WEBVTT

NOTE duration: ”00:59:21.728”

NOTE Confidence: 0.9358111

00:00:01.439 --> 00:00:03.040 All right. Well, good afternoon,

NOTE Confidence: 0.9358111

00:00:03.040 --> 00:00:04.559 everyone, and welcome to today's

NOTE Confidence: 0.9358111

00:00:04.559 --> 00:00:06.080 webinar through the Yale Center

NOTE Confidence: 0.9358111

00:00:06.080 --> 00:00:07.359 for the Science of Cannabis

NOTE Confidence: 0.9358111

00:00:07.359 --> 00:00:08.020 and Cannabinoids.

NOTE Confidence: 0.9702031

00:00:08.639 --> 00:00:10.240 It's my pleasure to introduce

NOTE Confidence: 0.9702031

00:00:10.240 --> 00:00:12.420 today's speaker, Doctor. Godfrey Purlson.

NOTE Confidence: 0.9981157

00:00:12.985 --> 00:00:14.764 Doctor. Purlson is a nationally

NOTE Confidence: 0.9981157

00:00:14.905 --> 00:00:15.724 and internationally

NOTE Confidence: 0.9814006

00:00:16.025 --> 00:00:18.445 recognized leader in psychiatric neuroscience

NOTE Confidence: 0.9814006

00:00:18.664 --> 00:00:20.204 and brain imaging research.

NOTE Confidence: 0.98930216

00:00:20.585 --> 00:00:21.945 He serves as the founding

NOTE Confidence: 0.98930216

00:00:21.945 --> 00:00:23.645 director of the Olin Neuropsychiatry

NOTE Confidence: 0.9627801

00:00:24.105 --> 00:00:25.544 Research Center at the Institute

NOTE Confidence: 0.9627801

00:00:25.544 --> 00:00:26.789 of Living and is a

NOTE Confidence: 0.9627801

00:00:26.789 --> 00:00:28.810 professor of psychiatry and neuroscience

NOTE Confidence: 0.9627801

00:00:28.869 --> 00:00:30.390 at Yale University School of

NOTE Confidence: 0.9627801

00:00:30.390 --> 00:00:30.890 Medicine.

NOTE Confidence: 0.97896636

00:00:31.430 --> 00:00:32.470 Over the course of his

NOTE Confidence: 0.97896636

00:00:32.470 --> 00:00:34.390 distinguished career Doctor. Carlson has

NOTE Confidence: 0.97896636

00:00:34.390 --> 00:00:36.390 made seminal contributions to our

NOTE Confidence: 0.97896636

00:00:36.390 --> 00:00:37.850 understanding of the neurobiological

NOTE Confidence: 0.99978304

00:00:38.390 --> 00:00:38.890 underpinnings

NOTE Confidence: 0.9495757

00:00:39.405 --> 00:00:41.825 of psychiatric disorders particularly schizophrenia

NOTE Confidence: 0.9495757

00:00:42.045 --> 00:00:43.425 and substance use disorders

NOTE Confidence: 0.97028625

00:00:44.365 --> 00:00:45.485 His work has helped bridge

NOTE Confidence: 0.97028625

00:00:45.485 --> 00:00:47.425 the gap between clinical psychiatry

NOTE Confidence: 0.97028625

00:00:47.565 --> 00:00:48.705 and advanced neuroimaging

NOTE Confidence: 0.7701544

00:00:49.085 --> 00:00:49.585 utilizing

NOTE Confidence: 0.9956601

00:00:49.885 --> 00:00:51.745 structural and functional MRI

NOTE Confidence: 0.9802888

00:00:52.409 --> 00:00:54.989 connectivity analyses, and translational approaches

NOTE Confidence: 0.9802888

00:00:55.050 --> 00:00:56.909 to better understand brain circuitry

NOTE Confidence: 0.9909331

00:00:57.210 --> 00:00:58.909 and its relationship to behavior

NOTE Confidence: 0.9909331

00:00:58.969 --> 00:00:59.629 and psychopathology.

NOTE Confidence: 0.963636

00:01:00.570 --> 00:01:02.089 He's authored hundreds of peer

NOTE Confidence: 0.963636

00:01:02.089 --> 00:01:04.170 reviewed publications and texts, including

NOTE Confidence: 0.963636

00:01:04.170 --> 00:01:05.850 a book titled Weed Science,

NOTE Confidence: 0.963636

00:01:05.850 --> 00:01:07.790 Cannabis Controversies and Challenges.

NOTE Confidence: 0.9693059

00:01:08.515 --> 00:01:09.954 Doctor. Perlson has also been

NOTE Confidence: 0.9693059

00:01:09.954 --> 00:01:11.875 continuously funded by the National

NOTE Confidence: 0.9693059

00:01:11.875 --> 00:01:13.415 Institutes of Health for decades,

NOTE Confidence: 0.9693059

00:01:13.715 --> 00:01:14.915 a testament to both the

NOTE Confidence: 0.9693059

00:01:14.915 --> 00:01:16.354 rigor and impact of his

NOTE Confidence: 0.9693059

00:01:16.354 --> 00:01:16.854 research.

NOTE Confidence: 0.9870065

00:01:17.634 --> 00:01:19.875 Beyond his scientific accomplishments, Doctor.

NOTE Confidence: 0.9870065

00:01:19.875 --> 00:01:21.795 Perlson is widely respected as

NOTE Confidence: 0.9870065

00:01:21.795 --> 00:01:22.455 a mentor,

NOTE Confidence: 0.9856576

00:01:22.890 --> 00:01:24.250 collaborator, and a true leader

NOTE Confidence: 0.9856576

00:01:24.250 --> 00:01:25.390 in the field of neuropsychiatry.

NOTE Confidence: 0.9798388

00:01:26.490 --> 00:01:27.770 And today Doctor. Pearlston will

NOTE Confidence: 0.9798388

00:01:27.770 --> 00:01:29.290 be sharing insights on cannabis

NOTE Confidence: 0.9798388

00:01:29.290 --> 00:01:30.730 and driving and we're fortunate

NOTE Confidence: 0.9798388

00:01:30.730 --> 00:01:31.950 to have him join us.

NOTE Confidence: 0.9798388

00:01:32.090 --> 00:01:33.610 As a reminder, Doctor. Pearlston

NOTE Confidence: 0.9798388

00:01:33.610 --> 00:01:34.569 has shared his preference to

NOTE Confidence: 0.9798388

00:01:34.569 --> 00:01:35.850 hold questions until the end,

NOTE Confidence: 0.9798388

00:01:35.850 --> 00:01:36.970 but please feel free to

NOTE Confidence: 0.9798388

00:01:36.970 --> 00:01:38.170 put your questions into the

NOTE Confidence: 0.9798388

00:01:38.170 --> 00:01:39.185 chat and we'll save a

NOTE Confidence: 0.9798388

00:01:39.185 --> 00:01:40.305 few minutes for q and

NOTE Confidence: 0.9798388

00:01:40.305 --> 00:01:41.345 a at the conclusion of

NOTE Confidence: 0.9798388

00:01:41.345 --> 00:01:42.005 the presentation.

NOTE Confidence: 0.9707027

00:01:42.625 --> 00:01:43.584 And with that, please join

NOTE Confidence: 0.9707027

00:01:43.584 --> 00:01:44.865 me in welcoming doctor Godfrey

NOTE Confidence: 0.9707027

00:01:44.865 --> 00:01:45.365 Carlson.

NOTE Confidence: 0.99472827

00:01:49.425 --> 00:01:50.945 Thanks, Ashley, for that lovely

NOTE Confidence: 0.99472827

00:01:50.945 --> 00:01:51.445 introduction.

NOTE Confidence: 0.90860164

00:01:52.305 --> 00:01:52.805 Normally,

NOTE Confidence: 0.9902558

00:01:53.520 --> 00:01:55.040 doctor D'Souza would join us,

NOTE Confidence: 0.9902558

00:01:55.040 --> 00:01:56.479 but he sends his regrets

NOTE Confidence: 0.9902558

00:01:56.479 --> 00:01:57.940 and says he's somewhere between

NOTE Confidence: 0.99881834

00:01:58.400 --> 00:01:59.760 New Delhi and Abu Dhabi

NOTE Confidence: 0.99881834

00:01:59.760 --> 00:02:00.720 in the air at the

NOTE Confidence: 0.99881834

00:02:00.720 --> 00:02:01.220 moment.

NOTE Confidence: 0.9941861

00:02:03.520 --> 00:02:05.360 So no conflicts of interest,

NOTE Confidence: 0.9941861

00:02:05.360 --> 00:02:06.320 and I'll try and get

NOTE Confidence: 0.9941861

00:02:06.320 --> 00:02:07.700 through a lot of complex

NOTE Confidence: 0.9941861

00:02:07.840 --> 00:02:08.340 material

NOTE Confidence: 0.9831525

00:02:09.044 --> 00:02:10.485 as quickly as possible so

NOTE Confidence: 0.9831525

00:02:10.485 --> 00:02:11.845 there's ample time for discussion

NOTE Confidence: 0.9831525

00:02:11.845 --> 00:02:12.585 at the end.

NOTE Confidence: 0.99924755

00:02:13.205 --> 00:02:13.705 So

NOTE Confidence: 0.97129303

00:02:14.085 --> 00:02:14.965 I do want to give

NOTE Confidence: 0.97129303

00:02:14.965 --> 00:02:15.945 a lot of background

NOTE Confidence: 0.9938042

00:02:16.485 --> 00:02:17.305 just to

NOTE Confidence: 0.97829545

00:02:17.764 --> 00:02:19.125 because the context is so

NOTE Confidence: 0.97829545

00:02:19.125 --> 00:02:20.105 rich, and

NOTE Confidence: 0.99145

00:02:20.405 --> 00:02:21.845 the issues we're talking about

NOTE Confidence: 0.99145

00:02:21.845 --> 00:02:23.145 really do need framing.

NOTE Confidence: 0.98847723

00:02:23.580 --> 00:02:24.620 So I'll try and do

NOTE Confidence: 0.98847723

00:02:24.620 --> 00:02:25.120 that.

NOTE Confidence: 0.97210586

00:02:25.740 --> 00:02:28.080 But the central theme is,

NOTE Confidence: 0.9648166

00:02:28.540 --> 00:02:31.120 does cannabis impair driving behaviors?

NOTE Confidence: 0.8715372

00:02:31.820 --> 00:02:33.919 Which ones for how long,

NOTE Confidence: 0.92653936

00:02:34.620 --> 00:02:36.080 after an acute dose?

NOTE Confidence: 0.9917403

00:02:36.545 --> 00:02:38.065 And to what extent? Are

NOTE Confidence: 0.9917403

00:02:38.065 --> 00:02:39.585 they very impaired or just

NOTE Confidence: 0.9917403

00:02:39.585 --> 00:02:40.485 a little bit?

NOTE Confidence: 0.9850634

00:02:41.105 --> 00:02:42.165 Is that behavioral,

NOTE Confidence: 0.96247727

00:02:43.185 --> 00:02:44.785 profile anything like that of

NOTE Confidence: 0.96247727

00:02:44.785 --> 00:02:45.285 alcohol?

NOTE Confidence: 0.9969505

00:02:46.225 --> 00:02:46.725 And

NOTE Confidence: 0.9448956

00:02:47.905 --> 00:02:49.845 important for medical legal reasons,

NOTE Confidence: 0.99959266

00:02:50.220 --> 00:02:51.919 is that impairment of cannabis

NOTE Confidence: 0.9564792

00:02:52.540 --> 00:02:54.480 related in any way temporally

NOTE Confidence: 0.9895252

00:02:55.099 --> 00:02:56.459 to the dose or to

NOTE Confidence: 0.9895252

00:02:56.459 --> 00:02:57.900 the blood levels of THC

NOTE Confidence: 0.9895252

00:02:57.900 --> 00:02:58.799 or its metabolites?

NOTE Confidence: 0.9433859

00:02:59.739 --> 00:03:00.560 And finally,

NOTE Confidence: 0.9464885

00:03:01.019 --> 00:03:02.860 can we detect stone drivers

NOTE Confidence: 0.9464885

00:03:02.860 --> 00:03:03.599 at the roadside?

NOTE Confidence: 0.9859838

00:03:04.115 --> 00:03:05.495 And because I'm a neuroimaging

NOTE Confidence: 0.9859838

00:03:05.715 --> 00:03:06.215 person,

NOTE Confidence: 0.9877431

00:03:07.475 --> 00:03:08.915 I'm gonna talk for just

NOTE Confidence: 0.9877431

00:03:08.915 --> 00:03:10.294 a couple of minutes about

NOTE Confidence: 0.9877431

00:03:10.435 --> 00:03:11.794 brain changes. I can't help

NOTE Confidence: 0.9877431

00:03:11.794 --> 00:03:13.475 myself, but the focus is

NOTE Confidence: 0.9877431

00:03:13.475 --> 00:03:14.675 on behavior and not on

NOTE Confidence: 0.9877431

00:03:14.675 --> 00:03:15.415 those changes.

NOTE Confidence: 0.99229485

00:03:16.035 --> 00:03:17.635 So this is obviously a

NOTE Confidence: 0.99229485

00:03:17.635 --> 00:03:19.200 topic with many public health

NOTE Confidence: 0.99229485

00:03:19.440 --> 00:03:19.940 implications.

NOTE Confidence: 0.98837155

00:03:20.639 --> 00:03:22.000 This is an old slide,

NOTE Confidence: 0.98837155

00:03:22.000 --> 00:03:23.220 but you can see that

NOTE Confidence: 0.98837155

00:03:23.360 --> 00:03:24.340 since alcohol,

NOTE Confidence: 0.9506903

00:03:26.480 --> 00:03:26.980 DWIs

NOTE Confidence: 0.90231967

00:03:27.440 --> 00:03:28.099 have been,

NOTE Confidence: 0.98801875

00:03:28.480 --> 00:03:29.860 laws have been more strictly

NOTE Confidence: 0.98801875

00:03:30.000 --> 00:03:30.500 enforced,

NOTE Confidence: 0.99960977

00:03:31.120 --> 00:03:33.379 the number of drug related

NOTE Confidence: 0.9267592

00:03:34.335 --> 00:03:36.255 fatal vehicle crashes has trended

NOTE Confidence: 0.9267592

00:03:36.255 --> 00:03:36.755 downwards,

NOTE Confidence: 0.9893304

00:03:37.295 --> 00:03:38.435 whereas the

NOTE Confidence: 0.99952304

00:03:38.975 --> 00:03:39.475 intoxicated

NOTE Confidence: 0.97133976

00:03:39.855 --> 00:03:40.995 from other substances,

NOTE Confidence: 0.9931456

00:03:41.775 --> 00:03:42.835 mainly cannabis

NOTE Confidence: 0.9319153

00:03:43.295 --> 00:03:45.075 road deaths, have trended upwards,

NOTE Confidence: 0.9319153

00:03:45.215 --> 00:03:46.335 and that's a trend that's

NOTE Confidence: 0.9319153

00:03:46.335 --> 00:03:46.835 continued.

NOTE Confidence: 0.95210457

00:03:47.439 --> 00:03:48.980 This is something that's preoccupied

NOTE Confidence: 0.95210457

00:03:49.120 --> 00:03:50.900 the National Highway and Traffic

NOTE Confidence: 0.9154163

00:03:51.280 --> 00:03:52.959 Safety Administration. So they put

NOTE Confidence: 0.9154163

00:03:52.959 --> 00:03:53.700 out multiple

NOTE Confidence: 0.9986356

00:03:54.159 --> 00:03:54.659 public

NOTE Confidence: 0.9959058

00:03:55.200 --> 00:03:57.439 service announcements about marijuana impaired

NOTE Confidence: 0.9959058

00:03:57.439 --> 00:03:57.939 driving.

NOTE Confidence: 0.9708772

00:03:59.335 --> 00:04:00.635 So some of the background

NOTE Confidence: 0.9708772

00:04:00.695 --> 00:04:02.375 trends are that more states

NOTE Confidence: 0.9708772

00:04:02.375 --> 00:04:03.275 have legalized

NOTE Confidence: 0.9988656

00:04:03.735 --> 00:04:04.235 recreational

NOTE Confidence: 0.97670996

00:04:04.935 --> 00:04:07.275 or medicinal cannabis or both,

NOTE Confidence: 0.9715969

00:04:08.855 --> 00:04:09.755 that the percentage

NOTE Confidence: 0.99962354

00:04:10.055 --> 00:04:11.035 of THC

NOTE Confidence: 0.99736255

00:04:11.930 --> 00:04:13.530 has steadily risen as a

NOTE Confidence: 0.99736255

00:04:13.530 --> 00:04:14.590 triumph of selective

NOTE Confidence: 0.9635296

00:04:14.970 --> 00:04:15.470 breeding,

NOTE Confidence: 0.9927055

00:04:16.730 --> 00:04:19.390 whereas the amount of cannabidiol

NOTE Confidence: 0.98683286

00:04:19.770 --> 00:04:21.450 has stayed the same. In

NOTE Confidence: 0.98683286

00:04:21.450 --> 00:04:22.970 fact, these things are related

NOTE Confidence: 0.98683286

00:04:22.970 --> 00:04:24.845 genetically. If you breed the

NOTE Confidence: 0.98683286

00:04:24.845 --> 00:04:27.245 cannabis plant to express more

NOTE Confidence: 0.98683286

00:04:27.245 --> 00:04:27.745 THC,

NOTE Confidence: 0.99555403

00:04:28.125 --> 00:04:29.325 you're gonna drive down the

NOTE Confidence: 0.99555403

00:04:29.325 --> 00:04:30.385 amount of cannabidiol.

NOTE Confidence: 0.99608594

00:04:32.365 --> 00:04:33.805 For the first time last

NOTE Confidence: 0.99608594

00:04:33.805 --> 00:04:35.964 year, the amount of daily

NOTE Confidence: 0.99608594

00:04:35.964 --> 00:04:37.070 use of

NOTE Confidence: 0.99968815

00:04:37.450 --> 00:04:37.950 cannabis

NOTE Confidence: 0.9877791

00:04:38.730 --> 00:04:39.230 actually

NOTE Confidence: 0.9812875

00:04:39.690 --> 00:04:41.370 exceeded that of alcohol, which

NOTE Confidence: 0.9812875

00:04:41.370 --> 00:04:43.150 is trending down very slightly.

NOTE Confidence: 0.9946935

00:04:43.529 --> 00:04:44.810 So more people are smoking

NOTE Confidence: 0.9946935

00:04:44.810 --> 00:04:46.110 weed than getting drunk.

NOTE Confidence: 0.9986707

00:04:46.970 --> 00:04:47.470 And

NOTE Confidence: 0.9973612

00:04:47.850 --> 00:04:49.770 unlike the perception of safety

NOTE Confidence: 0.9973612

00:04:49.770 --> 00:04:51.050 for other drugs, people are

NOTE Confidence: 0.9973612

00:04:51.050 --> 00:04:52.270 increasingly seeing

NOTE Confidence: 0.9715322

00:04:52.785 --> 00:04:54.545 cannabis as a safe substance

NOTE Confidence: 0.9715322

00:04:54.545 --> 00:04:55.904 and are therefore more inclined

NOTE Confidence: 0.9715322

00:04:55.904 --> 00:04:56.725 to use it.

NOTE Confidence: 0.98946106

00:04:57.585 --> 00:04:59.825 So in talking about cannabis

NOTE Confidence: 0.98946106

00:04:59.825 --> 00:05:01.904 related driving, there are four

NOTE Confidence: 0.98946106

00:05:01.904 --> 00:05:03.605 big sources of confusion,

NOTE Confidence: 0.9992459

00:05:04.305 --> 00:05:04.805 and

NOTE Confidence: 0.98569685

00:05:05.240 --> 00:05:06.360 I really wanna go into

NOTE Confidence: 0.98569685

00:05:06.360 --> 00:05:08.120 those just to try and

NOTE Confidence: 0.98569685

00:05:08.120 --> 00:05:08.620 disambiguate

NOTE Confidence: 0.999632

00:05:09.160 --> 00:05:10.300 what we're looking at.

NOTE Confidence: 0.99932617

00:05:10.680 --> 00:05:11.420 So the

NOTE Confidence: 0.9976321

00:05:12.120 --> 00:05:12.620 pharmacokinetics

NOTE Confidence: 0.999714

00:05:13.160 --> 00:05:13.900 of THC

NOTE Confidence: 0.98503464

00:05:14.760 --> 00:05:16.600 differs radically from that of

NOTE Confidence: 0.98503464

00:05:16.600 --> 00:05:17.880 alcohol, so we'll talk a

NOTE Confidence: 0.98503464

00:05:17.880 --> 00:05:19.100 little bit about that.

NOTE Confidence: 0.98985595

00:05:19.805 --> 00:05:21.904 The cannabis plant contains multiple

NOTE Confidence: 0.98985595

00:05:21.964 --> 00:05:22.464 compounds,

NOTE Confidence: 0.9874412

00:05:23.165 --> 00:05:24.544 many of which are intoxicating,

NOTE Confidence: 0.9720964

00:05:25.165 --> 00:05:26.285 but some of which have

NOTE Confidence: 0.9720964

00:05:26.285 --> 00:05:27.264 opposing effects.

NOTE Confidence: 0.99553335

00:05:27.805 --> 00:05:29.425 So that's not like alcohol.

NOTE Confidence: 0.9421839

00:05:30.365 --> 00:05:32.044 That cannabis is used in

NOTE Confidence: 0.9421839

00:05:32.044 --> 00:05:34.544 multiple nonequivalent dosage formats.

NOTE Confidence: 0.99836254

00:05:35.350 --> 00:05:36.710 So taking a bong hit

NOTE Confidence: 0.99836254

00:05:36.710 --> 00:05:37.670 is not the same as

NOTE Confidence: 0.99836254

00:05:37.670 --> 00:05:38.650 eating an edible

NOTE Confidence: 0.9952262

00:05:39.029 --> 00:05:40.089 in terms of the

NOTE Confidence: 0.997633

00:05:40.550 --> 00:05:41.450 time of onset,

NOTE Confidence: 0.9975198

00:05:41.830 --> 00:05:43.290 the metabolites produced,

NOTE Confidence: 0.99959415

00:05:44.550 --> 00:05:45.050 or

NOTE Confidence: 0.98229146

00:05:45.350 --> 00:05:45.850 the,

NOTE Confidence: 0.9984662

00:05:46.550 --> 00:05:47.770 ultimate blood levels.

NOTE Confidence: 0.99526167

00:05:49.404 --> 00:05:51.005 And unlike alcohol, there's no

NOTE Confidence: 0.99526167

00:05:51.005 --> 00:05:52.785 standard dose equivalent for cannabis.

NOTE Confidence: 0.99913776

00:05:54.045 --> 00:05:56.464 So for blood alcohol concentrations

NOTE Confidence: 0.9833456

00:05:56.845 --> 00:05:58.464 or breath alcohol concentrations,

NOTE Confidence: 0.9946134

00:05:58.765 --> 00:06:00.685 which are basically the same

NOTE Confidence: 0.9946134

00:06:00.685 --> 00:06:01.185 thing,

NOTE Confidence: 0.9980491

00:06:01.485 --> 00:06:03.404 the relationships with alcohol are

NOTE Confidence: 0.9980491

00:06:03.404 --> 00:06:04.110 very simple.

NOTE Confidence: 0.9988963

00:06:04.509 --> 00:06:05.889 So the more you drink,

NOTE Confidence: 0.9912078

00:06:06.669 --> 00:06:09.009 the more intoxicated you get.

NOTE Confidence: 0.9912078

00:06:09.150 --> 00:06:10.189 The more you drink, the

NOTE Confidence: 0.9912078

00:06:10.189 --> 00:06:11.469 higher your blood or breath

NOTE Confidence: 0.9912078

00:06:11.469 --> 00:06:12.689 alcohol concentrations.

NOTE Confidence: 0.9990692

00:06:13.629 --> 00:06:15.009 And the more you drink,

NOTE Confidence: 0.9990692

00:06:15.150 --> 00:06:15.810 the higher

NOTE Confidence: 0.8990409

00:06:16.430 --> 00:06:17.870 your BAC and the higher

NOTE Confidence: 0.8990409

00:06:17.870 --> 00:06:18.370 your

NOTE Confidence: 0.93725336

00:06:19.294 --> 00:06:20.574 odds of being involved in

NOTE Confidence: 0.93725336

00:06:20.574 --> 00:06:22.354 a a motor vehicle crash.

NOTE Confidence: 0.97610176

00:06:22.735 --> 00:06:23.854 So those things are all

NOTE Confidence: 0.97610176

00:06:23.854 --> 00:06:24.675 very simple.

NOTE Confidence: 0.94585794

00:06:25.214 --> 00:06:26.034 And, unfortunately,

NOTE Confidence: 0.99941766

00:06:26.414 --> 00:06:27.235 people have

NOTE Confidence: 0.7476453

00:06:27.775 --> 00:06:28.275 said,

NOTE Confidence: 0.9984887

00:06:28.654 --> 00:06:29.615 since that's the case for

NOTE Confidence: 0.9984887

00:06:29.615 --> 00:06:30.814 alcohol, it's also the case

NOTE Confidence: 0.9984887

00:06:30.814 --> 00:06:32.014 for cannabis, which is not

NOTE Confidence: 0.9984887

00:06:32.014 --> 00:06:32.675 the case.

NOTE Confidence: 0.9588668

00:06:33.199 --> 00:06:34.900 So what follows from alcohol's

NOTE Confidence: 0.9588668

00:06:34.960 --> 00:06:36.720 water solubility? We can make

NOTE Confidence: 0.9588668

00:06:36.720 --> 00:06:38.020 cocktails. Woo hoo.

NOTE Confidence: 0.9595224

00:06:39.919 --> 00:06:40.419 Concentrations

NOTE Confidence: 0.9595304

00:06:40.800 --> 00:06:42.339 everywhere in the body, including

NOTE Confidence: 0.9595304

00:06:42.400 --> 00:06:44.000 the brain and the breath

NOTE Confidence: 0.9595304

00:06:44.000 --> 00:06:44.500 and

NOTE Confidence: 0.89483523

00:06:46.795 --> 00:06:47.855 blood and saliva

NOTE Confidence: 0.94883084

00:06:48.315 --> 00:06:50.075 are all related and all

NOTE Confidence: 0.94883084

00:06:50.075 --> 00:06:51.214 pretty much the same.

