past 12 months that
- NOTE Confidence: 0.8366226506666667
- $00{:}04{:}47{.}813 \dashrightarrow 00{:}04{:}49{.}839$ 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: 0.8366226506666667
- $00:04:54.230 \rightarrow 00:04:56.926$ Most of these uh illicit drug users started
- NOTE Confidence: 0.8366226506666667
- $00:04:56.926 \rightarrow 00:04:59.766$ now at that point with pain relievers.
- NOTE Confidence: 0.8366226506666667
- $00{:}04{:}59{.}770 \dashrightarrow 00{:}05{:}01{.}480$ One would never believe that it
- NOTE Confidence: 0.8366226506666667
- 00:05:01.480 --> 00:05:03.725 over did you know marijuana as how
- NOTE Confidence: 0.836622650666667
- $00{:}05{:}03.725 \dashrightarrow 00{:}05{:}05.470$ people would start using drugs.
- NOTE Confidence: 0.8366226506666667

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

NOTE Confidence: 0.8366226506666667

 $00{:}05{:}08.038 \dashrightarrow 00{:}05{:}10.890$ 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

 $00:05:13.138 \rightarrow 00:05:14.890$ younger than 18 and were females.

NOTE Confidence: 0.8366226506666667

 $00:05:14.890 \longrightarrow 00:05:17.417$ But once again a very different demographic

NOTE Confidence: 0.836622650666667

 $00{:}05{:}17{.}417 \dashrightarrow 00{:}05{:}19{.}950$ than it had been with heroin use.

NOTE Confidence: 0.8366226506666667

 $00:05:19.950 \rightarrow 00:05:21.718$ This is just a little graph of that

NOTE Confidence: 0.8366226506666667

 $00{:}05{:}21.718 \dashrightarrow 00{:}05{:}23.386$ data that I was telling you about.

NOTE Confidence: 0.836622650666667

 $00{:}05{:}23.390 \dashrightarrow 00{:}05{:}25.610$ This is back.

NOTE Confidence: 0.836622650666667

00:05:25.610 --> 00:05:26.350 From.

NOTE Confidence: 0.8366226506666667

 $00:05:26.350 \dashrightarrow 00:05:28.790$ 205 and in fact it only got worse over time.

NOTE Confidence: 0.8366226506666667

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

NOTE Confidence: 0.8366226506666667

 $00:05:31.190 \longrightarrow 00:05:33.818$ Pain relievers were the more common

NOTE Confidence: 0.8366226506666667

 $00{:}05{:}33{.}818 \dashrightarrow 00{:}05{:}37{.}029$ initiates for drug abuse than was marijuana.

NOTE Confidence: 0.8366226506666667

 $00:05:37.030 \dashrightarrow 00:05:38.794$ And of course anything else that

NOTE Confidence: 0.8366226506666667

 $00:05:38.794 \longrightarrow 00:05:40.660$ you can see on this list.

- NOTE Confidence: 0.836622650666667
- $00{:}05{:}40.660 \dashrightarrow 00{:}05{:}43.639$ And this continued on for a number of years
- NOTE Confidence: 0.8366226506666667
- $00{:}05{:}43.639 \dashrightarrow 00{:}05{:}46.590$ and of course was blamed on many things.
- NOTE Confidence: 0.8366226506666667
- $00:05:46.590 \longrightarrow 00:05:49.502$ And the the Reaper has now hit
- NOTE Confidence: 0.8366226506666667
- $00:05:49.502 \rightarrow 00:05:51.287$ many pharmaceutical companies where
- NOTE Confidence: 0.8366226506666667
- $00:05:51.287 \rightarrow 00:05:53.577$ they're getting billions of dollars
- NOTE Confidence: 0.8366226506666667
- $00:05:53.577 \dashrightarrow 00:05:56.040$ in settlements that they have to.
- NOTE Confidence: 0.8366226506666667
- $00{:}05{:}56{.}040 \dashrightarrow 00{:}05{:}57{.}412$ Hand out.
- NOTE Confidence: 0.836622650666667
- 00:05:57.412 --> 00:06:00.156 From 1999 to 2014,
- NOTE Confidence: 0.8366226506666667
- $00{:}06{:}00{.}160 \dashrightarrow 00{:}02{.}570$ the opiate overdose deaths were
- NOTE Confidence: 0.8366226506666667
- $00:06:02.570 \longrightarrow 00:06:05.576$ quite profound on this was started
- NOTE Confidence: 0.8366226506666667
- $00:06:05.576 \dashrightarrow 00:06:08.136$ with the MD over prescribing,
- NOTE Confidence: 0.831131808333333
- $00{:}06{:}08{.}140 \dashrightarrow 00{:}06{:}10{.}198$ but there was a fourfold increase.
- NOTE Confidence: 0.831131808333333
- $00{:}06{:}10.200 \dashrightarrow 00{:}06{:}12.944$ The Reds represent high areas of opiate
- NOTE Confidence: 0.831131808333333
- $00{:}06{:}12.944 \dashrightarrow 00{:}06{:}14.808$ overdoses, the blue relatively lower.
- NOTE Confidence: 0.831131808333333
- $00:06:14.808 \rightarrow 00:06:17.010$ Hopefully you can easily see there's
- NOTE Confidence: 0.831131808333333

 $00:06:17.072 \longrightarrow 00:06:18.984$ a lot more red on the right than

NOTE Confidence: 0.831131808333333

 $00:06:18.984 \rightarrow 00:06:21.132$ there is on the left, and you'll see

NOTE Confidence: 0.831131808333333

 $00:06:21.132 \rightarrow 00:06:22.956$ that there are concentrations of it.

NOTE Confidence: 0.831131808333333

 $00:06:22.960 \rightarrow 00:06:24.940$ The most important concentration that

NOTE Confidence: 0.831131808333333

 $00{:}06{:}24.940 \dashrightarrow 00{:}06{:}27.739$ 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

 $00{:}06{:}29{.}890 \dashrightarrow 00{:}06{:}32{.}704$ the Appalachian Mountain area where there

NOTE Confidence: 0.831131808333333

 $00:06:32.704 \rightarrow 00:06:35.580$ was just tremendous amounts of overdoses

NOTE Confidence: 0.831131808333333

 $00:06:35.580 \rightarrow 00:06:37.910$ and deaths from prescribed opiates,

NOTE Confidence: 0.831131808333333

 $00:06:37.910 \rightarrow 00:06:39.626$ mercy, these were not urban areas

NOTE Confidence: 0.831131808333333

 $00:06:39.626 \rightarrow 00:06:41.379$ where they were selling this stuff.

NOTE Confidence: 0.89963331

 $00{:}06{:}43.620 \dashrightarrow 00{:}06{:}47.092$ All right, so by 2010, the prescription

NOTE Confidence: 0.89963331

 $00:06:47.092 \rightarrow 00:06:50.354$ drug epidemic was plateauing 10 to 16.

NOTE Confidence: 0.89963331

 $00{:}06{:}50{.}360 \dashrightarrow 00{:}06{:}53{.}909$ Wave two started of the opioid epidemic

NOTE Confidence: 0.89963331

 $00{:}06{:}53{.}909 \dashrightarrow 00{:}06{:}57{.}520$ as doctors began prescribing less and less NOTE Confidence: 0.89963331

 $00{:}06{:}57{.}520 \dashrightarrow 00{:}07{:}00{.}720$ and the overdoses from heroin came back

 $00:07:00.720 \longrightarrow 00:07:04.480$ again as an issue that plateaued in 2016.

NOTE Confidence: 0.89963331

 $00:07:04.480 \longrightarrow 00:07:06.951$ And in 2014, wave three of the

NOTE Confidence: 0.89963331

 $00:07:06.951 \rightarrow 00:07:08.700$ epidemic started with fentanyl.

NOTE Confidence: 0.89963331

 $00:07:08.700 \rightarrow 00:07:11.316$ It rapidly escalate escalated to pass

NOTE Confidence: 0.89963331

 $00{:}07{:}11.316 \dashrightarrow 00{:}07{:}13.530$ heroin and the prescription drugs.

NOTE Confidence: 0.89963331

 $00:07:13.530 \dashrightarrow 00:07:16.570$ And this fentanyl epidemic continues.

NOTE Confidence: 0.89963331

 $00:07:16.570 \longrightarrow 00:07:19.307$ What's happened since 2016 is Wave 4,

NOTE Confidence: 0.89963331

 $00:07:19.310 \longrightarrow 00:07:21.145$ the epidemic and that started

NOTE Confidence: 0.89963331

 $00{:}07{:}21.145 \dashrightarrow 00{:}07{:}22.613$ with cocaine and amphetamine,

NOTE Confidence: 0.89963331

 $00:07:22.620 \longrightarrow 00:07:26.267$ with fentanyl being mixed in with these

NOTE Confidence: 0.89963331

 $00{:}07{:}26.267 \dashrightarrow 00{:}07{:}29.342$ white powders and therefore the combination

NOTE Confidence: 0.89963331

 $00{:}07{:}29.342 \dashrightarrow 00{:}07{:}31.882$ becoming causes of drug overdose.

NOTE Confidence: 0.89963331

 $00{:}07{:}31.890 \dashrightarrow 00{:}07{:}34.746$ And this is continued again and escalated

NOTE Confidence: 0.89963331

 $00:07:34.746 \dashrightarrow 00:07:38.008$ and escalated in some rather surprising ways.

NOTE Confidence: 0.89963331

 $00{:}07{:}38.010 \dashrightarrow 00{:}07{:}39.894$ So this is simply the same

 $00:07:39.894 \longrightarrow 00:07:41.150$ kinds of graphs again,

NOTE Confidence: 0.89963331

 $00{:}07{:}41.150 \dashrightarrow 00{:}07{:}43.670$ the red line or orange.

NOTE Confidence: 0.89963331

 $00:07:43.670 \rightarrow 00:07:46.742$ Depending on how color blind you

NOTE Confidence: 0.89963331

 $00:07:46.742 \longrightarrow 00:07:49.024$ are that's shown on the left is

NOTE Confidence: 0.89963331

 $00:07:49.024 \dashrightarrow 00:07:50.760$ fentanyl going up through the roof.

NOTE Confidence: 0.89963331

 $00{:}07{:}50.760 \dashrightarrow 00{:}07{:}53.430$ And what you can see on the right is the NOTE Confidence: 0.89963331

 $00{:}07{:}53.498 \dashrightarrow 00{:}07{:}57.146$ comparison from 2003 to 2017 and a map

NOTE Confidence: 0.89963331

 $00:07:57.146 \rightarrow 00:08:01.357$ 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

 $00{:}08{:}02{.}848 \dashrightarrow 00{:}08{:}05{.}830$ the fentanyl deaths have got red

NOTE Confidence: 0.89963331

 $00:08:05.934 \dashrightarrow 00:08:08.326$ areas all over the Midwest being

NOTE Confidence: 0.89963331

 $00:08:08.326 \rightarrow 00:08:10.378$ one of the more surprising areas.

NOTE Confidence: 0.89963331

 $00{:}08{:}10.380 \dashrightarrow 00{:}08{:}12.072$ At least that because that was

NOTE Confidence: 0.89963331

 $00:08:12.072 \longrightarrow 00:08:13.680$ not from the big cities.

NOTE Confidence: 0.89963331

 $00:08:13.680 \longrightarrow 00:08:14.130$ Necessarily,

NOTE Confidence: 0.89963331

 $00:08:14.130 \longrightarrow 00:08:16.830$ these were in fact often rural

- NOTE Confidence: 0.89963331
- $00:08:16.830 \longrightarrow 00:08:19.266$ areas that we're having this

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

NOTE Confidence: 0.89963331

 $00:08:21.270 \longrightarrow 00:08:22.538$ So what about fentanyl,

NOTE Confidence: 0.89963331

 $00:08:22.538 \longrightarrow 00:08:23.489$ which is again,

NOTE Confidence: 0.89963331

 $00:08:23.490 \longrightarrow 00:08:26.880$ this is wave 3 synthetic opiate,

NOTE Confidence: 0.89963331

 $00{:}08{:}26.880 \dashrightarrow 00{:}08{:}29.824$ 50 to 100 times more potent than morphine,

NOTE Confidence: 0.89963331

 $00:08:29.830 \longrightarrow 00:08:32.525$ 30 to 50 times greater than heroin.

NOTE Confidence: 0.89963331

 $00:08:32.530 \longrightarrow 00:08:34.204$ A lethal dose of fentanyl can

NOTE Confidence: 0.89963331

 $00:08:34.204 \longrightarrow 00:08:36.190$ 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

 $00:08:37.990 \longrightarrow 00:08:39.890$ 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

 $00:08:45.425 \longrightarrow 00:08:47.557$ of potency from 15 times more

- $00:08:47.557 \rightarrow 00:08:49.282$ potent than morphine to 10,000
- NOTE Confidence: 0.89963331
- $00{:}08{:}49{.}282 \dashrightarrow 00{:}08{:}51{.}260$ times more potent than morphine.
- NOTE Confidence: 0.89963331
- $00:08:51.260 \longrightarrow 00:08:52.808$ That is carfent anyl.
- NOTE Confidence: 0.89963331
- $00{:}08{:}52{.}808 \dashrightarrow 00{:}08{:}55{.}388$ And this epidemic again starts
- NOTE Confidence: 0.89963331
- $00{:}08{:}55{.}388 \dashrightarrow 00{:}08{:}58{.}240$ at around 2014.
- NOTE Confidence: 0.89963331
- $00:08:58.240 \rightarrow 00:08:59.920$ 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
- $00:09:00.185 \dashrightarrow 00:09:01.775$ these are the FDA approved treatments.
- NOTE Confidence: 0.89963331
- $00{:}09{:}01.780 \dashrightarrow 00{:}09{:}04.200$ There's the naltrex one and particularly
- NOTE Confidence: 0.89963331
- $00:09:04.200 \longrightarrow 00:09:06.620$ the long acting injectable naltrexone.
- NOTE Confidence: 0.89963331
- $00:09:06.620 \rightarrow 00:09:09.316$ There's bup renorphine or bup renorphine
- NOTE Confidence: 0.89963331
- 00:09:09.316 --> 00:09:09.990 naloxone.
- NOTE Confidence: 0.89963331
- $00:09:09.990 \longrightarrow 00:09:13.578$ 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
- $00{:}09{:}16.272 \dashrightarrow 00{:}09{:}19.442$ with the film and then later on of
- NOTE Confidence: 0.89963331
- $00:09:19.442 \rightarrow 00:09:21.582$ course an injectable became available

- NOTE Confidence: 0.89963331
- $00:09:21.582 \dashrightarrow 00:09:24.157$ and methadone which is a full agonist.
- NOTE Confidence: 0.89963331
- $00:09:24.160 \longrightarrow 00:09:27.100$ So this is the three mainstays
- NOTE Confidence: 0.89963331
- $00:09:27.100 \rightarrow 00:09:29.398$ bup renorphine came the closest to being.
- NOTE Confidence: 0.89963331
- $00:09:29.400 \longrightarrow 00:09:31.755$ Essentially a way that you
- NOTE Confidence: 0.89963331
- 00:09:31.755 --> 00:09:33.168 could combat fentanyl.
- NOTE Confidence: 0.89963331
- $00:09:33.170 \longrightarrow 00:09:34.640$ Fentanyl easily overrides
- NOTE Confidence: 0.89963331
- $00:09:34.640 \rightarrow 00:09:36.110$ methadone for analgesia,
- NOTE Confidence: 0.89963331
- $00:09:36.110 \longrightarrow 00:09:38.742$ 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
- $00:09:40.590 \rightarrow 00:09:42.234$ Buprenorphine may protect against
- NOTE Confidence: 0.89963331
- $00:09:42.234 \rightarrow 00:09:43.467$ the fentanyl overdose,
- NOTE Confidence: 0.89963331
- $00{:}09{:}43.470 \dashrightarrow 00{:}09{:}45.566$ though clinically the bup renorphine
- NOTE Confidence: 0.89963331
- $00:09:45.566 \dashrightarrow 00:09:48.710$ blood level of five nanograms per
- NOTE Confidence: 0.89963331
- $00{:}09{:}48.786 \dashrightarrow 00{:}09{:}51.291$ milliliter was found to prevent
- NOTE Confidence: 0.89963331
- $00:09:51.291 \rightarrow 00:09:53.295$ respiratory distress from about
- NOTE Confidence: 0.89963331

- 00:09:53.295 --> 00:09:55.619 .7 milligrams of fentanyl.
- NOTE Confidence: 0.89963331
- $00:09:55.620 \longrightarrow 00:09:56.688$ This was in.
- NOTE Confidence: 0.89963331
- $00:09:56.688 \rightarrow 00:09:58.468$ It's twice the apnea dose
- NOTE Confidence: 0.89963331
- $00:09:58.468 \longrightarrow 00:10:00.690$ in non tolerant patients,
- NOTE Confidence: 0.89963331
- $00{:}10{:}00{.}690 \dashrightarrow 00{:}10{:}03{.}336$ so this was this was done in an actual
- NOTE Confidence: 0.89963331
- $00:10:03.336 \rightarrow 00:10:05.723$ 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
- $00:10:07.788 \longrightarrow 00:10:10.000$ 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
- $00:10:12.160 \rightarrow 00:10:15.220$ 16 milligrams of sublingual buprenorphine,
- NOTE Confidence: 0.8997030175
- $00{:}10{:}15{.}220 \dashrightarrow 00{:}10{:}17{.}509$ 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
- $00{:}10{:}19.868 \dashrightarrow 00{:}10{:}21.896$.67 nanograms per milliliter.
- NOTE Confidence: 0.8997030175
- $00:10:21.900 \longrightarrow 00:10:23.844$ You'll notice that that's at least
- NOTE Confidence: 0.8997030175
- $00:10:23.844 \rightarrow 00:10:25.878 10$ fold lower than what you're
- NOTE Confidence: 0.8997030175
- $00:10:25.878 \rightarrow 00:10:27.894$ 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
- $00:10:30.650 \longrightarrow 00:10:33.584$ 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
- $00:10:35.540 \longrightarrow 00:10:37.545$ 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
- $00:10:40.520 \rightarrow 00:10:43.020$ less than half of what you're going to need.
- NOTE Confidence: 0.8997030175
- $00:10:43.020 \longrightarrow 00:10:46.492$ If you give the 300 milligram Suboxone
- NOTE Confidence: 0.8997030175
- 00:10:46.492 --> 00:10:48.600 supplicate injectable dose though,
- NOTE Confidence: 0.8997030175
- $00{:}10{:}48.600 \dashrightarrow 00{:}10{:}51.625$ you can attain a blood level of 6.54
- NOTE Confidence: 0.8997030175
- $00{:}10{:}51.625 \dashrightarrow 00{:}10{:}53.695$ nanograms per milliliter and you could
- NOTE Confidence: 0.8997030175
- $00{:}10{:}53.695 \dashrightarrow 00{:}10{:}55.580$ maintain that for about 30 days.
- NOTE Confidence: 0.8997030175
- $00:10:55.580 \rightarrow 00:10:57.729$ This is giving the 300 milligram dose,
- NOTE Confidence: 0.8997030175
- $00{:}10{:}57{.}730 \dashrightarrow 00{:}10{:}59{.}536$ which is not typical to give
- NOTE Confidence: 0.8997030175
- $00:10:59.536 \longrightarrow 00:11:01.532$ that every month, but if you do,
- NOTE Confidence: 0.8997030175

 $00:11:01.532 \rightarrow 00:11:04.143$ you can in fact get close to a level

NOTE Confidence: 0.8997030175

 $00:11:04.143 \longrightarrow 00:11:06.243$ 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

 $00:11:08.440 \longrightarrow 00:11:09.571$ From the usual,

NOTE Confidence: 0.8997030175

 $00:11:09.571 \rightarrow 00:11:12.210$ let's call it the rapeutic dose of fentanyl,

NOTE Confidence: 0.8997030175

 $00{:}11{:}12{.}210 \dashrightarrow 00{:}11{:}14{.}705$ obviously overdoses are using dosages

NOTE Confidence: 0.8997030175

 $00:11:14.705 \rightarrow 00:11:18.109$ that are not the therapeutic dose of .7,

NOTE Confidence: 0.8997030175

 $00:11:18.110 \longrightarrow 00:11:20.720$ but are usually twice or three

NOTE Confidence: 0.8997030175

 $00{:}11{:}20.720 \dashrightarrow 00{:}11{:}22.025$ 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

 $00:11:23.790 \rightarrow 00:11:26.062$ but it if you want to get buprenorphine

NOTE Confidence: 0.8997030175

 $00:11:26.062 \rightarrow 00:11:28.029$ to work the best for fentanyl,

NOTE Confidence: 0.8997030175

 $00:11:28.030 \rightarrow 00:11:31.350$ this is probably as good as you can hope for.

