WEBVTT

NOTE duration:"01:01:30"

NOTE recognizability:0.880

NOTE language:en-us

NOTE Confidence: 0.824757143636364

00:00:00.000 --> 00:00:01.896 Something is making a very weird

NOTE Confidence: 0.824757143636364

00:00:01.896 --> 00:00:05.210 noise in this call room. Oh no.

NOTE Confidence: 0.859208505

00:00:05.210 --> 00:00:06.438 Will have a disclaimer

NOTE Confidence: 0.863766164545455

00:00:07.130 --> 00:00:08.258 will be like when I run

NOTE Confidence: 0.863766164545455

00:00:08.258 --> 00:00:09.290 out of the screen just.

NOTE Confidence: 0.86701247

00:00:12.580 --> 00:00:16.370 Alright, so good afternoon everyone.

NOTE Confidence: 0.86701247

00:00:16.370 --> 00:00:17.924 So as usual I'm going to start

NOTE Confidence: 0.86701247

00:00:17.924 --> 00:00:19.845 with a few announcements before I

NOTE Confidence: 0.86701247

00:00:19.845 --> 00:00:22.148 introduce our speaker first that

NOTE Confidence: 0.86701247

00:00:22.148 --> 00:00:24.918 these sleep seminar lectures are

NOTE Confidence: 0.86701247

00:00:24.918 --> 00:00:27.860 available for CME Credit Wendy.

NOTE Confidence: 0.86701247

00:00:27.860 --> 00:00:29.444 In real time and to receive

NOTE Confidence: 0.86701247

00:00:29.444 --> 00:00:31.331 credit you do need to text the

NOTE Confidence: 0.86701247

00:00:31.331 --> 00:00:33.137 ID for the lecture to Yale Cloud.

NOTE Confidence: 0.86701247

00:00:33.140 --> 00:00:34.512 See any by 3:15 PM today and

NOTE Confidence: 0.86701247

00:00:34.512 --> 00:00:35.864 there will be more information in

NOTE Confidence: 0.86701247

00:00:35.864 --> 00:00:37.530 the chat on his lecture goes on

NOTE Confidence: 0.86701247

00:00:37.581 --> 00:00:39.096 recordings of the lectures are

NOTE Confidence: 0.86701247

00:00:39.096 --> 00:00:40.611 available in approximately 2 weeks

NOTE Confidence: 0.86701247

00:00:40.620 --> 00:00:42.300 and the site will be in the chat.

NOTE Confidence: 0.86701247

00:00:42.300 --> 00:00:43.710 There is no CME credit

NOTE Confidence: 0.86701247

00:00:43.710 --> 00:00:44.838 available for later viewings.

NOTE Confidence: 0.86701247

00:00:44.840 --> 00:00:46.358 If you have questions please type

NOTE Confidence: 0.86701247

00:00:46.358 --> 00:00:48.105 them into the chat and we'll get

NOTE Confidence: 0.86701247

00:00:48.105 --> 00:00:49.701 to them at the end and otherwise.

NOTE Confidence: 0.86701247

00:00:49.710 --> 00:00:52.678 Please keep your microphone muted so

NOTE Confidence: 0.86701247

00:00:52.678 --> 00:00:55.542 today it is my pleasure to introduce our

NOTE Confidence: 0.86701247

00:00:55.542 --> 00:00:58.019 seminar speaker who's one of our own.

NOTE Confidence: 0.86701247

00:00:58.020 --> 00:01:00.484 Doctor Melissa Canaller Dr Can Art is

NOTE Confidence: 0.86701247

00:01:00.484 --> 00:01:02.644 an assistant professor in the Yale

NOTE Confidence: 0.86701247

00:01:02.644 --> 00:01:04.720 School of Medicine with a secondary

NOTE Confidence: 0.86701247

00:01:04.720 --> 00:01:06.717 appointment in the L School of Nursing.

NOTE Confidence: 0.86701247

00:01:06.720 --> 00:01:08.463 She received her pH D and her

NOTE Confidence: 0.86701247

00:01:08.463 --> 00:01:09.850 medical degree from Yale School

NOTE Confidence: 0.86701247

00:01:09.850 --> 00:01:11.908 of Medicine and then she moved to

NOTE Confidence: 0.86701247

00:01:11.908 --> 00:01:13.378 Philadelphia for Internal Medicine,

NOTE Confidence: 0.86701247

00:01:13.380 --> 00:01:15.530 internship and residency at the

NOTE Confidence: 0.86701247

00:01:15.530 --> 00:01:16.820 University of Pennsylvania.