NOTE Confidence: 0.85897624

00:06:51.755 --> 00:06:53.755 The BAC levels reflect plasma

NOTE Confidence: 0.85897624

00:06:53.755 --> 00:06:55.375 levels reflect brain levels.

NOTE Confidence: 0.96563196

00:06:56.235 --> 00:06:57.755 They are, as we said,

NOTE Confidence: 0.96563196

00:06:57.755 --> 00:06:59.695 proportional to dose decline predictably.

NOTE Confidence: 0.9975878

00:07:00.660 --> 00:07:02.200 And as breath is moist,

NOTE Confidence: 0.9975878

00:07:02.420 --> 00:07:04.100 there's plenty of alcohol available

NOTE Confidence: 0.9975878

00:07:04.100 --> 00:07:05.400 to sample at the roadside.

NOTE Confidence: 0.9682052

00:07:06.580 --> 00:07:08.680 With plasma THC, the relationships

NOTE Confidence: 0.9682052

00:07:08.820 --> 00:07:09.960 are way more complicated

NOTE Confidence: 0.9218893

00:07:10.580 --> 00:07:11.080 because

NOTE Confidence: 0.99378777

00:07:11.460 --> 00:07:13.380 THC is fat soluble, not

NOTE Confidence: 0.99378777

00:07:13.380 --> 00:07:14.600 at all water soluble.

NOTE Confidence: 0.9964291

00:07:15.195 --> 00:07:16.415 So if you take

NOTE Confidence: 0.9870424

00:07:16.875 --> 00:07:17.915 a puff from a joint

NOTE Confidence: 0.9870424

00:07:17.915 --> 00:07:19.055 or a bong hit,

NOTE Confidence: 0.9990463

00:07:19.355 --> 00:07:21.215 you get a quick rise

NOTE Confidence: 0.9555504

00:07:21.675 --> 00:07:23.854 in plasma THC that rapidly

NOTE Confidence: 0.9555504

00:07:23.915 --> 00:07:25.695 within five minutes or so

NOTE Confidence: 0.9555504

00:07:25.915 --> 00:07:27.375 returns to a basal

NOTE Confidence: 0.9784577

00:07:27.835 --> 00:07:28.655 low level.

NOTE Confidence: 0.97752815

00:07:29.490 --> 00:07:31.009 And for some metabolites, it

NOTE Confidence: 0.97752815

00:07:31.009 --> 00:07:32.050 stays up a bit longer

NOTE Confidence: 0.97752815

00:07:32.050 --> 00:07:33.349 like the seventeen hydroxy.

NOTE Confidence: 0.9978109

00:07:34.530 --> 00:07:37.090 But the tissue compartment levels

NOTE Confidence: 0.9978109

00:07:37.090 --> 00:07:38.690 are completely different based on

NOTE Confidence: 0.9978109

00:07:38.690 --> 00:07:39.650 how much fat is in

NOTE Confidence: 0.9978109

00:07:39.650 --> 00:07:41.349 there. So blood

NOTE Confidence: 0.9990422

00:07:41.729 --> 00:07:42.229 is

NOTE Confidence: 0.9189297

00:07:42.770 --> 00:07:43.270 moderate,

NOTE Confidence: 0.968031

00:07:43.854 --> 00:07:46.014 brain is high, but adipose

NOTE Confidence: 0.968031

00:07:46.014 --> 00:07:47.694 tissue is very high. So

NOTE Confidence: 0.968031

00:07:47.694 --> 00:07:49.134 ultimately, what happens is you

NOTE Confidence: 0.968031

00:07:49.134 --> 00:07:50.335 get this spike in blood,

NOTE Confidence: 0.968031

00:07:50.335 --> 00:07:51.155 which disappears

NOTE Confidence: 0.93384403

00:07:51.694 --> 00:07:52.895 down to this low basal

NOTE Confidence: 0.93384403

00:07:52.895 --> 00:07:54.194 level. But

NOTE Confidence: 0.98584354

00:07:54.574 --> 00:07:56.414 hours later, the levels in

NOTE Confidence: 0.98584354

00:07:56.414 --> 00:07:57.634 fat are still rising.

NOTE Confidence: 0.889035

00:07:58.335 --> 00:07:59.550 They peak,

NOTE Confidence: 0.9995084

00:08:00.090 --> 00:08:00.750 and then

NOTE Confidence: 0.99654907

00:08:01.450 --> 00:08:03.370 THC is very slowly released

NOTE Confidence: 0.99654907

00:08:03.370 --> 00:08:04.910 from those adipose tissues.

NOTE Confidence: 0.9917846

00:08:05.530 --> 00:08:06.810 So how long drugs stay

NOTE Confidence: 0.9917846

00:08:06.810 --> 00:08:07.630 in your blood

NOTE Confidence: 0.9588525

00:08:07.930 --> 00:08:09.630 for alcohol is somewhere

NOTE Confidence: 0.90845084

00:08:10.090 --> 00:08:10.590 here,

NOTE Confidence: 0.9492834

00:08:11.065 --> 00:08:12.825 which is relatively short, as

NOTE Confidence: 0.9492834

00:08:12.825 --> 00:08:14.905 we said. For cannabis, it's

NOTE Confidence: 0.9492834

00:08:14.905 --> 00:08:16.045 incredibly long.

NOTE Confidence: 0.9991418

00:08:16.665 --> 00:08:17.165 So

NOTE Confidence: 0.9875234

00:08:17.545 --> 00:08:18.985 you can still measure cannabis

NOTE Confidence: 0.9875234

00:08:18.985 --> 00:08:20.105 in the blood a couple

NOTE Confidence: 0.9875234

00:08:20.105 --> 00:08:21.385 of weeks if you're a

NOTE Confidence: 0.9875234

00:08:21.385 --> 00:08:22.365 regular smoker,

NOTE Confidence: 0.98837924

00:08:23.145 --> 00:08:24.525 after you last used.

NOTE Confidence: 0.99036735

00:08:25.039 --> 00:08:26.880 So that has profound medical

NOTE Confidence: 0.99036735

00:08:26.880 --> 00:08:27.780 legal consequences.

NOTE Confidence: 0.9981878

00:08:28.960 --> 00:08:30.960 And unlike alcohol, how high

NOTE Confidence: 0.9981878

00:08:30.960 --> 00:08:32.160 you feel at a particular

NOTE Confidence: 0.9981878

00:08:32.160 --> 00:08:32.660 time

NOTE Confidence: 0.9974564

00:08:33.279 --> 00:08:34.959 is not only related to

NOTE Confidence: 0.9974564

00:08:34.959 --> 00:08:35.459 your

NOTE Confidence: 0.9997594

00:08:35.760 --> 00:08:37.140 initial blood spike

NOTE Confidence: 0.90757513

00:08:38.545 --> 00:08:39.045 transiently,

NOTE Confidence: 0.9874932

00:08:39.425 --> 00:08:41.265 but, basically, you're still feeling

NOTE Confidence: 0.9874932

00:08:41.265 --> 00:08:42.385 high and getting high at

NOTE Confidence: 0.9874932

00:08:42.385 --> 00:08:43.345 a time when your blood

NOTE Confidence: 0.9874932

00:08:43.345 --> 00:08:45.524 levels are actually coming down.

NOTE Confidence: 0.9874932

00:08:45.745 --> 00:08:47.125 So that's very, very different.

NOTE Confidence: 0.85696286

00:08:47.584 --> 00:08:49.105 And finally, there are these

NOTE Confidence: 0.85696286

00:08:49.105 --> 00:08:49.605 hysteresis

NOTE Confidence: 0.9996774

00:08:49.985 --> 00:08:50.485 curves

NOTE Confidence: 0.9892221

00:08:50.945 --> 00:08:52.404 where higher doses

NOTE Confidence: 0.9940226

00:08:53.100 --> 00:08:55.200 don't necessarily produce more effects.

NOTE Confidence: 0.9940226

00:08:55.500 --> 00:08:57.120 So low doses of THC

NOTE Confidence: 0.9940226

00:08:57.339 --> 00:08:58.240 are anxiolytic,

NOTE Confidence: 0.9516892

00:08:58.940 --> 00:09:00.880 whereas higher doses provoke,

NOTE Confidence: 0.95398915

00:09:03.420 --> 00:09:03.920 anxiety.

NOTE Confidence: 0.9832137

00:09:04.860 --> 00:09:06.160 How you feel the drug

NOTE Confidence: 0.9832137

00:09:06.220 --> 00:09:07.820 changes as you take in

NOTE Confidence: 0.9832137

00:09:07.820 --> 00:09:09.085 more and more, and they're

NOTE Confidence: 0.9832137

00:09:09.085 --> 00:09:10.545 not linearly related.

NOTE Confidence: 0.9795173

00:09:12.525 --> 00:09:14.145 So what follows from THC's

NOTE Confidence: 0.9795173

00:09:14.285 --> 00:09:15.885 fat solubility is we need

NOTE Confidence: 0.9795173

00:09:15.885 --> 00:09:17.025 fat to make edibles,

NOTE Confidence: 0.9951902

00:09:18.845 --> 00:09:20.684 and the distribution through the

NOTE Confidence: 0.9951902

00:09:20.684 --> 00:09:21.745 body is uneven.

NOTE Confidence: 0.9994591

00:09:22.720 --> 00:09:23.780 And because

NOTE Confidence: 0.9991971

00:09:24.400 --> 00:09:26.400 breath is moist, there's almost

NOTE Confidence: 0.9991971

00:09:26.400 --> 00:09:28.400 no THC available to detect.

NOTE Confidence: 0.9991971

00:09:28.400 --> 00:09:29.540 We don't breathe out

NOTE Confidence: 0.9743864

00:09:29.840 --> 00:09:32.000 lipid soluble substances for obvious

NOTE Confidence: 0.9743864

00:09:32.000 --> 00:09:32.500 reasons.

NOTE Confidence: 0.9991194

00:09:32.880 --> 00:09:33.540 So there's

NOTE Confidence: 0.99939346

00:09:33.840 --> 00:09:34.340 almost

NOTE Confidence: 0.99871385

00:09:36.080 --> 00:09:37.860 zero THC in breath.

NOTE Confidence: 0.9997881

00:09:39.975 --> 00:09:40.475 So

NOTE Confidence: 0.963573

00:09:41.014 --> 00:09:43.115 cannabis use does impair driving

NOTE Confidence: 0.963573

00:09:43.255 --> 00:09:43.755 acutely,

NOTE Confidence: 0.9991241

00:09:44.295 --> 00:09:44.795 and

NOTE Confidence: 0.95679045

00:09:45.334 --> 00:09:46.475 I'll just put that

NOTE Confidence: 0.87393093

00:09:46.855 --> 00:09:47.355 that

NOTE Confidence: 0.9718026

00:09:47.894 --> 00:09:49.415 that statement out there and

NOTE Confidence: 0.9718026

00:09:49.415 --> 00:09:50.615 then try and show you

NOTE Confidence: 0.9718026

00:09:50.615 --> 00:09:51.755 why that's the case.

NOTE Confidence: 0.9985551

00:09:52.260 --> 00:09:53.880 And the impairment is primarily

NOTE Confidence: 0.9985551

00:09:53.940 --> 00:09:54.840 due to THC,

NOTE Confidence: 0.88452023

00:09:55.380 --> 00:09:56.260 which as we know is

NOTE Confidence: 0.88452023

00:09:56.260 --> 00:09:57.780 a c b one receptor

NOTE Confidence: 0.88452023

00:09:57.780 --> 00:09:58.680 partial agonist,

NOTE Confidence: 0.99936503

00:09:59.220 --> 00:10:01.060 and cannabidiol has very little

NOTE Confidence: 0.99936503

00:10:01.060 --> 00:10:01.560 relevance.

NOTE Confidence: 0.9908045

00:10:02.020 --> 00:10:03.800 In fact, although people commonly

NOTE Confidence: 0.9908045

00:10:03.860 --> 00:10:04.760 say CBD

NOTE Confidence: 0.98735833

00:10:05.460 --> 00:10:06.680 modulates THC,

NOTE Confidence: 0.9670024

00:10:07.365 --> 00:10:08.905 There's actually not much evidence

NOTE Confidence: 0.9670024

00:10:08.965 --> 00:10:10.885 for that. CBD has very

NOTE Confidence: 0.9670024

00:10:10.885 --> 00:10:12.025 little modulating

NOTE Confidence: 0.9833313

00:10:12.405 --> 00:10:14.345 influence on THC impairment.

NOTE Confidence: 0.9716024

00:10:15.365 --> 00:10:17.765 But the questions are, what

NOTE Confidence: 0.9716024

00:10:17.765 --> 00:10:19.125 sort of impairment, how long

NOTE Confidence: 0.9716024

00:10:19.125 --> 00:10:20.325 does it last, and with

NOTE Confidence: 0.9716024

00:10:20.325 --> 00:10:22.025 what consequences to driving?

NOTE Confidence: 0.98880845

00:10:22.850 --> 00:10:24.210 And because more and more

NOTE Confidence: 0.98880845

00:10:24.210 --> 00:10:26.550 people are using as legalization

NOTE Confidence: 0.98880845

00:10:26.850 --> 00:10:27.890 is happening in more and

NOTE Confidence: 0.98880845

00:10:27.890 --> 00:10:29.510 more states or decriminalization,

NOTE Confidence: 0.93694234

00:10:30.770 --> 00:10:32.290 the numerator is that more

NOTE Confidence: 0.93694234

00:10:32.290 --> 00:10:33.590 drivers are exposed.

NOTE Confidence: 0.9914927

00:10:34.130 --> 00:10:35.410 And because the dose is

NOTE Confidence: 0.9914927

00:10:35.410 --> 00:10:37.110 increasing, more people are exposed

NOTE Confidence: 0.9914927

00:10:37.404 --> 00:10:39.165 to higher doses and then

NOTE Confidence: 0.9914927

00:10:39.165 --> 00:10:41.025 driving. So this is potentially

NOTE Confidence: 0.9914927

00:10:41.085 --> 00:10:42.304 a public health problem.

NOTE Confidence: 0.9993384

00:10:43.245 --> 00:10:44.605 So what's the evidence for

NOTE Confidence: 0.9993384

00:10:44.605 --> 00:10:46.145 that? So epidemiologically,

NOTE Confidence: 0.9987526

00:10:48.125 --> 00:10:49.025 there are

NOTE Confidence: 0.9768864

00:10:50.100 --> 00:10:51.880 studies looking at post crash

NOTE Confidence: 0.9768864

00:10:51.940 --> 00:10:53.700 blood tests, so people involved

NOTE Confidence: 0.9768864

00:10:53.700 --> 00:10:54.980 in a major motor vehicle

NOTE Confidence: 0.9768864

00:10:54.980 --> 00:10:55.480 accident

NOTE Confidence: 0.7801373

00:10:56.100 --> 00:10:56.600 and

NOTE Confidence: 0.96649593

00:10:56.900 --> 00:10:57.400 epidemiologists

NOTE Confidence: 0.99795675

00:10:57.860 --> 00:10:59.000 taking samples

NOTE Confidence: 0.9037701

00:10:59.380 --> 00:11:01.000 or looking at results from,

NOTE Confidence: 0.9421383

00:11:01.460 --> 00:11:02.120 law enforcement.

NOTE Confidence: 0.9928093

00:11:03.300 --> 00:11:06.154 And looking at the increases

NOTE Confidence: 0.9928093

00:11:06.295 --> 00:11:07.834 in motor vehicle crashes

NOTE Confidence: 0.98531413

00:11:08.295 --> 00:11:08.795 following

NOTE Confidence: 0.97905105

00:11:09.334 --> 00:11:11.735 cannabis legalization in states that

NOTE Confidence: 0.97905105

00:11:11.735 --> 00:11:12.475 have legalized

NOTE Confidence: 0.90196204

00:11:13.175 --> 00:11:14.695 compares that to those that

NOTE Confidence: 0.90196204

00:11:14.695 --> 00:11:17.255 don't. So the best meta

NOTE Confidence: 0.90196204

00:11:17.255 --> 00:11:19.255 study is this Roggeberg and

NOTE Confidence: 0.90196204

00:11:19.255 --> 00:11:19.755 Elvick

NOTE Confidence: 0.9921751

00:11:20.160 --> 00:11:21.779 Scandinavian meta analysis,

NOTE Confidence: 0.9528198

00:11:22.639 --> 00:11:23.940 back ten years ago,

NOTE Confidence: 0.98851275

00:11:24.320 --> 00:11:25.360 looking at a quarter of

NOTE Confidence: 0.98851275

00:11:25.360 --> 00:11:27.519 a million individuals across multiple

NOTE Confidence: 0.98851275

00:11:27.519 --> 00:11:28.019 studies.

NOTE Confidence: 0.9243384

00:11:28.559 --> 00:11:30.019 And they recognized

NOTE Confidence: 0.9931011

00:11:30.320 --> 00:11:32.579 they calculated an odds ratio

NOTE Confidence: 0.99798995

00:11:33.279 --> 00:11:34.480 of being involved in a

NOTE Confidence: 0.99798995

00:11:34.480 --> 00:11:36.375 motor vehicle crash of about

NOTE Confidence: 0.99798995

00:11:36.375 --> 00:11:37.434 one point four.

NOTE Confidence: 0.9917229

00:11:38.054 --> 00:11:38.554 Okay?

NOTE Confidence: 0.98495287

00:11:38.934 --> 00:11:40.635 So compare that to alcohol

NOTE Confidence: 0.98495287

00:11:40.695 --> 00:11:42.054 where the odds ratios are

NOTE Confidence: 0.98495287

00:11:42.054 --> 00:11:42.955 about twenty,

NOTE Confidence: 0.993726

00:11:43.735 --> 00:11:44.715 at a BAC

NOTE Confidence: 0.99788827

00:11:45.095 --> 00:11:46.395 of point one.

NOTE Confidence: 0.97190416

00:11:46.934 --> 00:11:48.375 So the these are very,

NOTE Confidence: 0.97190416

00:11:48.375 --> 00:11:49.559 very different beasts,

NOTE Confidence: 0.996031

00:11:50.120 --> 00:11:51.400 and it's worth saying that

NOTE Confidence: 0.996031

00:11:51.400 --> 00:11:52.779 in this in this comparison.

NOTE Confidence: 0.9862711

00:11:55.080 --> 00:11:56.940 Here are some typical studies,

NOTE Confidence: 0.91644317

00:11:57.720 --> 00:11:59.420 this one from, Cayman,

NOTE Confidence: 0.9900128

00:12:00.440 --> 00:12:01.500 six years ago,

NOTE Confidence: 0.99177045

00:12:01.865 --> 00:12:03.565 but there are multiple similar

NOTE Confidence: 0.99177045

00:12:03.704 --> 00:12:04.764 subsequent studies

NOTE Confidence: 0.97406274

00:12:05.304 --> 00:12:06.684 looking at states that,

NOTE Confidence: 0.99967027

00:12:07.464 --> 00:12:07.964 legalized

NOTE Confidence: 0.99885595

00:12:08.504 --> 00:12:09.004 cannabis

NOTE Confidence: 0.7661205

00:12:09.704 --> 00:12:10.204 comparing

NOTE Confidence: 0.8598094

00:12:10.745 --> 00:12:12.684 pre legalization study period,

NOTE Confidence: 0.97503614

00:12:13.225 --> 00:12:14.285 waiting a while

NOTE Confidence: 0.99763805

00:12:14.610 --> 00:12:16.130 from the law being passed

NOTE Confidence: 0.99763805

00:12:16.130 --> 00:12:16.630 until

NOTE Confidence: 0.9606118

00:12:17.010 --> 00:12:19.010 dispensaries were actually selling the

NOTE Confidence: 0.9606118

00:12:19.010 --> 00:12:19.510 substance,

NOTE Confidence: 0.9704312

00:12:19.890 --> 00:12:21.170 then looking at what happened

NOTE Confidence: 0.9704312

00:12:21.170 --> 00:12:23.510 to traffic fatality rates.

NOTE Confidence: 0.9880544

00:12:23.890 --> 00:12:25.750 And there's reasonable evidence

NOTE Confidence: 0.9738944

00:12:26.290 --> 00:12:27.970 that compared to these control

NOTE Confidence: 0.9738944

00:12:27.970 --> 00:12:28.929 states, you can see at

NOTE Confidence: 0.9738944

00:12:28.929 --> 00:12:29.589 the bottom,

NOTE Confidence: 0.997804

00:12:29.985 --> 00:12:32.165 that most states that legalized

NOTE Confidence: 0.9601995

00:12:32.785 --> 00:12:34.325 had somewhat of an increase

NOTE Confidence: 0.9601995

00:12:34.464 --> 00:12:35.605 except for Washington,

NOTE Confidence: 0.9738399

00:12:36.464 --> 00:12:39.045 in traffic fatalities post legalization.

NOTE Confidence: 0.9994772

00:12:40.785 --> 00:12:41.285 So

NOTE Confidence: 0.97208613

00:12:43.520 --> 00:12:45.440 the epidemiologic studies are out

NOTE Confidence: 0.97208613

00:12:45.440 --> 00:12:45.940 there

NOTE Confidence: 0.9295719

00:12:46.800 --> 00:12:48.480 calculate that there's about a

NOTE Confidence: 0.9295719

00:12:48.480 --> 00:12:49.940 doubling in deaths

NOTE Confidence: 0.99209875

00:12:50.480 --> 00:12:53.040 per billion vehicle miles traveled

NOTE Confidence: 0.99209875

00:12:53.040 --> 00:12:53.940 due to cannabis.

NOTE Confidence: 0.99982446

00:12:54.705 --> 00:12:55.205 So

NOTE Confidence: 0.9946376

00:12:55.585 --> 00:12:57.345 because motor vehicle deaths are

NOTE Confidence: 0.9946376

00:12:57.345 --> 00:12:58.965 very uncommon overall,

NOTE Confidence: 0.9988975

00:12:59.345 --> 00:13:00.785 you really do need this

NOTE Confidence: 0.9988975

00:13:00.785 --> 00:13:01.285 billion

NOTE Confidence: 0.9984646

00:13:01.905 --> 00:13:03.425 vehicle miles traveled to be

NOTE Confidence: 0.9984646

00:13:03.425 --> 00:13:04.805 able to have a

NOTE Confidence: 0.9742114

00:13:05.665 --> 00:13:06.885 a genuine metric.

NOTE Confidence: 0.977423

00:13:07.460 --> 00:13:08.980 So if that's accurate and

NOTE Confidence: 0.977423

00:13:08.980 --> 00:13:10.340 it's disputed as we'll see

NOTE Confidence: 0.977423

00:13:10.340 --> 00:13:12.100 in a moment, that translates

NOTE Confidence: 0.977423

00:13:12.100 --> 00:13:13.800 into about a twenty percent

NOTE Confidence: 0.92487156

00:13:14.420 --> 00:13:14.920 or

NOTE Confidence: 0.9671453

00:13:15.300 --> 00:13:17.240 approximately seven thousand person

NOTE Confidence: 0.9985978

00:13:17.700 --> 00:13:19.800 increase in USA traffic fatalities

NOTE Confidence: 0.9975065

00:13:20.325 --> 00:13:21.605 that are about thirty seven

NOTE Confidence: 0.9975065

00:13:21.605 --> 00:13:23.304 thousand back in twenty eighteen.

NOTE Confidence: 0.9984655

00:13:24.405 --> 00:13:25.605 But what we don't know

NOTE Confidence: 0.9984655

00:13:25.605 --> 00:13:28.005 is whether alcohol consumption rates

NOTE Confidence: 0.9984655

00:13:28.005 --> 00:13:28.505 decrease

NOTE Confidence: 0.9929449

00:13:28.965 --> 00:13:31.445 as cannabis consumption rises, which

NOTE Confidence: 0.9929449

00:13:31.445 --> 00:13:33.385 would somewhat mitigate that figure.

NOTE Confidence: 0.9872358

00:13:34.165 --> 00:13:36.150 And what not all studies

NOTE Confidence: 0.9872358

00:13:36.210 --> 00:13:37.570 examine is what percentage of

NOTE Confidence: 0.9872358

00:13:37.570 --> 00:13:39.030 cannabis impaired drivers

NOTE Confidence: 0.99016774

00:13:39.410 --> 00:13:41.030 also had some alcohol,

NOTE Confidence: 0.8145176

00:13:41.809 --> 00:13:42.470 on board.

NOTE Confidence: 0.99522895

00:13:44.050 --> 00:13:45.190 So there are epidemiologic

NOTE Confidence: 0.78824466

00:13:45.650 --> 00:13:46.790 skeptics, most,

NOTE Confidence: 0.9024569

00:13:47.865 --> 00:13:48.365 notably,

NOTE Confidence: 0.992216

00:13:48.825 --> 00:13:50.184 Michael White and Nick Burns

NOTE Confidence: 0.992216

00:13:50.184 --> 00:13:50.845 in Australia

NOTE Confidence: 0.86604244

00:13:51.465 --> 00:13:53.385 who say we've revered reviewed

NOTE Confidence: 0.86604244

00:13:53.385 --> 00:13:55.804 the epidemiologic and psychological literature

NOTE Confidence: 0.919828

00:13:56.105 --> 00:13:57.304 on the risk of THC

NOTE Confidence: 0.919828

00:13:57.304 --> 00:13:58.365 positive driving.

NOTE Confidence: 0.9525539

00:13:58.665 --> 00:14:00.345 We concluded those risks are

NOTE Confidence: 0.9525539

00:14:00.345 --> 00:14:01.625 lower than most people would

NOTE Confidence: 0.9525539

00:14:01.625 --> 00:14:02.125 assume.

NOTE Confidence: 0.89371175

00:14:02.949 --> 00:14:03.449 And,

NOTE Confidence: 0.9874154

00:14:05.269 --> 00:14:05.769 their

NOTE Confidence: 0.9806126

00:14:06.230 --> 00:14:07.910 skepticism is based on two

NOTE Confidence: 0.9806126

00:14:07.910 --> 00:14:09.990 main factors. One is if

NOTE Confidence: 0.9806126

00:14:09.990 --> 00:14:10.490 someone

NOTE Confidence: 0.9491351

00:14:10.949 --> 00:14:12.309 is in a involved in

NOTE Confidence: 0.9491351

00:14:12.309 --> 00:14:13.449 a fatal crash,

NOTE Confidence: 0.9562772

00:14:13.829 --> 00:14:15.110 you take a blood sample

NOTE Confidence: 0.9562772

00:14:15.110 --> 00:14:16.809 and you find THC there.