NOTE Confidence: 0.8997030175

 $00{:}11{:}31{.}350 \dashrightarrow 00{:}11{:}34{.}926$ So as the epidemic moves along

NOTE Confidence: 0.8997030175

 $00{:}11{:}34{.}930 \dashrightarrow 00{:}11{:}37{.}955$ 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
- $00{:}11{:}41{.}710 \dashrightarrow 00{:}11{:}43{.}630$ as you can see on this graph at the bottom,
- NOTE Confidence: 0.8997030175
- $00:11:43.630 \rightarrow 00:11:46.430$ that's starting to rise and around 2015,
- NOTE Confidence: 0.8997030175
- $00:11:46.430 \longrightarrow 00:11:49.256$ that's wave four and wave 4
- NOTE Confidence: 0.8997030175
- $00:11:49.256 \rightarrow 00:11:51.140$ psychostimulants combined with the
- NOTE Confidence: 0.8997030175
- $00{:}11{:}51{.}220 \dashrightarrow 00{:}11{:}54{.}490$ opiates and that has gone up and up and up.
- NOTE Confidence: 0.8997030175
- $00:11:54.490 \rightarrow 00:11:58.424$ And this data obviously stops at 2019,
- NOTE Confidence: 0.8997030175
- $00:11:58.430 \longrightarrow 00:12:00.670$ but the data that comes through with
- NOTE Confidence: 0.8997030175
- $00:12:00.670 \longrightarrow 00:12:03.561$ 2021 with 2022 data not yet being
- NOTE Confidence: 0.8997030175
- $00:12:03.561 \rightarrow 00:12:05.800$ 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
- $00:12:11.060 \longrightarrow 00:12:13.110$ the physicians to think about,
- NOTE Confidence: 0.899162484545455
- $00:12:13.110 \longrightarrow 00:12:14.550$ 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
- $00:12:16.305 \rightarrow 00:12:18.729$ for the last 15 or 20 years,
- NOTE Confidence: 0.899162484545455

 $00:12:18.730 \longrightarrow 00:12:21.195$ 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

 $00:12:23.742 \longrightarrow 00:12:26.508$ four of this ongoing lethal epidemic.

NOTE Confidence: 0.899162484545455

 $00:12:26.510 \rightarrow 00:12:28.300$ They certainly contributed to the

NOTE Confidence: 0.899162484545455

 $00{:}12{:}28.300 \dashrightarrow 00{:}12{:}30.690$ first phase of this opiate epidemic,

NOTE Confidence: 0.899162484545455

 $00:12:30.690 \longrightarrow 00:12:33.770$ 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

 $00:12:35.149 \rightarrow 00:12:37.284$ for adult ADHD patients in the past.

NOTE Confidence: 0.899162484545455

 $00{:}12{:}37{.}290 \dashrightarrow 00{:}12{:}39{.}200$ Five years.

NOTE Confidence: 0.899162484545455

 $00:12:39.200 \longrightarrow 00:12:40.632$ The abuse of pharmaceutical

NOTE Confidence: 0.899162484545455

00:12:40.632 --> 00:12:42.064 amphetamine has become wides pread

NOTE Confidence: 0.899162484545455

 $00:12:42.064 \rightarrow 00:12:43.630$ 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

 $00:12:45.800 \rightarrow 00:12:49.100$ and much is from physician prescribing.

NOTE Confidence: 0.899162484545455

 $00:12:49.100 \rightarrow 00:12:51.020$ But recently there have been sales

NOTE Confidence: 0.899162484545455

 $00{:}12{:}51.020 \dashrightarrow 00{:}12{:}53.526$ on the Internet and on the street

- NOTE Confidence: 0.899162484545455
- $00:12:53.526 \rightarrow 00:12:55.456$ of counterfeit Adderall pills that
- NOTE Confidence: 0.899162484545455
- $00:12:55.456 \rightarrow 00:12:57.358$ contain fentanyl at lethal dosages.
- NOTE Confidence: 0.899162484545455
- $00:12:57.360 \longrightarrow 00:12:59.257$ And about 1/4 to 1/3 of the
- NOTE Confidence: 0.899162484545455
- $00:12:59.257 \rightarrow 00:13:01.039$ pills that are on the street,
- NOTE Confidence: 0.899162484545455
- $00:13:01.040 \rightarrow 00:13:03.768$ it's because they're it's not that the drug
- NOTE Confidence: 0.899162484545455
- $00:13:03.768 \rightarrow 00:13:06.099$ dealers want to have a lot of fentanyl.
- NOTE Confidence: 0.899162484545455
- $00:13:06.100 \rightarrow 00:13:07.956$ They want to have enough that you'd have
- NOTE Confidence: 0.899162484545455
- $00:13:07.956 \rightarrow 00:13:10.096$ a good time not necessarily to kill you.
- NOTE Confidence: 0.899162484545455
- $00:13:10.100 \longrightarrow 00:13:12.648$ But their quality control
- NOTE Confidence: 0.899162484545455
- $00:13:12.648 \rightarrow 00:13:15.196$ is not exactly precise.
- NOTE Confidence: 0.899162484545455
- $00:13:15.200 \longrightarrow 00:13:17.630$ This is the adolescent data
- NOTE Confidence: 0.899162484545455
- $00:13:17.630 \longrightarrow 00:13:19.728$ from 2008 through 2011.
- NOTE Confidence: 0.8540504666666667
- $00:13:22.140 \longrightarrow 00:13:25.020$ The adolescents age 13 to 18,
- NOTE Confidence: 0.8540504666666667
- $00:13:25.020 \longrightarrow 00:13:27.959$ what you can see in 2011 is that
- NOTE Confidence: 0.8540504666666667
- $00:13:27.959 \rightarrow 00:13:32.660$ the rate of of doctors giving out.
- NOTE Confidence: 0.8540504666666667

- 00:13:32.660 -> 00:13:34.022 Adolescence amphetamines
- NOTE Confidence: 0.8540504666666667
- $00{:}13{:}34{.}022 \dashrightarrow 00{:}13{:}36{.}746$ has more than doubled,
- NOTE Confidence: 0.8540504666666667
- $00:13:36.750 \rightarrow 00:13:38.950$ so that's what that red line is showing.
- NOTE Confidence: 0.8540504666666667
- $00:13:38.950 \rightarrow 00:13:40.917$ The opiates haven't changed that much and
- NOTE Confidence: 0.8540504666666667
- $00{:}13{:}40{.}917 \dashrightarrow 00{:}13{:}42{.}590$ the depressants haven't changed that much.
- NOTE Confidence: 0.8540504666666667
- $00:13:42.590 \longrightarrow 00:13:43.295$ They they're more,
- NOTE Confidence: 0.8540504666666667
- $00:13:43.295 \longrightarrow 00:13:44.470$ more or less flat lines,
- NOTE Confidence: 0.8540504666666667
- $00:13:44.470 \rightarrow 00:13:45.894$ but going down somewhat.
- NOTE Confidence: 0.8540504666666667
- 00:13:45.894 --> 00:13:46.606 If anything,
- NOTE Confidence: 0.8540504666666667
- $00:13:46.610 \rightarrow 00:13:50.370$ when you look at the young adults 19 to 25.
- NOTE Confidence: 0.8540504666666667
- 00:13:50.370 --> 00:13:53.178 By 2014, you're seeing a significant
- NOTE Confidence: 0.8540504666666667
- $00:13:53.178 \rightarrow 00:13:55.050$ divergence that's occurring between
- NOTE Confidence: 0.8540504666666667
- 00:13:55.115 --> 00:13:57.390 prescribing opiates to them and
- NOTE Confidence: 0.8540504666666667
- $00:13:57.390 \longrightarrow 00:13:59.210$ prescribing stimulants to them.
- NOTE Confidence: 0.8540504666666667
- $00:13:59.210 \longrightarrow 00:14:00.278$ It is again,
- NOTE Confidence: 0.8540504666666667
- 00:14:00.278 --> 00:14:02.770 it's reached a plateau again at about

- NOTE Confidence: 0.8540504666666667
- $00:14:02.847 \rightarrow 00:14:05.766$ the same time as the younger adolescents,
- NOTE Confidence: 0.8540504666666667
- $00:14:05.770 \longrightarrow 00:14:08.521$ but the drop off in the opiate
- NOTE Confidence: 0.8540504666666667
- $00:14:08.521 \rightarrow 00:14:10.171$ prescription has clearly had
- NOTE Confidence: 0.8540504666666667
- $00:14:10.171 \longrightarrow 00:14:12.136$ a much more traumatic effect.
- NOTE Confidence: 0.8540504666666667
- $00{:}14{:}12{.}140 \dashrightarrow 00{:}14{:}15{.}404$ So doctors are prescribing a
- NOTE Confidence: 0.8540504666666667
- $00:14:15.404 \longrightarrow 00:14:16.959$ lot of stimulants and they're
- NOTE Confidence: 0.8540504666666667
- $00{:}14{:}16{.}959 \dashrightarrow 00{:}14{:}18{.}637$ out there all over the place.
- NOTE Confidence: 0.83945735
- $00:14:20.720 \longrightarrow 00:14:23.040$ So that's the epidemic stuff.
- NOTE Confidence: 0.83945735
- $00:14:23.040 \longrightarrow 00:14:24.790$ 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
- $00{:}14{:}26.642 \dashrightarrow 00{:}14{:}28.530$ 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
- $00:14:34.030 \longrightarrow 00:14:36.080$ Well, slow onset and slow
- NOTE Confidence: 0.83945735

 $00:14:36.080 \longrightarrow 00:14:37.310$ release long acting.

NOTE Confidence: 0.83945735

 $00:14:37.310 \rightarrow 00:14:39.750$ That would be the qualities you'd like with

NOTE Confidence: 0.83945735

 $00:14:39.750 \rightarrow 00:14:42.208$ that kind of a substitution type therapy.

NOTE Confidence: 0.83945735

 $00{:}14{:}42{.}210 \dashrightarrow 00{:}14{:}44{.}702$ 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

 $00{:}14{:}49{.}890 \dashrightarrow 00{:}14{:}53{.}824$ 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

 $00:14:57.318 \rightarrow 00:14:59.160$ time to talk about immunotherapies.

NOTE Confidence: 0.83945735

 $00{:}14{:}59{.}160 \dashrightarrow 00{:}15{:}02{.}249$ With the anti cocaine vaccine and

NOTE Confidence: 0.83945735

 $00{:}15{:}02.249 \dashrightarrow 00{:}15{:}03.694$ then the anti fentanyl vaccine

NOTE Confidence: 0.83945735

 $00:15:03.694 \longrightarrow 00:15:05.000$ which we've developed as a.

NOTE Confidence: 0.854076325714286

 $00:15:07.370 \longrightarrow 00:15:09.001$ I guess you could say a daughter

NOTE Confidence: 0.854076325714286

 $00{:}15{:}09{.}001 \dashrightarrow 00{:}15{:}11{.}127$ or a son of that cocaine vaccine.

NOTE Confidence: 0.854076325714286

 $00{:}15{:}11{.}130 \dashrightarrow 00{:}15{:}13{.}342$ So what about the slow onset and

 $00:15:13.342 \rightarrow 00:15:15.100$ 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

 $00:15:17.122 \longrightarrow 00:15:19.302$ that was brought to my attention

NOTE Confidence: 0.854076325714286

 $00:15:19.302 \longrightarrow 00:15:21.207$ actually by Stephanie and this

NOTE Confidence: 0.854076325714286

 $00:15:21.207 \rightarrow 00:15:24.890$ 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

 $00:15:26.670 \longrightarrow 00:15:29.034$ you know 14,000 patients that were

NOTE Confidence: 0.854076325714286

 $00:15:29.034 \rightarrow 00:15:31.944$ they had a mean age at 3470% were men

NOTE Confidence: 0.854076325714286

 $00{:}15{:}31{.}944 \dashrightarrow 00{:}15{:}34{.}145$ and it was during the period from 2006

NOTE Confidence: 0.854076325714286

 $00:15:34.145 \longrightarrow 00:15:37.305$ to 2018 and it was a within subjects.

NOTE Confidence: 0.854076325714286

 $00:15:37.310 \longrightarrow 00:15:40.540$ Comparing on versus off medications

NOTE Confidence: 0.854076325714286

 $00{:}15{:}40{.}540$ --> $00{:}15{:}44{.}395$ and lisd examfetamine which is a form

NOTE Confidence: 0.854076325714286

 $00{:}15{:}44{.}395 \dashrightarrow 00{:}15{:}47{.}398$ of amphetamine that is has to be

NOTE Confidence: 0.854076325714286

 $00{:}15{:}47{.}398 \dashrightarrow 00{:}15{:}48{.}622$ metabolized before the amphetamine

NOTE Confidence: 0.854076325714286

 $00:15:48.622 \rightarrow 00:15:49.960$ could have its effect.

 $00:15:49.960 \rightarrow 00:15:51.616$ So you're not going to get immediate effect,

NOTE Confidence: 0.854076325714286

 $00:15:51.620 \longrightarrow 00:15:53.100$ it's going to be slow.

NOTE Confidence: 0.854076325714286

 $00:15:53.100 \rightarrow 00:15:55.386$ But what they showed were positive

NOTE Confidence: 0.854076325714286

 $00:15:55.386 \longrightarrow 00:15:57.693$ outcomes and relative risk for the

NOTE Confidence: 0.854076325714286

 $00:15:57.693 \rightarrow 00:15:59.829$ people who got list Essick phetamine

NOTE Confidence: 0.854076325714286

 $00:15:59.829 \rightarrow 00:16:02.448$ versus those who were given any kind of

NOTE Confidence: 0.854076325714286

 $00:16:02.448 \longrightarrow 00:16:04.742$ stimulant and that and what they were

NOTE Confidence: 0.854076325714286

 $00:16:04.742 \rightarrow 00:16:08.200$ looking at was on versus off the medications.

NOTE Confidence: 0.854076325714286

 $00{:}16{:}08{.}200 \dashrightarrow 00{:}16{:}10{.}531$ What they found was that there was

NOTE Confidence: 0.854076325714286

 $00:16:10.531 \rightarrow 00:16:12.280$ less hospitalization for substance use

NOTE Confidence: 0.854076325714286

 $00:16:12.280 \rightarrow 00:16:14.688$ disorders when they were on the medication

NOTE Confidence: 0.854076325714286

 $00:16:14.688 \rightarrow 00:16:17.018$ then when they were off the medication.

NOTE Confidence: 0.854076325714286

 $00:16:17.020 \rightarrow 00:16:20.324$ Overall there was less of any type of

NOTE Confidence: 0.854076325714286

 $00:16:20.324 \rightarrow 00:16:22.842$ hospitalization when they were on the

NOTE Confidence: 0.854076325714286

 $00:16:22.842 \rightarrow 00:16:24.867$ medication versus off the medication

NOTE Confidence: 0.854076325714286

 $00:16:24.867 \rightarrow 00:16:27.740$ and there was less all cause mortality

- NOTE Confidence: 0.854076325714286
- $00{:}16{:}27.740 \dashrightarrow 00{:}16{:}30.354$ from the periods when people were on
- NOTE Confidence: 0.854076325714286
- $00{:}16{:}30{.}354 \dashrightarrow 00{:}16{:}32{.}382$ the medication then periods when they
- NOTE Confidence: 0.854076325714286
- $00{:}16{:}32{.}382 \dashrightarrow 00{:}16{:}34{.}768$ were off the medication that that
- NOTE Confidence: 0.854076325714286
- $00:16:34.768 \rightarrow 00:16:36.753$ odds ratio obviously relatively large.
- NOTE Confidence: 0.854076325714286
- $00:16:36.760 \longrightarrow 00:16:38.660$ So that's these are important.
- NOTE Confidence: 0.854076325714286
- $00:16:38.660 \longrightarrow 00:16:40.564$ Considerations that these treatments
- NOTE Confidence: 0.854076325714286
- $00:16:40.564 \longrightarrow 00:16:44.062$ can in fact be useful even in
- NOTE Confidence: 0.854076325714286
- $00:16:44.062 \longrightarrow 00:16:46.294$ substance abusing populations if
- NOTE Confidence: 0.854076325714286
- $00:16:46.294 \rightarrow 00:16:47.968$ they're carefully done.
- NOTE Confidence: 0.854076325714286
- $00:16:47.970 \longrightarrow 00:16:49.638$ What about the randomized
- NOTE Confidence: 0.854076325714286
- $00:16:49.638 \rightarrow 00:16:51.306$ clinical trials using stimulants?
- NOTE Confidence: 0.854076325714286
- $00:16:51.310 \longrightarrow 00:16:53.230$ Have they shown some efficacy?
- NOTE Confidence: 0.854076325714286
- $00:16:53.230 \longrightarrow 00:16:53.583$ Well,
- NOTE Confidence: 0.854076325714286
- $00{:}16{:}53{.}583 \dashrightarrow 00{:}16{:}56{.}054$ the because this other was of course
- NOTE Confidence: 0.854076325714286
- $00{:}16{:}56.054 \dashrightarrow 00{:}16{:}57.870$ an epidemiological study from Sweden.
- NOTE Confidence: 0.854076325714286

00:16:57.870 --> 00:16:58.989 The clinical trials,

NOTE Confidence: 0.854076325714286

 $00{:}16{:}58{.}989 \dashrightarrow 00{:}17{:}01{.}600$ there are reviews of them in 2019

NOTE Confidence: 0.854076325714286

 $00:17:01.670 \longrightarrow 00:17:03.190$ and other one in 2016.

NOTE Confidence: 0.854076325714286

 $00{:}17{:}03.190 \dashrightarrow 00{:}17{:}05.854$ There are 26 different studies that

NOTE Confidence: 0.854076325714286

 $00:17:05.854 \rightarrow 00:17:08.414$ have been done involving over.

NOTE Confidence: 0.854076325714286

 $00{:}17{:}08{.}414 \dashrightarrow 00{:}17{:}12{.}086$ 2000 subjects and what those studies

NOTE Confidence: 0.854076325714286

 $00{:}17{:}12.086 \dashrightarrow 00{:}17{:}16.025$ show is that the cocaine abstinence

NOTE Confidence: 0.854076325714286

 $00:17:16.025 \rightarrow 00:17:19.790$ relative risk ratio was 1.36 which is good.

NOTE Confidence: 0.854076325714286

 $00{:}17{:}19.790 \dashrightarrow 00{:}17{:}21.530$ I mean it's better than one.

NOTE Confidence: 0.854076325714286

 $00:17:21.530 \longrightarrow 00:17:23.540$ And then the necessary number

NOTE Confidence: 0.854076325714286

 $00:17:23.540 \longrightarrow 00:17:25.148$ to treat of patients,

NOTE Confidence: 0.854076325714286

 $00:17:25.150 \longrightarrow 00:17:26.698$ you treat 14 patients to expect

NOTE Confidence: 0.854076325714286

 $00:17:26.698 \longrightarrow 00:17:28.730$ to get one of them that might

NOTE Confidence: 0.854076325714286

 $00:17:28.730 \dashrightarrow 00:17:30.602$ have a positive response to this.