NOTE Confidence: 0.86701247

00:01:16.820 --> 00:01:18.472 She returned to Yale to do her

NOTE Confidence: 0.86701247

00:01:18.472 --> 00:01:19.827 pulmonary and critical care and

NOTE Confidence: 0.86701247

00:01:19.827 --> 00:01:21.015 her Sleep Medicine fellowships,

NOTE Confidence: 0.86701247

00:01:21.020 --> 00:01:23.022 and then she Subs when we stayed

NOTE Confidence: 0.86701247

00:01:23.022 --> 00:01:24.480 on here as faculty,

NOTE Confidence: 0.86701247

00:01:24.480 --> 00:01:26.605 she is active clinically in

NOTE Confidence: 0.86701247

00:01:26.605 --> 00:01:27.880 education and research.

NOTE Confidence: 0.86701247

00:01:27.880 --> 00:01:29.520 She attends in Sleep Medicine.

NOTE Confidence: 0.86701247

00:01:29.520 --> 00:01:31.753 And in the medical ICU she's currently

NOTE Confidence: 0.86701247

00:01:31.753 --> 00:01:33.960 on jeopardy and working as we speak,

NOTE Confidence: 0.86701247

00:01:33.960 --> 00:01:35.936 so we give her a lot of credit

NOTE Confidence: 0.86701247

00:01:35.936 --> 00:01:37.120 for doing this talk.

NOTE Confidence: 0.86701247

00:01:37.120 --> 00:01:39.619 Today she served as the associate program

NOTE Confidence: 0.86701247

00:01:39.619 --> 00:01:42.076 director for the Yale Sleep Medicine

NOTE Confidence: 0.86701247

00:01:42.076 --> 00:01:44.486 Fellowship program from 2013 to 2021,

NOTE Confidence: 0.86701247

00:01:44.486 --> 00:01:46.296 and she's been an inspirational

NOTE Confidence: 0.86701247

00:01:46.296 --> 00:01:48.702 mentor and role model for multiple

NOTE Confidence: 0.86701247

00:01:48.702 --> 00:01:50.318 trainees during this time.

NOTE Confidence: 0.86701247

00:01:50.320 --> 00:01:51.126 She's lectured,

NOTE Confidence: 0.86701247

00:01:51.126 --> 00:01:52.738 know locally and nationally,

NOTE Confidence: 0.86701247

00:01:52.740 --> 00:01:55.239 on topics and sleep in circadian science,

NOTE Confidence: 0.86701247

00:01:55.240 --> 00:01:56.600 and she's regularly participated in

NOTE Confidence: 0.86701247

00:01:56.600 --> 00:01:58.470 the American College of Chest Physicians.

NOTE Confidence: 0.86701247

00:01:58.470 --> 00:02:00.670 Sleep four to review course.

NOTE Confidence: 0.86701247

00:02:00.670 --> 00:02:02.878 Her research centers on sleep and

NOTE Confidence: 0.86701247

00:02:02.878 --> 00:02:04.860 circadian disruption in critical illness.

NOTE Confidence: 0.86701247

00:02:04.860 --> 00:02:06.904 She is a recipient of numerous grants,

NOTE Confidence: 0.86701247

00:02:06.910 --> 00:02:08.646 including from the NHLBI,

NOTE Confidence: 0.86701247

00:02:08.646 --> 00:02:10.816 the National Center for Advancing

NOTE Confidence: 0.86701247

00:02:10.816 --> 00:02:11.850 Translational Sciences,

NOTE Confidence: 0.86701247

00:02:11.850 --> 00:02:13.900 the National Institute on Aging,

NOTE Confidence: 0.86701247

00:02:13.900 --> 00:02:15.450 American Academy of Sleep Medicine,

NOTE Confidence: 0.86701247

00:02:15.450 --> 00:02:16.626 and other agencies.