NOTE Confidence: 0.9562772

00:14:17.105 --> 00:14:18.545 Is that THC because they

NOTE Confidence: 0.9562772

00:14:18.545 --> 00:14:19.845 are acutely intoxicated

NOTE Confidence: 0.9005082

00:14:20.625 --> 00:14:22.245 and their driving was impaired,

NOTE Confidence: 0.99944675

00:14:22.545 --> 00:14:23.585 or did they smoke a

NOTE Confidence: 0.99944675

00:14:23.585 --> 00:14:24.325 week ago

NOTE Confidence: 0.8905298

00:14:24.705 --> 00:14:26.965 and they're actually driving it

NOTE Confidence: 0.8905298

00:14:27.185 --> 00:14:27.685 baseline

NOTE Confidence: 0.2292408

00:14:27.985 --> 00:14:28.065 cap

NOTE Confidence: 0.72019565

00:14:28.945 --> 00:14:29.445 competence,

NOTE Confidence: 0.96789974

00:14:30.080 --> 00:14:31.600 but THC just happened to

NOTE Confidence: 0.96789974

00:14:31.600 --> 00:14:33.120 be there because it's released

NOTE Confidence: 0.96789974

00:14:33.120 --> 00:14:34.800 slowly from fat because of

NOTE Confidence: 0.96789974

00:14:34.800 --> 00:14:36.020 its p k profile.

NOTE Confidence: 0.9849009

00:14:36.720 --> 00:14:37.680 The other thing is that

NOTE Confidence: 0.9849009

00:14:37.680 --> 00:14:38.740 they think the,

NOTE Confidence: 0.96503896

00:14:39.440 --> 00:14:40.420 numbers are miscalculated,

NOTE Confidence: 0.9723372

00:14:40.800 --> 00:14:42.080 and it's closer to two

NOTE Confidence: 0.9723372

00:14:42.080 --> 00:14:43.460 thousand and seven thousand.

NOTE Confidence: 0.9894797

00:14:43.805 --> 00:14:45.165 So they're not denying that

NOTE Confidence: 0.9894797

00:14:45.165 --> 00:14:46.225 there are some increases.

NOTE Confidence: 0.99539584

00:14:46.685 --> 00:14:48.144 They just think they're exaggerated

NOTE Confidence: 0.99967

00:14:49.084 --> 00:14:49.584 by

NOTE Confidence: 0.99189126

00:14:50.045 --> 00:14:51.345 epidemiologic miscalculations.

NOTE Confidence: 0.98504376

00:14:51.885 --> 00:14:53.084 Okay. So bear that in

NOTE Confidence: 0.98504376

00:14:53.084 --> 00:14:53.584 mind.

NOTE Confidence: 0.99811554

00:14:55.165 --> 00:14:55.665 So

NOTE Confidence: 0.9172931

00:14:56.150 --> 00:14:57.350 there are a few well

NOTE Confidence: 0.9172931

00:14:57.350 --> 00:14:57.850 controlled

NOTE Confidence: 0.9864273

00:14:58.550 --> 00:15:00.790 studies of actual cannabis impaired

NOTE Confidence: 0.9864273

00:15:00.790 --> 00:15:01.290 driving.

NOTE Confidence: 0.95795697

00:15:03.510 --> 00:15:04.010 And

NOTE Confidence: 0.967252

00:15:04.390 --> 00:15:05.510 as I said, because of

NOTE Confidence: 0.967252

00:15:05.510 --> 00:15:07.350 persistence, it's unclear to how

NOTE Confidence: 0.967252

00:15:07.350 --> 00:15:08.010 to interpret

NOTE Confidence: 0.94160384

00:15:08.390 --> 00:15:09.690 body fluid sampling.

NOTE Confidence: 0.9976009

00:15:11.475 --> 00:15:13.175 Who presents which data

NOTE Confidence: 0.99862075

00:15:14.195 --> 00:15:15.235 has to be viewed with

NOTE Confidence: 0.99862075

00:15:15.235 --> 00:15:15.735 skepticism

NOTE Confidence: 0.90535045

00:15:16.675 --> 00:15:18.455 because there is

NOTE Confidence: 0.9975611

00:15:19.155 --> 00:15:20.055 agenda driven

NOTE Confidence: 0.9979323

00:15:20.515 --> 00:15:21.975 reporting of the statistics

NOTE Confidence: 0.99196625

00:15:23.475 --> 00:15:25.735 from both sides. Remember, there's

NOTE Confidence: 0.99196625

00:15:25.940 --> 00:15:27.000 there's big alcohol

NOTE Confidence: 0.9882048

00:15:27.779 --> 00:15:28.839 and big cannabis,

NOTE Confidence: 0.9959966

00:15:29.140 --> 00:15:30.760 and they have competing agendas.

NOTE Confidence: 0.9868117

00:15:31.300 --> 00:15:32.740 And some of the reports

NOTE Confidence: 0.9868117

00:15:32.740 --> 00:15:33.480 in states

NOTE Confidence: 0.9768116

00:15:34.019 --> 00:15:34.519 are,

NOTE Confidence: 0.96877

00:15:35.459 --> 00:15:36.899 funded by one or the

NOTE Confidence: 0.96877

00:15:36.899 --> 00:15:37.880 other of these,

NOTE Confidence: 0.9984685

00:15:38.274 --> 00:15:39.395 So you really have to

NOTE Confidence: 0.9984685

00:15:39.395 --> 00:15:40.515 take a step back and

NOTE Confidence: 0.9984685

00:15:40.515 --> 00:15:42.135 put on your skeptic glasses,

NOTE Confidence: 0.9998418

00:15:42.995 --> 00:15:43.955 to be able to look

NOTE Confidence: 0.9998418

00:15:43.955 --> 00:15:44.615 at reports

NOTE Confidence: 0.995185

00:15:45.235 --> 00:15:45.735 carefully.

NOTE Confidence: 0.99670035

00:15:46.755 --> 00:15:48.834 And unlike alcohol, there's no

NOTE Confidence: 0.99670035

00:15:48.834 --> 00:15:50.055 agreed on roadside

NOTE Confidence: 0.9984503

00:15:50.435 --> 00:15:51.975 valid sobriety testing

NOTE Confidence: 0.99946314

00:15:52.329 --> 00:15:54.170 for cannabis impairment, which is

NOTE Confidence: 0.99946314

00:15:54.170 --> 00:15:55.850 something we'll be spending a

NOTE Confidence: 0.99946314

00:15:55.850 --> 00:15:57.230 lot of time looking at.

NOTE Confidence: 0.9912117

00:16:01.370 --> 00:16:03.790 Other things are to note

NOTE Confidence: 0.9912117

00:16:03.850 --> 00:16:04.350 that

NOTE Confidence: 0.9988145

00:16:05.415 --> 00:16:06.375 if we take you in

NOTE Confidence: 0.9988145

00:16:06.375 --> 00:16:07.735 the lab and give you

NOTE Confidence: 0.9988145

00:16:07.735 --> 00:16:08.235 cannabis

NOTE Confidence: 0.9272255

00:16:08.615 --> 00:16:10.135 and you were impaired on

NOTE Confidence: 0.9272255

00:16:10.135 --> 00:16:11.435 a cognitive task,

NOTE Confidence: 0.9978297

00:16:12.135 --> 00:16:13.834 that may be completely irrelevant

NOTE Confidence: 0.9978297

00:16:13.975 --> 00:16:15.435 if that cognitive task

NOTE Confidence: 0.99966633

00:16:15.894 --> 00:16:18.154 has no relevance to driving.

NOTE Confidence: 0.988842

00:16:19.020 --> 00:16:21.180 So just because someone's impaired

NOTE Confidence: 0.988842

00:16:21.180 --> 00:16:22.960 on a task doesn't mean

NOTE Confidence: 0.988842

00:16:23.020 --> 00:16:24.300 there's anything wrong with their

NOTE Confidence: 0.988842

00:16:24.300 --> 00:16:27.120 driving. So that's something that

NOTE Confidence: 0.988842

00:16:27.260 --> 00:16:28.800 has to be shown empirically.

NOTE Confidence: 0.9710081

00:16:30.380 --> 00:16:31.740 Second thing is that we

NOTE Confidence: 0.9710081

00:16:31.740 --> 00:16:33.340 often, at the roadside, don't

NOTE Confidence: 0.9710081

00:16:33.340 --> 00:16:33.840 know,

NOTE Confidence: 0.95684105

00:16:34.445 --> 00:16:36.705 someone's baseline draping capability.

NOTE Confidence: 0.992704

00:16:37.325 --> 00:16:38.365 So if you pull over

NOTE Confidence: 0.992704

00:16:38.365 --> 00:16:39.805 someone and they have cannabis

NOTE Confidence: 0.992704

00:16:39.805 --> 00:16:41.325 in their blood and they

NOTE Confidence: 0.992704

00:16:41.325 --> 00:16:42.465 appear to be impaired,

NOTE Confidence: 0.9647536

00:16:42.925 --> 00:16:44.205 maybe they were impaired at

NOTE Confidence: 0.9647536

00:16:44.205 --> 00:16:44.705 baseline,

NOTE Confidence: 0.9766065

00:16:45.725 --> 00:16:46.685 and they're just a bad

NOTE Confidence: 0.9766065

00:16:46.685 --> 00:16:47.820 driver. And now they're a

NOTE Confidence: 0.9766065

00:16:47.820 --> 00:16:49.180 bad stone driver, but no

NOTE Confidence: 0.9766065

00:16:49.180 --> 00:16:50.220 worse off than they were

NOTE Confidence: 0.9766065

00:16:50.220 --> 00:16:51.660 before. So you have to

NOTE Confidence: 0.9766065

00:16:51.660 --> 00:16:52.960 know something about that.

NOTE Confidence: 0.9406243

00:16:53.820 --> 00:16:56.080 Another unanswered question is,

NOTE Confidence: 0.996671

00:16:56.620 --> 00:16:57.500 if I take a couple

NOTE Confidence: 0.996671

00:16:57.500 --> 00:16:58.620 of beers and take a

NOTE Confidence: 0.996671

00:16:58.620 --> 00:17:00.000 couple of bong hits,

NOTE Confidence: 0.9590793

00:17:00.415 --> 00:17:02.335 is that a plus b

NOTE Confidence: 0.9590793

00:17:02.335 --> 00:17:03.535 or is it a times

NOTE Confidence: 0.9590793

00:17:03.535 --> 00:17:04.835 b, and they're synergistic

NOTE Confidence: 0.9424341

00:17:05.375 --> 00:17:06.915 rather than merely additive?

NOTE Confidence: 0.8642905

00:17:09.055 --> 00:17:10.355 There's a lack of understanding

NOTE Confidence: 0.8642905

00:17:10.494 --> 00:17:10.994 regarding

NOTE Confidence: 0.9824827

00:17:11.295 --> 00:17:12.755 the time course of THC

NOTE Confidence: 0.9824827

00:17:12.815 --> 00:17:14.195 related driving impairment,

NOTE Confidence: 0.9988533

00:17:14.975 --> 00:17:15.475 and

NOTE Confidence: 0.98126507

00:17:16.000 --> 00:17:17.859 we're pretty ignorant of THC's

NOTE Confidence: 0.9996511

00:17:18.480 --> 00:17:18.980 specificity

NOTE Confidence: 0.9990947

00:17:19.440 --> 00:17:20.100 in testing

NOTE Confidence: 0.9483145

00:17:20.559 --> 00:17:22.400 compared, say, to opioids or

NOTE Confidence: 0.9483145

00:17:22.400 --> 00:17:22.900 benzodiazepines

NOTE Confidence: 0.995907

00:17:23.840 --> 00:17:25.779 as compared to alcohol. So

NOTE Confidence: 0.995907

00:17:25.840 --> 00:17:27.299 bear those things in mind.

NOTE Confidence: 0.995907

00:17:27.520 --> 00:17:28.980 So let's dig a little

NOTE Confidence: 0.995907

00:17:29.039 --> 00:17:30.740 deeper into these issues.

NOTE Confidence: 0.9994934

00:17:31.715 --> 00:17:33.795 So multiple products with different

NOTE Confidence: 0.9994934

00:17:33.795 --> 00:17:34.295 pharmacokinetics

NOTE Confidence: 0.9944563

00:17:35.234 --> 00:17:36.775 and different dosage rates.

NOTE Confidence: 0.98720443

00:17:40.115 --> 00:17:42.275 So for alcohol, there are

NOTE Confidence: 0.98720443

00:17:42.275 --> 00:17:44.375 equivalences. So a standard drink

NOTE Confidence: 0.9991054

00:17:44.755 --> 00:17:45.255 is

NOTE Confidence: 0.83396673

00:17:45.555 --> 00:17:46.055 like

NOTE Confidence: 0.99345255

00:17:46.640 --> 00:17:48.240 sixteen ounces of beer, five

NOTE Confidence: 0.99345255

00:17:48.240 --> 00:17:49.840 ounces of wine, eight ounces

NOTE Confidence: 0.99345255

00:17:49.840 --> 00:17:50.880 of malt liquor, and so

NOTE Confidence: 0.99345255

00:17:50.880 --> 00:17:51.620 on. But

NOTE Confidence: 0.9994624

00:17:52.720 --> 00:17:53.220 taking

NOTE Confidence: 0.9990468

00:17:53.680 --> 00:17:54.420 a brownie

NOTE Confidence: 0.99949884

00:17:54.800 --> 00:17:55.300 with

NOTE Confidence: 0.99943084

00:17:55.680 --> 00:17:57.220 five milligrams of THC,

NOTE Confidence: 0.998437

00:17:58.640 --> 00:18:00.080 smoking a dab with five

NOTE Confidence: 0.998437

00:18:00.080 --> 00:18:01.300 milligrams of THC,

NOTE Confidence: 0.9964696

00:18:01.945 --> 00:18:03.305 and taking a bong hit

NOTE Confidence: 0.9964696

00:18:03.305 --> 00:18:04.845 with five milligrams of THC

NOTE Confidence: 0.99428284

00:18:05.305 --> 00:18:06.605 are not at all equivalent

NOTE Confidence: 0.9113953

00:18:07.065 --> 00:18:07.565 pharmacokinetically

NOTE Confidence: 0.97943366

00:18:08.265 --> 00:18:09.484 or in terms of intoxication,

NOTE Confidence: 0.9976514

00:18:11.305 --> 00:18:12.665 at its peak or in

NOTE Confidence: 0.9976514

00:18:12.665 --> 00:18:13.405 its duration.

NOTE Confidence: 0.9921313

00:18:14.025 --> 00:18:16.280 So there's no intuitive standard

NOTE Confidence: 0.9921313

00:18:16.280 --> 00:18:17.800 joint measure, and there's no

NOTE Confidence: 0.9921313

00:18:17.800 --> 00:18:18.940 getting around that.

NOTE Confidence: 0.9305868

00:18:20.359 --> 00:18:21.420 So driving.

NOTE Confidence: 0.9895854

00:18:22.600 --> 00:18:24.520 Can we detect cannabis impaired

NOTE Confidence: 0.9895854

00:18:24.520 --> 00:18:25.500 drivers reliably

NOTE Confidence: 0.99618053

00:18:25.880 --> 00:18:26.780 at the roadside?

NOTE Confidence: 0.99190944

00:18:28.445 --> 00:18:29.405 And as I said, we

NOTE Confidence: 0.99190944

00:18:29.405 --> 00:18:30.765 need validity. So if you

NOTE Confidence: 0.99190944

00:18:30.765 --> 00:18:32.285 have a measure, is that

NOTE Confidence: 0.99190944

00:18:32.285 --> 00:18:33.744 measure actually related

NOTE Confidence: 0.99904746

00:18:34.445 --> 00:18:35.665 to driving impairment

NOTE Confidence: 0.9870458

00:18:36.045 --> 00:18:37.405 rather than just a measure

NOTE Confidence: 0.9870458

00:18:37.405 --> 00:18:38.925 of being stoned? And that

NOTE Confidence: 0.9870458

00:18:39.005 --> 00:18:40.705 that's a very important distinction.

NOTE Confidence: 0.9991808

00:18:42.149 --> 00:18:43.929 So what is driving?

NOTE Confidence: 0.9974752

00:18:44.389 --> 00:18:45.350 I like to think of

NOTE Confidence: 0.9974752

00:18:45.350 --> 00:18:46.730 driving as a pyramid

NOTE Confidence: 0.99837637

00:18:47.269 --> 00:18:48.649 of increasing complexity.

NOTE Confidence: 0.98994184

00:18:49.190 --> 00:18:50.149 So if you look at

NOTE Confidence: 0.98994184

00:18:50.149 --> 00:18:52.470 bottom up, basically, can you

NOTE Confidence: 0.98994184

00:18:52.470 --> 00:18:53.210 see things?

NOTE Confidence: 0.9990198

00:18:53.830 --> 00:18:55.769 What's your visual reaction time?

NOTE Confidence: 0.9997143

00:18:56.735 --> 00:18:58.895 Can you integrate what you're

NOTE Confidence: 0.9997143

00:18:58.895 --> 00:19:00.035 seeing on the road

NOTE Confidence: 0.9826712

00:19:00.335 --> 00:19:01.855 with your motor patterns in

NOTE Confidence: 0.9826712

00:19:01.855 --> 00:19:03.535 terms of speeding up or

NOTE Confidence: 0.9826712

00:19:03.535 --> 00:19:04.035 braking?

NOTE Confidence: 0.9733794

00:19:04.575 --> 00:19:06.655 And at the abscissa of

NOTE Confidence: 0.9733794

00:19:06.655 --> 00:19:08.335 the pyramid at the very

NOTE Confidence: 0.9733794

00:19:08.335 --> 00:19:08.835 peak,

NOTE Confidence: 0.9668848

00:19:09.375 --> 00:19:10.494 you get driving as an

NOTE Confidence: 0.9668848

00:19:10.494 --> 00:19:12.150 emergent property, or you can

NOTE Confidence: 0.9668848

00:19:12.150 --> 00:19:13.450 look at it top down.

NOTE Confidence: 0.99116004

00:19:14.550 --> 00:19:16.150 So it's basically a complex

NOTE Confidence: 0.99116004

00:19:16.150 --> 00:19:18.730 behavior with multiple integrated cognitive

NOTE Confidence: 0.99116004

00:19:18.869 --> 00:19:20.090 and motor components

NOTE Confidence: 0.9976546

00:19:20.550 --> 00:19:22.010 that you can measure separately

NOTE Confidence: 0.9929835

00:19:22.310 --> 00:19:23.609 or integrate together.

NOTE Confidence: 0.99698657

00:19:25.445 --> 00:19:28.185 So cannabis certainly impairs individual

NOTE Confidence: 0.99698657

00:19:28.405 --> 00:19:28.905 psychomotor

NOTE Confidence: 0.95073634

00:19:29.445 --> 00:19:31.785 abilities related to vehicle driving.

NOTE Confidence: 0.97302276

00:19:32.085 --> 00:19:34.085 So that's well established. But

NOTE Confidence: 0.97302276

00:19:34.085 --> 00:19:34.905 as I said,

NOTE Confidence: 0.98964036

00:19:35.285 --> 00:19:36.565 they may be related to

NOTE Confidence: 0.98964036

00:19:36.565 --> 00:19:37.785 motor vehicle driving,

NOTE Confidence: 0.9518165

00:19:38.190 --> 00:19:39.629 but are they related to

NOTE Confidence: 0.9518165

00:19:39.629 --> 00:19:41.169 actual driving either

NOTE Confidence: 0.9779647

00:19:41.629 --> 00:19:42.129 virtually,

NOTE Confidence: 0.9652733

00:19:42.830 --> 00:19:44.429 in in virtual reality on

NOTE Confidence: 0.9652733

00:19:44.429 --> 00:19:45.490 a driving simulator

NOTE Confidence: 0.9842025

00:19:45.950 --> 00:19:47.409 or on an actual road?

NOTE Confidence: 0.99783236

00:19:48.509 --> 00:19:49.009 So

NOTE Confidence: 0.9851128

00:19:49.389 --> 00:19:50.429 some of them seem to

NOTE Confidence: 0.9851128

00:19:50.429 --> 00:19:52.509 be looking at sensitivity and

NOTE Confidence: 0.9851128

00:19:52.509 --> 00:19:53.009 specificity,

NOTE Confidence: 0.8669063

00:19:54.165 --> 00:19:55.385 particular tests,

NOTE Confidence: 0.9252045

00:19:55.765 --> 00:19:57.605 like a maze task, just

NOTE Confidence: 0.9252045

00:19:57.605 --> 00:19:58.744 to pick one example,

NOTE Confidence: 0.9991348

00:19:59.285 --> 00:20:00.585 related to planning

NOTE Confidence: 0.90397334

00:20:01.845 --> 00:20:03.705 and, frontal lobe function,

NOTE Confidence: 0.9741423

00:20:04.405 --> 00:20:06.085 gives you about seventy eight

NOTE Confidence: 0.9741423

00:20:06.085 --> 00:20:07.705 and eighty two percent sensitivity

NOTE Confidence: 0.9741423

00:20:07.765 --> 00:20:08.505 and specificity.

NOTE Confidence: 0.97528994

00:20:09.450 --> 00:20:11.549 And some individual tests perform

NOTE Confidence: 0.9971737

00:20:11.850 --> 00:20:12.750 a little better.

NOTE Confidence: 0.98866963

00:20:13.530 --> 00:20:15.289 But my contention, and this

NOTE Confidence: 0.98866963

00:20:15.289 --> 00:20:16.669 is something that our research

NOTE Confidence: 0.98866963

00:20:16.730 --> 00:20:18.250 has borne out, is that

NOTE Confidence: 0.98866963

00:20:18.250 --> 00:20:19.450 you really need a battery

NOTE Confidence: 0.98866963

00:20:19.450 --> 00:20:20.109 of tests

NOTE Confidence: 0.97106534

00:20:20.490 --> 00:20:21.710 and to get a behavioral

NOTE Confidence: 0.97106534

00:20:21.850 --> 00:20:22.350 fingerprint.

NOTE Confidence: 0.999332

00:20:24.169 --> 00:20:24.669 So

NOTE Confidence: 0.9948179

00:20:25.105 --> 00:20:27.105 does cannabis impair on road

NOTE Confidence: 0.9948179

00:20:27.105 --> 00:20:29.184 or simulated driving abilities? And

NOTE Confidence: 0.9948179

00:20:29.184 --> 00:20:30.625 that's something we and others

NOTE Confidence: 0.9948179

00:20:30.625 --> 00:20:31.684 have looked at extensively.

NOTE Confidence: 0.9996649

00:20:32.625 --> 00:20:33.125 So

NOTE Confidence: 0.9560855

00:20:33.904 --> 00:20:35.825 the literature summary is often

NOTE Confidence: 0.9560855

00:20:35.825 --> 00:20:37.764 looked at single driving tasks

NOTE Confidence: 0.9989216

00:20:38.600 --> 00:20:40.920 and a particular task, which

NOTE Confidence: 0.9989216

00:20:40.920 --> 00:20:41.880 I'll get into in a

NOTE Confidence: 0.9989216

00:20:41.880 --> 00:20:42.380 second.

NOTE Confidence: 0.77154243

00:20:45.320 --> 00:20:45.820 So,

NOTE Confidence: 0.97126585

00:20:47.800 --> 00:20:49.560 driving impairment seems to be

NOTE Confidence: 0.97126585

00:20:49.560 --> 00:20:51.340 most noticeable from the literature

NOTE Confidence: 0.97126585

00:20:51.400 --> 00:20:52.760 in activities that are more

NOTE Confidence: 0.97126585

00:20:52.760 --> 00:20:53.260 automatic

NOTE Confidence: 0.999659

00:20:53.845 --> 00:20:54.665 and simpler

NOTE Confidence: 0.9727132

00:20:55.045 --> 00:20:57.545 and require minimal attentional control

NOTE Confidence: 0.9107331

00:20:58.325 --> 00:20:58.825 and

NOTE Confidence: 0.9995486

00:20:59.605 --> 00:21:00.105 less

NOTE Confidence: 0.97576004

00:21:00.485 --> 00:21:00.985 impaired,

NOTE Confidence: 0.9945036

00:21:03.125 --> 00:21:05.445 on more complex frontal lobe

NOTE Confidence: 0.9945036

00:21:05.445 --> 00:21:06.345 planning abilities,

NOTE Confidence: 0.97805923

00:21:07.009 --> 00:21:09.090 which is interesting. Yeah. I

NOTE Confidence: 0.97805923

00:21:09.090 --> 00:21:10.389 would expect the opposite.

NOTE Confidence: 0.944679

00:21:11.490 --> 00:21:12.789 And STLP,

NOTE Confidence: 0.90383685

00:21:13.570 --> 00:21:14.609 which if you come from

NOTE Confidence: 0.90383685

00:21:14.609 --> 00:21:15.970 Ireland is not the Social

NOTE Confidence: 0.90383685

00:21:15.970 --> 00:21:16.470 Democratic

NOTE Confidence: 0.72387534

00:21:16.929 --> 00:21:18.549 Labor Party, but,

NOTE Confidence: 0.9893427

00:21:18.929 --> 00:21:20.869 standard deviation of lane position

NOTE Confidence: 0.9893427

00:21:20.929 --> 00:21:21.590 or weaving

NOTE Confidence: 0.9796393

00:21:22.035 --> 00:21:23.795 is the most robustly affected

NOTE Confidence: 0.9796393

00:21:23.795 --> 00:21:24.855 in many tests.

NOTE Confidence: 0.97671854

00:21:25.475 --> 00:21:25.975 But,

NOTE Confidence: 0.7396277

00:21:26.915 --> 00:21:27.415 sometimes,

NOTE Confidence: 0.98124725

00:21:28.195 --> 00:21:29.715 the only metric that's been

NOTE Confidence: 0.98124725

00:21:29.715 --> 00:21:31.555 studied for driving, so hard

NOTE Confidence: 0.98124725

00:21:31.555 --> 00:21:32.215 to say.