NOTE Confidence: 0.854076325714286

 $00:17:30.610 \longrightarrow 00:17:33.402$ So if it's still that that's not a, you know,

NOTE Confidence: 0.854076325714286

 $00:17:33.402 \rightarrow 00:17:35.229$ number needed to treat is not great,

- NOTE Confidence: 0.854076325714286
- $00:17:35.230 \longrightarrow 00:17:36.892$ but it indicates that there can
- NOTE Confidence: 0.854076325714286
- $00:17:36.892 \longrightarrow 00:17:39.020$ in fact be a role for these.
- NOTE Confidence: 0.854076325714286
- $00:17:39.020 \longrightarrow 00:17:42.380$ Slow onset look much lower.
- NOTE Confidence: 0.854076325714286
- 00:17:42.380 --> 00:17:43.886 Abuse liability stimulants,
- NOTE Confidence: 0.854076325714286
- $00:17:43.886 \longrightarrow 00:17:45.894$ the short onset ones,
- NOTE Confidence: 0.854076325714286
- $00:17:45.900 \rightarrow 00:17:47.838$ which is what the patients want,
- NOTE Confidence: 0.854076325714286
- $00:17:47.840 \longrightarrow 00:17:50.159$ not so good.
- NOTE Confidence: 0.854076325714286
- $00:17:50.160 \rightarrow 00:17:53.409$ So I've tried to cover a balanced view of,
- NOTE Confidence: 0.854076325714286
- $00{:}17{:}53{.}410 \dashrightarrow 00{:}17{:}54{.}887$ you know, how stimulants can be used,
- NOTE Confidence: 0.854076325714286
- $00:17:54.890 \rightarrow 00:17:56.498$ but they have to be used very carefully.
- NOTE Confidence: 0.854076325714286
- $00:17:56.500 \rightarrow 00:17:59.848$ They're clearly a very useful treatment
- NOTE Confidence: 0.854076325714286
- $00{:}17{:}59.848 \dashrightarrow 00{:}18{:}02.080$ for attention deficit disorder.
- NOTE Confidence: 0.854076325714286
- $00:18:02.080 \longrightarrow 00:18:03.532$ But a lot of people with
- NOTE Confidence: 0.854076325714286
- $00:18:03.532 \longrightarrow 00:18:04.258$ attention deficit disorder,
- NOTE Confidence: 0.854076325714286
- $00:18:04.260 \rightarrow 00:18:07.300$ 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

 $00:18:08.780 \longrightarrow 00:18:10.364$ methamphetamine to or

NOTE Confidence: 0.854076325714286

 $00:18:10.364 \rightarrow 00:18:12.476$ amphetamine to treat it,

NOTE Confidence: 0.854076325714286

 $00:18:12.480 \longrightarrow 00:18:15.078$ 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

 $00:18:17.048 \longrightarrow 00:18:18.032$ totally different thing,

NOTE Confidence: 0.783931143333333

 $00:18:18.040 \rightarrow 00:18:20.098$ which is let's talk about pharmacogenetics.

NOTE Confidence: 0.783931143333333

 $00:18:20.100 \longrightarrow 00:18:22.728$ 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

 $00{:}18{:}24.070 \dashrightarrow 00{:}18{:}25.790$ which is an A1 blocker.

NOTE Confidence: 0.783931143333333

 $00{:}18{:}25{.}790 \dashrightarrow 00{:}18{:}27{.}800$ And the polymorphism that I'm looking

NOTE Confidence: 0.783931143333333

 $00{:}18{:}27.800 \dashrightarrow 00{:}18{:}29.910$ at is dopamine beta hydroxylase,

NOTE Confidence: 0.783931143333333

 $00:18:29.910 \longrightarrow 00:18:32.892$ which is a gene that converts

NOTE Confidence: 0.783931143333333

 $00:18:32.892 \rightarrow 00:18:34.383$ dopamine to norepinephrine.

NOTE Confidence: 0.783931143333333

 $00:18:34.390 \rightarrow 00:18:36.470$ 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
- $00:18:38.270 \longrightarrow 00:18:41.750$ and this is the enzyme that
- NOTE Confidence: 0.783931143333333
- $00:18:41.750 \longrightarrow 00:18:43.378$ makes that conversion possible.
- NOTE Confidence: 0.783931143333333
- $00:18:43.378 \longrightarrow 00:18:45.820$ And so if you have very
- NOTE Confidence: 0.783931143333333
- $00:18:45.900 \longrightarrow 00:18:47.528$ little of that enzyme,
- NOTE Confidence: 0.783931143333333
- $00:18:47.530 \longrightarrow 00:18:49.575$ you're going to have dopamine
- NOTE Confidence: 0.783931143333333
- $00{:}18{:}49{.}575 \dashrightarrow 00{:}18{:}50{.}802$ released from no repinephrine
- NOTE Confidence: 0.783931143333333
- $00:18:50.802 \rightarrow 00:18:52.679$ neurons instead of norepinephrine.
- NOTE Confidence: 0.783931143333333
- $00:18:52.680 \longrightarrow 00:18:54.678$ And if you have a lot of that enzyme,
- NOTE Confidence: 0.783931143333333
- $00{:}18{:}54{.}680 \dashrightarrow 00{:}18{:}56{.}732$ you're going to convert a lot
- NOTE Confidence: 0.783931143333333
- $00:18:56.732 \rightarrow 00:18:58.100$ of things to norepinephrine.
- NOTE Confidence: 0.783931143333333
- $00:18:58.100 \rightarrow 00:19:00.476$ Now, clearly not out of the dopamine neurons,
- NOTE Confidence: 0.783931143333333
- $00:19:00.480 \longrightarrow 00:19:01.936$ because the dopamine neurons
- NOTE Confidence: 0.783931143333333
- $00:19:01.936 \rightarrow 00:19:03.756$ themselves don't contain this enzyme.
- NOTE Confidence: 0.783931143333333
- $00{:}19{:}03.760 \dashrightarrow 00{:}19{:}06.880$ It's in the norepine phrine neurons.
- NOTE Confidence: 0.783931143333333
- $00:19:06.880 \longrightarrow 00:19:08.580$ And no repinephrine, 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

 $00{:}19{:}12{.}060 \dashrightarrow 00{:}19{:}15{.}570$ 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

 $00:19:20.600 \longrightarrow 00:19:23.155$ 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

 $00{:}19{:}25{.}200 \dashrightarrow 00{:}19{:}28{.}540$ and it's the location is

NOTE Confidence: 0.902426198888889

 $00{:}19{:}28{.}540 \dashrightarrow 00{:}19{:}31{.}880$ in fact before the actual.

NOTE Confidence: 0.902426198888889

 $00:19:31.880 \rightarrow 00:19:34.764$ Gene itself that codes for the protein,

NOTE Confidence: 0.902426198888889

 $00{:}19{:}34.770 \dashrightarrow 00{:}19{:}37.970$ so it's a regulatory polymorphism.

NOTE Confidence: 0.902426198888889

 $00:19:37.970 \longrightarrow 00:19:39.530$ It's in the promoter region,

NOTE Confidence: 0.902426198888889

 $00:19:39.530 \longrightarrow 00:19:41.174$ it's critically involved in

NOTE Confidence: 0.902426198888889

 $00:19:41.174 \longrightarrow 00:19:42.818$ the activity of DBH.

NOTE Confidence: 0.902426198888889

 $00{:}19{:}42.820 \dashrightarrow 00{:}19{:}45.494$ There's a total of about 6 mutations

NOTE Confidence: 0.902426198888889

 $00{:}19{:}45{.}494 \dashrightarrow 00{:}19{:}48{.}384$ 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

 $00:19:50.470 \rightarrow 00:19:51.841$ which is ATT,

- NOTE Confidence: 0.902426198888889
- 00:19:51.841 --> 00:19:54.126 produces about 100 times more
- NOTE Confidence: 0.902426198888889
- $00{:}19{:}54{.}126 \dashrightarrow 00{:}19{:}56{.}931$ no repinephrine than if you have one of
- NOTE Confidence: 0.902426198888889
- $00:19:56.931 \rightarrow 00:19:59.510$ these polymorphisms and the the CC and
- NOTE Confidence: 0.902426198888889
- $00:19:59.510 \rightarrow 00:20:01.932$ this particular one is the one that.
- NOTE Confidence: 0.902426198888889
- $00:20:01.940 \longrightarrow 00:20:03.240$ This is the lowest levels,
- NOTE Confidence: 0.902426198888889
- $00:20:03.240 \longrightarrow 00:20:05.478$ but it's also the most common.
- NOTE Confidence: 0.902426198888889
- $00:20:05.480 \longrightarrow 00:20:07.622$ 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
- $00{:}20{:}08.540 \dashrightarrow 00{:}20{:}10.540$ from psychosis to conduct disorders.
- NOTE Confidence: 0.902426198888889
- $00:20:10.540 \longrightarrow 00:20:13.048$ It's one of the genetic polymorphisms
- NOTE Confidence: 0.902426198888889
- $00:20:13.048 \rightarrow 00:20:15.587$ 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
- $00{:}20{:}20{.}717 \dashrightarrow 00{:}20{:}22{.}902$ for cocaine abuse and found
- NOTE Confidence: 0.902426198888889
- $00{:}20{:}22{.}902 \dashrightarrow 00{:}20{:}25{.}320$ that indeed that the placebo,
- NOTE Confidence: 0.902426198888889

 $00:20:25.320 \rightarrow 00:20:27.656$ which you can see in the solid line,

NOTE Confidence: 0.902426198888889

 $00{:}20{:}27{.}660 \dashrightarrow 00{:}20{:}30{.}516$ if anything there, cocaine use is going up.

NOTE Confidence: 0.902426198888889

 $00:20:30.520 \rightarrow 00:20:31.948$ And the people who got the ducks.

NOTE Confidence: 0.902426198888889

 $00:20:31.950 \rightarrow 00:20:35.894$ Places in there, cocaine use is going down.

NOTE Confidence: 0.902426198888889

 $00:20:35.900 \longrightarrow 00:20:38.360$ This is a profound effect.

NOTE Confidence: 0.902426198888889

 $00{:}20{:}38{.}360 \dashrightarrow 00{:}20{:}39{.}209$ Of course not.

NOTE Confidence: 0.902426198888889

 $00{:}20{:}39{.}209 \dashrightarrow 00{:}20{:}41{.}190$ We we have very few medications in

NOTE Confidence: 0.902426198888889

 $00:20:41.254 \rightarrow 00:20:43.798$ cocaine abuse that produce profound effects.

NOTE Confidence: 0.902426198888889

 $00:20:43.800 \longrightarrow 00:20:47.166$ 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

 $00:20:49.190 \longrightarrow 00:20:51.214$ and the active medication,

NOTE Confidence: 0.902426198888889

 $00{:}20{:}51{.}220 \dashrightarrow 00{:}20{:}55{.}308$ and it's fairly sustained after the 5th week.

NOTE Confidence: 0.902426198888889

 $00{:}20{:}55{.}310 \dashrightarrow 00{:}20{:}57{.}630$ And let's see next one.

NOTE Confidence: 0.885811125

 $00:21:00.230 \longrightarrow 00:21:02.526$ 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

 $00:21:04.188 \rightarrow 00:21:06.658$ how much of the enzyme was actually
- NOTE Confidence: 0.885811125
- $00:21:06.658 \rightarrow 00:21:09.437$ there and did that have an effect?

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

NOTE Confidence: 0.885811125

 $00:21:11.928 \rightarrow 00:21:14.856$ one the people that have the genetic

NOTE Confidence: 0.885811125

 $00:21:14.856 \rightarrow 00:21:17.086$ 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

 $00{:}21{:}19{.}920 \dashrightarrow 00{:}21{:}22{.}494$ And what we found is with these lower levels,

NOTE Confidence: 0.885811125

 $00:21:22.500 \longrightarrow 00:21:24.880$ 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

 $00{:}21{:}26.784 \dashrightarrow 00{:}21{:}28.920$ and the active medication.

NOTE Confidence: 0.885811125

 $00:21:28.920 \longrightarrow 00:21:29.880$ On the other hand,

NOTE Confidence: 0.885811125

 $00:21:29.880 \longrightarrow 00:21:31.080$ 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

 $00:21:33.936 \rightarrow 00:21:36.032$ polymorphism and therefore had a

NOTE Confidence: 0.885811125

 $00:21:36.032 \rightarrow 00:21:38.432$ reduction in the amount of genetically

NOTE Confidence: 0.885811125

 $00:21:38.432 \rightarrow 00:21:40.412$ produced norepinephrine that their

 $00:21:40.412 \rightarrow 00:21:42.508$ cocaine use significantly dropped

NOTE Confidence: 0.885811125

 $00:21:42.508 \longrightarrow 00:21:45.930$ 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

 $00{:}21{:}50{.}832 \dashrightarrow 00{:}21{:}53{.}100$ or six and continuing to go down

NOTE Confidence: 0.885811125

 $00{:}21{:}53{.}100 \dashrightarrow 00{:}21{:}55{.}184$ 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

 $00{:}21{:}57.040 \dashrightarrow 00{:}21{:}59.080$ 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

 $00:22:01.630 \longrightarrow 00:22:03.789$ are reduced about 40%.

NOTE Confidence: 0.885811125

 $00{:}22{:}03.790 \dashrightarrow 00{:}22{:}05.980$ From the baseline in these people

NOTE Confidence: 0.885811125

 $00:22:05.980 \longrightarrow 00:22:08.370$ that had this genetic polymorphism,

NOTE Confidence: 0.885811125

 $00:22:08.370 \longrightarrow 00:22:10.332$ we then you know repeated this

NOTE Confidence: 0.885811125

 $00:22:10.332 \longrightarrow 00:22:12.729$ in a couple of other studies.

NOTE Confidence: 0.885811125

 $00:22:12.730 \longrightarrow 00:22:15.047$ 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,

 $00:22:17.450 \rightarrow 00:22:19.928$ but we've also found that a polymorphism

NOTE Confidence: 0.885811125

00:22:19.928 --> 00:22:22.025 in the alpha norad
renergic receptor

NOTE Confidence: 0.885811125

 $00:22:22.025 \rightarrow 00:22:24.911$ which leads to less sensitivity and

NOTE Confidence: 0.885811125

 $00:22:24.911 \longrightarrow 00:22:27.660$ or difference in sensitivity in that

NOTE Confidence: 0.885811125

 $00{:}22{:}27.660 \dashrightarrow 00{:}22{:}30.228$ receptor that that's also associated with

NOTE Confidence: 0.885811125

 $00{:}22{:}30{.}230 \dashrightarrow 00{:}22{:}33{.}744$ 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

 $00:22:38.228 \rightarrow 00:22:41.580$ the DBH and that other polymorphism

NOTE Confidence: 0.885811125

 $00{:}22{:}41.580 \dashrightarrow 00{:}22{:}44.030$ in the receptor for no repinephrine

NOTE Confidence: 0.885811125

 $00{:}22{:}44.030 \dashrightarrow 00{:}22{:}47.935$ that they do act together to have a an

NOTE Confidence: 0.885811125

 $00{:}22{:}47{.}935 \dashrightarrow 00{:}22{:}50{.}479$ 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

 $00{:}22{:}51{.}719 \dashrightarrow 00{:}22{:}54{.}610$ It's been hard to convince that the

NOTE Confidence: 0.885811125

 $00:22:54.689 \longrightarrow 00:22:56.864$ powers to be that Pharmacogenetics

NOTE Confidence: 0.885811125

 $00:22:56.864 \rightarrow 00:22:59.540$ has any role for substance abuse,

 $00:22:59.540 \rightarrow 00:23:02.195$ but we've found it with a variety of drugs.

NOTE Confidence: 0.885811125

 $00:23:02.200 \longrightarrow 00:23:03.984$ This is for cocaine.

NOTE Confidence: 0.885811125

 $00{:}23{:}03{.}984 \dashrightarrow 00{:}23{:}05{.}768$ So there's a pharma cogenetic

NOTE Confidence: 0.885811125

 $00:23:05.768 \rightarrow 00:23:07.911$ hypothesis that I hope is obvious

NOTE Confidence: 0.885811125

 $00:23:07.911 \longrightarrow 00:23:10.403$ 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

 $00{:}23{:}12{.}360 \dashrightarrow 00{:}23{:}14{.}796$ 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

 $00{:}23{:}17.140 \dashrightarrow 00{:}23{:}20.952$ that if there's less no repine phrine there

NOTE Confidence: 0.885811125

 $00:23:20.952 \longrightarrow 00:23:24.864$ that we find that in fact the block by

NOTE Confidence: 0.885811125

 $00:23:24.864 \rightarrow 00:23:27.860$ doxazosin then has a more profound effect.

NOTE Confidence: 0.885811125

 $00:23:27.860 \longrightarrow 00:23:32.426$ And this is again I think.

NOTE Confidence: 0.885811125

 $00{:}23{:}32{.}430 \dashrightarrow 00{:}23{:}35{.}231$ A function that makes at least some

NOTE Confidence: 0.885811125

 $00:23:35.231 \rightarrow 00:23:37.997$ sense that the doxazosin would work

NOTE Confidence: 0.885811125

 $00{:}23{:}37{.}997 \dashrightarrow 00{:}23{:}41{.}823$ better in the cocaine use puppet patients

NOTE Confidence: 0.885811125

 $00:23:41.823 \rightarrow 00:23:45.357$ that have this polymorphism that they're.

- NOTE Confidence: 0.885811125
- $00:23:45.360 \longrightarrow 00:23:46.485$ Norepinephrine levels are

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

NOTE Confidence: 0.885811125

 $00:23:48.740 \longrightarrow 00:23:51.640$ 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

 $00{:}23{:}54{.}139 \dashrightarrow 00{:}23{:}56{.}209$ levels would be therefore lower,

NOTE Confidence: 0.885811125

 $00{:}23{:}56{.}210 \dashrightarrow 00{:}23{:}58{.}238$ and therefore blocking it with Doxazosin

NOTE Confidence: 0.885811125

 $00:23:58.238 \rightarrow 00:24:00.449$ 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

 $00:24:04.262 \longrightarrow 00:24:05.905$ to have a couple of other slides

NOTE Confidence: 0.869943317333334

 $00:24:05.905 \rightarrow 00:24:07.372$ where I write the stuff correctly

NOTE Confidence: 0.869943317333334

 $00:24:07.372 \rightarrow 00:24:09.356$ and that is we're now going to talk

NOTE Confidence: 0.869943317333334

 $00{:}24{:}09{.}356 \dashrightarrow 00{:}24{:}11{.}262$ 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

 $00{:}24{:}13.740 \dashrightarrow 00{:}24{:}15.474$ Really to prevent overdose is what

NOTE Confidence: 0.869943317333334

 $00{:}24{:}15{.}474 \dashrightarrow 00{:}24{:}17{.}246$ we're thinking about and how that

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

NOTE Confidence: 0.869943317333334

 $00:24:18.650 \rightarrow 00:24:20.652$ 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

 $00:24:22.803 \rightarrow 00:24:25.820$ with the cocaine vaccine in general.

NOTE Confidence: 0.869943317333334

 $00{:}24{:}25.820 \dashrightarrow 00{:}24{:}28.984$ We've been using a variety of different

NOTE Confidence: 0.869943317333334

 $00{:}24{:}28{.}984 \dashrightarrow 00{:}24{:}31{.}544$ proteins as carriers because the drugs NOTE Confidence: 0.869943317333334

 $00:24:31.544 \longrightarrow 00:24:34.176$ 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

 $00:24:36.820 \rightarrow 00:24:40.570$ So that we've been recently using

NOTE Confidence: 0.869943317333334

 $00:24:40.570 \longrightarrow 00:24:43.740$ 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

 $00{:}24{:}45{.}228 \dashrightarrow 00{:}24{:}47{.}460$ but we've also used cholera toxoid,

NOTE Confidence: 0.869943317333334

 $00:24:47.460 \longrightarrow 00:24:48.260$ tetanus toxoid.

NOTE Confidence: 0.869943317333334

 $00{:}24{:}48{.}260 \dashrightarrow 00{:}24{:}51{.}060$ 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

 $00:24:53.800 \rightarrow 00:24:56.820$ So it's got a lot of safety data on it.