NOTE Confidence: 0.86701247

00:02:16.626 --> 00:02:18.586 She is currently principal investigator

NOTE Confidence: 0.86701247

00:02:18.586 --> 00:02:20.820 on three ongoing clinical trials,

NOTE Confidence: 0.86701247

00:02:20.820 --> 00:02:22.384 including circadian rhythm as

NOTE Confidence: 0.86701247

00:02:22.384 --> 00:02:24.339 a novel therapeutic target in

NOTE Confidence: 0.86701247

00:02:24.339 --> 00:02:26.039 the intensive care unit.

NOTE Confidence: 0.86701247

00:02:26.040 --> 00:02:28.308 Randomized control trial of daytime bright,

NOTE Confidence: 0.86701247

00:02:28.310 --> 00:02:30.630 light, circadian abnormalities and delirium.

NOTE Confidence: 0.86701247

00:02:30.630 --> 00:02:32.514 In medical ICU patients and a

NOTE Confidence: 0.86701247

00:02:32.514 --> 00:02:33.770 randomized controlled trial of

NOTE Confidence: 0.86701247

00:02:33.825 --> 00:02:35.649 intermittent feeding in mechanically

NOTE Confidence: 0.86701247

00:02:35.649 --> 00:02:37.017 ventilated ICU patients.

NOTE Confidence: 0.86701247

00:02:37.020 --> 00:02:38.112 She wasn't invited.

NOTE Confidence: 0.86701247

00:02:38.112 --> 00:02:39.932 ASM representative at the recent

NOTE Confidence: 0.86701247

00:02:39.932 --> 00:02:41.880 Sleep Research Society Workshop on

NOTE Confidence: 0.86701247

00:02:41.880 --> 00:02:43.815 Sleep and circadian rhythm disorders,

NOTE Confidence: 0.86701247

00:02:43.820 --> 00:02:45.535 so we are really pleased to have

NOTE Confidence: 0.86701247

00:02:45.535 --> 00:02:46.025 Doctor Canal.

NOTE Confidence: 0.86701247

00:02:46.030 --> 00:02:47.983 Join us today and she's going to

NOTE Confidence: 0.86701247

00:02:47.983 --> 00:02:49.181 be discussing sleep deficiency

NOTE Confidence: 0.86701247

00:02:49.181 --> 00:02:50.975 in the ICU beyond the brain.

NOTE Confidence: 0.86701247

00:02:50.980 --> 00:02:51.560 Welcome,

NOTE Confidence: 0.966108988571429

00:02:51.920 --> 00:02:53.260 thanks so much Janet.

NOTE Confidence: 0.966108988571429

00:02:53.260 --> 00:02:54.265 Thank you everyone.

NOTE Confidence: 0.966108988571429

00:02:54.270 --> 00:02:56.398 It's really a pleasure to be here.

NOTE Confidence: 0.966108988571429

00:02:56.400 --> 00:02:58.776 I am over in the hospital and if I

NOTE Confidence: 0.966108988571429

00:02:58.776 --> 00:03:01.139 for some reason get disconnected.

NOTE Confidence: 0.966108988571429

00:03:01.140 --> 00:03:02.956 Or frozen, I'm just gonna jump back on

NOTE Confidence: 0.966108988571429

00:03:02.956 --> 00:03:05.318 or or pause and wait for it to keep going.

NOTE Confidence: 0.966108988571429

00:03:05.320 --> 00:03:06.840 It seems like the connection is pretty good,

NOTE Confidence: 0.966108988571429

00:03:06.840 --> 00:03:09.420 but I apologize for the logistics.

NOTE Confidence: 0.966108988571429

00:03:09.420 --> 00:03:11.429 It really is my pleasure today to

NOTE Confidence: 0.966108988571429

00:03:11.429 --> 00:03:13.427 talk to you about safe deficiency

NOTE Confidence: 0.966108988571429

00:03:13.427 --> 00:03:15.557 in the ICU beyond the brain.

NOTE Confidence: 0.966108988571429

00:03:15.560 --> 00:03:18.160 This is a new talk for me in a really

NOTE Confidence: 0.966108988571429

00:03:18.235 --> 00:03:19.995 fun talk and sort of scientifically,

NOTE Confidence: 0.966108988571429

00:03:19.995 --> 00:03:21.520 really exciting that there's there's

NOTE Confidence: 0.966108988571429

00:03:21.520 --> 00:03:23.188 something a little bit to talk about

NOTE Confidence: 0.966108988571429

00:03:23.188 --> 00:03:24.883 because I think this is something that's

NOTE Confidence: 0.966108988571429

00:03:24.883 --> 00:03:27.458 been emerging for much of my my career,

NOTE Confidence: 0.966108988571429

00:03:27.460 --> 00:03:29.880 and so glad that we've

NOTE Confidence: 0.966108988571429

00:03:29.880 --> 00:03:31.816 taken some steps forward.