NOTE Confidence: 0.9989808

00:21:33.155 --> 00:21:33.655 And

NOTE Confidence: 0.9990806

00:21:34.530 --> 00:21:36.050 there are suggestions of long

NOTE Confidence: 0.9990806

00:21:36.050 --> 00:21:37.109 lasting impairments,

NOTE Confidence: 0.99856025

00:21:37.650 --> 00:21:38.150 but

NOTE Confidence: 0.99394906

00:21:38.530 --> 00:21:39.970 the majority of studies have

NOTE Confidence: 0.99394906

00:21:39.970 --> 00:21:41.010 not looked more than a

NOTE Confidence: 0.99394906

00:21:41.010 --> 00:21:42.450 couple of hours out after

NOTE Confidence: 0.99394906

00:21:42.450 --> 00:21:43.430 an acute dose.

NOTE Confidence: 0.98014367

00:21:44.369 --> 00:21:46.210 And there's little support for

NOTE Confidence: 0.98014367

00:21:46.210 --> 00:21:48.070 impairment being related to THC

NOTE Confidence: 0.98014367

00:21:48.290 --> 00:21:49.990 blood or oral fluid levels,

NOTE Confidence: 0.9812213

00:21:50.875 --> 00:21:52.475 unlike alcohol. So we'll get

NOTE Confidence: 0.9812213

00:21:52.475 --> 00:21:53.295 into that.

NOTE Confidence: 0.9614248

00:21:54.795 --> 00:21:55.994 So probably one of the

NOTE Confidence: 0.9614248

00:21:55.994 --> 00:21:58.174 best tasks was done by

NOTE Confidence: 0.9614248

00:21:58.234 --> 00:21:59.695 Tom Marcotte at UCSD

NOTE Confidence: 0.99710363

00:22:00.475 --> 00:22:01.835 that he published four years

NOTE Confidence: 0.99710363

00:22:01.835 --> 00:22:02.335 ago.

NOTE Confidence: 0.94300735

00:22:02.795 --> 00:22:03.570 So So he looked at

NOTE Confidence: 0.94300735

00:22:03.570 --> 00:22:04.549 a couple of hundred

NOTE Confidence: 0.9997502

00:22:04.850 --> 00:22:06.390 regular cannabis users

NOTE Confidence: 0.98978853

00:22:06.770 --> 00:22:07.590 and randomized

NOTE Confidence: 0.9734062

00:22:08.369 --> 00:22:10.230 each person to either placebo,

NOTE Confidence: 0.9710411

00:22:10.929 --> 00:22:12.850 six percent THC, or thirteen

NOTE Confidence: 0.9710411

00:22:12.850 --> 00:22:13.830 percent THC

NOTE Confidence: 0.9737537

00:22:14.530 --> 00:22:15.970 in parallel groups. So it

NOTE Confidence: 0.9737537

00:22:15.970 --> 00:22:17.190 wasn't the same person

NOTE Confidence: 0.99883986

00:22:17.734 --> 00:22:19.195 challenged multiple times.

NOTE Confidence: 0.998482

00:22:19.975 --> 00:22:21.195 So everyone smoked

NOTE Confidence: 0.9908868

00:22:21.575 --> 00:22:23.275 a point seven gram joint

NOTE Confidence: 0.92357635

00:22:23.895 --> 00:22:25.755 ad lib, so not everyone

NOTE Confidence: 0.97023755

00:22:26.295 --> 00:22:27.975 smoked the same amount even

NOTE Confidence: 0.97023755

00:22:27.975 --> 00:22:29.910 within a dose range, and

NOTE Confidence: 0.97023755

00:22:29.910 --> 00:22:31.270 then drove on a simulator

NOTE Confidence: 0.97023755

00:22:31.270 --> 00:22:32.410 for twenty five minutes.

NOTE Confidence: 0.9992705

00:22:33.190 --> 00:22:33.690 And

NOTE Confidence: 0.9764245

00:22:34.150 --> 00:22:36.150 no single driving metric was

NOTE Confidence: 0.9764245

00:22:36.150 --> 00:22:36.650 significant,

NOTE Confidence: 0.9989821

00:22:37.190 --> 00:22:38.869 so he summarized everything into

NOTE Confidence: 0.9989821

00:22:38.869 --> 00:22:40.170 a composite score

NOTE Confidence: 0.81622034

00:22:40.790 --> 00:22:41.290 and

NOTE Confidence: 0.99939144

00:22:41.884 --> 00:22:43.904 then found that composite score

NOTE Confidence: 0.9997249

00:22:44.764 --> 00:22:45.264 was

NOTE Confidence: 0.99975544

00:22:45.565 --> 00:22:46.065 impaired

NOTE Confidence: 0.93205166

00:22:46.365 --> 00:22:48.865 but unrelated to THC dose

NOTE Confidence: 0.9822819

00:22:49.244 --> 00:22:50.465 or use history

NOTE Confidence: 0.9817659

00:22:50.845 --> 00:22:52.544 or blood THC levels.

NOTE Confidence: 0.99566555

00:22:52.924 --> 00:22:54.605 Okay. So that's kind of

NOTE Confidence: 0.99566555

00:22:54.605 --> 00:22:55.725 the best study that we

NOTE Confidence: 0.99566555

00:22:55.725 --> 00:22:56.605 have out there at the

NOTE Confidence: 0.99566555

00:22:56.605 --> 00:22:57.105 moment.

NOTE Confidence: 0.9995839

00:22:58.310 --> 00:22:59.590 So how does this actually

NOTE Confidence: 0.9995839

00:22:59.590 --> 00:23:00.570 work in practice?

NOTE Confidence: 0.9912468

00:23:01.270 --> 00:23:03.030 So I'm driving along the

NOTE Confidence: 0.9912468

00:23:03.030 --> 00:23:05.109 road, and I'm pulled over

NOTE Confidence: 0.9912468

00:23:05.109 --> 00:23:06.250 by a law enforcement

NOTE Confidence: 0.95163167

00:23:06.550 --> 00:23:07.050 officer.

NOTE Confidence: 0.9624514

00:23:07.590 --> 00:23:08.869 And that could happen for

NOTE Confidence: 0.9624514

00:23:08.869 --> 00:23:10.945 probable cause, which is my

NOTE Confidence: 0.9624514

00:23:10.945 --> 00:23:12.725 driving is awful and weaving

NOTE Confidence: 0.9539029

00:23:13.345 --> 00:23:15.664 or driving excessively slow or

NOTE Confidence: 0.9539029

00:23:15.664 --> 00:23:16.164 fast,

NOTE Confidence: 0.9680213

00:23:16.544 --> 00:23:17.825 or I've got a busted

NOTE Confidence: 0.9680213

00:23:17.825 --> 00:23:19.044 taillight or something,

NOTE Confidence: 0.94351435

00:23:19.585 --> 00:23:20.644 or I encounter,

NOTE Confidence: 0.9989269

00:23:21.904 --> 00:23:22.565 a DWI

NOTE Confidence: 0.8232304

00:23:22.945 --> 00:23:23.445 checkpoint.

NOTE Confidence: 0.99531174

00:23:24.490 --> 00:23:25.609 So they're just pulling over

NOTE Confidence: 0.99531174

00:23:25.609 --> 00:23:26.990 everyone and testing them.

NOTE Confidence: 0.99952126

00:23:27.529 --> 00:23:28.590 And if my

NOTE Confidence: 0.9997242

00:23:30.330 --> 00:23:31.950 roadside impairment testing

NOTE Confidence: 0.9747715

00:23:32.570 --> 00:23:34.650 is abnormal, I'm staggering, I

NOTE Confidence: 0.9747715

00:23:34.650 --> 00:23:35.929 can't walk a straight line,

NOTE Confidence: 0.9747715

00:23:35.929 --> 00:23:37.390 I'm slurring my words,

NOTE Confidence: 0.99752676

00:23:38.345 --> 00:23:39.725 I appear to be intoxicated.

NOTE Confidence: 0.9998189

00:23:40.744 --> 00:23:41.244 I'll

NOTE Confidence: 0.99337184

00:23:42.105 --> 00:23:44.125 be tested with a breathalyzer.

NOTE Confidence: 0.99939895

00:23:45.305 --> 00:23:45.805 And

NOTE Confidence: 0.92089903

00:23:46.185 --> 00:23:47.885 if my breathalyzer is abnormal,

NOTE Confidence: 0.97627556

00:23:48.425 --> 00:23:49.625 that is I have more

NOTE Confidence: 0.97627556

00:23:49.625 --> 00:23:50.984 than the required amount of

NOTE Confidence: 0.97627556

00:23:50.984 --> 00:23:53.165 alcohol on board, then I'm

NOTE Confidence: 0.9993461

00:23:54.419 --> 00:23:54.919 automatically

NOTE Confidence: 0.9349769

00:23:55.380 --> 00:23:56.600 WI for alcohol.

NOTE Confidence: 0.9548352

00:23:57.299 --> 00:23:58.900 If my BAC is negative

NOTE Confidence: 0.9548352

00:23:58.900 --> 00:24:00.340 but I appear to be

NOTE Confidence: 0.9548352

00:24:00.340 --> 00:24:00.840 intoxicated,

NOTE Confidence: 0.99962234

00:24:01.619 --> 00:24:03.539 law enforcement may choose to

NOTE Confidence: 0.99962234

00:24:03.539 --> 00:24:05.059 have me go to a

NOTE Confidence: 0.99962234

00:24:05.059 --> 00:24:06.359 local testing facility

NOTE Confidence: 0.9410801

00:24:07.005 --> 00:24:08.685 and have my blood drawn

NOTE Confidence: 0.9410801

00:24:08.685 --> 00:24:10.465 for drugs including THC.

NOTE Confidence: 0.91143876

00:24:11.405 --> 00:24:12.845 And the average across the

NOTE Confidence: 0.91143876

00:24:12.845 --> 00:24:14.045 US for that is ninety

NOTE Confidence: 0.91143876

00:24:14.045 --> 00:24:14.545 minutes.

NOTE Confidence: 0.994721

00:24:15.005 --> 00:24:16.045 And they may call in

NOTE Confidence: 0.994721

00:24:16.045 --> 00:24:17.744 a drug recognition expert,

NOTE Confidence: 0.97834593

00:24:18.445 --> 00:24:19.885 who's someone who has been

NOTE Confidence: 0.97834593

00:24:19.885 --> 00:24:20.385 trained

NOTE Confidence: 0.9980449

00:24:20.790 --> 00:24:22.869 to recognize behavioral impairment in

NOTE Confidence: 0.9980449

00:24:22.869 --> 00:24:23.369 drivers

NOTE Confidence: 0.99891406

00:24:23.750 --> 00:24:25.210 due to specific substances.

NOTE Confidence: 0.9780611

00:24:26.710 --> 00:24:27.210 So,

NOTE Confidence: 0.99915665

00:24:28.710 --> 00:24:30.730 DREs are excellent for alcohol

NOTE Confidence: 0.933976

00:24:31.190 --> 00:24:32.730 but prove to be extremely

NOTE Confidence: 0.933976

00:24:33.030 --> 00:24:34.869 variable for cannabis at their

NOTE Confidence: 0.933976

00:24:34.869 --> 00:24:36.795 best. Some can do it,

NOTE Confidence: 0.933976

00:24:36.935 --> 00:24:37.915 most cannot.

NOTE Confidence: 0.9084382

00:24:39.095 --> 00:24:40.535 And the blood test test

NOTE Confidence: 0.9084382

00:24:40.535 --> 00:24:42.315 for THC are its metabolites,

NOTE Confidence: 0.9915427

00:24:43.015 --> 00:24:44.315 but that has a problem,

NOTE Confidence: 0.973683

00:24:45.095 --> 00:24:46.695 because it takes ninety minutes

NOTE Confidence: 0.973683

00:24:46.695 --> 00:24:47.575 to get me to a

NOTE Confidence: 0.973683

00:24:47.575 --> 00:24:49.255 test site, and the blood

NOTE Confidence: 0.973683

00:24:49.255 --> 00:24:50.875 that's drawn there may reflect

NOTE Confidence: 0.99976057

00:24:51.409 --> 00:24:51.909 prior

NOTE Confidence: 0.99428433

00:24:52.450 --> 00:24:53.490 use a long time ago

NOTE Confidence: 0.99428433

00:24:53.490 --> 00:24:54.609 that's leaching out of my

NOTE Confidence: 0.99428433

00:24:54.609 --> 00:24:55.350 fat stores.

NOTE Confidence: 0.9996258

00:24:57.090 --> 00:24:57.590 So

NOTE Confidence: 0.9975707

00:24:59.650 --> 00:25:01.409 the evaluation that's done at

NOTE Confidence: 0.9975707

00:25:01.409 --> 00:25:03.029 the roadside is basically

NOTE Confidence: 0.9989839

00:25:03.890 --> 00:25:04.950 based on

NOTE Confidence: 0.9679676

00:25:06.445 --> 00:25:08.705 intoxication patterns for drunk drivers

NOTE Confidence: 0.74593586

00:25:09.565 --> 00:25:10.625 and is,

NOTE Confidence: 0.9979083

00:25:11.965 --> 00:25:13.325 to put it bluntly, no

NOTE Confidence: 0.9979083

00:25:13.325 --> 00:25:14.065 pun intended,

NOTE Confidence: 0.9993469

00:25:14.685 --> 00:25:17.005 really not applicable to cannabis

NOTE Confidence: 0.9993469

00:25:17.005 --> 00:25:17.505 intoxication.

NOTE Confidence: 0.98713195

00:25:18.480 --> 00:25:18.980 Cannabis

NOTE Confidence: 0.99962085

00:25:19.520 --> 00:25:21.700 intoxicated drivers can perform perfectly

NOTE Confidence: 0.99962085

00:25:21.840 --> 00:25:22.980 okay on this

NOTE Confidence: 0.97062

00:25:24.160 --> 00:25:25.059 in many cases.

NOTE Confidence: 0.9994063

00:25:26.160 --> 00:25:28.400 So what if THC is

NOTE Confidence: 0.9994063

00:25:28.400 --> 00:25:29.780 detected in my blood?

NOTE Confidence: 0.98041284

00:25:30.800 --> 00:25:31.920 A number of states have

NOTE Confidence: 0.98041284

00:25:31.920 --> 00:25:33.700 so called per se laws.

NOTE Confidence: 0.99815035

00:25:34.195 --> 00:25:34.695 Basically,

NOTE Confidence: 0.99831307

00:25:35.715 --> 00:25:36.915 if you have THC in

NOTE Confidence: 0.99831307

00:25:36.915 --> 00:25:38.615 your blood, they presume impairment.

NOTE Confidence: 0.99776334

00:25:39.795 --> 00:25:41.955 So eleven states prohibit driving

NOTE Confidence: 0.99776334

00:25:41.955 --> 00:25:43.415 with any amount of detectable

NOTE Confidence: 0.99776334

00:25:43.555 --> 00:25:44.375 blood THC.

NOTE Confidence: 0.9366708

00:25:44.915 --> 00:25:47.000 THC shows up. You're

NOTE Confidence: 0.9873702

00:25:47.460 --> 00:25:49.460 stoned, you're intoxicated while driving,

NOTE Confidence: 0.9873702

00:25:49.460 --> 00:25:50.200 you're convicted.

NOTE Confidence: 0.9944925

00:25:51.220 --> 00:25:52.520 A few states imply

NOTE Confidence: 0.9270461

00:25:52.900 --> 00:25:54.920 a legal THC cutoff level,

NOTE Confidence: 0.9270461

00:25:55.220 --> 00:25:56.660 but those levels are not

NOTE Confidence: 0.9270461

00:25:56.660 --> 00:25:58.040 the same in different states.

NOTE Confidence: 0.99712586

00:25:59.565 --> 00:26:01.085 And the remainder of states

NOTE Confidence: 0.99712586

00:26:01.085 --> 00:26:02.705 that don't specify levels

NOTE Confidence: 0.9555387

00:26:03.085 --> 00:26:03.585 have

NOTE Confidence: 0.9991317

00:26:03.885 --> 00:26:04.385 incapacitated

NOTE Confidence: 0.96012247

00:26:04.845 --> 00:26:06.304 by or under the influence

NOTE Confidence: 0.96012247

00:26:06.525 --> 00:26:07.665 of laws

NOTE Confidence: 0.9476371

00:26:08.525 --> 00:26:09.965 that are slightly different, but

NOTE Confidence: 0.9476371

00:26:09.965 --> 00:26:11.165 boiled down to a somewhat

NOTE Confidence: 0.9476371

00:26:11.165 --> 00:26:11.984 vague prohibition

NOTE Confidence: 0.9481068

00:26:12.525 --> 00:26:14.065 on driving while high,

NOTE Confidence: 0.9644953

00:26:14.410 --> 00:26:15.710 however they test it.

NOTE Confidence: 0.99795073

00:26:16.170 --> 00:26:17.609 So these just show you

NOTE Confidence: 0.99795073

00:26:17.609 --> 00:26:18.109 the

NOTE Confidence: 0.9619694

00:26:18.410 --> 00:26:19.850 per se laws in different

NOTE Confidence: 0.9619694

00:26:19.850 --> 00:26:20.350 states,

NOTE Confidence: 0.9973394

00:26:21.130 --> 00:26:22.170 and I'm not gonna go

NOTE Confidence: 0.9973394

00:26:22.170 --> 00:26:23.369 into that in detail. We

NOTE Confidence: 0.9973394

00:26:23.369 --> 00:26:24.170 can come back to it

NOTE Confidence: 0.9973394

00:26:24.170 --> 00:26:25.310 if people are interested.

NOTE Confidence: 0.9992215

00:26:26.330 --> 00:26:27.690 But the bottom line on

NOTE Confidence: 0.9992215

00:26:27.690 --> 00:26:28.670 per se laws

NOTE Confidence: 0.9169712

00:26:29.294 --> 00:26:31.075 is I'm driving along.

NOTE Confidence: 0.9957474

00:26:31.615 --> 00:26:32.754 I'm pulled over.

NOTE Confidence: 0.9966722

00:26:33.134 --> 00:26:35.154 Someone decides that I'm mildly

NOTE Confidence: 0.9966722

00:26:35.215 --> 00:26:35.715 impaired.

NOTE Confidence: 0.9537673

00:26:37.534 --> 00:26:38.815 I get my blood drawn.

NOTE Confidence: 0.9537673

00:26:38.815 --> 00:26:40.575 There's THC on board, so

NOTE Confidence: 0.9537673

00:26:40.575 --> 00:26:42.115 I get an automatic conviction,

NOTE Confidence: 0.9537673

00:26:42.414 --> 00:26:43.934 although I haven't smoked cannabis

NOTE Confidence: 0.9537673

00:26:43.934 --> 00:26:44.754 for two weeks.

NOTE Confidence: 0.96407825

00:26:45.160 --> 00:26:46.840 So these laws to us

NOTE Confidence: 0.96407825

00:26:46.840 --> 00:26:48.280 seem to be arbitrary and

NOTE Confidence: 0.96407825

00:26:48.280 --> 00:26:49.420 not science based.

NOTE Confidence: 0.9975273

00:26:50.200 --> 00:26:50.700 And

NOTE Confidence: 0.99605256

00:26:51.400 --> 00:26:52.840 they could be replaced by

NOTE Confidence: 0.99605256

00:26:52.840 --> 00:26:54.140 a THC breathalyzer,

NOTE Confidence: 0.9980092

00:26:55.400 --> 00:26:57.020 to detect recent use

NOTE Confidence: 0.97782934

00:26:57.675 --> 00:26:59.435 or by a specific field

NOTE Confidence: 0.97782934

00:26:59.435 --> 00:27:01.855 sobriety test for cannabis specific,

NOTE Confidence: 0.9992874

00:27:02.795 --> 00:27:04.015 behavioral driving

NOTE Confidence: 0.99927527

00:27:04.475 --> 00:27:04.975 impairment

NOTE Confidence: 0.9815677

00:27:05.595 --> 00:27:08.015 that actually reflects impaired driving

NOTE Confidence: 0.9784333

00:27:08.315 --> 00:27:09.295 and and not

NOTE Confidence: 0.99676913

00:27:09.755 --> 00:27:10.655 something random.

NOTE Confidence: 0.999508

00:27:11.595 --> 00:27:12.095 So

NOTE Confidence: 0.8448785

00:27:12.790 --> 00:27:14.010 the Hound Labs

NOTE Confidence: 0.91592443

00:27:14.550 --> 00:27:16.090 for the last ten years

NOTE Confidence: 0.98519325

00:27:16.390 --> 00:27:17.770 has been trying to market,

NOTE Confidence: 0.99161816

00:27:18.550 --> 00:27:19.850 a cannabis breathalyzer,

NOTE Confidence: 0.9739421

00:27:20.550 --> 00:27:21.990 which is a very difficult

NOTE Confidence: 0.9739421

00:27:21.990 --> 00:27:24.090 task given the nanomolar

NOTE Confidence: 0.8430299

00:27:24.390 --> 00:27:24.890 equivalents

NOTE Confidence: 0.999064

00:27:25.750 --> 00:27:26.250 of

NOTE Confidence: 0.99326175

00:27:26.674 --> 00:27:28.275 THC that are detectable in

NOTE Confidence: 0.99326175

00:27:28.275 --> 00:27:28.775 breath.

NOTE Confidence: 0.97120637

00:27:29.635 --> 00:27:31.715 And, ultimately, that venture failed,

NOTE Confidence: 0.97120637

00:27:31.715 --> 00:27:32.515 and they went out of

NOTE Confidence: 0.97120637

00:27:32.515 --> 00:27:33.734 business a year ago.

NOTE Confidence: 0.99743325

00:27:34.755 --> 00:27:35.975 And there's no replacement

NOTE Confidence: 0.9948027

00:27:36.434 --> 00:27:37.655 on on the horizon.

NOTE Confidence: 0.9993116

00:27:38.755 --> 00:27:40.615 So let's rethink these issues.

NOTE Confidence: 0.9900951

00:27:42.520 --> 00:27:43.800 What would be a valid

NOTE Confidence: 0.9900951

00:27:43.800 --> 00:27:45.580 and reliable measure of driving

NOTE Confidence: 0.9900951

00:27:45.720 --> 00:27:46.220 impairment?

NOTE Confidence: 0.97037303

00:27:47.080 --> 00:27:49.500 So we've chosen to validate,

NOTE Confidence: 0.99933875

00:27:51.000 --> 00:27:52.140 all of our measures

NOTE Confidence: 0.97368854

00:27:54.615 --> 00:27:56.455 using virtual driving and driving

NOTE Confidence: 0.97368854

00:27:56.455 --> 00:27:56.955 simulators,

NOTE Confidence: 0.94190484

00:27:58.375 --> 00:27:59.575 because we think that has

NOTE Confidence: 0.94190484

00:27:59.575 --> 00:28:01.675 sufficient construct criteria and validity

NOTE Confidence: 0.97383004

00:28:02.215 --> 00:28:03.815 since we can't ethically allow

NOTE Confidence: 0.97383004

00:28:03.815 --> 00:28:05.675 our subjects to drive stoned

NOTE Confidence: 0.97383004

00:28:05.815 --> 00:28:07.335 down I ninety five and

NOTE Confidence: 0.97383004

00:28:07.335 --> 00:28:08.155 avoid traffic.

NOTE Confidence: 0.9414105

00:28:10.220 --> 00:28:12.380 Some major considerations and choices

NOTE Confidence: 0.9414105

00:28:12.380 --> 00:28:13.040 are here.

NOTE Confidence: 0.99210227

00:28:15.340 --> 00:28:16.700 So I won't dwell on

NOTE Confidence: 0.99210227

00:28:16.700 --> 00:28:17.980 those, but I'll go through

NOTE Confidence: 0.99210227

00:28:17.980 --> 00:28:18.960 them very briefly.

NOTE Confidence: 0.970467

00:28:19.900 --> 00:28:22.240 So simulated driving for us

NOTE Confidence: 0.9866605

00:28:22.545 --> 00:28:23.985 is the gold standard for

NOTE Confidence: 0.9866605

00:28:23.985 --> 00:28:25.505 relevant impairment, and we've done

NOTE Confidence: 0.9866605

00:28:25.505 --> 00:28:27.845 this with alcohol impaired driving

NOTE Confidence: 0.9866605

00:28:28.065 --> 00:28:29.525 over the last twenty years

NOTE Confidence: 0.9810145

00:28:29.905 --> 00:28:30.965 and other substances

NOTE Confidence: 0.93411237

00:28:31.505 --> 00:28:33.285 and more recently with cannabis.

NOTE Confidence: 0.9859331

00:28:34.145 --> 00:28:36.305 It's controlled. It's safe. You

NOTE Confidence: 0.9859331

00:28:36.305 --> 00:28:36.965 can have

NOTE Confidence: 0.9444137

00:28:37.500 --> 00:28:39.120 endlessly repeated variance

NOTE Confidence: 0.9634329

00:28:39.420 --> 00:28:41.100 so people don't learn that

NOTE Confidence: 0.9634329

00:28:41.100 --> 00:28:42.460 ten minutes into the task,

NOTE Confidence: 0.9634329

00:28:42.460 --> 00:28:43.660 a dog runs across the

NOTE Confidence: 0.9634329

00:28:43.660 --> 00:28:44.160 road

NOTE Confidence: 0.97464347

00:28:44.700 --> 00:28:46.540 or another vehicle pulls in

NOTE Confidence: 0.97464347

00:28:46.540 --> 00:28:47.740 front of you. It's different

NOTE Confidence: 0.97464347

00:28:47.740 --> 00:28:48.480 every time.

NOTE Confidence: 0.97330844

00:28:48.780 --> 00:28:50.320 And you can mimic scenarios

NOTE Confidence: 0.97330844

00:28:50.540 --> 00:28:51.600 that are impractical

NOTE Confidence: 0.99986744

00:28:52.215 --> 00:28:53.115 or unethical

NOTE Confidence: 0.9847159

00:28:53.654 --> 00:28:55.095 to test in real life,

NOTE Confidence: 0.9847159

00:28:55.095 --> 00:28:56.934 like a child suddenly runs

NOTE Confidence: 0.9847159

00:28:56.934 --> 00:28:57.835 into the road.