- NOTE Confidence: 0.869943317333334
- $00:24:56.820 \longrightarrow 00:24:58.692$ And the fentanyl can be attached
- NOTE Confidence: 0.869943317333334
- $00:24:58.692 \longrightarrow 00:25:01.024$ to the code by either succinyl
- NOTE Confidence: 0.869943317333334
- $00{:}25{:}01{.}024 \dashrightarrow 00{:}25{:}03{.}060$ linkages or glycerol linkages.
- NOTE Confidence: 0.869943317333334
- $00{:}25{:}03.060 \dashrightarrow 00{:}25{:}05.447$ And it attaches to what are the
- NOTE Confidence: 0.869943317333334
- $00{:}25{:}05{.}447 \dashrightarrow 00{:}25{:}07{.}691$ 12 lysine amino acids on the
- NOTE Confidence: 0.869943317333334
- $00{:}25{:}07.691 \dashrightarrow 00{:}25{:}09.596$ outside of the creme protein.
- NOTE Confidence: 0.869943317333334
- $00:25:09.600 \longrightarrow 00:25:10.376$ With tetanus,
- NOTE Confidence: 0.869943317333334
- $00:25:10.376 \rightarrow 00:25:13.092$ there's many more lysines on the outside.
- NOTE Confidence: 0.869943317333334
- $00{:}25{:}13.100 \dashrightarrow 00{:}25{:}15.068$ 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
- $00:25:17.968 \rightarrow 00:25:21.090$ in terms of using it as a carrier.
- NOTE Confidence: 0.869943317333334
- $00{:}25{:}21.090 \dashrightarrow 00{:}25{:}23.365$ So we're looking to make
- NOTE Confidence: 0.869943317333334
- $00:25:23.365 \rightarrow 00:25:25.185$ inexpensive versions of vaccines,
- NOTE Confidence: 0.869943317333334
- $00:25:25.190 \longrightarrow 00:25:26.666$ and this is how they work.
- NOTE Confidence: 0.869943317333334
- $00{:}25{:}26.670 \dashrightarrow 00{:}25{:}28.548$ 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

 $00{:}25{:}29{.}790 \dashrightarrow 00{:}25{:}31{.}380$ it concentrates in the brain because

NOTE Confidence: 0.869943317333334

 $00{:}25{:}31{.}380 \dashrightarrow 00{:}25{:}32{.}897$ there are receptors in the brain

NOTE Confidence: 0.869943317333334

 $00:25:32.897 \rightarrow 00:25:34.513$ for it to bind to give the vaccine.

NOTE Confidence: 0.869943317333334

 $00{:}25{:}34{.}520 \dashrightarrow 00{:}25{:}36{.}285$ The vaccine makes these antibodies

NOTE Confidence: 0.869943317333334

 $00{:}25{:}36{.}285 \dashrightarrow 00{:}25{:}38{.}050$ that stay in the blood stream.

NOTE Confidence: 0.869943317333334

 $00:25:38.050 \rightarrow 00:25:39.586$ They don't go into the brain.

NOTE Confidence: 0.869943317333334

 $00:25:39.590 \longrightarrow 00:25:41.452$ 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

 $00:25:43.503 \rightarrow 00:25:45.478$ there already with the antibodies.

NOTE Confidence: 0.869943317333334

 $00{:}25{:}45{.}480 \dashrightarrow 00{:}25{:}48{.}280$ You keep the drug in the blood stream.

NOTE Confidence: 0.869943317333334

 $00:25:48.280 \longrightarrow 00:25:49.974$ Some of it gets into the brain,

NOTE Confidence: 0.869943317333334

 $00:25:49.980 \longrightarrow 00:25:52.124$ but in fact if you had a higher

NOTE Confidence: 0.869943317333334

 $00:25:52.124 \rightarrow 00:25:53.279$ concentration in the brain,

NOTE Confidence: 0.869943317333334

 $00:25:53.280 \rightarrow 00:25:55.194$ the antibodies would pull the drug

NOTE Confidence: 0.869943317333334

 $00{:}25{:}55{.}194 \dashrightarrow 00{:}25{:}58{.}386$ out of the brain and into and onto the

- NOTE Confidence: 0.869943317333334
- $00:25:58.386 \rightarrow 00:26:00.231$ antibodies where they then circulate.
- NOTE Confidence: 0.869943317333334
- $00:26:00.240 \longrightarrow 00:26:03.576$ And the cocaine or whatever the drug is,
- NOTE Confidence: 0.869943317333334
- $00:26:03.580 \longrightarrow 00:26:06.184$ is eliminated through liver
- NOTE Confidence: 0.869943317333334
- $00:26:06.184 \rightarrow 00:26:10.090$ metabolism and also in the urine.
- NOTE Confidence: 0.869943317333334
- $00:26:10.090 \rightarrow 00:26:12.346$ 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
- $00:26:13.160 \rightarrow 00:26:15.340$ Here's another picture of how it might work.
- NOTE Confidence: 0.869943317333334
- $00:26:15.340 \longrightarrow 00:26:18.052$ And this is particularly
- NOTE Confidence: 0.869943317333334
- $00:26:18.052 \longrightarrow 00:26:20.086$ relevant to monoclonals.
- NOTE Confidence: 0.869943317333334
- $00:26:20.090 \rightarrow 00:26:24.520$ For a monoclonal against fentanyl
- NOTE Confidence: 0.869943317333334
- $00:26:24.520 \rightarrow 00:26:26.420$ or against cocaine or whatever,
- NOTE Confidence: 0.869943317333334
- $00:26:26.420 \longrightarrow 00:26:27.940$ they would actually pull the
- NOTE Confidence: 0.869943317333334
- $00:26:27.940 \longrightarrow 00:26:29.460$ drug out of the brain.
- NOTE Confidence: 0.869943317333334
- $00{:}26{:}29{.}460 \dashrightarrow 00{:}26{:}32{.}946$ And so this could be a very
- NOTE Confidence: 0.869943317333334
- $00{:}26{:}32{.}946 \dashrightarrow 00{:}26{:}34{.}440$ rapid overdose treatment.
- NOTE Confidence: 0.869943317333334

00:26:34.440 --> 00:26:35.457 And by injecting,

NOTE Confidence: 0.869943317333334

 $00{:}26{:}35{.}457 \dashrightarrow 00{:}26{:}37{.}491$ but you'd have to inject the

NOTE Confidence: 0.869943317333334

 $00:26:37.491 \longrightarrow 00:26:38.850$ monoclonal into the person,

NOTE Confidence: 0.869943317333334

 $00:26:38.850 \longrightarrow 00:26:40.894$ there are some monoclonals.

NOTE Confidence: 0.869943317333334

 $00:26:40.894 \rightarrow 00:26:43.449$ That can be given subcutaneously.

NOTE Confidence: 0.869943317333334

 $00{:}26{:}43.450 \dashrightarrow 00{:}26{:}45.484$ That have been developed for Alzheimer's

NOTE Confidence: 0.869943317333334

 $00:26:45.484 \rightarrow 00:26:47.421$ disease and they're ones that even

NOTE Confidence: 0.869943317333334

 $00:26:47.421 \rightarrow 00:26:49.248$ look like you can give them orally,

NOTE Confidence: 0.869943317333334

 $00{:}26{:}49{.}250 \dashrightarrow 00{:}26{:}51{.}695$ but obviously if someone's passed

NOTE Confidence: 0.869943317333334

 $00{:}26{:}51.695 \dashrightarrow 00{:}26{:}54.668$ out you would probably give them

NOTE Confidence: 0.869943317333334

 $00{:}26{:}54.668 \dashrightarrow 00{:}26{:}57.344$ by injection and subq as possible.

NOTE Confidence: 0.869943317333334

 $00:26:57.350 \longrightarrow 00:26:59.740$ 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

 $00:27:01.445 \longrightarrow 00:27:02.809$ to overcome these vaccines?

NOTE Confidence: 0.869943317333334

 $00{:}27{:}02.810 \dashrightarrow 00{:}27{:}04.202$ Well, yes, they can,

NOTE Confidence: 0.869943317333334

 $00{:}27{:}04.202 \dashrightarrow 00{:}27{:}06.290$ but it would take some effort.

 $00:27:06.290 \rightarrow 00:27:08.850$ This is not someone who's taking the vaccine,

NOTE Confidence: 0.783211143333333

 $00:27:08.850 \rightarrow 00:27:11.208$ obviously, but someone with a stunt.

NOTE Confidence: 0.783211143333333

 $00{:}27{:}11{.}210 \dashrightarrow 00{:}27{:}11{.}912$ You'd have to,

NOTE Confidence: 0.783211143333333

 $00:27:11.912 \longrightarrow 00:27:14.229$ you'd have to take a lot of cocaine in,

NOTE Confidence: 0.783211143333333

 $00:27:14.230 \longrightarrow 00:27:15.510$ and in particular fentanyl,

NOTE Confidence: 0.783211143333333

 $00:27:15.510 \longrightarrow 00:27:17.430$ which we're going to get to.

NOTE Confidence: 0.783211143333333

 $00{:}27{:}17.430 \dashrightarrow 00{:}27{:}19.070$ 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

 $00:27:20.390 \longrightarrow 00:27:21.530$ 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

 $00{:}27{:}24.030 \dashrightarrow 00{:}27{:}25.623$ we never could get it to work that well.

NOTE Confidence: 0.783211143333333

 $00:27:25.630 \longrightarrow 00:27:26.785$ And I'll show you some of those.

NOTE Confidence: 0.783211143333333

 $00{:}27{:}26.790 \dashrightarrow 00{:}27{:}29.574$ Data because people take in so

NOTE Confidence: 0.783211143333333

 $00{:}27{:}29{.}574 \dashrightarrow 00{:}27{:}31{.}972$ much cocaine compared to the

NOTE Confidence: 0.783211143333333

 $00:27:31.972 \longrightarrow 00:27:34.720$ amount that's taken in a fentanyl.

 $00:27:34.720 \longrightarrow 00:27:36.416$ So what are the?

NOTE Confidence: 0.783211143333333

 $00{:}27{:}36{.}416 \dashrightarrow 00{:}27{:}38{.}536$ These cocaine vaccines look like,

NOTE Confidence: 0.783211143333333

 $00{:}27{:}38.540 \dashrightarrow 00{:}27{:}40.052$ well pharmacologically they looked

NOTE Confidence: 0.783211143333333

 $00:27:40.052 \rightarrow 00:27:42.320$ sensible and that if you had

NOTE Confidence: 0.783211143333333

 $00:27:42.388 \longrightarrow 00:27:44.188$ a high antibody which we could

NOTE Confidence: 0.783211143333333

 $00:27:44.188 \longrightarrow 00:27:46.066$ develop by giving a larger dose NOTE Confidence: 0.783211143333333

 $00{:}27{:}46.066 \dashrightarrow 00{:}27{:}47.902$ of the vaccine or low antibodies

NOTE Confidence: 0.783211143333333

 $00:27:47.902 \longrightarrow 00:27:50.850$ from a lower dose of the vaccine.

NOTE Confidence: 0.783211143333333

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

NOTE Confidence: 0.783211143333333

 $00:27:53.230 \longrightarrow 00:27:55.024$ which of the cocaine and then

NOTE Confidence: 0.783211143333333

 $00:27:55.024 \longrightarrow 00:27:56.706$ we gave either 25 milligrams

NOTE Confidence: 0.783211143333333

 $00{:}27{:}56.706 \dashrightarrow 00{:}27{:}58.776$ or 50 milligrams of cocaine.

NOTE Confidence: 0.783211143333333

 $00:27:58.780 \longrightarrow 00:28:01.380$ This was smoked cocaine.

NOTE Confidence: 0.783211143333333

 $00:28:01.380 \longrightarrow 00:28:03.912$ And you could get an 80% blockage.

NOTE Confidence: 0.783211143333333

 $00:28:03.912 \longrightarrow 00:28:06.024$ So what is the purple

NOTE Confidence: 0.783211143333333

 $00:28:06.024 \rightarrow 00:28:07.979$ versus the Gray or not Gray?

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

NOTE Confidence: 0.783211143333333

 $00:28:11.320 \longrightarrow 00:28:14.092$ 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

 $00:28:16.420 \longrightarrow 00:28:17.413$ good drug effect.

NOTE Confidence: 0.783211143333333

 $00:28:17.413 \longrightarrow 00:28:18.737$ In this particular case,

NOTE Confidence: 0.783211143333333

 $00:28:18.740 \longrightarrow 00:28:20.460$ you get an 80% reduction.

NOTE Confidence: 0.783211143333333

 $00:28:20.460 \longrightarrow 00:28:22.679$ So the the purple was that week

NOTE Confidence: 0.783211143333333

 $00:28:22.679 \rightarrow 00:28:24.720$ three before we had vaccinated,

NOTE Confidence: 0.783211143333333

 $00{:}28{:}24{.}720 \dashrightarrow 00{:}28{:}27{.}352$ week 13 was after we had put in

NOTE Confidence: 0.783211143333333

 $00:28:27.352 \longrightarrow 00:28:29.140$ three vaccinations into the people.

NOTE Confidence: 0.783211143333333

 $00:28:29.140 \longrightarrow 00:28:30.996$ If you then doubled the dose of cocaine,

NOTE Confidence: 0.783211143333333

 $00{:}28{:}31{.}000 \dashrightarrow 00{:}28{:}31{.}960$ which is shown again.

NOTE Confidence: 0.783211143333333

 $00:28:31.960 \longrightarrow 00:28:35.070$ On this left side, you get a 50% reduction.

NOTE Confidence: 0.783211143333333

 $00{:}28{:}35{.}070 \dashrightarrow 00{:}28{:}36{.}958$ If you had a low level of antibodies,

NOTE Confidence: 0.783211143333333

 $00{:}28{:}36{.}960 \dashrightarrow 00{:}28{:}39{.}394$ you only got a 23% reduction with

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

NOTE Confidence: 0.783211143333333

 $00:28:41.990 \rightarrow 00:28:43.478$ and if you doubled the dose of cocaine,

NOTE Confidence: 0.783211143333333

 $00:28:43.480 \longrightarrow 00:28:45.321$ you only got a 13% reduction.

NOTE Confidence: 0.783211143333333

 $00:28:45.321 \rightarrow 00:28:47.876$ Neither of those were statistically

NOTE Confidence: 0.783211143333333

 $00:28:47.876 \longrightarrow 00:28:48.387$ significant.

NOTE Confidence: 0.783211143333333

 $00{:}28{:}48{.}390 \dashrightarrow 00{:}28{:}49{.}955$ Both of them were significant

NOTE Confidence: 0.783211143333333

 $00:28:49.955 \rightarrow 00:28:51.960$ though at the high antibody levels,

NOTE Confidence: 0.783211143333333

 $00:28:51.960 \rightarrow 00:28:54.095$ which simply meant giving a

NOTE Confidence: 0.783211143333333

 $00{:}28{:}54.095 \dashrightarrow 00{:}28{:}56.230$ high dosage of the vaccine.

NOTE Confidence: 0.783211143333333

 $00{:}28{:}56{.}230 \dashrightarrow 00{:}28{:}59{.}345$ So this was good pharmacological

NOTE Confidence: 0.783211143333333

 $00{:}28{:}59{.}345 \dashrightarrow 00{:}29{:}02{.}460$ demonstration of dose response effect.

NOTE Confidence: 0.783211143333333

 $00{:}29{:}02{.}460 \dashrightarrow 00{:}29{:}04{.}770$ So how did this turn out when we did the

NOTE Confidence: 0.783211143333333

 $00{:}29{:}04.837 \dashrightarrow 00{:}29{:}07.037$ randomized controls outpatient trials,

NOTE Confidence: 0.783211143333333

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

NOTE Confidence: 0.783211143333333

 $00:29:08.310 \longrightarrow 00:29:09.580$ these studies in any detail,

NOTE Confidence: 0.783211143333333

 $00:29:09.580 \longrightarrow 00:29:11.660$ but these are double-blind

- NOTE Confidence: 0.783211143333333
- $00:29:11.660 \longrightarrow 00:29:12.180$ placebo-controlled.
- NOTE Confidence: 0.783211143333333
- $00:29:12.180 \longrightarrow 00:29:14.298$ We vaccinated without actually 5 dosages
- NOTE Confidence: 0.783211143333333
- $00{:}29{:}14{.}298 \dashrightarrow 00{:}29{:}16{.}777$ of the vaccine over a 12 week period.
- NOTE Confidence: 0.783211143333333
- $00:29:16.780 \longrightarrow 00:29:18.440$ We did urine toxicology.
- NOTE Confidence: 0.783211143333333
- $00:29:18.440 \rightarrow 00:29:20.515$ We measured antibody levels and
- NOTE Confidence: 0.783211143333333
- $00{:}29{:}20.515 \dashrightarrow 00{:}29{:}23.082$ we had calculated that a single
- NOTE Confidence: 0.783211143333333
- $00:29:23.082 \longrightarrow 00:29:25.157$ 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
- $00:29:28.187 \rightarrow 00:29:30.693$ 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
- $00{:}29{:}35{.}430 \dashrightarrow 00{:}29{:}37{.}320$ because that was blinding about
- NOTE Confidence: 0.783211143333333
- $00:29:37.320 \longrightarrow 00:29:41.560 \ 80\%$ 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

 $00:29:44.476 \rightarrow 00:29:46.616$ people reached our threshold of 43

NOTE Confidence: 0.783211143333333

 $00{:}29{:}46.616 \dashrightarrow 00{:}29{:}49.080$ and that's what's shown in blue here.

NOTE Confidence: 0.783211143333333

 $00:29:49.080 \longrightarrow 00:29:51.592$ And what you can see is as we

NOTE Confidence: 0.783211143333333

 $00:29:51.592 \rightarrow 00:29:52.880$ repeatedly immunized them over

NOTE Confidence: 0.783211143333333

 $00{:}29{:}52{.}880 \dashrightarrow 00{:}29{:}54{.}650$ the first looks like 16 weeks

NOTE Confidence: 0.783211143333333

 $00:29:54.650 \rightarrow 00:29:56.760$ but was actually only 12 weeks.

NOTE Confidence: 0.783211143333333

 $00:29:56.760 \rightarrow 00:29:58.965$ The antibody levels steadily rose

NOTE Confidence: 0.783211143333333

 $00:29:58.965 \rightarrow 00:30:01.170$ and then the antibody levels

NOTE Confidence: 0.783211143333333

 $00:30:01.250 \dashrightarrow 00:30:03.458$ steadily go back down again but

NOTE Confidence: 0.783211143333333

 $00:30:03.460 \longrightarrow 00:30:05.896$ for the people in the high.

NOTE Confidence: 0.783211143333333

00:30:05.900 --> 00:30:06.854 Antibody group,

NOTE Confidence: 0.783211143333333

 $00:30:06.854 \rightarrow 00:30:08.762$ their average antibody levels

NOTE Confidence: 0.783211143333333

 $00:30:08.762 \longrightarrow 00:30:11.512$ by week eight were in fact up

NOTE Confidence: 0.783211143333333

 $00:30:11.512 \longrightarrow 00:30:13.480$ above 40 and they stayed up

NOTE Confidence: 0.840266933125

 $00:30:13.565 \rightarrow 00:30:15.395$ above 40 out to week 24,

NOTE Confidence: 0.840266933125

 $00:30:15.400 \rightarrow 00:30:16.680$ which would be six months,

 $00{:}30{:}16.680 \dashrightarrow 00{:}30{:}18.660$ which meant about three months of

NOTE Confidence: 0.840266933125

 $00:30:18.660 \dashrightarrow 00:30:20.545$ 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

 $00:30:22.611 \longrightarrow 00:30:24.641$ did give boosters to a number of

NOTE Confidence: 0.840266933125

 $00{:}30{:}24.641 \dashrightarrow 00{:}30{:}26.507$ these patients and a single booster

NOTE Confidence: 0.840266933125

 $00{:}30{:}26{.}507 \dashrightarrow 00{:}30{:}28{.}481$ would push their antibody levels back

NOTE Confidence: 0.840266933125

 $00:30:28.481 \longrightarrow 00:30:30.777$ up to the peak that they had before.

NOTE Confidence: 0.840266933125

 $00:30:30.780 \longrightarrow 00:30:33.223$ So you'd probably be with this vaccine

NOTE Confidence: 0.840266933125

 $00{:}30{:}33{.}223 \dashrightarrow 00{:}30{:}35{.}709$ be giving it to responders about.

NOTE Confidence: 0.840266933125

 $00:30:35.710 \longrightarrow 00:30:37.200$ Every three to four months,

NOTE Confidence: 0.840266933125

 $00{:}30{:}37{.}200 \dashrightarrow 00{:}30{:}38{.}916$ 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

 $00{:}30{:}42.042 \dashrightarrow 00{:}30{:}43.380$ 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

 $00:30:44.640 \longrightarrow 00:30:45.480$ at 2/3 of them.