NOTE Confidence: 0.977704

00:28:58.135 --> 00:28:59.755 And it's a very easily

NOTE Confidence: 0.977704

00:28:59.815 --> 00:29:00.315 programmable,

NOTE Confidence: 0.97469544

00:29:00.615 --> 00:29:02.775 manipulated environment, so you can

NOTE Confidence: 0.97469544

00:29:02.775 --> 00:29:04.054 change the weather and make

NOTE Confidence: 0.97469544

00:29:04.054 --> 00:29:05.654 it skiddy or make it

NOTE Confidence: 0.97469544

00:29:05.654 --> 00:29:07.095 rain or foggy or anything

NOTE Confidence: 0.97469544

00:29:07.095 --> 00:29:07.755 you want.

NOTE Confidence: 0.99487275

00:29:08.480 --> 00:29:09.540 So the ideal

NOTE Confidence: 0.99914354

00:29:09.840 --> 00:29:10.820 is Iowa's

NOTE Confidence: 0.7402553

00:29:11.360 --> 00:29:12.900 National Advanced Drivers'

NOTE Confidence: 0.96745104

00:29:13.200 --> 00:29:14.180 Driving Simulator.

NOTE Confidence: 0.9898052

00:29:14.720 --> 00:29:16.260 Whoever thought of the acronym

NOTE Confidence: 0.9898052

00:29:16.480 --> 00:29:17.840 was clearly not having a

NOTE Confidence: 0.9898052

00:29:17.840 --> 00:29:18.820 thoughtful day.

NOTE Confidence: 0.9741369

00:29:19.200 --> 00:29:20.880 And this is basically an

NOTE Confidence: 0.9741369

00:29:20.880 --> 00:29:21.380 enormous,

NOTE Confidence: 0.99983513

00:29:22.640 --> 00:29:23.140 bubble

NOTE Confidence: 0.98684525

00:29:24.025 --> 00:29:25.785 on rails so that it

NOTE Confidence: 0.98684525

00:29:25.785 --> 00:29:27.645 actually accelerates and decelerates

NOTE Confidence: 0.9922192

00:29:28.345 --> 00:29:29.945 and feels like real driving.

NOTE Confidence: 0.9922192

00:29:29.945 --> 00:29:31.545 I've actually tried this. It's

NOTE Confidence: 0.9922192

00:29:31.545 --> 00:29:32.045 amazing.

NOTE Confidence: 0.9483316

00:29:32.505 --> 00:29:33.705 And you you can lower

NOTE Confidence: 0.9483316

00:29:33.705 --> 00:29:35.385 anything into that, an actual

NOTE Confidence: 0.9483316

00:29:35.385 --> 00:29:35.885 vehicle,

NOTE Confidence: 0.99190766

00:29:36.185 --> 00:29:38.425 an Abrams tank, or anything

NOTE Confidence: 0.99190766

00:29:38.425 --> 00:29:39.325 that you want.

NOTE Confidence: 0.97406757

00:29:41.200 --> 00:29:42.559 So, we've looked at this,

NOTE Confidence: 0.97406757

00:29:42.559 --> 00:29:44.080 and it wasn't practical for

NOTE Confidence: 0.97406757

00:29:44.080 --> 00:29:45.200 us to use in Iowa,

NOTE Confidence: 0.97406757

00:29:45.200 --> 00:29:46.559 but we've come up with

NOTE Confidence: 0.97406757

00:29:46.559 --> 00:29:47.940 something that we think is

NOTE Confidence: 0.97406757

00:29:48.160 --> 00:29:48.660 close.

NOTE Confidence: 0.94955957

00:29:49.440 --> 00:29:51.440 Now what we did is

NOTE Confidence: 0.94955957

00:29:51.440 --> 00:29:52.880 Virginia Tech has a so

NOTE Confidence: 0.94955957

00:29:52.880 --> 00:29:54.100 called smart road,

NOTE Confidence: 0.9992466

00:29:54.975 --> 00:29:55.475 And

NOTE Confidence: 0.99959

00:29:56.335 --> 00:29:56.835 the

NOTE Confidence: 0.99895763

00:29:57.135 --> 00:29:57.955 smart road

NOTE Confidence: 0.99976975

00:29:58.495 --> 00:29:58.995 is

NOTE Confidence: 0.99943995

00:29:59.375 --> 00:30:01.054 a couple of kilometers of

NOTE Confidence: 0.99943995

00:30:01.054 --> 00:30:01.554 real

NOTE Confidence: 0.9920744

00:30:02.735 --> 00:30:03.235 interstate

NOTE Confidence: 0.9006267

00:30:03.535 --> 00:30:05.155 that connects with an interstate,

NOTE Confidence: 0.9006267

00:30:05.215 --> 00:30:06.655 but as a test bed

NOTE Confidence: 0.9006267

00:30:06.655 --> 00:30:07.315 for driving.

NOTE Confidence: 0.9818686

00:30:07.940 --> 00:30:08.980 They can make it rain

NOTE Confidence: 0.9818686

00:30:08.980 --> 00:30:10.820 or snow, and the entire

NOTE Confidence: 0.9818686

00:30:10.820 --> 00:30:12.760 tarmac is embedded with sensors.

NOTE Confidence: 0.9858638

00:30:13.620 --> 00:30:14.740 And all the cars that

NOTE Confidence: 0.9858638

00:30:14.740 --> 00:30:16.340 drive on it have a

NOTE Confidence: 0.9858638

00:30:16.340 --> 00:30:17.860 bunch of computer hardware in

NOTE Confidence: 0.9858638

00:30:17.860 --> 00:30:19.299 their trunks so that you

NOTE Confidence: 0.9858638

00:30:19.299 --> 00:30:20.740 can get an instant readout

NOTE Confidence: 0.9858638

00:30:20.740 --> 00:30:22.355 of how people are driving.

NOTE Confidence: 0.99697244

00:30:22.735 --> 00:30:24.755 We compared our driving simulator

NOTE Confidence: 0.99697244

00:30:24.975 --> 00:30:26.035 software performance

NOTE Confidence: 0.9845137

00:30:26.735 --> 00:30:28.355 under conditions of impairment

NOTE Confidence: 0.9993044

00:30:28.895 --> 00:30:30.515 to actual people driving

NOTE Confidence: 0.9600495

00:30:30.815 --> 00:30:32.815 one of these cars on

NOTE Confidence: 0.9600495

00:30:32.815 --> 00:30:34.679 Virginia Tech smart road, and

NOTE Confidence: 0.9600495

00:30:34.679 --> 00:30:35.580 they do correspond

NOTE Confidence: 0.97566265

00:30:35.960 --> 00:30:36.460 significantly.

NOTE Confidence: 0.99970126

00:30:36.919 --> 00:30:38.279 So we're confident that we

NOTE Confidence: 0.99970126

00:30:38.279 --> 00:30:39.799 have a valid set of

NOTE Confidence: 0.99970126

00:30:39.799 --> 00:30:40.299 parameters.

NOTE Confidence: 0.94906723

00:30:42.440 --> 00:30:43.960 We use people we don't

NOTE Confidence: 0.94906723

00:30:43.960 --> 00:30:45.399 use drug virgins. We use

NOTE Confidence: 0.94906723

00:30:45.399 --> 00:30:47.100 people who are have

NOTE Confidence: 0.99781233

00:30:47.559 --> 00:30:49.179 more or less experience

NOTE Confidence: 0.9676636

00:30:49.675 --> 00:30:51.695 with administering cannabis to themselves.

NOTE Confidence: 0.9991848

00:30:53.115 --> 00:30:53.615 And

NOTE Confidence: 0.9767595

00:30:54.075 --> 00:30:55.275 we try and make it

NOTE Confidence: 0.9767595

00:30:55.275 --> 00:30:57.275 as naturalistic as possible. So

NOTE Confidence: 0.9767595

00:30:57.275 --> 00:30:58.875 we have smoked, oral, or

NOTE Confidence: 0.9767595

00:30:58.875 --> 00:31:00.095 vaporized forms,

NOTE Confidence: 0.9997603

00:31:00.955 --> 00:31:01.935 versus intravenous

NOTE Confidence: 0.8162942

00:31:03.360 --> 00:31:03.860 THC,

NOTE Confidence: 0.9996044

00:31:04.400 --> 00:31:05.680 but we have not tested

NOTE Confidence: 0.9996044

00:31:05.680 --> 00:31:06.180 edibles

NOTE Confidence: 0.9433719

00:31:08.480 --> 00:31:09.760 as yet. We plan to

NOTE Confidence: 0.9433719

00:31:09.760 --> 00:31:10.580 in the future.

NOTE Confidence: 0.94887966

00:31:17.465 --> 00:31:19.085 And the amounts we've give,

NOTE Confidence: 0.94887966

00:31:19.225 --> 00:31:21.485 until recently, were limited by

NOTE Confidence: 0.94887966

00:31:21.544 --> 00:31:23.804 what NIDA supplies to investigators.

NOTE Confidence: 0.99788

00:31:24.345 --> 00:31:25.385 We're not able to go

NOTE Confidence: 0.99788

00:31:25.385 --> 00:31:26.985 into our local dispensary and

NOTE Confidence: 0.99788

00:31:26.985 --> 00:31:28.365 buy what people are using.

NOTE Confidence: 0.99788

00:31:28.580 --> 00:31:29.700 We have to use what

NOTE Confidence: 0.99788

00:31:29.700 --> 00:31:30.680 NIDA supplies

NOTE Confidence: 0.99816316

00:31:31.060 --> 00:31:31.880 or authorizes.

NOTE Confidence: 0.9945119

00:31:32.740 --> 00:31:34.500 So until recently, we've given

NOTE Confidence: 0.9945119

00:31:34.500 --> 00:31:35.780 people half a gram of

NOTE Confidence: 0.9945119

00:31:35.780 --> 00:31:36.920 either seven percent

NOTE Confidence: 0.99824095

00:31:37.540 --> 00:31:39.320 or thirteen percent THC

NOTE Confidence: 0.9585995

00:31:40.180 --> 00:31:41.160 with no CBD

NOTE Confidence: 0.9507476

00:31:41.540 --> 00:31:42.040 added.

NOTE Confidence: 0.98333627

00:31:42.660 --> 00:31:44.595 The highest dose is equivalent

NOTE Confidence: 0.98333627

00:31:44.595 --> 00:31:46.035 to sixty five milligrams of

NOTE Confidence: 0.98333627

00:31:46.035 --> 00:31:46.535 THC,

NOTE Confidence: 0.9517312

00:31:46.995 --> 00:31:48.775 which our subjects tell us,

NOTE Confidence: 0.9916735

00:31:49.315 --> 00:31:50.675 eighty percent of our subjects

NOTE Confidence: 0.9916735

00:31:50.675 --> 00:31:51.795 tell us is equivalent to

NOTE Confidence: 0.9916735

00:31:51.795 --> 00:31:53.555 what they dose themselves when

NOTE Confidence: 0.9916735

00:31:53.555 --> 00:31:54.295 they're using.

NOTE Confidence: 0.98265

00:31:55.490 --> 00:31:57.250 But, admittedly, that's a much

NOTE Confidence: 0.98265

00:31:57.250 --> 00:31:58.150 lower percent

NOTE Confidence: 0.9333876

00:31:58.530 --> 00:32:00.130 THC than is available to

NOTE Confidence: 0.9333876

00:32:00.130 --> 00:32:02.050 most people at most modern

NOTE Confidence: 0.9333876

00:32:02.050 --> 00:32:02.550 dispensaries.

NOTE Confidence: 0.99947053

00:32:04.690 --> 00:32:05.750 And we do

NOTE Confidence: 0.9397546

00:32:06.050 --> 00:32:07.970 measurements of multiple measures following

NOTE Confidence: 0.9397546

00:32:07.970 --> 00:32:09.350 a single acute dose.

NOTE Confidence: 0.99307775

00:32:11.745 --> 00:32:13.184 We take repeated blood and

NOTE Confidence: 0.99307775

00:32:13.184 --> 00:32:14.085 saliva samples.

NOTE Confidence: 0.9648279

00:32:15.184 --> 00:32:15.664 We take

NOTE Confidence: 0.92368984

00:32:16.625 --> 00:32:17.765 we look at the Draeger

NOTE Confidence: 0.92368984

00:32:17.825 --> 00:32:19.765 for immediate THC in addition

NOTE Confidence: 0.95596445

00:32:20.385 --> 00:32:21.684 and look at multiple

NOTE Confidence: 0.9920432

00:32:22.500 --> 00:32:23.700 samples at all of these

NOTE Confidence: 0.9920432

00:32:23.700 --> 00:32:25.720 times following an acute dose.

NOTE Confidence: 0.9483509

00:32:29.780 --> 00:32:31.400 Nothing really relevant there.

NOTE Confidence: 0.989592

00:32:33.620 --> 00:32:34.660 Several of the labs at

NOTE Confidence: 0.989592

00:32:34.660 --> 00:32:36.945 Yale use intravenous THC, and

NOTE Confidence: 0.989592

00:32:36.945 --> 00:32:38.144 the advantage of that is

NOTE Confidence: 0.989592

00:32:38.144 --> 00:32:39.904 that everyone gets exactly the

NOTE Confidence: 0.989592

00:32:39.904 --> 00:32:41.745 same dose at exactly the

NOTE Confidence: 0.989592

00:32:41.745 --> 00:32:42.485 same time.

NOTE Confidence: 0.99629056

00:32:44.065 --> 00:32:44.565 UCSD

NOTE Confidence: 0.971045

00:32:44.865 --> 00:32:46.225 uses a joint or a

NOTE Confidence: 0.971045

00:32:46.225 --> 00:32:46.725 bong,

NOTE Confidence: 0.9823418

00:32:47.825 --> 00:32:49.605 so different people get very

NOTE Confidence: 0.9823418

00:32:49.825 --> 00:32:50.804 variable doses,

NOTE Confidence: 0.9575351

00:32:51.750 --> 00:32:53.350 and they smoke that on

NOTE Confidence: 0.9575351

00:32:53.350 --> 00:32:55.050 their own time ad lib,

NOTE Confidence: 0.9575351

00:32:55.350 --> 00:32:56.310 so you don't have to

NOTE Confidence: 0.9575351

00:32:56.310 --> 00:32:56.810 finish.

NOTE Confidence: 0.9606037

00:32:58.310 --> 00:33:00.070 We use paste inhalation from

NOTE Confidence: 0.9606037

00:33:00.070 --> 00:33:01.990 a vaporizer bag, and everyone

NOTE Confidence: 0.9606037

00:33:01.990 --> 00:33:03.290 has to finish the bag.

NOTE Confidence: 0.9606037

00:33:03.350 --> 00:33:04.630 So everyone gets the same

NOTE Confidence: 0.9606037

00:33:04.630 --> 00:33:06.310 dose, but not necessarily at

NOTE Confidence: 0.9606037

00:33:06.310 --> 00:33:07.370 quite the same rate.

NOTE Confidence: 0.98211676

00:33:07.725 --> 00:33:08.924 So there are pro and

NOTE Confidence: 0.98211676

00:33:08.924 --> 00:33:10.525 con arguments for those methods

NOTE Confidence: 0.98211676

00:33:10.525 --> 00:33:11.265 of administration,

NOTE Confidence: 0.9984503

00:33:12.205 --> 00:33:12.705 balancing

NOTE Confidence: 0.9265755

00:33:13.245 --> 00:33:15.265 knowing exactly what someone got

NOTE Confidence: 0.9265755

00:33:15.325 --> 00:33:15.825 versus

NOTE Confidence: 0.93774194

00:33:16.285 --> 00:33:16.785 natural

NOTE Confidence: 0.99426574

00:33:17.645 --> 00:33:19.505 how naturalistic that administration

NOTE Confidence: 0.9983096

00:33:19.885 --> 00:33:20.385 is.

NOTE Confidence: 0.99971086

00:33:21.899 --> 00:33:22.399 So

NOTE Confidence: 0.98366696

00:33:23.019 --> 00:33:24.460 what what we used is

NOTE Confidence: 0.98366696

00:33:24.460 --> 00:33:27.340 three different driving tasks over

NOTE Confidence: 0.98366696

00:33:27.340 --> 00:33:28.399 a thirty minute,

NOTE Confidence: 0.9994972

00:33:29.340 --> 00:33:29.840 driving

NOTE Confidence: 0.99905103

00:33:30.379 --> 00:33:30.879 scenario.

NOTE Confidence: 0.9604544

00:33:32.059 --> 00:33:33.674 We used a a steering

NOTE Confidence: 0.9604544

00:33:33.674 --> 00:33:35.914 task that measures operational aspects

NOTE Confidence: 0.9604544

00:33:35.914 --> 00:33:36.575 of driving,

NOTE Confidence: 0.9832272

00:33:36.875 --> 00:33:38.394 a car following task that

NOTE Confidence: 0.9832272

00:33:38.394 --> 00:33:39.774 looks at tactical aspects,

NOTE Confidence: 0.9325044

00:33:41.195 --> 00:33:42.875 and then overtaking task that

NOTE Confidence: 0.9325044

00:33:42.875 --> 00:33:44.815 looks at strategic aspects.

NOTE Confidence: 0.9308503

00:33:48.430 --> 00:33:49.550 I don't wanna dwell on

NOTE Confidence: 0.9308503

00:33:49.550 --> 00:33:50.050 that.

NOTE Confidence: 0.9989512

00:33:50.670 --> 00:33:51.170 So

NOTE Confidence: 0.9759942

00:33:51.550 --> 00:33:53.710 what we wanted were tests

NOTE Confidence: 0.9759942

00:33:53.710 --> 00:33:54.990 that were a battery of

NOTE Confidence: 0.9759942

00:33:54.990 --> 00:33:56.270 tests that were simple, quick,

NOTE Confidence: 0.9759942

00:33:56.270 --> 00:33:56.930 and robust,

NOTE Confidence: 0.87252504

00:33:58.430 --> 00:33:59.550 practical to give it the

NOTE Confidence: 0.87252504

00:33:59.550 --> 00:34:00.050 roadside.

NOTE Confidence: 0.9982883

00:34:00.825 --> 00:34:02.025 So these have to be

NOTE Confidence: 0.9982883

00:34:02.025 --> 00:34:03.164 things you could administer

NOTE Confidence: 0.9302023

00:34:03.784 --> 00:34:05.725 when it's raining at night,

NOTE Confidence: 0.9254036

00:34:07.065 --> 00:34:08.344 on a computer, when a

NOTE Confidence: 0.9254036

00:34:08.344 --> 00:34:09.705 bunch of traffic is driving

NOTE Confidence: 0.9254036

00:34:09.705 --> 00:34:10.205 by.

NOTE Confidence: 0.99583966

00:34:11.465 --> 00:34:13.224 So that constrains what you

NOTE Confidence: 0.99583966

00:34:13.224 --> 00:34:13.885 can do.

NOTE Confidence: 0.9655803

00:34:15.030 --> 00:34:17.110 We wanted things that accurately

NOTE Confidence: 0.9655803

00:34:17.110 --> 00:34:17.610 predicted

NOTE Confidence: 0.914542

00:34:19.430 --> 00:34:22.070 and had strong criterion related

NOTE Confidence: 0.914542

00:34:22.070 --> 00:34:24.310 validity. That is they actually

NOTE Confidence: 0.914542

00:34:24.310 --> 00:34:25.510 did match and that were

NOTE Confidence: 0.914542

00:34:25.510 --> 00:34:26.330 highly correlated,

NOTE Confidence: 0.9994572

00:34:27.590 --> 00:34:28.090 with

NOTE Confidence: 0.9850056

00:34:30.705 --> 00:34:31.605 virtual driving.

NOTE Confidence: 0.99374485

00:34:32.545 --> 00:34:33.905 And as I said earlier,

NOTE Confidence: 0.99374485

00:34:33.905 --> 00:34:34.945 we wanna know how long

NOTE Confidence: 0.99374485

00:34:34.945 --> 00:34:35.685 these lasted,

NOTE Confidence: 0.9988526

00:34:36.385 --> 00:34:37.985 how reliable they are across

NOTE Confidence: 0.9988526

00:34:37.985 --> 00:34:38.885 different populations,

NOTE Confidence: 0.9904343

00:34:39.425 --> 00:34:41.364 occasional versus frequent users,

NOTE Confidence: 0.9589245

00:34:42.145 --> 00:34:43.505 and are they specific to

NOTE Confidence: 0.9589245

00:34:43.505 --> 00:34:44.005 cannabis?

NOTE Confidence: 0.99900895

00:34:46.550 --> 00:34:48.010 So the first

NOTE Confidence: 0.9978904

00:34:49.510 --> 00:34:50.630 thing I'll tell you about

NOTE Confidence: 0.9978904

00:34:50.630 --> 00:34:51.130 used

NOTE Confidence: 0.9602723

00:34:51.510 --> 00:34:53.510 thirty eight subjects, twenty seven

NOTE Confidence: 0.9602723

00:34:53.510 --> 00:34:54.010 men,

NOTE Confidence: 0.96150666

00:34:54.390 --> 00:34:55.690 exposed to placebo,

NOTE Confidence: 0.93978935

00:34:56.310 --> 00:34:57.670 low and high doses on

NOTE Confidence: 0.93978935

00:34:57.670 --> 00:34:59.510 on three separate days at

NOTE Confidence: 0.93978935

00:34:59.510 --> 00:35:00.010 random,

NOTE Confidence: 0.984394

00:35:00.805 --> 00:35:02.185 completely double blind.

NOTE Confidence: 0.9979183

00:35:03.364 --> 00:35:03.864 And

NOTE Confidence: 0.92888224

00:35:04.405 --> 00:35:06.085 we assess those three driving

NOTE Confidence: 0.92888224

00:35:06.085 --> 00:35:06.905 risk measures,

NOTE Confidence: 0.9342656

00:35:08.645 --> 00:35:09.925 and that this was mainly

NOTE Confidence: 0.9342656

00:35:09.925 --> 00:35:11.145 looking at driving

NOTE Confidence: 0.99866045

00:35:11.525 --> 00:35:12.885 rather than developing a test

NOTE Confidence: 0.99866045

00:35:12.885 --> 00:35:14.344 battery, which is the next

NOTE Confidence: 0.99866045

00:35:14.485 --> 00:35:16.140 set of data I'll give

NOTE Confidence: 0.99866045

00:35:16.140 --> 00:35:16.640 you.

NOTE Confidence: 0.9982271

00:35:17.020 --> 00:35:18.219 So this is our ideal

NOTE Confidence: 0.9982271

00:35:18.219 --> 00:35:19.119 study subject.

NOTE Confidence: 0.97631264

00:35:19.739 --> 00:35:21.579 In fact, these are the

NOTE Confidence: 0.97631264

00:35:21.579 --> 00:35:22.079 statistics

NOTE Confidence: 0.9853935

00:35:22.780 --> 00:35:23.739 of the people that we

NOTE Confidence: 0.9853935

00:35:23.739 --> 00:35:24.480 looked at,

NOTE Confidence: 0.99657613

00:35:25.500 --> 00:35:26.780 so I won't dwell on

NOTE Confidence: 0.99657613

00:35:26.780 --> 00:35:27.280 that.

NOTE Confidence: 0.99580353

00:35:27.795 --> 00:35:29.075 And this is the overall

NOTE Confidence: 0.99580353

00:35:29.075 --> 00:35:30.375 study design. So

NOTE Confidence: 0.9260602

00:35:30.675 --> 00:35:32.934 we got predose measures, including

NOTE Confidence: 0.9260602

00:35:32.994 --> 00:35:33.815 blood tests.

NOTE Confidence: 0.99029124

00:35:34.275 --> 00:35:35.974 Person had an IV catheter.

NOTE Confidence: 0.9776187

00:35:36.434 --> 00:35:37.954 We got blood and then

NOTE Confidence: 0.9776187

00:35:37.954 --> 00:35:39.234 saliva at all of these

NOTE Confidence: 0.9776187

00:35:39.234 --> 00:35:40.055 test points.

NOTE Confidence: 0.9016441

00:35:40.915 --> 00:35:41.075 And,

NOTE Confidence: 0.99781096

00:35:42.250 --> 00:35:43.550 they went in the scanner

NOTE Confidence: 0.97768724

00:35:43.850 --> 00:35:45.530 and had the driving paradigm

NOTE Confidence: 0.97768724

00:35:45.530 --> 00:35:46.890 in the scanner so we

NOTE Confidence: 0.97768724

00:35:46.890 --> 00:35:48.110 could look at their brain.

NOTE Confidence: 0.97768724

00:35:48.330 --> 00:35:50.250 And that these other three

NOTE Confidence: 0.97768724

00:35:50.250 --> 00:35:51.630 remaining test points,

NOTE Confidence: 0.9979278

00:35:52.570 --> 00:35:54.270 over five plus hours,

NOTE Confidence: 0.99956954

00:35:55.335 --> 00:35:57.275 they got a battery of

NOTE Confidence: 0.99125445

00:35:57.575 --> 00:35:58.475 little tests,

NOTE Confidence: 0.9581191

00:35:59.655 --> 00:36:02.155 plus either were randomized to

NOTE Confidence: 0.92764825

00:36:02.935 --> 00:36:04.855 you a a desktop driving

NOTE Confidence: 0.92764825

00:36:04.855 --> 00:36:05.355 simulator

NOTE Confidence: 0.9936413

00:36:05.735 --> 00:36:06.935 or driving in the scanner.

NOTE Confidence: 0.9936413

00:36:06.935 --> 00:36:07.895 They got one or the

NOTE Confidence: 0.9936413

00:36:07.895 --> 00:36:08.395 other.

NOTE Confidence: 0.98705006

00:36:10.829 --> 00:36:12.609 So here's the person practicing

NOTE Confidence: 0.99320865

00:36:12.910 --> 00:36:14.509 flat on their back so

NOTE Confidence: 0.99320865

00:36:14.509 --> 00:36:15.710 that they can drive flat

NOTE Confidence: 0.99320865

00:36:15.710 --> 00:36:16.670 on their back, which they

NOTE Confidence: 0.99320865

00:36:16.670 --> 00:36:17.809 do in the scanner.

NOTE Confidence: 0.988384

00:36:18.989 --> 00:36:20.750 This is the desktop driving

NOTE Confidence: 0.988384

00:36:20.750 --> 00:36:21.250 simulator.

NOTE Confidence: 0.95990247

00:36:21.710 --> 00:36:22.989 This is someone using the

NOTE Confidence: 0.95990247

00:36:22.989 --> 00:36:23.969 driving simulator.

NOTE Confidence: 0.99921525

00:36:24.829 --> 00:36:25.329 This

NOTE Confidence: 0.99635994

00:36:26.055 --> 00:36:27.515 is like a Burger King

NOTE Confidence: 0.95917434

00:36:27.895 --> 00:36:29.734 extractor fan. So when subjects

NOTE Confidence: 0.95917434

00:36:29.734 --> 00:36:30.714 are getting high,

NOTE Confidence: 0.9628213

00:36:31.015 --> 00:36:32.614 they breathe out and the

NOTE Confidence: 0.9628213

00:36:32.614 --> 00:36:33.994 cannabis vapor disappears

NOTE Confidence: 0.9813047

00:36:34.535 --> 00:36:35.734 so that our staff don't

NOTE Confidence: 0.9813047

00:36:35.734 --> 00:36:36.714 become intoxicated.

NOTE Confidence: 0.9793879

00:36:37.335 --> 00:36:38.875 This is the driving software

NOTE Confidence: 0.9562858

00:36:39.630 --> 00:36:40.130 that's,

NOTE Confidence: 0.97678345

00:36:40.989 --> 00:36:42.589 basically fiber optics, so it's

NOTE Confidence: 0.97678345

00:36:42.589 --> 00:36:44.529 completely compatible with the scanner.

NOTE Confidence: 0.93897414

00:36:45.309 --> 00:36:47.150 So this just is our

NOTE Confidence: 0.93897414

00:36:47.150 --> 00:36:48.670 old scanner, but shows you

NOTE Confidence: 0.93897414

00:36:48.670 --> 00:36:50.289 the basic design,

NOTE Confidence: 0.9969145

00:36:50.670 --> 00:36:51.650 steering wheel,

NOTE Confidence: 0.99914813

00:36:52.430 --> 00:36:52.930 adjustable

NOTE Confidence: 0.75121266

00:36:53.230 --> 00:36:54.049 gas and

NOTE Confidence: 0.9530544

00:36:54.895 --> 00:36:55.635 brake pedals.

NOTE Confidence: 0.99879897

00:36:58.335 --> 00:36:58.835 And

NOTE Confidence: 0.99714154

00:36:59.375 --> 00:37:01.614 we do infrared eye tracking.

NOTE Confidence: 0.99714154

00:37:01.614 --> 00:37:03.055 So if someone crashes into

NOTE Confidence: 0.99714154

00:37:03.055 --> 00:37:03.955 another vehicle,

NOTE Confidence: 0.9651208

00:37:04.495 --> 00:37:06.015 the question is, what were

NOTE Confidence: 0.9651208

00:37:06.015 --> 00:37:06.975 they looking at? Were they

NOTE Confidence: 0.9651208

00:37:06.975 --> 00:37:07.935 looking at the car in

NOTE Confidence: 0.9651208

00:37:07.935 --> 00:37:09.569 front, and were just completely

NOTE Confidence: 0.9651208

00:37:09.790 --> 00:37:10.989 oblivious to the fact that

NOTE Confidence: 0.9651208

00:37:10.989 --> 00:37:12.609 it wasn't car in front?

NOTE Confidence: 0.9651208

00:37:12.829 --> 00:37:13.950 Or were they so stoned

NOTE Confidence: 0.9651208

00:37:13.950 --> 00:37:14.829 they were looking up at

NOTE Confidence: 0.9651208

00:37:14.829 --> 00:37:16.750 the virtual sky and saying,

NOTE Confidence: 0.9651208

00:37:16.750 --> 00:37:18.450 oh, what pretty virtual clouds?

NOTE Confidence: 0.9651208

00:37:18.589 --> 00:37:19.630 We wanna know what they

NOTE Confidence: 0.9651208

00:37:19.630 --> 00:37:20.609 were looking at.

NOTE Confidence: 0.95670545

00:37:22.755 --> 00:37:24.355 And the driving paradigm, as

NOTE Confidence: 0.95670545

00:37:24.355 --> 00:37:25.395 I said a little earlier,

NOTE Confidence: 0.95670545

00:37:25.395 --> 00:37:26.594 just to elaborate on that,

NOTE Confidence: 0.95670545

00:37:26.594 --> 00:37:28.275 lane keeping, you're driving on

NOTE Confidence: 0.95670545

00:37:28.275 --> 00:37:29.555 a straight highway. There are

NOTE Confidence: 0.95670545

00:37:29.555 --> 00:37:30.994 wind gusts. You've got to

NOTE Confidence: 0.95670545

00:37:30.994 --> 00:37:31.895 stay in lane.

NOTE Confidence: 0.9302511

00:37:32.594 --> 00:37:34.755 Car following, you're following your

NOTE Confidence: 0.9302511

00:37:34.755 --> 00:37:35.494 lead vehicle.

NOTE Confidence: 0.99810356

00:37:36.020 --> 00:37:37.380 It speeds up and slows

NOTE Confidence: 0.99810356

00:37:37.380 --> 00:37:37.880 down.

NOTE Confidence: 0.9955082

00:37:38.180 --> 00:37:39.079 You have to

NOTE Confidence: 0.9608184

00:37:39.859 --> 00:37:41.219 stay a safe distance from

NOTE Confidence: 0.9608184

00:37:41.219 --> 00:37:42.680 it, a fixed distance.

NOTE Confidence: 0.9348053

00:37:43.060 --> 00:37:43.800 And overtaking,

NOTE Confidence: 0.92691153

00:37:44.260 --> 00:37:45.300 you're driving on a two

NOTE Confidence: 0.92691153

00:37:45.300 --> 00:37:46.660 lane highway. The car in

NOTE Confidence: 0.92691153

00:37:46.660 --> 00:37:47.940 front of you breaks down.

NOTE Confidence: 0.92691153

00:37:47.940 --> 00:37:49.700 There's oncoming traffic you've gotta

NOTE Confidence: 0.92691153

00:37:49.700 --> 00:37:51.239 drive past in safely.

NOTE Confidence: 0.99944496

00:37:51.605 --> 00:37:52.585 So these are increasing

NOTE Confidence: 0.9993992

00:37:53.045 --> 00:37:53.545 complexity.

NOTE Confidence: 0.9623761

00:37:56.645 --> 00:37:57.145 People

NOTE Confidence: 0.9992

00:37:57.605 --> 00:37:58.424 rate themselves

NOTE Confidence: 0.9575186

00:37:58.964 --> 00:38:00.484 this is their highness over

NOTE Confidence: 0.9575186

00:38:00.484 --> 00:38:01.385 time, so

NOTE Confidence: 0.9932586

00:38:02.244 --> 00:38:03.625 higher at the high dose,

NOTE Confidence: 0.99418545

00:38:04.325 --> 00:38:05.844 highest a few minutes after

NOTE Confidence: 0.99418545

00:38:05.844 --> 00:38:06.344 smoking,

NOTE Confidence: 0.998888

00:38:06.789 --> 00:38:08.009 decreases thereafter.

NOTE Confidence: 0.9306927

00:38:10.309 --> 00:38:11.289 This these are

NOTE Confidence: 0.9708381

00:38:11.750 --> 00:38:13.369 blood THC and metabolite,

NOTE Confidence: 0.9992299

00:38:13.989 --> 00:38:16.410 values that also spike early

NOTE Confidence: 0.9913997

00:38:16.710 --> 00:38:17.529 and decrease

NOTE Confidence: 0.8805619

00:38:17.989 --> 00:38:18.809 coming down,

NOTE Confidence: 0.99541754

00:38:19.805 --> 00:38:21.825 more slowly for the eleven

NOTE Confidence: 0.99541754

00:38:22.125 --> 00:38:22.625 hydroxy

NOTE Confidence: 0.9465394

00:38:23.245 --> 00:38:24.065 eleven carboxy,

NOTE Confidence: 0.99852467

00:38:24.845 --> 00:38:25.345 measure.

NOTE Confidence: 0.9403211

00:38:26.365 --> 00:38:29.085 The impairments on multiple aspects

NOTE Confidence: 0.9403211

00:38:29.085 --> 00:38:29.745 of driving,

NOTE Confidence: 0.9107915

00:38:30.525 --> 00:38:31.665 these are our nineteen

NOTE Confidence: 0.85061806

00:38:32.045 --> 00:38:32.545 submeasures,

NOTE Confidence: 0.994937

00:38:33.460 --> 00:38:34.660 and many of them were

NOTE Confidence: 0.994937

00:38:34.660 --> 00:38:35.160 significant.

NOTE Confidence: 0.9349097

00:38:38.500 --> 00:38:39.940 And the only thing I'd

NOTE Confidence: 0.9349097

00:38:39.940 --> 00:38:41.140 emphasize here is that the

NOTE Confidence: 0.9349097

00:38:41.140 --> 00:38:42.739 high dose, some of those

NOTE Confidence: 0.9349097

00:38:42.739 --> 00:38:44.200 like lane keeping impairments,

NOTE Confidence: 0.95907813

00:38:44.660 --> 00:38:46.180 were still obvious at five

NOTE Confidence: 0.95907813

00:38:46.180 --> 00:38:47.400 hours after dosing,

NOTE Confidence: 0.9969597

00:38:47.885 --> 00:38:49.165 less so after the low

NOTE Confidence: 0.9969597

00:38:49.165 --> 00:38:50.605 dose. So these things are

NOTE Confidence: 0.9969597

00:38:50.605 --> 00:38:51.825 remarkably persistent,

NOTE Confidence: 0.9996088

00:38:52.685 --> 00:38:53.905 for many of the measures.

NOTE Confidence: 0.91135603

00:38:57.805 --> 00:38:59.085 Okay. I don't wanna dwell

NOTE Confidence: 0.91135603

00:38:59.085 --> 00:38:59.825 on that.

NOTE Confidence: 0.98304665

00:39:00.609 --> 00:39:02.690 The peak blood and saliva

NOTE Confidence: 0.98304665

00:39:02.690 --> 00:39:04.150 levels were dose related,

NOTE Confidence: 0.98656017

00:39:04.530 --> 00:39:05.830 but only at peak.

NOTE Confidence: 0.9896467

00:39:06.530 --> 00:39:08.869 The behavioral worsening was completely

NOTE Confidence: 0.9896467

00:39:08.930 --> 00:39:11.109 unrelated to blood or saliva

NOTE Confidence: 0.9896467

00:39:11.330 --> 00:39:12.790 metabolite or THC

NOTE Confidence: 0.4229536

00:39:13.330 --> 00:39:13.650 complicate

NOTE Confidence: 0.6721094

00:39:14.369 --> 00:39:14.869 concentrations,

NOTE Confidence: 0.96939784

00:39:16.065 --> 00:39:17.585 so big implications for per

NOTE Confidence: 0.96939784

00:39:17.585 --> 00:39:18.325 se laws.

NOTE Confidence: 0.9796403

00:39:18.785 --> 00:39:20.145 And if you want me

NOTE Confidence: 0.9796403

00:39:20.145 --> 00:39:20.645 to

NOTE Confidence: 0.98976326

00:39:20.945 --> 00:39:22.305 give you a one sentence

NOTE Confidence: 0.98976326

00:39:22.305 --> 00:39:23.425 summary of what all those

NOTE Confidence: 0.98976326

00:39:23.425 --> 00:39:24.625 impairments were, there was a

NOTE Confidence: 0.98976326

00:39:24.625 --> 00:39:27.045 slight generalized slowing in behavioral

NOTE Confidence: 0.95656663

00:39:27.344 --> 00:39:28.945 response. People are just a

NOTE Confidence: 0.95656663

00:39:28.945 --> 00:39:30.385 bit a little bit slower

NOTE Confidence: 0.95656663

00:39:30.385 --> 00:39:31.045 to respond.

NOTE Confidence: 0.9757836

00:39:32.760 --> 00:39:33.739 And although,

NOTE Confidence: 0.9988572

00:39:34.760 --> 00:39:35.980 people were impaired,

NOTE Confidence: 0.999754

00:39:36.440 --> 00:39:37.900 two thirds of them reported

NOTE Confidence: 0.999754

00:39:37.960 --> 00:39:39.800 willingness to drive across the

NOTE Confidence: 0.999754

00:39:39.800 --> 00:39:40.700 entire time

NOTE Confidence: 0.9720932

00:39:41.320 --> 00:39:42.920 despite their awareness of being

NOTE Confidence: 0.9720932

00:39:42.920 --> 00:39:44.219 subjectively impaired

NOTE Confidence: 0.98720115

00:39:44.835 --> 00:39:46.835 and objectively worse driving performance.

NOTE Confidence: 0.98720115

00:39:46.835 --> 00:39:48.215 So that's concerning.

NOTE Confidence: 0.9692391

00:39:48.594 --> 00:39:50.375 People know they're driving worse.

NOTE Confidence: 0.9692391

00:39:50.435 --> 00:39:51.815 They are driving worse,

NOTE Confidence: 0.95018196

00:39:52.195 --> 00:39:54.035 but still in all, they

NOTE Confidence: 0.95018196

00:39:54.035 --> 00:39:55.255 are willing to drive.

NOTE Confidence: 0.9941422

00:39:56.435 --> 00:39:57.895 What's happening in the brain?

NOTE Confidence: 0.90183765

00:39:59.060 --> 00:40:00.120 A bunch of regions

NOTE Confidence: 0.99773294

00:40:00.820 --> 00:40:02.600 over the entire thirty minutes

NOTE Confidence: 0.9974457

00:40:04.180 --> 00:40:05.400 do change from normal.

NOTE Confidence: 0.9544804

00:40:06.900 --> 00:40:08.420 Many of those regions are

NOTE Confidence: 0.9544804

00:40:08.420 --> 00:40:10.704 correlated with altered driving, but

NOTE Confidence: 0.9544804

00:40:10.704 --> 00:40:11.585 you can see there are

NOTE Confidence: 0.9544804

00:40:11.585 --> 00:40:12.964 little itty bitty regions.

NOTE Confidence: 0.9894246

00:40:13.585 --> 00:40:15.525 So what we did is

NOTE Confidence: 0.9894246

00:40:15.585 --> 00:40:16.964 use something more sophisticated.

NOTE Confidence: 0.98948467

00:40:17.825 --> 00:40:19.684 We used graph theory metrics.

NOTE Confidence: 0.99927974

00:40:20.385 --> 00:40:21.665 So if you think about

NOTE Confidence: 0.99927974

00:40:21.665 --> 00:40:21.984 people

NOTE Confidence: 0.9981284

00:40:24.210 --> 00:40:25.670 if you think about airports,

NOTE Confidence: 0.9995559

00:40:26.050 --> 00:40:26.550 airports

NOTE Confidence: 0.9676552

00:40:27.089 --> 00:40:29.170 are in hubs. Those hubs

NOTE Confidence: 0.9676552

00:40:29.170 --> 00:40:30.770 hubs connect to many other

NOTE Confidence: 0.9676552

00:40:30.770 --> 00:40:31.270 routes.

NOTE Confidence: 0.995246

00:40:31.730 --> 00:40:33.410 Some of the hubs connect

NOTE Confidence: 0.995246

00:40:33.410 --> 00:40:34.930 to a few routes. Some

NOTE Confidence: 0.995246

00:40:34.930 --> 00:40:35.589 of the hubs,

NOTE Confidence: 0.97750545

00:40:36.530 --> 00:40:38.225 connect to many routes. And

NOTE Confidence: 0.97750545

00:40:38.225 --> 00:40:39.585 you can look at brain

NOTE Confidence: 0.97750545

00:40:39.585 --> 00:40:40.085 connections,

NOTE Confidence: 0.9945749

00:40:40.785 --> 00:40:42.465 during functional MRI in exactly

NOTE Confidence: 0.9945749

00:40:42.465 --> 00:40:44.065 the same way. And when

NOTE Confidence: 0.9945749

00:40:44.065 --> 00:40:45.105 we looked at that, many

NOTE Confidence: 0.9945749

00:40:45.105 --> 00:40:46.885 of these graph theory metrics

NOTE Confidence: 0.9988023

00:40:47.425 --> 00:40:48.165 were altered

NOTE Confidence: 0.9785345

00:40:48.465 --> 00:40:49.525 compared to controls.

NOTE Confidence: 0.9930237

00:40:50.000 --> 00:40:50.880 And if you look at

NOTE Confidence: 0.9930237

00:40:50.880 --> 00:40:52.079 the hub that was most

NOTE Confidence: 0.9930237

00:40:52.079 --> 00:40:52.579 affected,

NOTE Confidence: 0.9646781

00:40:52.960 --> 00:40:54.420 that was in the hippocampus,

NOTE Confidence: 0.9353763

00:40:55.040 --> 00:40:56.640 and the hippocampus is full

NOTE Confidence: 0.9353763

00:40:56.640 --> 00:40:58.339 of CB one receptors.

NOTE Confidence: 0.96684104

00:40:58.719 --> 00:41:00.420 So that's not entirely surprising,

NOTE Confidence: 0.9995377

00:41:00.799 --> 00:41:01.299 but

NOTE Confidence: 0.8847194

00:41:01.680 --> 00:41:03.119 that gave us much more

NOTE Confidence: 0.8847194

00:41:03.119 --> 00:41:03.619 sophisticated

NOTE Confidence: 0.95125675

00:41:04.245 --> 00:41:05.845 and much more significant results

NOTE Confidence: 0.95125675

00:41:05.845 --> 00:41:06.805 than other ways of looking

NOTE Confidence: 0.95125675

00:41:06.805 --> 00:41:07.925 at this. So that's all

NOTE Confidence: 0.95125675

00:41:07.925 --> 00:41:09.305 I wanna say about driving.

NOTE Confidence: 0.95210284

00:41:11.925 --> 00:41:13.205 Last thing I wanna talk

NOTE Confidence: 0.95210284

00:41:13.205 --> 00:41:15.945 about is our roadside sobriety

NOTE Confidence: 0.95210284

00:41:16.005 --> 00:41:16.905 testing battery,

NOTE Confidence: 0.88357985

00:41:17.605 --> 00:41:18.345 that came,

NOTE Confidence: 0.9959092

00:41:18.719 --> 00:41:20.000 as part of research we're

NOTE Confidence: 0.9959092

00:41:20.000 --> 00:41:21.219 doing for NHTSA.

NOTE Confidence: 0.952556

00:41:21.680 --> 00:41:24.340 And NHTSA has embargoed embargoed

NOTE Confidence: 0.952556

00:41:24.560 --> 00:41:26.160 the final data, so I

NOTE Confidence: 0.952556

00:41:26.160 --> 00:41:27.200 can only tell you in

NOTE Confidence: 0.952556

00:41:27.200 --> 00:41:28.900 general terms what we found.

NOTE Confidence: 0.99488753

00:41:29.440 --> 00:41:30.800 But this week, we are

NOTE Confidence: 0.99488753

00:41:30.800 --> 00:41:31.935 sending them our

NOTE Confidence: 0.8747927

00:41:32.335 --> 00:41:33.875 findings for a publication.

NOTE Confidence: 0.9994366

00:41:34.655 --> 00:41:36.094 So those data should be

NOTE Confidence: 0.9994366

00:41:36.094 --> 00:41:36.594 available

NOTE Confidence: 0.99693954

00:41:36.895 --> 00:41:37.395 publicly

NOTE Confidence: 0.9561326

00:41:38.094 --> 00:41:39.875 reasonably soon. Stay tuned.

NOTE Confidence: 0.979247

00:41:40.975 --> 00:41:42.675 So there, we had subjects

NOTE Confidence: 0.979247

00:41:42.895 --> 00:41:43.955 live on a CRC

NOTE Confidence: 0.9998415

00:41:44.735 --> 00:41:45.795 for five days

NOTE Confidence: 0.98266274

00:41:46.310 --> 00:41:48.070 to control our access to

NOTE Confidence: 0.98266274

00:41:48.070 --> 00:41:49.910 all other substances, including their

NOTE Confidence: 0.98266274

00:41:49.910 --> 00:41:50.810 personal supply.

NOTE Confidence: 0.95714235

00:41:52.150 --> 00:41:53.350 And every morning, they came

NOTE Confidence: 0.95714235

00:41:53.350 --> 00:41:54.010 to us,

NOTE Confidence: 0.9826161

00:41:54.469 --> 00:41:56.070 and they got either THC

NOTE Confidence: 0.9826161

00:41:56.070 --> 00:41:57.989 or placebo in the paradigm

NOTE Confidence: 0.9826161

00:41:57.989 --> 00:41:59.430 I told you about. A

NOTE Confidence: 0.9826161

00:41:59.430 --> 00:42:00.969 single acute dose

NOTE Confidence: 0.939085

00:42:01.455 --> 00:42:02.835 from a desktop simulator,

NOTE Confidence: 0.9633327

00:42:03.855 --> 00:42:05.215 high or low dose or

NOTE Confidence: 0.9633327

00:42:05.215 --> 00:42:05.715 placebo.

NOTE Confidence: 0.9714045

00:42:06.255 --> 00:42:07.535 Two days high, two days

NOTE Confidence: 0.9714045

00:42:07.535 --> 00:42:09.215 low, one day placebo, random

NOTE Confidence: 0.9714045

00:42:09.215 --> 00:42:10.515 assignment, double blind,

NOTE Confidence: 0.99879456

00:42:10.975 --> 00:42:13.315 multiple tasks, multiple blood levels,

NOTE Confidence: 0.9522313

00:42:14.175 --> 00:42:14.675 including,

NOTE Confidence: 0.99943537

00:42:15.535 --> 00:42:16.515 virtual driving.

NOTE Confidence: 0.9775647

00:42:17.150 --> 00:42:18.850 So this is the design.

NOTE Confidence: 0.88420486

00:42:20.670 --> 00:42:21.489 No scanning,

NOTE Confidence: 0.9793699

00:42:22.670 --> 00:42:24.210 battery of tests given

NOTE Confidence: 0.94275725

00:42:24.590 --> 00:42:25.969 at these various times,

NOTE Confidence: 0.99895066

00:42:27.710 --> 00:42:29.090 with regular blood

NOTE Confidence: 0.9463331

00:42:29.805 --> 00:42:31.645 and oral fluid sampling exactly

NOTE Confidence: 0.9463331

00:42:31.645 --> 00:42:32.844 as in the NIDA study.

NOTE Confidence: 0.9463331

00:42:32.844 --> 00:42:34.785 So that's not shown here.

NOTE Confidence: 0.99040776

00:42:35.484 --> 00:42:37.744 So, again, twenty one subjects

NOTE Confidence: 0.99040776

00:42:37.805 --> 00:42:38.305 completed

NOTE Confidence: 0.99413884

00:42:38.844 --> 00:42:40.525 out of twenty seven. So

NOTE Confidence: 0.99413884

00:42:40.525 --> 00:42:42.224 we had twenty seven participants

NOTE Confidence: 0.9036456

00:42:42.605 --> 00:42:43.805 worth of data, but twenty

NOTE Confidence: 0.9036456

00:42:43.805 --> 00:42:44.625 one complete.

NOTE Confidence: 0.99041903

00:42:47.239 --> 00:42:48.600 And this is the test

NOTE Confidence: 0.99041903

00:42:48.600 --> 00:42:49.880 battery. I don't wanna say

NOTE Confidence: 0.99041903

00:42:49.880 --> 00:42:51.020 much more about that

NOTE Confidence: 0.9297123

00:42:51.400 --> 00:42:52.360 other than they got the

NOTE Confidence: 0.9297123

00:42:52.360 --> 00:42:53.719 alert meter, which is a

NOTE Confidence: 0.9297123

00:42:53.719 --> 00:42:55.100 comp commercial device,

NOTE Confidence: 0.94143295

00:42:56.200 --> 00:42:57.400 a bunch of tests from

NOTE Confidence: 0.94143295

00:42:57.400 --> 00:42:58.700 the COG state battery,

NOTE Confidence: 0.99728394

00:42:59.145 --> 00:43:00.265 a bunch of tests that

NOTE Confidence: 0.99728394

00:43:00.265 --> 00:43:01.005 we designed

NOTE Confidence: 0.89567524

00:43:01.545 --> 00:43:02.925 looking at time reproduction

NOTE Confidence: 0.94270563

00:43:03.705 --> 00:43:04.925 and time estimation.

NOTE Confidence: 0.78786606

00:43:05.625 --> 00:43:07.245 We used the Anam Pursuit,

NOTE Confidence: 0.9788277

00:43:08.825 --> 00:43:09.305 just,

NOTE Confidence: 0.85726696

00:43:09.705 --> 00:43:10.765 pursuit tracking,

NOTE Confidence: 0.9765433

00:43:11.780 --> 00:43:13.219 a number of tasks from

NOTE Confidence: 0.9765433

00:43:13.219 --> 00:43:15.080 the Druid, so roadside

NOTE Confidence: 0.96163064

00:43:15.619 --> 00:43:17.540 sobriety tests, walking on a

NOTE Confidence: 0.96163064

00:43:17.540 --> 00:43:19.460 straight line, standing on one

NOTE Confidence: 0.96163064

00:43:19.460 --> 00:43:19.960 leg,

NOTE Confidence: 0.8191437

00:43:21.780 --> 00:43:22.280 Ramaker's

NOTE Confidence: 0.977482

00:43:22.580 --> 00:43:24.200 critical tracking task,

NOTE Confidence: 0.98931986

00:43:25.434 --> 00:43:26.575 and body sway,

NOTE Confidence: 0.97481173

00:43:26.954 --> 00:43:28.555 from an iPad. We have

NOTE Confidence: 0.97481173

00:43:28.555 --> 00:43:30.315 a very sophisticated body sway

NOTE Confidence: 0.97481173

00:43:30.315 --> 00:43:30.815 measurement.