 $00{:}30{:}45{.}480 \dashrightarrow 00{:}30{:}47{.}622$ That didn't make it at all

NOTE Confidence: 0.840266933125

 $00{:}30{:}47.622 \dashrightarrow 00{:}30{:}50.099$ as far as what you needed.

NOTE Confidence: 0.840266933125

 $00:30:50.100 \rightarrow 00:30:51.956$ So we then looked at these three groups,

NOTE Confidence: 0.840266933125

 $00:30:51.960 \longrightarrow 00:30:53.400$ 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

 $00:30:54.863 \longrightarrow 00:30:55.939$ of antibodies and the people

NOTE Confidence: 0.840266933125

 $00:30:55.939 \longrightarrow 00:30:57.346$ that had the high levels of the

NOTE Confidence: 0.840266933125

 $00:30:57.346 \longrightarrow 00:30:58.617$ levels that we thought you need.

NOTE Confidence: 0.840266933125

 $00{:}30{:}58{.}620 \dashrightarrow 00{:}31{:}01{.}063$ 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

 $00{:}31{:}03{.}585 \dashrightarrow 00{:}31{:}06{.}441$ 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

 $00{:}31{:}09{.}180 \dashrightarrow 00{:}31{:}11{.}172$ reduction in cocaine use for the

NOTE Confidence: 0.840266933125

 $00:31:11.172 \rightarrow 00:31:13.199$ people that had attained our levels.

NOTE Confidence: 0.840266933125

 $00:31:13.200 \rightarrow 00:31:14.736$ For those that didn't attain them,

NOTE Confidence: 0.840266933125

 $00:31:14.740 \longrightarrow 00:31:17.921$ which was you know, 60% of the vaccinated,

- NOTE Confidence: 0.840266933125
- $00:31:17.921 \rightarrow 00:31:20.109$ they got some reduction.
- NOTE Confidence: 0.840266933125
- $00:31:20.110 \longrightarrow 00:31:21.150 \ 1 \ 1/2 \text{ or so},$
- NOTE Confidence: 0.840266933125
- $00:31:21.150 \longrightarrow 00:31:22.630 50\%$ 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
- $00{:}31{:}24.155 \dashrightarrow 00{:}31{:}25.627$ from what the baseline was.
- NOTE Confidence: 0.840266933125
- $00:31:25.630 \longrightarrow 00:31:27.450$ So this was a nice gun stair
- NOTE Confidence: 0.840266933125
- $00:31:27.450 \rightarrow 00:31:29.070$ step dose response kind of thing.
- NOTE Confidence: 0.840266933125
- $00:31:29.070 \longrightarrow 00:31:30.912$ Also not enough to convince the
- NOTE Confidence: 0.840266933125
- $00:31:30.912 \longrightarrow 00:31:32.650$ FDA that this was useful,
- NOTE Confidence: 0.840266933125
- $00:31:32.650 \longrightarrow 00:31:34.900$ but enough to give us money
- NOTE Confidence: 0.840266933125
- $00:31:34.900 \longrightarrow 00:31:36.025$ for another study.
- NOTE Confidence: 0.840266933125
- $00:31:36.030 \longrightarrow 00:31:38.892$ And this was looking at all the
- NOTE Confidence: 0.840266933125
- $00:31:38.892 \longrightarrow 00:31:40.216$ different levels of antibody
- NOTE Confidence: 0.840266933125
- $00{:}31{:}40{.}216 \dashrightarrow 00{:}31{:}42{.}759$ that we had in the study versus
- NOTE Confidence: 0.840266933125
- $00:31:42.759 \longrightarrow 00:31:44.669$ the percent of cocaine urones.
- NOTE Confidence: 0.840266933125

 $00:31:44.670 \longrightarrow 00:31:47.309$ And we found you could reach a

NOTE Confidence: 0.840266933125

 $00:31:47.309 \dashrightarrow 00:31:49.610$ level of antibody at which people

NOTE Confidence: 0.840266933125

 $00:31:49.610 \longrightarrow 00:31:50.765$ just simply stopped.

NOTE Confidence: 0.840266933125

 $00:31:50.770 \rightarrow 00:31:53.236$ Using cocaine altogether because it wasn't.

NOTE Confidence: 0.840266933125

 $00:31:53.240 \longrightarrow 00:31:54.540$ They didn't have enough money

NOTE Confidence: 0.840266933125

 $00{:}31{:}54{.}540 \dashrightarrow 00{:}31{:}56{.}040$ or it just wasn't worth it.

NOTE Confidence: 0.840266933125

 $00:31:56.040 \rightarrow 00:31:57.664$ When we asked them why did they stop,

NOTE Confidence: 0.840266933125

 $00:31:57.670 \rightarrow 00:31:58.303$ they said, well,

NOTE Confidence: 0.840266933125

 $00:31:58.303 \rightarrow 00:32:00.100$ they just couldn't find a good enough dealer,

NOTE Confidence: 0.840266933125

 $00:32:00.100 \longrightarrow 00:32:01.840$ so nobody seemed to believe

NOTE Confidence: 0.840266933125

 $00:32:01.840 \longrightarrow 00:32:03.580$ that the vaccine did anything,

NOTE Confidence: 0.840266933125

 $00{:}32{:}03{.}580 \dashrightarrow 00{:}32{:}05{.}740$ even though when we asked them

NOTE Confidence: 0.840266933125

 $00:32:05.740 \rightarrow 00:32:08.099$ who thought they got the vaccine,

NOTE Confidence: 0.840266933125

 $00:32:08.100 \longrightarrow 00:32:09.684$ 80% of the people thought they

NOTE Confidence: 0.840266933125

 $00{:}32{:}09.684 \dashrightarrow 00{:}32{:}10.740$ got the active vaccine,

NOTE Confidence: 0.840266933125

 $00:32:10.740 \longrightarrow 00:32:13.818$ even though only 50% actually did.

- NOTE Confidence: 0.840266933125
- $00:32:13.820 \longrightarrow 00:32:15.578$ 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
- $00:32:17.599 \rightarrow 00:32:18.914$ the alumnae your arm hurt,
- NOTE Confidence: 0.840266933125
- $00:32:18.920 \dashrightarrow 00:32:20.560$ so they assumed that was the real thing.
- NOTE Confidence: 0.90277069
- $00:32:22.880 \longrightarrow 00:32:24.320$ So what do we conclude?
- NOTE Confidence: 0.90277069
- $00:32:24.320 \dashrightarrow 00:32:26.736$ That the vaccine was better than a placebo,
- NOTE Confidence: 0.90277069
- $00{:}32{:}26{.}740 \dashrightarrow 00{:}32{:}29{.}038$ that the cocaine free Urnes increased
- NOTE Confidence: 0.90277069
- $00:32:29.038 \dashrightarrow 00:32:31.280$ as the antibody levels increased.
- NOTE Confidence: 0.90277069
- $00:32:31.280 \longrightarrow 00:32:33.005 40\%$ of the patients had
- NOTE Confidence: 0.90277069
- $00:32:33.005 \rightarrow 00:32:34.040$ effective antibody response.
- NOTE Confidence: 0.90277069
- $00:32:34.040 \longrightarrow 00:32:35.580$ That's 40% of vaccinated.
- NOTE Confidence: 0.90277069
- $00{:}32{:}35{.}580 \dashrightarrow 00{:}32{:}37{.}120$ It was medically safe.
- NOTE Confidence: 0.90277069
- $00{:}32{:}37{.}120 \dashrightarrow 00{:}32{:}39{.}280$ There was increases in cocaine
- NOTE Confidence: 0.90277069
- $00{:}32{:}39{.}280 \dashrightarrow 00{:}32{:}41{.}965$ use above baseline levels that we
- NOTE Confidence: 0.90277069
- $00:32:41.965 \dashrightarrow 00:32:44.210$ could find intermittently in their.
- NOTE Confidence: 0.90277069

 $00:32:44.210 \longrightarrow 00:32:45.275$ There are benzoylecgonine,

NOTE Confidence: 0.90277069

 $00{:}32{:}45{.}275 \dashrightarrow 00{:}32{:}47{.}405$ well urine levels where we found

NOTE Confidence: 0.90277069

 $00{:}32{:}47{.}405 \dashrightarrow 00{:}32{:}49{.}988$ a number of people that had urine

NOTE Confidence: 0.90277069

 $00:32:49.988 \dashrightarrow 00:32:51.432$ benzoylecgonine levels that if

NOTE Confidence: 0.90277069

 $00:32:51.491 \dashrightarrow 00:32:53.176$ they would not been vaccinated

NOTE Confidence: 0.90277069

 $00{:}32{:}53{.}176 \dashrightarrow 00{:}32{:}55{.}259$ they probably would be dead from

NOTE Confidence: 0.90277069

 $00{:}32{:}55{.}259 \dashrightarrow 00{:}32{:}57{.}593$ an overdose at least would have

NOTE Confidence: 0.90277069

 $00:32:57.593 \longrightarrow 00:32:59.230$ been seriously damaged by it.

NOTE Confidence: 0.90277069

 $00{:}32{:}59{.}230 \dashrightarrow 00{:}33{:}00{.}980$ But they in fact describe

NOTE Confidence: 0.90277069

 $00:33:00.980 \longrightarrow 00:33:02.730$ really no effects at all.

NOTE Confidence: 0.90277069

 $00{:}33{:}02{.}730 \dashrightarrow 00{:}33{:}05{.}054$ A few people described that their heart

NOTE Confidence: 0.90277069

 $00:33:05.054 \rightarrow 00:33:07.040$ went pitter patter a bit but very

NOTE Confidence: 0.90277069

 $00:33:07.040 \rightarrow 00:33:09.910$ unimpressive as far as they were concerned.

NOTE Confidence: 0.90277069

 $00{:}33{:}09{.}910 \dashrightarrow 00{:}33{:}12{.}416$ So this LED us to a multi

NOTE Confidence: 0.90277069

 $00:33:12.416 \longrightarrow 00:33:14.149$ site cocaine study it was.

NOTE Confidence: 0.90277069

 $00:33:14.150 \longrightarrow 00:33:17.040$ National study.

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

NOTE Confidence: 0.90277069

 $00:33:17.408 \rightarrow 00:33:19.984$ Basically the same dosage of the vaccine,

NOTE Confidence: 0.90277069

 $00:33:19.990 \longrightarrow 00:33:21.760$ the urine toxicology was 300

NOTE Confidence: 0.90277069

 $00:33:21.760 \longrightarrow 00:33:23.176$ 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

 $00{:}33{:}25{.}281 \dashrightarrow 00{:}33{:}26{.}966$ 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

 $00:33:28.680 \longrightarrow 00:33:31.438$ which is if you're looking at 40,

NOTE Confidence: 0.90277069

 $00:33:31.440 \longrightarrow 00:33:32.960$ we at best did that.

NOTE Confidence: 0.90277069

 $00:33:32.960 \longrightarrow 00:33:34.358$ We got maybe half of them,

NOTE Confidence: 0.90277069

 $00:33:34.360 \longrightarrow 00:33:36.928$ 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

 $00:33:42.304 \longrightarrow 00:33:44.476$ to antibody levels of over 250,

NOTE Confidence: 0.90277069

 $00:33:44.480 \rightarrow 00:33:48.360$ which is astounding so that there's quite a.

00:33:48.360 - 00:33:50.094 Quite a amount of antibody that NOTE Confidence: 0.90277069 $00{:}33{:}50{.}094 \dashrightarrow 00{:}33{:}52{.}009$ can be produced in some people, NOTE Confidence: 0.90277069 $00{:}33{:}52{.}010 \dashrightarrow 00{:}33{:}54{.}082$ and the trick of course is to either NOTE Confidence: 0.90277069 $00:33:54.082 \rightarrow 00:33:55.687$ get everybody to move up there or NOTE Confidence: 0.90277069 $00:33:55.687 \dashrightarrow 00:33:57.583$ to be able to select ahead of time NOTE Confidence: 0.90277069 $00:33:57.583 \rightarrow 00:33:59.466$ 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 $00:34:03.323 \rightarrow 00:34:07.490$ this is just the average data from the study. NOTE Confidence: 0.83209703 $00{:}34{:}07{.}490 \dashrightarrow 00{:}34{:}09{.}800$ And 59 was our average of NOTE Confidence: 0.83209703 $00:34:09.800 \rightarrow 00:34:11.690$ peak effect at week 16, NOTE Confidence: 0.83209703 $00:34:11.690 \rightarrow 00:34:14.450$ which was better than in the other study. NOTE Confidence: 0.83209703 $00:34:14.450 \longrightarrow 00:34:16.045$ There was no simple correlation NOTE Confidence: 0.83209703 $00:34:16.045 \rightarrow 00:34:17.640$ this time with the antibody NOTE Confidence: 0.83209703 $00:34:17.694 \rightarrow 00:34:19.369$ levels with cocaine for urones, NOTE Confidence: 0.83209703 $00:34:19.370 \rightarrow 00:34:22.034$ although we just published a paper NOTE Confidence: 0.83209703 $00:34:22.034 \rightarrow 00:34:24.868$ that this was looking at IG levels

 $00{:}34{:}24.868 \dashrightarrow 00{:}34{:}27.860$ and we had a paper in nature vaccines

NOTE Confidence: 0.83209703

 $00{:}34{:}27.860 \dashrightarrow 00{:}34{:}29.911$ at the beginning of this year showing

NOTE Confidence: 0.83209703

 $00:34:29.911 \longrightarrow 00:34:32.616$ that it looks like it's IGA, not IG.

NOTE Confidence: 0.83209703

 $00:34:32.616 \longrightarrow 00:34:34.050$ 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

 $00{:}34{:}36{.}290 \dashrightarrow 00{:}34{:}38{.}154$ 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

 $00:34:40.490 \dashrightarrow 00:34:43.598$ it also lines the blood brain barrier.

NOTE Confidence: 0.83209703

 $00{:}34{:}43.600 \dashrightarrow 00{:}34{:}46.000$ And so what's happening it looks

NOTE Confidence: 0.83209703

 $00:34:46.000 \longrightarrow 00:34:48.745$ like is that the cocaine or that

NOTE Confidence: 0.83209703

 $00:34:48.745 \longrightarrow 00:34:50.215$ we don't have it for fentanyl.

NOTE Confidence: 0.83209703

 $00:34:50.220 \longrightarrow 00:34:51.588$ Yeah, actually we do in the

NOTE Confidence: 0.83209703

 $00:34:51.588 \longrightarrow 00:34:52.272$ animals for fentanyl,

NOTE Confidence: 0.83209703

 $00{:}34{:}52{.}280 \dashrightarrow 00{:}34{:}54{.}450$ it's it's binding to the drug as

NOTE Confidence: 0.83209703

 $00:34:54.450 \longrightarrow 00:34:56.699$ it's trying to get into the brain,

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

NOTE Confidence: 0.83209703

 $00{:}34{:}58{.}520 \dashrightarrow 00{:}35{:}00{.}742$ what we've been chasing after is

NOTE Confidence: 0.83209703

 $00:35:00.742 \dashrightarrow 00:35:02.412$ 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

 $00:35:04.360 \longrightarrow 00:35:06.676$ And we so we duplicated this,

NOTE Confidence: 0.83209703

 $00:35:06.680 \rightarrow 00:35:07.404$ started the,

NOTE Confidence: 0.83209703

 $00:35:07.404 \longrightarrow 00:35:09.938$ the mouse finding that was in nature.

NOTE Confidence: 0.83209703

 $00:35:09.940 \longrightarrow 00:35:11.991$ 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

 $00:35:14.328 \longrightarrow 00:35:16.063$ back and reanalyzed this study.

NOTE Confidence: 0.83209703

 $00:35:16.070 \longrightarrow 00:35:18.806$ I found the same thing was true in humans.

NOTE Confidence: 0.83209703

 $00:35:18.810 \rightarrow 00:35:21.547$ So this is very encouraging and an

NOTE Confidence: 0.83209703

 $00:35:21.547 \dashrightarrow 00:35:23.685$ exciting discovery that IGA is in

NOTE Confidence: 0.83209703

 $00:35:23.685 \rightarrow 00:35:25.764$ fact maybe the way this is working

NOTE Confidence: 0.83209703

 $00:35:25.832 \rightarrow 00:35:27.787$ and there are some adjuvants,

NOTE Confidence: 0.83209703

 $00:35:27.790 \longrightarrow 00:35:30.195$ particularly some that could be

- NOTE Confidence: 0.83209703
- $00:35:30.195 \rightarrow 00:35:32.600$ given intranasally or orally that

 $00:35:32.680 \rightarrow 00:35:35.286$ will markedly increase mucosal IGA.

NOTE Confidence: 0.83209703

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

NOTE Confidence: 0.83209703

 $00:35:35.774 \rightarrow 00:35:38.214$ they're being developed for COVID

NOTE Confidence: 0.83209703

 $00:35:38.214 \rightarrow 00:35:40.870$ vaccines at the moment and that's,

NOTE Confidence: 0.83209703

 $00:35:40.870 \dashrightarrow 00:35:43.330$ you know, as if I have nothing else to do.

NOTE Confidence: 0.83209703

 $00:35:43.330 \rightarrow 00:35:44.734$ We actually have a COVID vaccine

NOTE Confidence: 0.83209703

 $00:35:44.734 \longrightarrow 00:35:46.129$ that we've come up with too.

NOTE Confidence: 0.83209703

 $00:35:46.130 \longrightarrow 00:35:46.898$ That's some.

NOTE Confidence: 0.83209703

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

NOTE Confidence: 0.83209703

 $00:35:47.282 \rightarrow 00:35:50.570$ focuses on this kind of IGA idea anyway.

NOTE Confidence: 0.83209703

 $00{:}35{:}50{.}570 \dashrightarrow 00{:}35{:}53{.}426$ So what did we find in it?

NOTE Confidence: 0.83209703

 $00{:}35{:}53{.}430 \dashrightarrow 00{:}35{:}54{.}910$ There was better treatment retention

NOTE Confidence: 0.83209703

 $00:35:54.910 \dashrightarrow 00:35:57.230$ if you got these higher antibody levels.

NOTE Confidence: 0.83209703

 $00{:}35{:}57{.}230 \dashrightarrow 00{:}35{:}58{.}645$ Three times more participants had

00:35:58.645 - 00:36:00.412 at least two weeks of abstinence

NOTE Confidence: 0.83209703

 $00{:}36{:}00{.}412 \dashrightarrow 00{:}36{:}02{.}200$ if they had these higher levels

NOTE Confidence: 0.83209703

 $00:36:02.200 \longrightarrow 00:36:04.128$ than either the placebo or the low.

NOTE Confidence: 0.83209703

 $00{:}36{:}04{.}130 \dashrightarrow 00{:}36{:}06{.}422$ And there were more cocaine for

NOTE Confidence: 0.83209703

 $00{:}36{:}06{.}422 \dashrightarrow 00{:}36{:}07{.}950$ urones compared to baseline.

NOTE Confidence: 0.83209703

 $00{:}36{:}07{.}950 \dashrightarrow 00{:}36{:}10{.}110$ But neither are investors nor the

NOTE Confidence: 0.83209703

 $00{:}36{:}10.110 \dashrightarrow 00{:}36{:}12.309$ FDA were impressed with these data.

NOTE Confidence: 0.83209703

 $00:36:12.310 \longrightarrow 00:36:13.642$ They said, you know,

NOTE Confidence: 0.83209703

00:36:13.642 --> 00:36:15.307 every
body you vaccinate has to

NOTE Confidence: 0.83209703

 $00{:}36{:}15{.}307 \dashrightarrow 00{:}36{:}17{.}245$ show a good response or it's a.

NOTE Confidence: 0.83209703

 $00{:}36{:}17.250 \dashrightarrow 00{:}36{:}21.654$ 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

 $00{:}36{:}22.988 \dashrightarrow 00{:}36{:}24.668$ got similar results with nicotine

NOTE Confidence: 0.83209703

 $00{:}36{:}24.668 \dashrightarrow 00{:}36{:}26.740$ from dropping out from the field.