NOTE Confidence: 0.9996897

00:43:31.755 --> 00:43:32.255 So

NOTE Confidence: 0.9958022

00:43:32.714 --> 00:43:35.355 our combined predictive ability using

NOTE Confidence: 0.9958022

00:43:35.355 --> 00:43:36.335 multiple tests

NOTE Confidence: 0.99990296

00:43:36.960 --> 00:43:37.460 rather

NOTE Confidence: 0.9434573

00:43:37.840 --> 00:43:38.900 than one task,

NOTE Confidence: 0.9431005

00:43:39.440 --> 00:43:41.160 looking at sensitivity and specificity,

NOTE Confidence: 0.9431005

00:43:41.160 --> 00:43:41.920 and I'm

NOTE Confidence: 0.98252535

00:43:42.320 --> 00:43:43.200 can't tell you what the

NOTE Confidence: 0.98252535

00:43:43.200 --> 00:43:44.880 tasks were. Some of the

NOTE Confidence: 0.98252535

00:43:44.880 --> 00:43:46.580 combos gave us really good

NOTE Confidence: 0.98252535

00:43:46.800 --> 00:43:47.300 sensitivity,

NOTE Confidence: 0.9998186

00:43:47.680 --> 00:43:48.180 specificity

NOTE Confidence: 0.99218684

00:43:48.815 --> 00:43:50.355 trade offs in terms of

NOTE Confidence: 0.99218684

00:43:50.575 --> 00:43:52.415 AUCs equivalent to about point

NOTE Confidence: 0.99218684

00:43:52.415 --> 00:43:53.775 nine, which is in the

NOTE Confidence: 0.99218684

00:43:53.775 --> 00:43:54.755 excellent range.

NOTE Confidence: 0.9801486

00:43:56.735 --> 00:43:57.235 And

NOTE Confidence: 0.9709164

00:43:57.855 --> 00:43:59.635 the tasks that did best,

NOTE Confidence: 0.935642

00:44:00.095 --> 00:44:01.475 some of them did awfully,

NOTE Confidence: 0.935642

00:44:01.695 --> 00:44:03.235 like no better than chance.

NOTE Confidence: 0.935642

00:44:03.510 --> 00:44:04.969 The test that did best

NOTE Confidence: 0.935642

00:44:05.030 --> 00:44:05.850 that we selected

NOTE Confidence: 0.99255556

00:44:06.469 --> 00:44:06.969 correlated

NOTE Confidence: 0.99964595

00:44:07.270 --> 00:44:07.770 highly

NOTE Confidence: 0.9675644

00:44:08.070 --> 00:44:09.590 with impaired driving on the

NOTE Confidence: 0.9675644

00:44:09.590 --> 00:44:10.090 simulator,

NOTE Confidence: 0.9846105

00:44:10.550 --> 00:44:12.410 so they actually have criterion

NOTE Confidence: 0.9846105

00:44:12.469 --> 00:44:12.969 validity,

NOTE Confidence: 0.9990419

00:44:13.430 --> 00:44:15.130 which was crucial for us.

NOTE Confidence: 0.9314342

00:44:15.905 --> 00:44:17.685 So they're sensitive, they're reliable,

NOTE Confidence: 0.9314342

00:44:17.744 --> 00:44:19.125 they have predictive ability,

NOTE Confidence: 0.9799957

00:44:19.425 --> 00:44:21.125 and they have criterion validity.

NOTE Confidence: 0.95910937

00:44:23.344 --> 00:44:24.705 We then picked the three

NOTE Confidence: 0.95910937

00:44:24.705 --> 00:44:26.465 best performing tasks from that

NOTE Confidence: 0.95910937

00:44:26.465 --> 00:44:27.665 study, which I can't tell

NOTE Confidence: 0.95910937

00:44:27.665 --> 00:44:28.590 you what they were,

NOTE Confidence: 0.99722093

00:44:29.070 --> 00:44:30.670 and retested them in thirty

NOTE Confidence: 0.99722093

00:44:30.670 --> 00:44:31.730 one new subjects,

NOTE Confidence: 0.9233106

00:44:33.070 --> 00:44:34.270 in a one day study

NOTE Confidence: 0.9233106

00:44:34.270 --> 00:44:35.969 where we gave everyone placebo

NOTE Confidence: 0.9233106

00:44:36.110 --> 00:44:37.469 first and then the high

NOTE Confidence: 0.9233106

00:44:37.469 --> 00:44:39.310 dose only and only used

NOTE Confidence: 0.9233106

00:44:39.310 --> 00:44:40.750 the lane keeping task for

NOTE Confidence: 0.9233106

00:44:40.750 --> 00:44:41.250 driving.

NOTE Confidence: 0.9802294

00:44:41.664 --> 00:44:43.684 And within that restricted,

NOTE Confidence: 0.99185693

00:44:45.265 --> 00:44:45.765 replication,

NOTE Confidence: 0.99917156

00:44:46.385 --> 00:44:48.164 we got really good replication

NOTE Confidence: 0.9978151

00:44:48.545 --> 00:44:50.065 from that of that first

NOTE Confidence: 0.9978151

00:44:50.065 --> 00:44:50.565 study.

NOTE Confidence: 0.9977947

00:44:52.864 --> 00:44:54.085 So the overall

NOTE Confidence: 0.9840196

00:44:54.545 --> 00:44:56.565 the overall summary of everything

NOTE Confidence: 0.95263565

00:44:58.200 --> 00:44:59.880 is there are quantitative effects

NOTE Confidence: 0.95263565

00:44:59.880 --> 00:45:01.400 of a QTHC on motor

NOTE Confidence: 0.95263565

00:45:01.400 --> 00:45:02.780 vehicle accident risk.

NOTE Confidence: 0.9822447

00:45:03.400 --> 00:45:05.239 They're subtle. They're like a

NOTE Confidence: 0.9822447

00:45:05.239 --> 00:45:06.600 tenth of what you see

NOTE Confidence: 0.9822447

00:45:06.600 --> 00:45:07.580 with alcohol

NOTE Confidence: 0.9768306

00:45:07.960 --> 00:45:09.180 at the point one,

NOTE Confidence: 0.98306

00:45:10.280 --> 00:45:11.340 BAC range.

NOTE Confidence: 0.95715195

00:45:12.594 --> 00:45:14.275 Field sobriety tests for cannabis

NOTE Confidence: 0.95715195

00:45:14.275 --> 00:45:15.635 impaired driving are a work

NOTE Confidence: 0.95715195

00:45:15.635 --> 00:45:16.295 in process,

NOTE Confidence: 0.98828346

00:45:16.835 --> 00:45:18.114 but you need a battery.

NOTE Confidence: 0.98828346

00:45:18.114 --> 00:45:19.655 No one task is sufficient.

NOTE Confidence: 0.9966408

00:45:21.315 --> 00:45:23.155 Everything should be validated against

NOTE Confidence: 0.9966408

00:45:23.155 --> 00:45:24.375 simulated driving.

NOTE Confidence: 0.97059935

00:45:25.489 --> 00:45:27.010 We found and others have

NOTE Confidence: 0.97059935

00:45:27.010 --> 00:45:28.690 found no clear relationship of

NOTE Confidence: 0.97059935

00:45:28.690 --> 00:45:29.190 impairment

NOTE Confidence: 0.9918361

00:45:29.730 --> 00:45:30.469 to THC,

NOTE Confidence: 0.9948575

00:45:31.809 --> 00:45:33.650 metabolite in blood or saliva

NOTE Confidence: 0.9948575

00:45:33.650 --> 00:45:34.150 levels

NOTE Confidence: 0.9368959

00:45:34.450 --> 00:45:36.369 with big implications for per

NOTE Confidence: 0.9368959

00:45:36.369 --> 00:45:37.109 se laws.

NOTE Confidence: 0.98537207

00:45:37.489 --> 00:45:38.849 And as yet, there's no

NOTE Confidence: 0.98537207

00:45:38.849 --> 00:45:40.150 BAC for THC.

NOTE Confidence: 0.97234607

00:45:42.985 --> 00:45:44.425 We need roadside tests that

NOTE Confidence: 0.97234607

00:45:44.425 --> 00:45:45.645 are cannabis specific

NOTE Confidence: 0.9651031

00:45:47.545 --> 00:45:48.905 that don't depend on knowing

NOTE Confidence: 0.9651031

00:45:48.905 --> 00:45:50.905 the subject's baseline performance. So

NOTE Confidence: 0.9651031

00:45:50.905 --> 00:45:51.565 you need

NOTE Confidence: 0.99544716

00:45:52.185 --> 00:45:54.685 very large normative data across

NOTE Confidence: 0.99544716

00:45:54.905 --> 00:45:55.805 different genders,

NOTE Confidence: 0.9991168

00:45:56.410 --> 00:45:57.870 across different age ranges

NOTE Confidence: 0.9548154

00:45:58.410 --> 00:46:00.510 that, again, relate to marijuana

NOTE Confidence: 0.9548154

00:46:00.650 --> 00:46:01.550 impaired driving.

NOTE Confidence: 0.9989404

00:46:02.570 --> 00:46:03.070 And

NOTE Confidence: 0.992177

00:46:03.530 --> 00:46:04.969 many of our cannabis using

NOTE Confidence: 0.992177

00:46:04.969 --> 00:46:05.469 subjects,

NOTE Confidence: 0.96982616

00:46:06.410 --> 00:46:07.230 get buzzed,

NOTE Confidence: 0.98579615

00:46:08.105 --> 00:46:09.464 with alcohol at the same

NOTE Confidence: 0.98579615

00:46:09.464 --> 00:46:10.765 time as they get high.

NOTE Confidence: 0.9914799

00:46:11.065 --> 00:46:13.065 So assessing the combinations are

NOTE Confidence: 0.9914799

00:46:13.065 --> 00:46:13.565 crucial.

NOTE Confidence: 0.93817925

00:46:17.065 --> 00:46:18.765 No one's really tested edibles.

NOTE Confidence: 0.93817925

00:46:18.825 --> 00:46:19.964 That needs to happen.

NOTE Confidence: 0.93393856

00:46:21.545 --> 00:46:22.765 And there's a

NOTE Confidence: 0.9967845

00:46:23.520 --> 00:46:24.260 a problem

NOTE Confidence: 0.90031296

00:46:25.680 --> 00:46:27.460 with testing older subjects.

NOTE Confidence: 0.99497795

00:46:27.760 --> 00:46:28.880 No one has really looked

NOTE Confidence: 0.99497795

00:46:28.880 --> 00:46:29.940 at older subjects

NOTE Confidence: 0.9982964

00:46:30.239 --> 00:46:31.280 to see to what extent

NOTE Confidence: 0.9982964

00:46:31.280 --> 00:46:32.820 they differ from younger subjects.

NOTE Confidence: 0.95407164

00:46:33.360 --> 00:46:34.820 So this is our team.

NOTE Confidence: 0.9972956

00:46:36.094 --> 00:46:36.594 And,

NOTE Confidence: 0.9870352

00:46:37.855 --> 00:46:38.895 so we have a number

NOTE Confidence: 0.9870352

00:46:38.895 --> 00:46:40.355 of nurses and,

NOTE Confidence: 0.999896

00:46:41.214 --> 00:46:42.194 senior collaborators

NOTE Confidence: 0.960973

00:46:43.535 --> 00:46:44.035 and,

NOTE Confidence: 0.99876404

00:46:45.375 --> 00:46:45.875 statisticians

NOTE Confidence: 0.9822858

00:46:47.055 --> 00:46:47.555 and

NOTE Confidence: 0.968644

00:46:47.855 --> 00:46:48.355 imagers

NOTE Confidence: 0.9655506

00:46:48.815 --> 00:46:51.155 and clinical research associates,

NOTE Confidence: 0.96220237

00:46:52.359 --> 00:46:53.800 all of whom collaborate, and

NOTE Confidence: 0.96220237

00:46:53.800 --> 00:46:55.500 we collaborate with doctor D'Souza

NOTE Confidence: 0.98938257

00:46:56.119 --> 00:46:57.320 increasingly on a lot of

NOTE Confidence: 0.98938257

00:46:57.320 --> 00:46:58.540 the work that we plan.

NOTE Confidence: 0.9903824

00:46:59.719 --> 00:47:01.739 And just a brief

NOTE Confidence: 0.93359023

00:47:02.040 --> 00:47:03.660 self serving shout out,

NOTE Confidence: 0.988601

00:47:04.479 --> 00:47:06.854 to my book. So I

NOTE Confidence: 0.988601

00:47:06.854 --> 00:47:09.228 think I'll leave things be

NOTE Confidence: 0.988601

00:47:09.228 --> 00:47:11.602 at that point. We've got

NOTE Confidence: 0.988601

00:47:11.602 --> 00:47:13.976 about fifteen minutes to answer

NOTE Confidence: 0.988601

00:47:13.976 --> 00:47:16.350 questions, so I'm happy to

NOTE Confidence: 0.988601

00:47:16.350 --> 00:47:18.725 take any questions that people

NOTE Confidence: 0.988601

00:47:18.725 --> 00:47:19.200 have.

NOTE Confidence: 0.9196296

00:47:21.920 --> 00:47:23.119 Thank you so much, Doctor.

NOTE Confidence: 0.9196296

00:47:23.119 --> 00:47:23.619 Carlson,

NOTE Confidence: 0.9686953

00:47:23.920 --> 00:47:25.040 for such a wonderful and

NOTE Confidence: 0.9686953

00:47:25.040 --> 00:47:26.800 thoughtful presentation. We have several

NOTE Confidence: 0.9686953

00:47:26.800 --> 00:47:28.099 questions in the chat.

NOTE Confidence: 0.9263716

00:47:28.719 --> 00:47:30.320 And please feel free if

NOTE Confidence: 0.9263716

00:47:30.320 --> 00:47:31.280 I'm reading your question you'd

NOTE Confidence: 0.9263716

00:47:31.280 --> 00:47:32.180 like to unmute.

NOTE Confidence: 0.95968485

00:47:33.565 --> 00:47:35.485 Bruce Parker has asked about

NOTE Confidence: 0.95968485

00:47:35.485 --> 00:47:36.765 a standard test, which might

NOTE Confidence: 0.95968485

00:47:36.765 --> 00:47:37.505 be useful.

NOTE Confidence: 0.97881746

00:47:38.205 --> 00:47:39.725 Is the reaction time to

NOTE Confidence: 0.97881746

00:47:39.725 --> 00:47:41.405 lift off an accelerator and

NOTE Confidence: 0.97881746

00:47:41.405 --> 00:47:42.445 place the foot on a

NOTE Confidence: 0.97881746

00:47:42.445 --> 00:47:42.945 brake,

NOTE Confidence: 0.9595316

00:47:43.405 --> 00:47:44.445 I think, in the driving

NOTE Confidence: 0.9595316

00:47:44.445 --> 00:47:44.945 simulator?

NOTE Confidence: 0.9778127

00:47:46.269 --> 00:47:47.869 Yes. We we do measure

NOTE Confidence: 0.9778127

00:47:47.869 --> 00:47:49.969 that, and that's very slightly

NOTE Confidence: 0.9778127

00:47:50.269 --> 00:47:50.769 slowed,

NOTE Confidence: 0.97042614

00:47:51.469 --> 00:47:53.469 but it's not one of

NOTE Confidence: 0.97042614

00:47:53.469 --> 00:47:55.410 our better performing tasks.

NOTE Confidence: 0.99896204

00:47:55.950 --> 00:47:56.450 That's

NOTE Confidence: 0.9192874

00:47:58.109 --> 00:47:59.469 we're all in favor of

NOTE Confidence: 0.9192874

00:47:59.469 --> 00:48:00.529 of simple

NOTE Confidence: 0.99750054

00:48:01.655 --> 00:48:03.175 tasks, but that's not one

NOTE Confidence: 0.99750054

00:48:03.175 --> 00:48:04.714 of the more reliable ones.

NOTE Confidence: 0.97622025

00:48:06.214 --> 00:48:08.234 There's very wide baseline variability,

NOTE Confidence: 0.9972442

00:48:08.855 --> 00:48:10.875 and it's not particularly impacted,

NOTE Confidence: 0.9996945

00:48:11.734 --> 00:48:12.795 which makes it

NOTE Confidence: 0.9416307

00:48:13.719 --> 00:48:15.480 a reasonable sounding choice, but

NOTE Confidence: 0.9416307

00:48:15.480 --> 00:48:16.520 not one that's good in

NOTE Confidence: 0.9416307

00:48:16.520 --> 00:48:17.020 practice.

NOTE Confidence: 0.93255943

00:48:21.560 --> 00:48:22.840 And Steven Holt asked if

NOTE Confidence: 0.93255943

00:48:22.840 --> 00:48:24.280 there's any benefit to serial

NOTE Confidence: 0.93255943

00:48:24.280 --> 00:48:25.420 testing of THC.

NOTE Confidence: 0.966048

00:48:25.880 --> 00:48:26.875 So he says that is,

NOTE Confidence: 0.966048

00:48:26.875 --> 00:48:27.995 does the rate of change

NOTE Confidence: 0.966048

00:48:27.995 --> 00:48:29.995 in serum THC level over

NOTE Confidence: 0.966048

00:48:29.995 --> 00:48:31.515 sixty minutes allow you to

NOTE Confidence: 0.966048

00:48:31.515 --> 00:48:32.015 extrapolate

NOTE Confidence: 0.90350395

00:48:32.315 --> 00:48:33.455 recency of use?

NOTE Confidence: 0.9624482

00:48:35.355 --> 00:48:35.855 So,

NOTE Confidence: 0.93823

00:48:36.635 --> 00:48:38.075 if if I'm understanding that

NOTE Confidence: 0.93823

00:48:38.075 --> 00:48:39.515 right, is should should we

NOTE Confidence: 0.93823

00:48:39.515 --> 00:48:41.375 be dozing people serially

NOTE Confidence: 0.9412383

00:48:42.190 --> 00:48:43.330 through through the task?

NOTE Confidence: 0.96692765

00:48:44.989 --> 00:48:46.510 Like, giving them repeated doses

NOTE Confidence: 0.96692765

00:48:46.510 --> 00:48:48.030 of THC rather than just

NOTE Confidence: 0.96692765

00:48:48.030 --> 00:48:49.150 one acute dose and then

NOTE Confidence: 0.96692765

00:48:49.150 --> 00:48:50.670 seeing what happens? No. When

NOTE Confidence: 0.96692765

00:48:50.670 --> 00:48:51.630 I had asked the question,

NOTE Confidence: 0.96692765

00:48:51.630 --> 00:48:52.910 I, which was a while

NOTE Confidence: 0.96692765

00:48:52.910 --> 00:48:53.870 ago earlier in your talk,

NOTE Confidence: 0.96692765

00:48:53.870 --> 00:48:55.224 I was asking if if,

NOTE Confidence: 0.96692765

00:48:55.224 --> 00:48:56.425 you know, when when law

NOTE Confidence: 0.96692765

00:48:56.425 --> 00:48:58.344 enforcement takes somebody and and

NOTE Confidence: 0.96692765

00:48:58.344 --> 00:48:59.545 decides that they have a

NOTE Confidence: 0.96692765

00:48:59.545 --> 00:49:01.065 normal blood alcohol level, they're

NOTE Confidence: 0.96692765

00:49:01.065 --> 00:49:02.505 still intoxicated, so they send

NOTE Confidence: 0.96692765

00:49:02.505 --> 00:49:03.724 them to get blood work.

NOTE Confidence: 0.96692765

00:49:03.945 --> 00:49:04.825 If they were to do

NOTE Confidence: 0.96692765

00:49:04.825 --> 00:49:06.665 blood work, you know, three

NOTE Confidence: 0.96692765

00:49:06.665 --> 00:49:08.344 times over sixty minutes, would

NOTE Confidence: 0.96692765

00:49:08.344 --> 00:49:09.545 the rate of change of

NOTE Confidence: 0.96692765

00:49:09.545 --> 00:49:10.940 their THC level,

NOTE Confidence: 0.99566966

00:49:11.560 --> 00:49:13.400 enable them to extrapolate how

NOTE Confidence: 0.99566966

00:49:13.400 --> 00:49:15.020 recently they used cannabis?

NOTE Confidence: 0.9952822

00:49:16.359 --> 00:49:17.739 It would if the person

NOTE Confidence: 0.9996331

00:49:18.200 --> 00:49:19.579 was driving along

NOTE Confidence: 0.9161403

00:49:20.440 --> 00:49:22.280 and taking tokes off a

NOTE Confidence: 0.9161403

00:49:22.280 --> 00:49:23.660 joint while driving,

NOTE Confidence: 0.9825761

00:49:24.344 --> 00:49:25.385 and they were caught in

NOTE Confidence: 0.9825761

00:49:25.385 --> 00:49:27.065 the first five minutes after

NOTE Confidence: 0.9825761

00:49:27.065 --> 00:49:28.525 a dose. Right.

NOTE Confidence: 0.99639946

00:49:29.065 --> 00:49:30.125 But not otherwise.

NOTE Confidence: 0.9992399

00:49:30.744 --> 00:49:31.244 Understood.

NOTE Confidence: 0.9612213

00:49:32.344 --> 00:49:33.625 But, yes, that's a reasonable

NOTE Confidence: 0.9612213

00:49:33.625 --> 00:49:35.545 question. If the person's actually

NOTE Confidence: 0.9612213

00:49:35.545 --> 00:49:36.605 driving and smoking,

NOTE Confidence: 0.9921972

00:49:37.170 --> 00:49:37.910 like the

NOTE Confidence: 0.9860457

00:49:38.450 --> 00:49:39.650 dude, in the picture that

NOTE Confidence: 0.9860457

00:49:39.650 --> 00:49:41.089 I showed you, that that

NOTE Confidence: 0.9860457

00:49:41.089 --> 00:49:42.450 would be valuable, but not

NOTE Confidence: 0.9860457

00:49:42.450 --> 00:49:42.950 otherwise.

NOTE Confidence: 0.8561555

00:49:49.585 --> 00:49:51.185 And Aly Scott asked many

NOTE Confidence: 0.8561555

00:49:51.185 --> 00:49:52.785 of the findings suggest that

NOTE Confidence: 0.8561555

00:49:52.785 --> 00:49:55.205 THC consumption leads to statistically

NOTE Confidence: 0.9489112

00:49:55.585 --> 00:49:57.125 significant worse functioning

NOTE Confidence: 0.98407584

00:49:57.665 --> 00:49:58.625 in many of the tasks

NOTE Confidence: 0.98407584

00:49:58.625 --> 00:49:59.905 that were examined. Can you

NOTE Confidence: 0.98407584

00:49:59.905 --> 00:50:01.025 comment on the size of

NOTE Confidence: 0.98407584

00:50:01.025 --> 00:50:02.465 these effects and whether they're

NOTE Confidence: 0.98407584

00:50:02.465 --> 00:50:02.965 noticeable

NOTE Confidence: 0.97391003

00:50:03.425 --> 00:50:04.245 or practically

NOTE Confidence: 0.8764961

00:50:05.280 --> 00:50:07.460 significant degrade in driving performance.

NOTE Confidence: 0.8764961

00:50:07.520 --> 00:50:08.800 I think our question is

NOTE Confidence: 0.8764961

00:50:08.800 --> 00:50:10.400 about effect size. Yeah. In

NOTE Confidence: 0.8764961

00:50:10.400 --> 00:50:11.780 terms of effect sizes,

NOTE Confidence: 0.99524033

00:50:12.320 --> 00:50:13.860 most of these are moderate,

NOTE Confidence: 0.9913432

00:50:15.280 --> 00:50:16.020 at best.

NOTE Confidence: 0.9147243

00:50:16.880 --> 00:50:17.380 So,

NOTE Confidence: 0.9355976

00:50:18.805 --> 00:50:20.185 I guess the best comparator

NOTE Confidence: 0.9355976

00:50:20.245 --> 00:50:21.625 is where we've given people,

NOTE Confidence: 0.99985695

00:50:22.885 --> 00:50:23.385 alcohol

NOTE Confidence: 0.9936092

00:50:23.685 --> 00:50:24.805 sufficient to get them to

NOTE Confidence: 0.9936092

00:50:24.805 --> 00:50:26.344 a blood alcohol concentration

NOTE Confidence: 0.9851867

00:50:27.045 --> 00:50:28.485 of zero point zero five

NOTE Confidence: 0.9851867

00:50:28.485 --> 00:50:29.945 or zero point one.

NOTE Confidence: 0.99852115

00:50:30.565 --> 00:50:31.305 So they're

NOTE Confidence: 0.99203897

00:50:31.619 --> 00:50:33.460 roughly equivalent in terms of

NOTE Confidence: 0.99203897

00:50:33.460 --> 00:50:34.819 effect sizes of what we'd

NOTE Confidence: 0.99203897

00:50:34.819 --> 00:50:35.319 see

NOTE Confidence: 0.9643636

00:50:36.579 --> 00:50:38.099 with alcohol at about zero

NOTE Confidence: 0.9643636

00:50:38.099 --> 00:50:39.319 point zero five.

NOTE Confidence: 0.9756788

00:50:40.180 --> 00:50:41.400 And the the best

NOTE Confidence: 0.9808862

00:50:42.019 --> 00:50:43.799 the the most impairing ones

NOTE Confidence: 0.9808862

00:50:44.019 --> 00:50:45.140 are about what we'd see

NOTE Confidence: 0.9808862

00:50:45.140 --> 00:50:47.235 at zero point zero eight,

NOTE Confidence: 0.9808862

00:50:47.295 --> 00:50:48.735 but almost none of them

NOTE Confidence: 0.9808862

00:50:48.735 --> 00:50:49.955 make it to that level.

NOTE Confidence: 0.87210655

00:50:50.335 --> 00:50:51.555 So they're they're modest.

NOTE Confidence: 0.96700203

00:51:00.280 --> 00:51:01.719 There's also a practical question

NOTE Confidence: 0.96700203

00:51:01.719 --> 00:51:03.500 about how long the saliva

NOTE Confidence: 0.96700203

00:51:03.560 --> 00:51:05.339 testing is positive for THC

NOTE Confidence: 0.94419336

00:51:05.640 --> 00:51:06.700 versus urine.

NOTE Confidence: 0.9509902

00:51:08.440 --> 00:51:09.660 Oh, versus urine?

NOTE Confidence: 0.68200964

00:51:10.280 --> 00:51:11.339 Yeah. Yeah. Because

NOTE Confidence: 0.93249345

00:51:15.674 --> 00:51:17.994 because THC has to leech

NOTE Confidence: 0.93249345

00:51:17.994 --> 00:51:20.094 out of fat slowly

NOTE Confidence: 0.9901199

00:51:21.114 --> 00:51:22.474 and takes a while to

NOTE Confidence: 0.9901199

00:51:22.474 --> 00:51:23.535 appear in urine,

NOTE Confidence: 0.99423945

00:51:24.075 --> 00:51:25.454 at least in our experience,

NOTE Confidence: 0.97438157

00:51:26.315 --> 00:51:27.454 saliva testing,

NOTE Confidence: 0.9974746

00:51:28.380 --> 00:51:29.900 has a shorter window than

NOTE Confidence: 0.9974746

00:51:29.900 --> 00:51:30.799 urine testing.

NOTE Confidence: 0.99901783

00:51:32.059 --> 00:51:32.559 But

NOTE Confidence: 0.89362776

00:51:33.339 --> 00:51:34.960 to also to be honest,

NOTE Confidence: 0.9964243

00:51:35.339 --> 00:51:37.200 we've not looked at either

NOTE Confidence: 0.9964243

00:51:37.260 --> 00:51:39.660 for, like, several days after

NOTE Confidence: 0.9964243

00:51:39.660 --> 00:51:40.160 testing,

NOTE Confidence: 0.9990719

00:51:40.539 --> 00:51:42.079 which is really what's relevant.

NOTE Confidence: 0.9369591

00:51:42.755 --> 00:51:43.255 So,

NOTE Confidence: 0.7929845

00:51:44.435 --> 00:51:44.835 in

NOTE Confidence: 0.9816562

00:51:45.475 --> 00:51:46.594 I'm not able to answer

NOTE Confidence: 0.9816562

00:51:46.594 --> 00:51:47.975 that from our experience

NOTE Confidence: 0.99805534

00:51:48.675 --> 00:51:50.915 for multiple days after an

NOTE Confidence: 0.99805534

00:51:50.915 --> 00:51:51.735 acute dose.

NOTE Confidence: 0.971405

00:51:56.710 --> 00:51:57.530 Anyone else?

NOTE Confidence: 0.98634696

00:51:57.910 --> 00:52:00.010 Mohini, can you address that?

NOTE Confidence: 0.98634696

00:52:00.150 --> 00:52:01.430 Hi, Godfrey. Thank you so

NOTE Confidence: 0.98634696

00:52:01.430 --> 00:52:02.630 much. Such a such an

NOTE Confidence: 0.98634696

00:52:02.630 --> 00:52:03.989 excellent and timely talk. I

NOTE Confidence: 0.98634696

00:52:03.989 --> 00:52:05.750 have I have a new

NOTE Confidence: 0.98634696

00:52:05.750 --> 00:52:07.190 driver at home, so he

NOTE Confidence: 0.98634696

00:52:07.190 --> 00:52:08.330 hears about this,

NOTE Confidence: 0.9647689

00:52:08.945 --> 00:52:10.385 all the time, and I

NOTE Confidence: 0.9647689

00:52:10.385 --> 00:52:11.505 should have invited him to

NOTE Confidence: 0.9647689

00:52:11.505 --> 00:52:13.185 this to this talk. I

NOTE Confidence: 0.9647689

00:52:13.185 --> 00:52:14.305 have a question, which as

NOTE Confidence: 0.9647689

00:52:14.305 --> 00:52:14.945 you know is one of

NOTE Confidence: 0.9647689

00:52:14.945 --> 00:52:16.225 my favorite questions. Can you

NOTE Confidence: 0.9647689

00:52:16.225 --> 00:52:17.605 comment a little bit about,

NOTE Confidence: 0.9973405

00:52:18.065 --> 00:52:19.985 sex differences as it relates

NOTE Confidence: 0.9973405

00:52:19.985 --> 00:52:21.685 to either performance

NOTE Confidence: 0.87844026

00:52:21.985 --> 00:52:22.805 or detection,

NOTE Confidence: 0.98117614

00:52:23.489 --> 00:52:25.090 in the context of driving

NOTE Confidence: 0.98117614

00:52:25.090 --> 00:52:25.590 performance?

NOTE Confidence: 0.97375935

00:52:28.690 --> 00:52:30.130 We don't see marked sex

NOTE Confidence: 0.97375935

00:52:30.130 --> 00:52:30.630 differences

NOTE Confidence: 0.9775974

00:52:31.730 --> 00:52:33.350 compared to the person's baseline

NOTE Confidence: 0.9775974

00:52:33.410 --> 00:52:33.910 driving.

NOTE Confidence: 0.9971806

00:52:34.770 --> 00:52:35.270 And

NOTE Confidence: 0.9797608

00:52:35.969 --> 00:52:36.950 we don't see

NOTE Confidence: 0.9964564

00:52:37.455 --> 00:52:39.135 marked sex differences in how

NOTE Confidence: 0.9964564

00:52:39.135 --> 00:52:39.635 high

NOTE Confidence: 0.99984515

00:52:39.935 --> 00:52:40.435 people

NOTE Confidence: 0.9100493

00:52:40.735 --> 00:52:41.555 rate themselves,

NOTE Confidence: 0.99969304

00:52:42.015 --> 00:52:43.395 but we do see differences

NOTE Confidence: 0.99969304

00:52:43.455 --> 00:52:44.675 in blood levels

NOTE Confidence: 0.9699593

00:52:44.975 --> 00:52:46.594 of THC and its metabolites.

NOTE Confidence: 0.9699593

00:52:46.735 --> 00:52:48.415 So it's hard to square

NOTE Confidence: 0.9699593

00:52:48.415 --> 00:52:49.155 those things.

NOTE Confidence: 0.9821227

00:52:49.719 --> 00:52:51.080 But, yeah, what what what

NOTE Confidence: 0.9821227

00:52:51.080 --> 00:52:52.360 do you see? Because you've

NOTE Confidence: 0.9821227

00:52:52.360 --> 00:52:53.719 looked at this more carefully

NOTE Confidence: 0.9821227

00:52:53.719 --> 00:52:54.540 than we have.

NOTE Confidence: 0.93404096

00:52:55.880 --> 00:52:57.320 So in in general, I

NOTE Confidence: 0.93404096

00:52:57.320 --> 00:52:58.440 think what and that I

NOTE Confidence: 0.93404096

00:52:58.440 --> 00:52:59.560 think that might be also

NOTE Confidence: 0.93404096

00:52:59.560 --> 00:53:01.480 what what you're finding is

NOTE Confidence: 0.93404096

00:53:01.480 --> 00:53:01.980 that,

NOTE Confidence: 0.996692

00:53:03.025 --> 00:53:04.725 women seem to kind of

NOTE Confidence: 0.996692

00:53:04.785 --> 00:53:05.285 experience

NOTE Confidence: 0.98488045

00:53:05.585 --> 00:53:07.105 the effects of THC even

NOTE Confidence: 0.98488045

00:53:07.105 --> 00:53:07.985 at a lower level. So

NOTE Confidence: 0.98488045

00:53:07.985 --> 00:53:09.525 they don't they don't necessarily

NOTE Confidence: 0.98488045

00:53:09.585 --> 00:53:10.885 need a very high

NOTE Confidence: 0.9752417

00:53:11.265 --> 00:53:12.305 dose of what is being

NOTE Confidence: 0.9752417

00:53:12.305 --> 00:53:14.065 ingested to achieve that goal

NOTE Confidence: 0.9752417

00:53:14.065 --> 00:53:14.565 of,

NOTE Confidence: 0.98681545

00:53:15.110 --> 00:53:17.030 feeling high, and that could

NOTE Confidence: 0.98681545

00:53:17.030 --> 00:53:18.550 be related to differences in

NOTE Confidence: 0.98681545

00:53:18.550 --> 00:53:19.050 metabolism

NOTE Confidence: 0.99954

00:53:19.350 --> 00:53:19.930 as well.

NOTE Confidence: 0.3735731

00:53:20.710 --> 00:53:21.210 And

NOTE Confidence: 0.99734896

00:53:21.670 --> 00:53:23.290 what we have also seen

NOTE Confidence: 0.99734896

00:53:23.350 --> 00:53:26.170 in chronic cannabis users is,

NOTE Confidence: 0.9594888

00:53:26.710 --> 00:53:27.670 for instance, in one of

NOTE Confidence: 0.9594888

00:53:27.670 --> 00:53:29.530 Cyril, D'Souza's studies,

NOTE Confidence: 0.97226137

00:53:30.935 --> 00:53:32.775 when we had people try

NOTE Confidence: 0.97226137

00:53:32.775 --> 00:53:33.175 to,

NOTE Confidence: 0.99653894

00:53:34.055 --> 00:53:34.555 abstain,

NOTE Confidence: 0.9986373

00:53:35.094 --> 00:53:35.915 it took

NOTE Confidence: 0.9963795

00:53:36.455 --> 00:53:38.455 some women much longer for

NOTE Confidence: 0.9963795

00:53:38.455 --> 00:53:40.155 the urine to test negative

NOTE Confidence: 0.9855578

00:53:40.855 --> 00:53:41.995 compared to,

NOTE Confidence: 0.99672544

00:53:42.695 --> 00:53:44.215 men who were using roughly

NOTE Confidence: 0.99672544

00:53:44.215 --> 00:53:46.075 the same amount. And so

NOTE Confidence: 0.99809694

00:53:46.640 --> 00:53:48.719 I'm just wondering what impact

NOTE Confidence: 0.99809694

00:53:48.719 --> 00:53:50.580 that might have in detection

NOTE Confidence: 0.99809694

00:53:50.719 --> 00:53:51.700 of THC

NOTE Confidence: 0.99545896

00:53:52.080 --> 00:53:53.620 in someone who might be,

NOTE Confidence: 0.9834852

00:53:54.480 --> 00:53:55.840 you know, pulled over for

NOTE Confidence: 0.9834852

00:53:55.840 --> 00:53:56.660 for driving,

NOTE Confidence: 0.9817877

00:53:57.520 --> 00:53:59.700 problems. Yeah. That's really important

NOTE Confidence: 0.9817877

00:53:59.760 --> 00:54:01.375 to know, actually, and that's

NOTE Confidence: 0.9817877

00:54:01.375 --> 00:54:02.894 not taken into account in

NOTE Confidence: 0.9817877

00:54:02.894 --> 00:54:04.515 per se testing at all.

NOTE Confidence: 0.9937748

00:54:07.375 --> 00:54:07.875 Thanks.

NOTE Confidence: 0.99909025

00:54:09.614 --> 00:54:10.434 Thank you.

NOTE Confidence: 0.9347154

00:54:13.850 --> 00:54:15.210 Doctor. Carlson, can you comment

NOTE Confidence: 0.9347154

00:54:15.210 --> 00:54:16.430 on how policymakers,

NOTE Confidence: 0.9721869

00:54:16.969 --> 00:54:18.890 legal professionals, and law enforcement

NOTE Confidence: 0.9721869

00:54:18.890 --> 00:54:20.830 officials could better educate themselves

NOTE Confidence: 0.9721869

00:54:20.890 --> 00:54:22.830 on the current scientific evidence

NOTE Confidence: 0.9746734

00:54:23.130 --> 00:54:25.310 regarding cannabis use driving impairment

NOTE Confidence: 0.9746734

00:54:25.450 --> 00:54:26.190 to inform

NOTE Confidence: 0.9812759

00:54:26.655 --> 00:54:29.075 reasonable policy development, legal standards,

NOTE Confidence: 0.9812759

00:54:29.295 --> 00:54:30.594 and enforcement practices?

NOTE Confidence: 0.8060774

00:54:31.135 --> 00:54:31.955 It's a big question.

NOTE Confidence: 0.9838137

00:54:32.255 --> 00:54:32.755 So,

NOTE Confidence: 0.98381746

00:54:33.935 --> 00:54:34.435 unfortunately,

NOTE Confidence: 0.9998793

00:54:35.055 --> 00:54:35.795 that happens

NOTE Confidence: 0.9840483

00:54:36.335 --> 00:54:38.094 state by state at the

NOTE Confidence: 0.9840483

00:54:38.094 --> 00:54:38.594 moment.

NOTE Confidence: 0.95841736

00:54:39.219 --> 00:54:40.020 But as far as I

NOTE Confidence: 0.95841736

00:54:40.020 --> 00:54:41.960 know, no one's testified before

NOTE Confidence: 0.95841736

00:54:42.020 --> 00:54:42.520 congress

NOTE Confidence: 0.9550396

00:54:43.219 --> 00:54:43.719 on,

NOTE Confidence: 0.98082566

00:54:45.460 --> 00:54:47.640 how laws should be formulated

NOTE Confidence: 0.98082566

00:54:47.860 --> 00:54:49.700 at a national level. And

NOTE Confidence: 0.98082566

00:54:49.700 --> 00:54:50.900 in part, that's due to

NOTE Confidence: 0.98082566

00:54:50.900 --> 00:54:51.560 the confusion

NOTE Confidence: 0.99931824

00:54:52.340 --> 00:54:52.840 over

NOTE Confidence: 0.9854652

00:54:55.015 --> 00:54:56.795 whether cannabis should be legalized

NOTE Confidence: 0.9854652

00:54:56.935 --> 00:54:57.675 or decriminalized

NOTE Confidence: 0.99614847

00:54:58.215 --> 00:54:58.955 or reclassified

NOTE Confidence: 0.9972195

00:54:59.655 --> 00:55:00.475 or unclassified

NOTE Confidence: 0.9945053

00:55:01.415 --> 00:55:02.635 at a national level.

NOTE Confidence: 0.9561987

00:55:03.815 --> 00:55:04.635 So there's

NOTE Confidence: 0.9681942

00:55:05.255 --> 00:55:07.035 confusion at so many levels.

NOTE Confidence: 0.99982095

00:55:07.335 --> 00:55:08.635 It's hard to get

NOTE Confidence: 0.9996891

00:55:10.910 --> 00:55:13.010 a comprehensive national policy

NOTE Confidence: 0.98259246

00:55:13.549 --> 00:55:14.049 formulated.

NOTE Confidence: 0.8746397

00:55:14.670 --> 00:55:15.410 But, locally,

NOTE Confidence: 0.6981219

00:55:16.670 --> 00:55:17.170 legislators

NOTE Confidence: 0.97606736

00:55:18.349 --> 00:55:19.170 seem pretty,

NOTE Confidence: 0.96293694

00:55:20.670 --> 00:55:22.029 willing to reach out to

NOTE Confidence: 0.96293694

00:55:22.029 --> 00:55:24.654 cannabis researchers. That's happened, I

NOTE Confidence: 0.96293694

00:55:24.654 --> 00:55:25.375 I know, in the state

NOTE Confidence: 0.96293694

00:55:25.375 --> 00:55:26.035 of Connecticut.

NOTE Confidence: 0.97200125

00:55:27.614 --> 00:55:29.295 And Connecticut chose not to

NOTE Confidence: 0.97200125

00:55:29.295 --> 00:55:30.575 have per se laws, at

NOTE Confidence: 0.97200125

00:55:30.575 --> 00:55:32.515 least until this time, explicitly.

NOTE Confidence: 0.8253351

00:55:34.654 --> 00:55:35.954 And I've helped.

NOTE Confidence: 0.91710067

00:55:36.950 --> 00:55:38.630 I think can Cyril and

NOTE Confidence: 0.91710067

00:55:38.630 --> 00:55:40.390 others have also helped, like,

NOTE Confidence: 0.91710067

00:55:40.390 --> 00:55:41.529 lobby for

NOTE Confidence: 0.97340757

00:55:41.910 --> 00:55:42.969 some of the legislation.

NOTE Confidence: 0.8464416

00:55:45.510 --> 00:55:46.650 But legislators

NOTE Confidence: 0.996966

00:55:46.950 --> 00:55:48.630 should feel welcome to reach

NOTE Confidence: 0.996966

00:55:48.630 --> 00:55:50.135 out to cannabis

NOTE Confidence: 0.97648215

00:55:50.755 --> 00:55:51.955 researchers, get a variety of

NOTE Confidence: 0.97648215

00:55:51.955 --> 00:55:52.455 opinions.

NOTE Confidence: 0.9652086

00:56:03.320 --> 00:56:04.680 And any other questions in

NOTE Confidence: 0.9652086

00:56:04.680 --> 00:56:05.340 the chat?

NOTE Confidence: 0.94159627

00:56:06.920 --> 00:56:08.680 Yeah. We have, one Ellie

NOTE Confidence: 0.94159627

00:56:08.680 --> 00:56:09.640 Scott just asked a follow-up

NOTE Confidence: 0.94159627

00:56:09.640 --> 00:56:10.680 about. Has there been any

NOTE Confidence: 0.94159627

00:56:10.680 --> 00:56:12.219 research looking at the relationship

NOTE Confidence: 0.94159627

00:56:12.280 --> 00:56:14.120 between drivers' self efficacy for

NOTE Confidence: 0.94159627

00:56:14.120 --> 00:56:15.420 driving under the influence

NOTE Confidence: 0.90565914

00:56:15.719 --> 00:56:17.980 and whether confidence mediates performance

NOTE Confidence: 0.90565914

00:56:18.040 --> 00:56:18.540 outcomes?

NOTE Confidence: 0.8311681

00:56:20.895 --> 00:56:21.635 We found

NOTE Confidence: 0.9980234

00:56:22.575 --> 00:56:23.075 almost

NOTE Confidence: 0.9580507

00:56:24.975 --> 00:56:27.235 no relationship between those things,

NOTE Confidence: 0.9327302

00:56:28.335 --> 00:56:30.755 at least on subjective measures,

NOTE Confidence: 0.99709415

00:56:31.290 --> 00:56:32.810 that some people think they're

NOTE Confidence: 0.99709415

00:56:32.810 --> 00:56:34.570 driving perfectly fine when they're

NOTE Confidence: 0.99709415

00:56:34.570 --> 00:56:35.070 not.

NOTE Confidence: 0.95938116

00:56:35.690 --> 00:56:37.290 But what what is truly

NOTE Confidence: 0.95938116

00:56:37.290 --> 00:56:38.270 interesting is

NOTE Confidence: 0.9570015

00:56:38.730 --> 00:56:40.910 compared to alcohol impaired drivers,

NOTE Confidence: 0.9891985

00:56:42.969 --> 00:56:44.650 it's very difficult if you're

NOTE Confidence: 0.9891985

00:56:44.650 --> 00:56:45.630 alcohol intoxicated

NOTE Confidence: 0.99887

00:56:46.090 --> 00:56:47.744 to make yourself sober up

NOTE Confidence: 0.99887

00:56:47.744 --> 00:56:49.125 and snap out of it

NOTE Confidence: 0.8939216

00:56:49.585 --> 00:56:51.204 despite trying your best.

NOTE Confidence: 0.91310745

00:56:51.744 --> 00:56:52.805 Whereas some,

NOTE Confidence: 0.9946124

00:56:53.984 --> 00:56:55.444 cannabis impaired drivers

NOTE Confidence: 0.9881303

00:56:56.385 --> 00:56:57.424 seem to be able to

NOTE Confidence: 0.9881303

00:56:57.424 --> 00:56:59.424 do that. We've not tested

NOTE Confidence: 0.9881303

00:56:59.424 --> 00:57:00.244 that explicitly,

NOTE Confidence: 0.9991008

00:57:01.184 --> 00:57:02.724 but that's what our

NOTE Confidence: 0.9834337

00:57:04.349 --> 00:57:05.469 subjects tell us,

NOTE Confidence: 0.95905286

00:57:05.869 --> 00:57:07.549 for what that's worth. Some

NOTE Confidence: 0.95905286

00:57:07.549 --> 00:57:08.829 people say, well, I was

NOTE Confidence: 0.95905286

00:57:08.829 --> 00:57:09.950 really stoned. I was pulled

NOTE Confidence: 0.95905286

00:57:09.950 --> 00:57:11.170 over by a cop,

NOTE Confidence: 0.9700402

00:57:11.549 --> 00:57:12.989 and I managed to just

NOTE Confidence: 0.9700402

00:57:12.989 --> 00:57:14.430 pull myself out of it

NOTE Confidence: 0.9700402

00:57:14.430 --> 00:57:16.130 and pass the sobriety test,

NOTE Confidence: 0.9700402

00:57:16.415 --> 00:57:18.195 given the problems with sobriety

NOTE Confidence: 0.9700402

00:57:18.255 --> 00:57:18.755 tests.

NOTE Confidence: 0.9918921

00:57:19.935 --> 00:57:21.155 So to that extent,

NOTE Confidence: 0.9997362

00:57:21.535 --> 00:57:22.655 some people do seem to

NOTE Confidence: 0.9997362

00:57:22.655 --> 00:57:23.714 be able to

NOTE Confidence: 0.99957144

00:57:24.494 --> 00:57:25.234 get themselves

NOTE Confidence: 0.9370743

00:57:26.655 --> 00:57:28.175 sober by effort of will

NOTE Confidence: 0.9370743

00:57:28.175 --> 00:57:29.535 and with cannabis in a

NOTE Confidence: 0.9370743

00:57:29.535 --> 00:57:30.994 way they're not able to

NOTE Confidence: 0.9370743

00:57:31.135 --> 00:57:31.955 with alcohol.

NOTE Confidence: 0.9536803

00:57:32.289 --> 00:57:33.910 And that's a curious understudied

NOTE Confidence: 0.9536803

00:57:34.130 --> 00:57:35.490 phenomenon that I don't quite

NOTE Confidence: 0.9536803

00:57:35.490 --> 00:57:35.990 understand.

NOTE Confidence: 0.99938834

00:57:45.515 --> 00:57:46.795 I think we might have

NOTE Confidence: 0.99938834

00:57:46.795 --> 00:57:48.735 time for one more question.

NOTE Confidence: 0.8993884

00:57:56.950 --> 00:57:57.990 Alright. It looks like doctor

NOTE Confidence: 0.8993884

00:57:57.990 --> 00:57:58.490 Ranganathan,

NOTE Confidence: 0.92936563

00:57:59.270 --> 00:58:00.310 got that in right under

NOTE Confidence: 0.92936563

00:58:00.310 --> 00:58:00.970 the wire.

NOTE Confidence: 0.95492536

00:58:02.310 --> 00:58:03.910 She's asking if we've heard,

NOTE Confidence: 0.95492536

00:58:03.910 --> 00:58:05.350 unless you'd like to ask,

NOTE Confidence: 0.95492536

00:58:05.510 --> 00:58:07.030 that with dry January there's

NOTE Confidence: 0.95492536

00:58:07.030 --> 00:58:08.870 increased cannabis use. Does this

NOTE Confidence: 0.95492536

00:58:08.870 --> 00:58:09.990 translate in some way to

NOTE Confidence: 0.95492536

00:58:09.990 --> 00:58:11.290 different rates of DUIs?

NOTE Confidence: 0.99383134

00:58:13.155 --> 00:58:14.515 That's a really interesting question.

NOTE Confidence: 0.99383134

00:58:14.515 --> 00:58:15.475 I don't know the answer

NOTE Confidence: 0.99383134

00:58:15.475 --> 00:58:16.135 to that.

NOTE Confidence: 0.9919073

00:58:16.435 --> 00:58:17.315 I I can,

NOTE Confidence: 0.97310066

00:58:18.035 --> 00:58:18.995 I can reach out to

NOTE Confidence: 0.97310066

00:58:18.995 --> 00:58:20.375 some of my epidemiology

NOTE Confidence: 0.9445285

00:58:21.475 --> 00:58:23.635 statistician friends and find that

NOTE Confidence: 0.9445285

00:58:23.635 --> 00:58:24.135 out,

NOTE Confidence: 0.9776314

00:58:24.595 --> 00:58:25.895 but, yes, that's

NOTE Confidence: 0.935036

00:58:26.240 --> 00:58:27.920 logically the the there may

NOTE Confidence: 0.935036

00:58:27.920 --> 00:58:29.440 well be, but I've never

NOTE Confidence: 0.935036

00:58:29.440 --> 00:58:30.420 seen that documented?

NOTE Confidence: 0.8993305

00:58:35.440 --> 00:58:35.940 And,

NOTE Confidence: 0.91672903

00:58:36.960 --> 00:58:38.880 doctor Prosen, if anybody has

NOTE Confidence: 0.91672903

00:58:38.880 --> 00:58:40.005 any follow-up questions,

NOTE Confidence: 0.9187525

00:58:42.845 --> 00:58:43.704 to reach you?

NOTE Confidence: 0.8764749

00:58:44.484 --> 00:58:46.585 Just email me at godfrey

NOTE Confidence: 0.8764749

00:58:46.724 --> 00:58:48.964 dot pearlson at yale dot

NOTE Confidence: 0.8764749

00:58:48.964 --> 00:58:49.785 e d u,

NOTE Confidence: 0.91441464

00:58:50.085 --> 00:58:51.765 and I'm happy to send

NOTE Confidence: 0.91441464

00:58:51.765 --> 00:58:52.265 people

NOTE Confidence: 0.9822978

00:58:52.724 --> 00:58:53.224 either

NOTE Confidence: 0.9022684

00:58:53.605 --> 00:58:54.105 papers,

NOTE Confidence: 0.93221784

00:58:54.780 --> 00:58:55.520 from the

NOTE Confidence: 0.99625015

00:58:56.060 --> 00:58:57.680 literature or answer questions directly.

NOTE Confidence: 0.9998029

00:58:58.300 --> 00:58:59.500 I'm very happy to do

NOTE Confidence: 0.9998029

00:58:59.500 --> 00:59:00.000 that.

NOTE Confidence: 0.9436262

00:59:00.620 --> 00:59:01.900 Thank you. We're adding the

NOTE Confidence: 0.9436262

00:59:01.900 --> 00:59:03.100 email to the chat for

NOTE Confidence: 0.9436262

00:59:03.100 --> 00:59:04.620 anybody who is Oh, okay.

NOTE Confidence: 0.9436262

00:59:04.620 --> 00:59:06.060 Thank you. You back. Appreciate

NOTE Confidence: 0.9436262

00:59:06.060 --> 00:59:06.560 that.

NOTE Confidence: 0.9274806

00:59:07.974 --> 00:59:09.095 Oh, I also have a

NOTE Confidence: 0.9274806

00:59:09.095 --> 00:59:10.714 TED talk on stone driving

NOTE Confidence: 0.9274806

00:59:10.935 --> 00:59:12.615 if anyone wants to listen

NOTE Confidence: 0.9274806

00:59:12.615 --> 00:59:14.635 to that. Oh, sounds great.

NOTE Confidence: 0.9106911

00:59:17.575 --> 00:59:18.775 Thank you so much, doctor

NOTE Confidence: 0.9106911

00:59:18.775 --> 00:59:19.275 Carlson.

NOTE Confidence: 0.98283815

00:59:19.734 --> 00:59:21.095 You're welcome. Thank you. Thank

NOTE Confidence: 0.98283815

00:59:21.095 --> 00:59:21.728 you. Thank you.