NOTE Confidence: 0.83209703

 $00:36:26.740 \longrightarrow 00:36:29.320$ And this is a while ago.

NOTE Confidence: 0.83209703

 $00:36:29.320 \rightarrow 00:36:32.040$ 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
- $00:36:32.338 \rightarrow 00:36:34.126$ we changed our protein carrier from
- NOTE Confidence: 0.83209703
- $00{:}36{:}34{.}126 \dashrightarrow 00{:}36{:}36{.}019$ cholera B to a better protein.
- NOTE Confidence: 0.83209703
- $00{:}36{:}36{.}020 \dashrightarrow 00{:}36{:}37{.}790$ We got a better agent.
- NOTE Confidence: 0.83209703
- $00{:}36{:}37.790 \dashrightarrow 00{:}36{:}40.534$ We started using a TLR four and
- NOTE Confidence: 0.83209703
- $00:36:40.534 \longrightarrow 00:36:41.318$ five adjuvants.
- NOTE Confidence: 0.83209703
- $00:36:41.320 \longrightarrow 00:36:44.005$ These are toll like receptor
- NOTE Confidence: 0.83209703
- $00{:}36{:}44.005 \dashrightarrow 00{:}36{:}46.690$ type adjuvants and agonists that
- NOTE Confidence: 0.83209703
- $00:36:46.785 \longrightarrow 00:36:48.459$ push these systems.
- NOTE Confidence: 0.83209703
- $00:36:48.460 \longrightarrow 00:36:50.455$ And that we really needed to get
- NOTE Confidence: 0.83209703
- $00{:}36{:}50{.}455 \dashrightarrow 00{:}36{:}52{.}035$ more patients who attain these
- NOTE Confidence: 0.83209703
- $00{:}36{:}52.035 \dashrightarrow 00{:}36{:}53.690$ 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
- $00{:}36{:}55{.}699 \dashrightarrow 00{:}36{:}57{.}613$ who at least can become abstinent
- NOTE Confidence: 0.83209703
- $00{:}36{:}57{.}613 \dashrightarrow 00{:}36{:}59{.}505$ before we start trying to vaccinate
- NOTE Confidence: 0.83209703

 $00{:}36{:}59{.}505 \dashrightarrow 00{:}37{:}01{.}070$ 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

 $00{:}37{:}02.850 \dashrightarrow 00{:}37{:}04.134$ to become abstinent.

NOTE Confidence: 0.893219046470588

 $00:37:04.140 \longrightarrow 00:37:05.748$ And again, with fentanyl,

NOTE Confidence: 0.893219046470588

 $00{:}37{:}05{.}748 \dashrightarrow 00{:}37{:}07{.}758$ we need much less antibody.

NOTE Confidence: 0.893219046470588

 $00:37:07.760 \longrightarrow 00:37:09.569$ So what's happening?

NOTE Confidence: 0.893219046470588

 $00:37:09.569 \rightarrow 00:37:13.790$ 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

 $00:37:16.982 \rightarrow 00:37:19.110$ 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

 $00{:}37{:}20.680 \dashrightarrow 00{:}37{:}22.130$ I don't shouldn't say hard,

NOTE Confidence: 0.893219046470588

 $00{:}37{:}22.130 \dashrightarrow 00{:}37{:}24.970$ but deaths from just cocaine

NOTE Confidence: 0.893219046470588

 $00:37:24.970 \longrightarrow 00:37:27.810$ 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

 $00:37:30.114 \rightarrow 00:37:33.138$ The abusers had returned to stimulants,

 $00:37:33.140 \longrightarrow 00:37:34.804$ including amphetamines that were

NOTE Confidence: 0.893219046470588

 $00{:}37{:}34{.}804 \dashrightarrow 00{:}37{:}36{.}884$ obtained from prescribers and in

NOTE Confidence: 0.893219046470588

 $00{:}37{:}36{.}884 \dashrightarrow 00{:}37{:}38{.}678$ cocaine bought from the street.

NOTE Confidence: 0.893219046470588

 $00:37:38.680 \rightarrow 00:37:40.276$ Because people were recognizing

NOTE Confidence: 0.893219046470588

 $00:37:40.276 \longrightarrow 00:37:42.670$ that taking opiates you were taking

NOTE Confidence: 0.893219046470588

 $00:37:42.732 \longrightarrow 00:37:44.460$ a big risk with the fentanyl.

NOTE Confidence: 0.893219046470588

 $00:37:44.460 \dashrightarrow 00:37:47.130$ That's almost always an opiates now.

NOTE Confidence: 0.893219046470588

 $00:37:47.130 \longrightarrow 00:37:48.780$ So the distributor started mixing

NOTE Confidence: 0.893219046470588

 $00:37:48.780 \longrightarrow 00:37:50.430$ fentanyl with the stimulants like

NOTE Confidence: 0.893219046470588

 $00{:}37{:}50{.}484 \dashrightarrow 00{:}37{:}52{.}208$ cocaine powder and methamphetamine.

NOTE Confidence: 0.893219046470588

 $00:37:52.210 \longrightarrow 00:37:53.590$ Why did they do that?

NOTE Confidence: 0.893219046470588

 $00{:}37{:}53{.}590 \dashrightarrow 00{:}37{:}55{.}930$ You could take very inexpensive,

NOTE Confidence: 0.893219046470588

 $00{:}37{:}55{.}930 \dashrightarrow 00{:}37{:}57{.}825$ crappy cocaine and methamphetamine and

NOTE Confidence: 0.893219046470588

 $00{:}37{:}57{.}825 \dashrightarrow 00{:}38{:}00{.}770$ put a little bit of fentanyl in it,

NOTE Confidence: 0.893219046470588

 $00:38:00.770 \longrightarrow 00:38:02.386$ and it feels like it's a great drug,

 $00:38:02.390 \longrightarrow 00:38:03.558$ apparently to the patient,

NOTE Confidence: 0.893219046470588

 $00:38:03.558 \longrightarrow 00:38:05.018$ so that they're not patients

NOTE Confidence: 0.893219046470588

 $00:38:05.018 \longrightarrow 00:38:06.408$ but people on the street.

NOTE Confidence: 0.893219046470588

 $00:38:06.410 \rightarrow 00:38:08.466$ 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

 $00:38:09.374 \rightarrow 00:38:11.540$ 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

 $00:38:13.876 \longrightarrow 00:38:15.628$ much more profitable.

NOTE Confidence: 0.893219046470588

 $00:38:15.630 \longrightarrow 00:38:17.702$ Then, early in 2021,

NOTE Confidence: 0.893219046470588

00:38:17.702 --> 00:38:19.256 counterfeit Adderall pills

NOTE Confidence: 0.893219046470588

 $00{:}38{:}19.256 \dashrightarrow 00{:}38{:}21.599$ containing fentanyl began to appear.

NOTE Confidence: 0.893219046470588

 $00:38:21.600 \longrightarrow 00:38:23.300$ And this is a.

NOTE Confidence: 0.893219046470588

 $00:38:23.300 \longrightarrow 00:38:24.150$ Big problem.

NOTE Confidence: 0.893219046470588

00:38:24.150 --> 00:38:25.834 In March of 2021,

NOTE Confidence: 0.893219046470588

 $00{:}38{:}25{.}834 \dashrightarrow 00{:}38{:}28{.}161$ the DEA had seized $600{,}000$

NOTE Confidence: 0.893219046470588

 $00:38:28.161 \rightarrow 00:38:30.084$ counterfeit pharmaceutical pills.

- NOTE Confidence: 0.893219046470588
- 00:38:30.084 --> 00:38:32.648 They all contain fentanyl.
- NOTE Confidence: 0.893219046470588
- $00{:}38{:}32.650 \dashrightarrow 00{:}38{:}33.892$ All of those at that time
- NOTE Confidence: 0.893219046470588
- $00:38:33.892 \longrightarrow 00:38:35.190$ were being sold as Adderall.
- NOTE Confidence: 0.893219046470588
- $00{:}38{:}35{.}190 \dashrightarrow 00{:}38{:}38{.}011$ But there's now also been evidence that
- NOTE Confidence: 0.893219046470588
- $00:38:38.011 \dashrightarrow 00:38:41.310$ it's in Percocet and that it's also in Xanax.
- NOTE Confidence: 0.893219046470588
- $00:38:41.310 \longrightarrow 00:38:43.669$ One in four of these pills had
- NOTE Confidence: 0.893219046470588
- $00:38:43.669 \rightarrow 00:38:45.230$ lethal fentanyl overdoses in them.
- NOTE Confidence: 0.893219046470588
- $00:38:45.230 \longrightarrow 00:38:46.920$ Now that was not purposeful
- NOTE Confidence: 0.893219046470588
- $00:38:46.920 \longrightarrow 00:38:48.272$ 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
- $00:38:50.686 \rightarrow 00:38:53.609$ customers but this new rising.
- NOTE Confidence: 0.893219046470588
- $00:38:53.609 \dashrightarrow 00:38:55.274$ Mortality from stimulants is due
- NOTE Confidence: 0.893219046470588
- $00:38:55.274 \longrightarrow 00:38:57.473$ to the fentanyl disguised as a
- NOTE Confidence: 0.893219046470588
- $00{:}38{:}57{.}473 \dashrightarrow 00{:}38{:}59{.}681$ stimulant or mixed with the stimulant.
- NOTE Confidence: 0.893219046470588
- $00{:}38{:}59{.}690 \dashrightarrow 00{:}39{:}01{.}525$ The stimulant mortality rate with
- NOTE Confidence: 0.893219046470588

 $00:39:01.525 \longrightarrow 00:39:04.175$ 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

 $00:39:06.413 \longrightarrow 00:39:08.770$ 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

 $00{:}39{:}12{.}930 \dashrightarrow 00{:}39{:}14{.}920$ versus for the opiates.

NOTE Confidence: 0.893219046470588

 $00:39:14.920 \longrightarrow 00:39:16.654$ With fentanyl it took ten years

NOTE Confidence: 0.893219046470588

 $00:39:16.654 \longrightarrow 00:39:18.370$ to get this fourfold increase.

NOTE Confidence: 0.893219046470588

 $00:39:18.370 \longrightarrow 00:39:21.378$ So the the path of the epidemic

NOTE Confidence: 0.893219046470588

 $00:39:21.378 \longrightarrow 00:39:24.287$ is now much more much steeper.

NOTE Confidence: 0.893219046470588

 $00:39:24.290 \longrightarrow 00:39:27.590$ And much more dangerous.

NOTE Confidence: 0.893219046470588

 $00:39:27.590 \rightarrow 00:39:31.214$ 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

 $00:39:32.894 \dashrightarrow 00:39:36.242$ the counterfeit one on the bottom

NOTE Confidence: 0.893219046470588

 $00:39:36.242 \longrightarrow 00:39:39.368$ in the middle is the Adderall.

NOTE Confidence: 0.893219046470588

 $00:39:39.370 \longrightarrow 00:39:41.850$ Adderall is the the real thing on the

- NOTE Confidence: 0.893219046470588
- $00:39:41.850 \rightarrow 00:39:44.688$ top and the counterfeits on the bottom.
- NOTE Confidence: 0.893219046470588
- $00:39:44.690 \rightarrow 00:39:46.280$ 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
- $00:39:51.010 \rightarrow 00:39:52.810$ 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
- $00{:}39{:}55{.}070 \dashrightarrow 00{:}39{:}56{.}670$ Xanax, the same thing.
- NOTE Confidence: 0.893219046470588
- $00{:}39{:}56.670 \dashrightarrow 00{:}39{:}58.270$ That's the other counterfeit
- NOTE Confidence: 0.893219046470588
- $00{:}39{:}58{.}270 \dashrightarrow 00{:}40{:}00{.}136$ and the real one that.
- NOTE Confidence: 0.893219046470588
- $00:40:00.136 \longrightarrow 00:40:02.366$ These are being, you know,
- NOTE Confidence: 0.893219046470588
- $00:40:02.370 \longrightarrow 00:40:04.342$ distributed on the streets
- NOTE Confidence: 0.893219046470588
- $00:40:04.342 \longrightarrow 00:40:06.807$ 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
- $00{:}40{:}08.870 \dashrightarrow 00{:}40{:}10.694$ any of the the dark Internet
- NOTE Confidence: 0.893219046470588
- $00{:}40{:}10.694 \dashrightarrow 00{:}40{:}11.910$ for Adderall at least,
- NOTE Confidence: 0.893219046470588

 $00:40:11.910 \longrightarrow 00:40:13.358$ is Adderall with fentanyl.

NOTE Confidence: 0.893219046470588

 $00:40:13.358 \rightarrow 00:40:15.168$ Virtually none of them now,

NOTE Confidence: 0.893219046470588

 $00:40:15.170 \longrightarrow 00:40:16.894$ or just really Adderall.

NOTE Confidence: 0.893219046470588

 $00:40:16.894 \rightarrow 00:40:19.480$ 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

 $00{:}40{:}21.296 \dashrightarrow 00{:}40{:}23.570$ 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

 $00:40:25.440 \rightarrow 00:40:28.880$ like water and that is happening with kids,

NOTE Confidence: 0.884379793636364

 $00:40:28.880 \longrightarrow 00:40:30.434$ this is going to be a problem.

NOTE Confidence: 0.884379793636364

 $00:40:30.440 \longrightarrow 00:40:32.864$ Because when you take the drug and you

NOTE Confidence: 0.884379793636364

 $00:40:32.864 \rightarrow 00:40:35.317$ take it and then a way to get high,

NOTE Confidence: 0.884379793636364

 $00:40:35.320 \rightarrow 00:40:37.315$ you're going to have to take escalating

NOTE Confidence: 0.884379793636364

 $00{:}40{:}37{.}315 \dashrightarrow 00{:}40{:}39{.}180$ dosages and those escalating dosages.

NOTE Confidence: 0.884379793636364

 $00:40:39.180 \rightarrow 00:40:41.637$ Sooner or later the doctor is going to say,

NOTE Confidence: 0.884379793636364

 $00:40:41.640 \longrightarrow 00:40:43.116$ no, I'm not going to give

NOTE Confidence: 0.884379793636364

 $00:40:43.116 \longrightarrow 00:40:44.100$ this to you anymore.
00:40:44.100 --> 00:40:46.386 The doctor shopping may work or may not work,

NOTE Confidence: 0.884379793636364

 $00:40:46.390 \longrightarrow 00:40:47.804$ which means you go to several different.

NOTE Confidence: 0.884379793636364

 $00:40:47.810 \longrightarrow 00:40:48.700$ 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

 $00{:}40{:}50{.}460 \dashrightarrow 00{:}40{:}52{.}023$ to either the Internet or the street

NOTE Confidence: 0.884379793636364

 $00:40:52.023 \rightarrow 00:40:53.679$ and you're going to be getting you.

NOTE Confidence: 0.884379793636364

 $00:40:53.680 \rightarrow 00:40:56.070$ I say you in a very general sense that the

NOTE Confidence: 0.884379793636364

 $00:40:56.134 \rightarrow 00:40:58.360$ abuser is going to be getting Adderall,

NOTE Confidence: 0.884379793636364

 $00:40:58.360 \longrightarrow 00:41:00.943$ it's got fentanyl in it and that

NOTE Confidence: 0.884379793636364

 $00:41:00.943 \longrightarrow 00:41:03.237$ fentanyl has got a one in four

NOTE Confidence: 0.884379793636364

 $00:41:03.237 \rightarrow 00:41:05.890$ chance is going to be a lethal dose.

NOTE Confidence: 0.884379793636364

 $00:41:05.890 \longrightarrow 00:41:08.026$ So fentanyl vaccine that's

NOTE Confidence: 0.884379793636364

 $00{:}41{:}08.026 \dashrightarrow 00{:}41{:}09.628$ in current development,

NOTE Confidence: 0.884379793636364

 $00{:}41{:}09{.}630 \dashrightarrow 00{:}41{:}11{.}065$ we're trying to apply the

NOTE Confidence: 0.884379793636364

00:41:11.065 --> 00:41:12.500 discoveries from an improved cocaine

 $00:41:12.548 \longrightarrow 00:41:14.028$ 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

 $00{:}41{:}16.186 \dashrightarrow 00{:}41{:}19.740$ few years now and this was from the

NOTE Confidence: 0.884379793636364

 $00:41:19.740 \longrightarrow 00:41:23.410$ paper that was in nature vaccines

NOTE Confidence: 0.884379793636364

 $00:41:23.410 \longrightarrow 00:41:25.307$ and this is a very complicated slide

NOTE Confidence: 0.884379793636364

 $00{:}41{:}25{.}307 \dashrightarrow 00{:}41{:}26{.}770$ that's got much more information

NOTE Confidence: 0.884379793636364

 $00:41:26.770 \longrightarrow 00:41:28.564$ than you really need to know,

NOTE Confidence: 0.884379793636364

 $00:41:28.570 \longrightarrow 00:41:31.460$ but if you look at.

NOTE Confidence: 0.884379793636364

00:41:31.460 --> 00:41:33.486 The C&D,

NOTE Confidence: 0.884379793636364

 $00:41:33.486 \longrightarrow 00:41:35.480$ and you look at the one,

NOTE Confidence: 0.884379793636364

 $00{:}41{:}35{.}480 \dashrightarrow 00{:}41{:}37{.}736$ the the bars that are purple and the

NOTE Confidence: 0.884379793636364

 $00:41:37.736 \longrightarrow 00:41:39.871$ bars that are dark blue all the way

NOTE Confidence: 0.884379793636364

 $00:41:39.871 \longrightarrow 00:41:42.315$ to the right on all of these four

NOTE Confidence: 0.884379793636364

 $00{:}41{:}42{.}315 \dashrightarrow 00{:}41{:}44{.}373$ different graphs that are shown there.

NOTE Confidence: 0.884379793636364

 $00:41:44.380 \longrightarrow 00:41:47.170$ This is what's happening if you

NOTE Confidence: 0.884379793636364

 $00{:}41{:}47.170 \dashrightarrow 00{:}41{:}50.221$ give fentanyl to mice that have

- NOTE Confidence: 0.884379793636364
- $00{:}41{:}50{.}221 \dashrightarrow 00{:}41{:}52{.}976$ been vaccinated or not vaccinated.
- NOTE Confidence: 0.884379793636364
- $00:41:52.980 \longrightarrow 00:41:55.129$ The clear bar is the naive mice
- NOTE Confidence: 0.884379793636364
- $00:41:55.129 \rightarrow 00:41:57.220$ that have not been vaccinated,
- NOTE Confidence: 0.884379793636364
- $00:41:57.220 \longrightarrow 00:41:59.607$ and the blue and the purple bars
- NOTE Confidence: 0.884379793636364
- $00{:}41{:}59{.}607 \dashrightarrow 00{:}42{:}01{.}110$ are to the mice.
- NOTE Confidence: 0.884379793636364
- $00{:}42{:}01{.}110 \dashrightarrow 00{:}42{:}05{.}037$ 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
- $00{:}42{:}08{.}088 \dashrightarrow 00{:}42{:}11{.}305$ bottom which is the C part that's 30
- NOTE Confidence: 0.884379793636364
- $00{:}42{:}11.305 \dashrightarrow 00{:}42{:}14.135$ micrograms per kilogram that is a you
- NOTE Confidence: 0.884379793636364
- $00:42:14.135 \rightarrow 00:42:16.851$ 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
- $00{:}42{:}19.086 \dashrightarrow 00{:}42{:}22.110$ is the next set of bars over is in
- NOTE Confidence: 0.884379793636364
- $00:42:22.110 \longrightarrow 00:42:24.286$ fact the lethal dose of fentanyl and
- NOTE Confidence: 0.884379793636364
- $00:42:24.286 \longrightarrow 00:42:27.095$ what you can see is that the the
- NOTE Confidence: 0.884379793636364
- $00:42:27.095 \rightarrow 00:42:31.120$ blocking of of pain from that 100.
- NOTE Confidence: 0.884379793636364

- $00:42:31.120 \rightarrow 00:42:32.497$ Who is complete?
- NOTE Confidence: 0.884379793636364
- $00{:}42{:}32{.}497 \dashrightarrow 00{:}42{:}35{.}710$ 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
- $00:42:37.888 \rightarrow 00:42:39.600$ you know, you don't feel any pain.
- NOTE Confidence: 0.884379793636364
- $00{:}42{:}39{.}600 \dashrightarrow 00{:}42{:}41{.}984$ I guess that's one way to put it
- NOTE Confidence: 0.884379793636364
- $00:42:41.984 \longrightarrow 00:42:44.520$ before you die on the blue bar,
- NOTE Confidence: 0.884379793636364
- $00:42:44.520 \longrightarrow 00:42:46.180$ blue and purple bars.
- NOTE Confidence: 0.884379793636364
- $00{:}42{:}46.180 \dashrightarrow 00{:}42{:}49.138$ Those are with the vaccination with.
- NOTE Confidence: 0.884379793636364
- $00{:}42{:}49{.}140 \dashrightarrow 00{:}42{:}51{.}780$ I'm not gonna go into the two different
- NOTE Confidence: 0.884379793636364
- $00:42:51.780 \longrightarrow 00:42:54.100$ types of adjuvants that we have,
- NOTE Confidence: 0.884379793636364
- $00{:}42{:}54{.}100 \dashrightarrow 00{:}42{:}56{.}420$ the DLT and the LTA,
- NOTE Confidence: 0.884379793636364
- $00:42:56.420 \rightarrow 00:42:59.525$ only to tell you that the LTA 1 adjuvant
- NOTE Confidence: 0.884379793636364
- $00:42:59.525 \rightarrow 00:43:02.901$ 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
- $00{:}43{:}06{.}128 \dashrightarrow 00{:}43{:}09{.}815$ more IGA is what's the key to success.
- NOTE Confidence: 0.884379793636364
- $00:43:09.820 \longrightarrow 00:43:10.732$ So the left,

- NOTE Confidence: 0.884379793636364
- $00:43:10.732 \longrightarrow 00:43:12.860$ so the C's are the tail flick,
- NOTE Confidence: 0.884379793636364
- $00:43:12.860 \longrightarrow 00:43:15.172$ the D's or the is the hot plate
- NOTE Confidence: 0.884379793636364
- $00{:}43{:}15{.}172 \dashrightarrow 00{:}43{:}17{.}179$ measure in these mice and it
- NOTE Confidence: 0.884379793636364
- $00{:}43{:}17.179 \dashrightarrow 00{:}43{:}19.207$ shows exactly the same sorts of
- NOTE Confidence: 0.867170720476191
- $00:43:19.277 \longrightarrow 00:43:21.200$ things, the hot plate,
- NOTE Confidence: 0.867170720476191
- 00:43:21.200 --> 00:43:22.640 perhaps more graphically,
- NOTE Confidence: 0.867170720476191
- $00:43:22.640 \longrightarrow 00:43:25.425$ 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
- $00{:}43{:}29{.}080 \dashrightarrow 00{:}43{:}30{.}830$ 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
- $00:43:32.466 \rightarrow 00:43:34.517$ that's the simplest test one can do.
- NOTE Confidence: 0.867170720476191
- $00{:}43{:}34{.}520 \dashrightarrow 00{:}43{:}36{.}615$ 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 $\operatorname{-->}$ 00:43:40.558 We then looked at the brain levels
- NOTE Confidence: 0.867170720476191
- $00{:}43{:}40.558 \dashrightarrow 00{:}43{:}42.823$ also and what you can see on the left
- NOTE Confidence: 0.867170720476191

 $00:43:42.823 \rightarrow 00:43:44.489$ or the brain levels of fentanyl,

NOTE Confidence: 0.867170720476191

 $00{:}43{:}44{.}490 \dashrightarrow 00{:}43{:}46{.}362$ and on the right of the

NOTE Confidence: 0.867170720476191

 $00:43:46.362 \longrightarrow 00:43:47.610$ blood levels of fentanyl.

NOTE Confidence: 0.867170720476191

 $00:43:47.610 \longrightarrow 00:43:50.886$ The open bar is the one that's

NOTE Confidence: 0.867170720476191

 $00:43:50.886 \rightarrow 00:43:53.814$ got the naive mouse, the dock,

NOTE Confidence: 0.867170720476191

 $00{:}43{:}53{.}814 \dashrightarrow 00{:}43{:}57{.}442$ the blue and purple bars are the

NOTE Confidence: 0.867170720476191

 $00{:}43{:}57{.}442 \dashrightarrow 00{:}44{:}00{.}197$ ones that have the vaccinated.

NOTE Confidence: 0.867170720476191

 $00:44:00.200 \rightarrow 00:44:03.091$ 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

 $00:44:05.760 \rightarrow 00:44:08.714$ yet if you look in the bloodstream,

NOTE Confidence: 0.867170720476191

 $00{:}44{:}08.720 \dashrightarrow 00{:}44{:}10.736$ a lot of fentanyl is getting in the brain.

NOTE Confidence: 0.867170720476191

 $00{:}44{:}10.740 \dashrightarrow 00{:}44{:}14.856$ So it's going from about 10 nanograms per

NOTE Confidence: 0.867170720476191

 $00:44:14.856 \rightarrow 00:44:18.211$ milliliter in the blood up to about 130,

NOTE Confidence: 0.867170720476191

 $00:44:18.211 \longrightarrow 00:44:20.710$ a 100 or I'm sorry about 170.

NOTE Confidence: 0.867170720476191

 $00:44:20.710 \longrightarrow 00:44:23.830$ So we have clearly gotten the fentanyl to

NOTE Confidence: 0.867170720476191

 $00:44:23.830 \rightarrow 00:44:27.282$ stay in the blood and not go into the brain.

- NOTE Confidence: 0.867170720476191
- $00:44:27.290 \longrightarrow 00:44:28.391$ 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
- $00:44:31.190 \longrightarrow 00:44:34.490$ So this is a big success.
- NOTE Confidence: 0.867170720476191
- $00:44:34.490 \rightarrow 00:44:38.018$ We then also looked at the type of antibody
- NOTE Confidence: 0.867170720476191
- $00:44:38.018 \rightarrow 00:44:43.050$ and this is with the anti fentanyl, IGA.
- NOTE Confidence: 0.867170720476191
- $00{:}44{:}43.050 \dashrightarrow 00{:}44{:}45.490$ What's on the left is the brain levels.
- NOTE Confidence: 0.867170720476191
- $00:44:45.490 \rightarrow 00:44:48.594$ The brain levels of,
- NOTE Confidence: 0.867170720476191
- $00:44:48.594 \rightarrow 00:44:52.340$ of and of the.
- NOTE Confidence: 0.867170720476191
- $00{:}44{:}52{.}340 \dashrightarrow 00{:}44{:}56{.}192$ The IG let's see the brain levels of the
- NOTE Confidence: 0.867170720476191
- $00:44:56.192 \rightarrow 00:44:59.427$ fentanyl with the anti fentanyl vaccine.
- NOTE Confidence: 0.867170720476191
- $00:44:59.430 \longrightarrow 00:45:01.770$ The bigger the concentration of
- NOTE Confidence: 0.867170720476191
- $00{:}45{:}01.770 \dashrightarrow 00{:}45{:}04.693$ that antibody is which is what's
- NOTE Confidence: 0.867170720476191
- $00{:}45{:}04.693 \dashrightarrow 00{:}45{:}07.651$ the the collection of diamonds and
- NOTE Confidence: 0.867170720476191
- $00{:}45{:}07.651 \dashrightarrow 00{:}45{:}10.596$ and triangles that are up in the
- NOTE Confidence: 0.867170720476191
- $00{:}45{:}10.596 \dashrightarrow 00{:}45{:}13.400$ left hand corner on the left side.
- NOTE Confidence: 0.867170720476191

 $00:45:13.400 \longrightarrow 00:45:17.050$ That's the antibody there and

NOTE Confidence: 0.867170720476191

 $00{:}45{:}17.050 \dashrightarrow 00{:}45{:}19.970$ you're looking at the.

NOTE Confidence: 0.867170720476191

 $00{:}45{:}19{.}970 \dashrightarrow 00{:}45{:}21{.}900$ The anti fentanyl antibody and

NOTE Confidence: 0.867170720476191

 $00{:}45{:}21.900 \dashrightarrow 00{:}45{:}24.670$ the amount of IGA as the brain.

NOTE Confidence: 0.867170720476191

 $00{:}45{:}24.670 \dashrightarrow 00{:}45{:}26.710$ Fentanyl is it.

NOTE Confidence: 0.867170720476191

00:45:26.710 --> 00:45:28.350 As it is. Uh,

NOTE Confidence: 0.867170720476191

 $00{:}45{:}28.350 \dashrightarrow 00{:}45{:}32.119$ those levels are going down of the antibody.

NOTE Confidence: 0.867170720476191

 $00:45:32.120 \rightarrow 00:45:35.408$ The brain levels of fentanyl are going up.

NOTE Confidence: 0.867170720476191

 $00{:}45{:}35{.}410 \dashrightarrow 00{:}45{:}36{.}856$ I said that that's all that

NOTE Confidence: 0.867170720476191

 $00:45:36.856 \rightarrow 00:45:38.270$ 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

 $00:45:38.966 \longrightarrow 00:45:39.894$ it would be a,

NOTE Confidence: 0.867170720476191

 $00{:}45{:}39{.}900 \dashrightarrow 00{:}45{:}41{.}440$ it would be a line except that

NOTE Confidence: 0.867170720476191

 $00{:}45{:}41{.}440 \dashrightarrow 00{:}45{:}43{.}029$ we really just have two clusters.

NOTE Confidence: 0.867170720476191

 $00:45:43.030 \rightarrow 00:45:44.983$ You either knock the fencing all out

NOTE Confidence: 0.867170720476191

 $00{:}45{:}44{.}983 \dashrightarrow 00{:}45{:}46{.}601$ completely from getting into the brain

 $00:45:46.601 \rightarrow 00:45:48.295$ 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

 $00{:}45{:}50{.}710 \dashrightarrow 00{:}45{:}53{.}286$ We then looked at tail flick also and

NOTE Confidence: 0.867170720476191

 $00:45:53.286 \rightarrow 00:45:56.006$ found the same association that when you

NOTE Confidence: 0.867170720476191

 $00:45:56.006 \rightarrow 00:45:59.049$ have had these higher levels of the antibody,

NOTE Confidence: 0.867170720476191

 $00:45:59.050 \longrightarrow 00:46:00.349$ the anti fentanyl,

NOTE Confidence: 0.867170720476191

00:46:00.349 --> 00:46:00.782 IGA,

NOTE Confidence: 0.867170720476191

 $00:46:00.782 \longrightarrow 00:46:02.947$ the tail flick doesn't occur,

NOTE Confidence: 0.867170720476191

 $00:46:02.950 \rightarrow 00:46:05.358$ although there there were a few exceptions.

NOTE Confidence: 0.867170720476191

 $00:46:05.360 \longrightarrow 00:46:07.622$ Of animals that we're still getting

NOTE Confidence: 0.867170720476191

 $00{:}46{:}07.622 \dashrightarrow 00{:}46{:}09.895$ some tail flicker effect that is

NOTE Confidence: 0.867170720476191

 $00{:}46{:}09{.}895 \dashrightarrow 00{:}46{:}12{.}001$ because the tail flick also involves

NOTE Confidence: 0.867170720476191

 $00{:}46{:}12.001 \dashrightarrow 00{:}46{:}14.330$ spinal cord reflexes and we're not

NOTE Confidence: 0.867170720476191

 $00{:}46{:}14.330 \dashrightarrow 00{:}46{:}16.664$ clear that this actually keeps fent anyl

NOTE Confidence: 0.867170720476191

 $00{:}46{:}16.670 \dashrightarrow 00{:}46{:}19.430$ completely out of the spinal cord in some,

 $00:46:19.430 \longrightarrow 00:46:22.830$ some animals will, but.

NOTE Confidence: 0.867170720476191

 $00{:}46{:}22.830 \dashrightarrow 00{:}46{:}25.910$ So this is brain levels and pain.

NOTE Confidence: 0.867170720476191

 $00:46:25.910 \longrightarrow 00:46:28.180$ This is a rat study.

NOTE Confidence: 0.867170720476191

 $00:46:28.180 \rightarrow 00:46:31.388$ This in the RAT study is what we're

NOTE Confidence: 0.867170720476191

 $00:46:31.388 \longrightarrow 00:46:34.810$ looking at is will rats self administer.

NOTE Confidence: 0.867170720476191

 $00{:}46{:}34{.}810 \dashrightarrow 00{:}46{:}37{.}834$ The fentanyl and what you can show is

NOTE Confidence: 0.867170720476191

 $00:46:37.834 \rightarrow 00:46:41.110$ that on the far left with no vaccine,

NOTE Confidence: 0.867170720476191

 $00:46:41.110 \longrightarrow 00:46:43.290$ yes, the the rats will,

NOTE Confidence: 0.867170720476191

00:46:43.290 --> 00:46:43.832 you know,

NOTE Confidence: 0.867170720476191

 $00{:}46{:}43.832 \dashrightarrow 00{:}46{:}46.000$ knock at the bar a million times to

NOTE Confidence: 0.829660051

 $00{:}46{:}46{.}060 \dashrightarrow 00{:}46{:}48{.}770$ get the fentanyl and as you push the dose up,

NOTE Confidence: 0.829660051

 $00:46:48.770 \longrightarrow 00:46:53.018$ you know they get pushed the bar more.

NOTE Confidence: 0.829660051

 $00:46:53.020 \longrightarrow 00:46:54.700$ Once you vaccinate them though,

NOTE Confidence: 0.829660051

 $00{:}46{:}54{.}700 \dashrightarrow 00{:}46{:}59{.}020$ you just completely knock out that ability.

NOTE Confidence: 0.829660051

 $00{:}46{:}59{.}020 \dashrightarrow 00{:}47{:}01{.}771$ We also looked at it in combination

NOTE Confidence: 0.829660051

 $00:47:01.771 \longrightarrow 00:47:03.586$ with bup renorphine because we wanted

- NOTE Confidence: 0.829660051
- $00:47:03.586 \rightarrow 00:47:05.968$ to be sure that we weren't decreasing
- NOTE Confidence: 0.829660051
- $00{:}47{:}05{.}968 \dashrightarrow 00{:}47{:}08{.}640$ the efficacy of bup renorphine.
- NOTE Confidence: 0.829660051
- $00:47:08.640 \longrightarrow 00:47:10.159$ And what we found is that no,
- NOTE Confidence: 0.829660051
- $00{:}47{:}10.160 \dashrightarrow 00{:}47{:}11.835$ we did not decrease the
- NOTE Confidence: 0.829660051
- 00:47:11.835 --> 00:47:12.840 efficacy of buprenorphine.
- NOTE Confidence: 0.829660051
- $00{:}47{:}12{.}840 \dashrightarrow 00{:}47{:}14{.}280$ If anything, it's enhancing some
- NOTE Confidence: 0.829660051
- $00{:}47{:}14.280 \dashrightarrow 00{:}47{:}15.720$ of the efficacy of bup renorphine,
- NOTE Confidence: 0.829660051
- $00:47:15.720 \longrightarrow 00:47:17.520$ which we're a little puzzled by,
- NOTE Confidence: 0.829660051
- $00:47:17.520 \longrightarrow 00:47:21.250$ but you know that's OK.
- NOTE Confidence: 0.829660051
- $00:47:21.250 \rightarrow 00:47:24.354$ This is a high dose fentanyl and lethality,
- NOTE Confidence: 0.829660051
- $00:47:24.360 \longrightarrow 00:47:25.740$ this is in the rats.
- NOTE Confidence: 0.829660051
- $00:47:25.740 \longrightarrow 00:47:28.128$ Hopefully you can see that on
- NOTE Confidence: 0.829660051
- $00{:}47{:}28.128 \dashrightarrow 00{:}47{:}30.740$ the right side of this slide.
- NOTE Confidence: 0.829660051
- $00{:}47{:}30{.}740 \dashrightarrow 00{:}47{:}32{.}748$ That's not what a rat should look like
- NOTE Confidence: 0.829660051
- $00{:}47{:}32{.}748 \dashrightarrow 00{:}47{:}34{.}456$ that's that's rigor mortis in the rat.
- NOTE Confidence: 0.829660051

 $00:47:34.460 \longrightarrow 00:47:36.084$ They are basically stiff.

NOTE Confidence: 0.829660051

 $00:47:36.084 \rightarrow 00:47:38.520$ They are basically dead from that

NOTE Confidence: 0.829660051

 $00{:}47{:}38{.}592 \dashrightarrow 00{:}47{:}41{.}064$ 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

 $00{:}47{:}47{.}913 \dashrightarrow 00{:}47{:}49{.}266$ they're they're walking around and

NOTE Confidence: 0.829660051

 $00:47:49.266 \longrightarrow 00:47:50.883$ they look fine and they are you

NOTE Confidence: 0.829660051

 $00{:}47{:}50.883 \dashrightarrow 00{:}47{:}52.657$ would not be able to hold them stiff.

NOTE Confidence: 0.829660051

 $00{:}47{:}52.660 \dashrightarrow 00{:}47{:}55.342$ The way you can on the right side picture,

NOTE Confidence: 0.829660051

 $00{:}47{:}55{.}350 \dashrightarrow 00{:}47{:}56{.}796$ so this vaccine,

NOTE Confidence: 0.829660051

 $00{:}47{:}56.796 \dashrightarrow 00{:}47{:}59.206$ we've also measured respirations in

NOTE Confidence: 0.829660051

 $00{:}47{:}59.206 \dashrightarrow 00{:}48{:}01.905$ the rats and the the respirations

NOTE Confidence: 0.829660051

 $00:48:01.905 \longrightarrow 00:48:04.412$ basically go down to 0 if you

NOTE Confidence: 0.829660051

 $00{:}48{:}04{.}412 \dashrightarrow 00{:}48{:}05{.}959$ don't have the vaccine and if you

NOTE Confidence: 0.829660051

 $00:48:05.959 \longrightarrow 00:48:07.519$ do they don't change at all.

 $00:48:09.640 \rightarrow 00:48:12.895$ So who should take the fentanyl vaccine?

NOTE Confidence: 0.73261615

 $00{:}48{:}12.900 \dashrightarrow 00{:}48{:}15.440$ What's the target patient population?

NOTE Confidence: 0.73261615

 $00:48:15.440 \rightarrow 00:48:17.396$ Well certainly treatment seeking

NOTE Confidence: 0.73261615

 $00:48:17.396 \rightarrow 00:48:19.841$ opioid who are inevitably fentanyl

NOTE Confidence: 0.73261615

 $00:48:19.841 \longrightarrow 00:48:22.280$ users maintained on bup renorphine,

NOTE Confidence: 0.73261615

 $00{:}48{:}22.280 \dashrightarrow 00{:}48{:}25.184$ they clearly want treatment because but

NOTE Confidence: 0.73261615

 $00{:}48{:}25{.}184 \dashrightarrow 00{:}48{:}27{.}947$ people morphine doesn't block fentanyl and

NOTE Confidence: 0.73261615

 $00{:}48{:}27{.}947 \dashrightarrow 00{:}48{:}30{.}971$ so they all of them should be vaccinated.

NOTE Confidence: 0.73261615

 $00{:}48{:}30{.}980 \dashrightarrow 00{:}48{:}33{.}310$ What about stimulant and benzodia zepine

NOTE Confidence: 0.73261615

 $00{:}48{:}33{.}310 \dashrightarrow 00{:}48{:}35{.}640$ users because of this adult eration

NOTE Confidence: 0.73261615

 $00:48:35.704 \longrightarrow 00:48:37.559$ with fentanyl which is driven

NOTE Confidence: 0.73261615

 $00:48:37.559 \rightarrow 00:48:39.414$ by St rebranding of fentanyl?

NOTE Confidence: 0.73261615

 $00{:}48{:}39{.}420 \dashrightarrow 00{:}48{:}41{.}596$ 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

 $00{:}48{:}43.415 \dashrightarrow 00{:}48{:}45.245$ and there's been an increased use

 $00:48:45.304 \longrightarrow 00:48:47.332$ in stimulants and the much lower

NOTE Confidence: 0.73261615

 $00:48:47.332 \rightarrow 00:48:49.430$ production and shipping cost of fentanyl.

NOTE Confidence: 0.73261615

 $00{:}48{:}49{.}430 \dashrightarrow 00{:}48{:}51{.}650$ We think the stimulant and benzo diazepine

NOTE Confidence: 0.73261615

 $00:48:51.650 \rightarrow 00:48:53.369$ abusers ought to be given some,

NOTE Confidence: 0.73261615

 $00{:}48{:}53{.}370 \dashrightarrow 00{:}48{:}55{.}434$ particularly the stimulant users

NOTE Confidence: 0.73261615

 $00{:}48{:}55{.}434 \dashrightarrow 00{:}48{:}57{.}498$ vaccinations for anti fentanyl

NOTE Confidence: 0.73261615

 $00{:}48{:}57{.}498 \dashrightarrow 00{:}48{:}59{.}968$ because they're going to die from it.

NOTE Confidence: 0.73261615

 $00{:}48{:}59{.}970 \dashrightarrow 00{:}49{:}02{.}122$ So we think there's a broad need for

NOTE Confidence: 0.73261615

 $00{:}49{:}02.122 \dashrightarrow 00{:}49{:}03.805$ 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

 $00{:}49{:}05{.}610 \dashrightarrow 00{:}49{:}07{.}955$ whether it's going to extend into

NOTE Confidence: 0.73261615

 $00:49:07.955 \rightarrow 00:49:09.519$ benzodiazepine abusers and virtually.

NOTE Confidence: 0.73261615

 $00{:}49{:}09{.}520 \dashrightarrow 00{:}49{:}11{.}460$ Anything else will depend upon

NOTE Confidence: 0.73261615

 $00:49:11.460 \longrightarrow 00:49:13.740$ how the marketing goes with the,

NOTE Confidence: 0.73261615

00:49:13.740 --> 00:49:14.404 you know,

NOTE Confidence: 0.73261615

 $00{:}49{:}14{.}404 \dashrightarrow 00{:}49{:}16{.}728$ the cartels in Mexico and the producers

 $00:49:16.728 \longrightarrow 00:49:19.045$ in China who are sending it here.

NOTE Confidence: 0.88797582117647

 $00:49:21.230 \longrightarrow 00:49:23.024$ Just a quick little summary of

NOTE Confidence: 0.88797582117647

 $00{:}49{:}23.024 \dashrightarrow 00{:}49{:}25.382$ what I've tried to go over that

NOTE Confidence: 0.88797582117647

 $00:49:25.382 \longrightarrow 00:49:26.846$ 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

 $00:49:29.818 \rightarrow 00:49:32.189$ consider unethical prescribing of opiates,

NOTE Confidence: 0.88797582117647

 $00{:}49{:}32{.}190 \dashrightarrow 00{:}49{:}34{.}032$ the MD's are over prescribing opiates

NOTE Confidence: 0.88797582117647

 $00:49:34.032 \longrightarrow 00:49:36.310$ that led to the illicit fentanyl.

NOTE Confidence: 0.88797582117647

 $00{:}49{:}36{.}310 \dashrightarrow 00{:}49{:}38{.}134$ It was something driven by a

NOTE Confidence: 0.88797582117647

 $00:49:38.134 \rightarrow 00:49:39.350$ lot of pharmaceutical companies.

NOTE Confidence: 0.88797582117647

 $00{:}49{:}39{.}350 \dashrightarrow 00{:}49{:}40{.}698$ 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

 $00{:}49{:}43{.}504 \dashrightarrow 00{:}49{:}45{.}304$ to prescribe much more stimulants

NOTE Confidence: 0.88797582117647

 $00{:}49{:}45{.}304 \dashrightarrow 00{:}49{:}47{.}190$ than they used to prescribe.

NOTE Confidence: 0.88797582117647

 $00:49:47.190 \longrightarrow 00:49:49.310$ Why? They're saying it's great

 $00:49:49.310 \longrightarrow 00:49:51.006$ for ADHD and adults.

NOTE Confidence: 0.88797582117647

 $00:49:51.010 \longrightarrow 00:49:52.810$ Even adults that didn't seem to

NOTE Confidence: 0.88797582117647

 $00{:}49{:}52{.}810 \dashrightarrow 00{:}49{:}54{.}910$ have it as kids that it's in,

NOTE Confidence: 0.88797582117647

 $00{:}49{:}54{.}910 \dashrightarrow 00{:}49{:}57{.}385$ kids that the diagnosis has

NOTE Confidence: 0.88797582117647

 $00:49:57.385 \dashrightarrow 00:49:58.870$ been markedly increased,

NOTE Confidence: 0.88797582117647

 $00{:}49{:}58.870 \dashrightarrow 00{:}50{:}01.678$ and there the kids are given.

NOTE Confidence: 0.88797582117647

 $00:50:01.680 \longrightarrow 00:50:03.696$ As I showed you from the data,

NOTE Confidence: 0.88797582117647

 $00:50:03.700 \longrightarrow 00:50:06.332$ you know early on these early adolescents

NOTE Confidence: 0.88797582117647

 $00{:}50{:}06{.}332 \dashrightarrow 00{:}50{:}08{.}737$ are being given more substantial four

NOTE Confidence: 0.88797582117647

 $00{:}50{:}08.737 \dashrightarrow 00{:}50{:}11.149$ times the amount of amphetamine or

NOTE Confidence: 0.88797582117647

 $00{:}50{:}11.149 \dashrightarrow 00{:}50{:}13.740$ what they than they used to be given.

NOTE Confidence: 0.88797582117647

 $00:50:13.740 \longrightarrow 00:50:14.472$ So this is.

NOTE Confidence: 0.88797582117647

 $00{:}50{:}14.472 \dashrightarrow 00{:}50{:}16.884$ And this is wave four and I think we

NOTE Confidence: 0.88797582117647

 $00:50:16.884 \rightarrow 00:50:19.117$ have to be very careful as physicians

NOTE Confidence: 0.88797582117647

 $00{:}50{:}19{.}117 \dashrightarrow 00{:}50{:}21{.}568$ that we don't get somehow blamed for

NOTE Confidence: 0.88797582117647

 $00:50:21.568 \rightarrow 00:50:23.925$ this epidemic that this is our doing.

00:50:23.925 --> 00:50:25.875 And I'm afraid it's it's not

NOTE Confidence: 0.88797582117647

 $00:50:25.875 \rightarrow 00:50:27.543$ necessarily coming from psychiatrist

NOTE Confidence: 0.88797582117647

 $00{:}50{:}27{.}543 \dashrightarrow 00{:}50{:}29{.}678$ it's coming from pediatricians and

NOTE Confidence: 0.88797582117647

 $00{:}50{:}29.678 \dashrightarrow 00{:}50{:}31.993$ 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

 $00:50:34.090 \longrightarrow 00:50:36.498$ I see in Texas all the time that

NOTE Confidence: 0.88797582117647

 $00:50:36.498 \rightarrow 00:50:38.356$ 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

 $00{:}50{:}40{.}530 \dashrightarrow 00{:}50{:}42{.}802$ this is and when they ask for a

NOTE Confidence: 0.88797582117647

 $00:50:42.802 \rightarrow 00:50:44.608$ stimulant they give them Adderall,

NOTE Confidence: 0.88797582117647

 $00:50:44.610 \longrightarrow 00:50:47.039$ that's the the one to give them.

NOTE Confidence: 0.88797582117647

 $00{:}50{:}47{.}040 \dashrightarrow 00{:}50{:}49{.}170$ And the company that makes it

NOTE Confidence: 0.88797582117647

 $00:50:49.170 \dashrightarrow 00:50:50.960$ obviously is not discouraging that.

NOTE Confidence: 0.88797582117647

 $00{:}50{:}50{.}960 \dashrightarrow 00{:}50{:}52{.}670$ So what about amphetamine for treating

NOTE Confidence: 0.88797582117647

 $00{:}50{:}52{.}670 \dashrightarrow 00{:}50{:}54{.}546$ stimulant use 30 yes there can be

 $00:50:54.546 \rightarrow 00:50:56.135$ and it needs to be particular ones

NOTE Confidence: 0.88797582117647

00:50:56.189 --> 00:50:57.714 though lis
dexampletamine 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

 $00:51:00.656 \rightarrow 00:51:03.262$ acting slow onset genetic matching.

NOTE Confidence: 0.88797582117647

 $00{:}51{:}03.262 \dashrightarrow 00{:}51{:}05.480$ I I think there's a real role for this.

NOTE Confidence: 0.88797582117647

 $00:51:05.480 \longrightarrow 00:51:08.259$ I only showed it for doxazosin and NOTE Confidence: 0.88797582117647

 $00{:}51{:}08{.}259 \dashrightarrow 00{:}51{:}10{.}260$ the DBH polymorphism but there's

NOTE Confidence: 0.88797582117647

 $00:51:10.260 \rightarrow 00:51:12.836$ in fact others that that are coming

NOTE Confidence: 0.88797582117647

 $00:51:12.836 \longrightarrow 00:51:14.963$ out including for the use

NOTE Confidence: 0.88797582117647

 $00:51:14.963 \longrightarrow 00:51:16.395$ of bup renorphine to treat.

NOTE Confidence: 0.88797582117647

 $00:51:16.395 \longrightarrow 00:51:17.490$ For pain abuse,

NOTE Confidence: 0.88797582117647

 $00{:}51{:}17{.}490 \dashrightarrow 00{:}51{:}20{.}619$ it ends up Dave Nielsen and I

NOTE Confidence: 0.88797582117647

 $00{:}51{:}20{.}619 \dashrightarrow 00{:}51{:}23{.}177$ published a paper recently showing

NOTE Confidence: 0.88797582117647

 $00{:}51{:}23.177 \dashrightarrow 00{:}51{:}27.097$ 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,

00:51:29.860 --> 00:51:31.968 dynorphin polymorphism that produced

NOTE Confidence: 0.88797582117647

 $00{:}51{:}31{.}968 \dashrightarrow 00{:}51{:}34{.}076$ that predicts treatment response.

NOTE Confidence: 0.88797582117647

 $00{:}51{:}34.080 \dashrightarrow 00{:}51{:}35.360$ And then there's the vaccines.

NOTE Confidence: 0.88797582117647

 $00{:}51{:}35{.}360 \dashrightarrow 00{:}51{:}37{.}010$ I didn't have time to talk

NOTE Confidence: 0.88797582117647

 $00{:}51{:}37.010 \dashrightarrow 00{:}51{:}37.835$ about choline sterase enzymes.

NOTE Confidence: 0.88797582117647

 $00{:}51{:}37{.}840 \dashrightarrow 00{:}51{:}40{.}120$ These have been around now for a while.

NOTE Confidence: 0.88797582117647

 $00{:}51{:}40{.}120 \dashrightarrow 00{:}51{:}43{.}060$ 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

 $00{:}51{:}46{.}040 \dashrightarrow 00{:}51{:}48{.}420$ 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

 $00:51:50.130 \longrightarrow 00:51:51.498$ it with the Colonel,

NOTE Confidence: 0.88797582117647

 $00:51:51.500 \longrightarrow 00:51:53.260$ one of the Colonel esterases,

NOTE Confidence: 0.88797582117647

 $00{:}51{:}53{.}260 \dashrightarrow 00{:}51{:}55{.}400$ and it was phenomenal in

NOTE Confidence: 0.88797582117647

 $00{:}51{:}55{.}400 \dashrightarrow 00{:}51{:}57{.}112$ that it completely blocked.

NOTE Confidence: 0.88797582117647

 $00{:}51{:}57{.}120 \dashrightarrow 00{:}51{:}58{.}840$ McCain use and the animals,

 $00:51:58.840 \rightarrow 00:52:01.296$ he just could not override it at all,

NOTE Confidence: 0.88797582117647

 $00:52:01.300 \longrightarrow 00:52:02.610$ even though they could override

NOTE Confidence: 0.88797582117647

 $00:52:02.610 \longrightarrow 00:52:03.920$ 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

 $00{:}52{:}05{.}230 \dashrightarrow 00{:}52{:}06{.}914$ because the colony esterase

NOTE Confidence: 0.88797582117647

 $00{:}52{:}06{.}914 \dashrightarrow 00{:}52{:}08{.}177$ is relatively slow,

NOTE Confidence: 0.88797582117647

 $00:52:08.180 \longrightarrow 00:52:10.476$ but when you put the two things together,

NOTE Confidence: 0.88797582117647

 $00:52:10.480 \longrightarrow 00:52:13.550$ it's unstoppable.

NOTE Confidence: 0.88797582117647

00:52:13.550 --> 00:52:14.858 And bu
prenorphine 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

 $00:52:16.872 \rightarrow 00:52:17.223$ sorry,

NOTE Confidence: 0.88797582117647

 $00{:}52{:}17{.}223 \dashrightarrow 00{:}52{:}19{.}680$ but and a vaccine can block the

NOTE Confidence: 0.88797582117647

 $00:52:19.757 \longrightarrow 00:52:22.022$ fentanyl abuse and the overdose

NOTE Confidence: 0.88797582117647

 $00{:}52{:}22.022 \dashrightarrow 00{:}52{:}24.287$ and the human fentanyl vaccine

NOTE Confidence: 0.797460120357143

 $00:52:24.370 \longrightarrow 00:52:25.741$ we've just started

 $00:52:25.741 \longrightarrow 00:52:28.026$ 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

 $00:52:29.290 \longrightarrow 00:52:30.550$ into people within a year.

NOTE Confidence: 0.797460120357143

 $00:52:30.550 \longrightarrow 00:52:31.994$ Depends on the FDA,

NOTE Confidence: 0.797460120357143

 $00:52:31.994 \rightarrow 00:52:33.799$ but they've accelerated for COVID

NOTE Confidence: 0.797460120357143

 $00:52:33.799 \rightarrow 00:52:35.232$ obviously the approval process

NOTE Confidence: 0.797460120357143

 $00:52:35.232 \rightarrow 00:52:37.260$ and we're hoping to convince them

NOTE Confidence: 0.797460120357143

 $00:52:37.260 \longrightarrow 00:52:39.270$ that they should be doing the same

NOTE Confidence: 0.797460120357143

 $00:52:39.270 \longrightarrow 00:52:40.944$ thing for an anti fentanyl vaccine.

NOTE Confidence: 0.797460120357143

 $00:52:40.944 \rightarrow 00:52:42.726$ We're not the only one working

NOTE Confidence: 0.797460120357143

 $00:52:42.726 \longrightarrow 00:52:43.800$ on this vaccine.

NOTE Confidence: 0.797460120357143

 $00{:}52{:}43.800 \dashrightarrow 00{:}52{:}45.474$ But we're about at least probably

NOTE Confidence: 0.797460120357143

 $00{:}52{:}45{.}474 \dashrightarrow 00{:}52{:}47{.}233$ two to three years ahead of

NOTE Confidence: 0.797460120357143

 $00:52:47.233 \rightarrow 00:52:48.683$ the other three groups working

NOTE Confidence: 0.797460120357143

 $00{:}52{:}48.683 \dashrightarrow 00{:}52{:}50.260$ on this around the country.

00:52:50.260 --> 00:52:54.274 It's not like we're we're competing

NOTE Confidence: 0.797460120357143

 $00:52:54.274 \longrightarrow 00:52:55.678$ with them in any real way.

NOTE Confidence: 0.797460120357143

 $00{:}52{:}55{.}680 \dashrightarrow 00{:}52{:}57{.}012$ We're collaborating with them.

NOTE Confidence: 0.797460120357143

 $00:52:57.012 \rightarrow 00:52:58.677$ We're trying to work together.

NOTE Confidence: 0.797460120357143

 $00{:}52{:}58{.}680 \dashrightarrow 00{:}53{:}00{.}132$ There's a group at Harvard that

NOTE Confidence: 0.797460120357143

 $00{:}53{:}00{.}132 \dashrightarrow 00{:}53{:}01{.}396$ 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

 $00:53:02.650 \longrightarrow 00:53:05.130$ another one and University of

NOTE Confidence: 0.797460120357143

 $00{:}53{:}05{.}130 \dashrightarrow 00{:}53{:}07{.}748$ Maryland and then together plus with

NOTE Confidence: 0.797460120357143

 $00{:}53{:}07{.}748 \dashrightarrow 00{:}53{:}10{.}004$ of course Niad and night etcetera

NOTE Confidence: 0.797460120357143

 $00{:}53{:}10.004 \dashrightarrow 00{:}53{:}11.853$ together we think that would come

NOTE Confidence: 0.797460120357143

 $00:53:11.853 \dashrightarrow 00:53:13.718$ up with this but our particular.

NOTE Confidence: 0.797460120357143

 $00:53:13.718 \rightarrow 00:53:16.301$ Group is is rather aggressive I guess

NOTE Confidence: 0.797460120357143

 $00{:}53{:}16{.}301 \dashrightarrow 00{:}53{:}18{.}720$ because I know how to do these kind

NOTE Confidence: 0.797460120357143

 $00:53:18.720 \rightarrow 00:53:21.149$ of clinical studies and nobody else involved.

NOTE Confidence: 0.797460120357143

 $00:53:21.150 \longrightarrow 00:53:22.570$ It's done clinical studies

- NOTE Confidence: 0.797460120357143
- $00:53:22.570 \longrightarrow 00:53:23.990$ with vaccines in addiction.
- NOTE Confidence: 0.797460120357143
- $00{:}53{:}23{.}990 \dashrightarrow 00{:}53{:}26{.}454$ So I think that is what's giving
- NOTE Confidence: 0.797460120357143
- $00{:}53{:}26{.}454 \dashrightarrow 00{:}53{:}30{.}850$ 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
- $00:53:32.534 \rightarrow 00:53:33.944$ this is not everybody who's
- NOTE Confidence: 0.797460120357143
- $00:53:33.944 \longrightarrow 00:53:35.389$ worked with me over time,
- NOTE Confidence: 0.797460120357143
- 00:53:35.390 --> 00:53:36.150 including, uh,
- NOTE Confidence: 0.797460120357143
- $00{:}53{:}36{.}150 \dashrightarrow 00{:}53{:}39{.}190$ very few of the Yale people who worked
- NOTE Confidence: 0.797460120357143
- $00{:}53{:}39{.}271 \dashrightarrow 00{:}53{:}42{.}287$ with me on these vaccines are listed here.
- NOTE Confidence: 0.797460120357143
- $00:53:42.290 \rightarrow 00:53:46.070$ But, you know, there are some.
- NOTE Confidence: 0.797460120357143
- $00:53:46.070 \rightarrow 00:53:47.910$ And anyone who sees my wife in the
- NOTE Confidence: 0.797460120357143
- $00:53:47.910 \longrightarrow 00:53:49.890$ 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
- $00{:}53{:}50{.}294 \dashrightarrow 00{:}53{:}52{.}150$ 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

 $00:53:54.316 \dashrightarrow 00:53:56.646$ Costume and the collaborators are,

NOTE Confidence: 0.797460120357143

 $00{:}53{:}56{.}650 \dashrightarrow 00{:}53{:}57{.}378$ of course,

NOTE Confidence: 0.797460120357143

 $00{:}53{:}57{.}378 \dashrightarrow 00{:}53{:}59{.}562$ a bunch of different companies who've

NOTE Confidence: 0.797460120357143

 $00{:}53{:}59{.}562 \dashrightarrow 00{:}54{:}01{.}999$ worked with us and making these things.

NOTE Confidence: 0.797460120357143

 $00{:}54{:}02{.}000 \dashrightarrow 00{:}54{:}05{.}198$ 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

 $00:54:09.080 \longrightarrow 00:54:10.643$ the Allergy infectious

NOTE Confidence: 0.797460120357143

00:54:10.643 --> 00:54:12.206 disease fouchy's group.

NOTE Confidence: 0.797460120357143

 $00:54:12.210 \longrightarrow 00:54:12.822$ 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

 $00{:}54{:}14.658 \dashrightarrow 00{:}54{:}17.017$ up as much time as I'm allowed

NOTE Confidence: 0.797460120357143

 $00{:}54{:}17.017 \dashrightarrow 00{:}54{:}19.178$ and I'm happy to address any

NOTE Confidence: 0.797460120357143

 $00:54:19.178 \longrightarrow 00:54:20.866$ questions that people have.

NOTE Confidence: 0.797460120357143

 $00:54:20.870 \longrightarrow 00:54:22.000$ So thank you very much.