NOTE Confidence: 0.966108988571429

00:03:31.820 --> 00:03:32.490 Uhm?

NOTE Confidence: 0.930561768

00:03:47.030 --> 00:03:48.030 I have nothing to disclose.

NOTE Confidence: 0.812127436666667

00:03:55.820 --> 00:03:58.676 I'm sorry, who is that work?

NOTE Confidence: 0.812127436666667

00:03:58.680 --> 00:04:01.810 OK sorry, sorry nothing to disclose

NOTE Confidence: 0.812127436666667

00:04:01.810 --> 00:04:04.214 and also the CME code is here on

NOTE Confidence: 0.812127436666667

00:04:04.214 --> 00:04:06.262 this slide and will also be in the

NOTE Confidence: 0.812127436666667

00:04:06.326 --> 00:04:08.336 chat as doctor Hilbert mentioned.

NOTE Confidence: 0.90845822

00:04:12.720 --> 00:04:14.392 OK, so today we're gonna do a little

NOTE Confidence: 0.90845822

00:04:14.392 --> 00:04:15.980 bit of work on definitions and

NOTE Confidence: 0.90845822

00:04:15.980 --> 00:04:17.648 background so that you know where

NOTE Confidence: 0.90845822

00:04:17.699 --> 00:04:19.397 I'm coming from with sleep and

NOTE Confidence: 0.90845822

00:04:19.397 --> 00:04:20.884 circadian disruption in the ICU.

NOTE Confidence: 0.90845822

00:04:20.884 --> 00:04:23.008 Well then go into the functional

NOTE Confidence: 0.90845822

00:04:23.008 --> 00:04:24.524 consequences of these disruptions

NOTE Confidence: 0.90845822

00:04:24.524 --> 00:04:26.888 and all scattered in through that.

NOTE Confidence: 0.90845822

00:04:26.890 --> 00:04:28.835 I'll talk about some possible

NOTE Confidence: 0.90845822

00:04:28.835 --> 00:04:30.391 interventions that are emerging

NOTE Confidence: 0.90845822

00:04:30.391 --> 00:04:32.519 for our critically ill patients.

NOTE Confidence: 0.90845822

00:04:32.520 --> 00:04:35.740 And so sleep deficiency is a construct

NOTE Confidence: 0.90845822

00:04:35.740 --> 00:04:38.295 proposed in more recent years by any

NOTE Confidence: 0.90845822

00:04:38.295 --> 00:04:41.586 by the NIH as an attempt to really

NOTE Confidence: 0.90845822

00:04:41.586 --> 00:04:44.267 define the domains within what I would

NOTE Confidence: 0.90845822

00:04:44.267 --> 00:04:46.570 call a syndrome of ways that sleep

NOTE Confidence: 0.90845822

00:04:46.646 --> 00:04:49.028 and circadian rhythms can go awry.

NOTE Confidence: 0.90845822

00:04:49.030 --> 00:04:49.582 There's mentioned,

NOTE Confidence: 0.90845822

00:04:49.582 --> 00:04:51.238 and these these things I think,

NOTE Confidence: 0.90845822

00:04:51.240 --> 00:04:52.455 are still evolving,

NOTE Confidence: 0.90845822

00:04:52.455 --> 00:04:54.885 and there's been some very thoughtful

NOTE Confidence: 0.90845822

00:04:54.885 --> 00:04:56.658 efforts to formalize these domains

NOTE Confidence: 0.90845822

00:04:56.658 --> 00:04:59.026 and to really try to come come

NOTE Confidence: 0.90845822

00:04:59.026 --> 00:05:01.234 to a common nosology a bit.

NOTE Confidence: 0.90845822

00:05:01.240 --> 00:05:01.870 At this time.

NOTE Confidence: 0.90845822

00:05:01.870 --> 00:05:03.340 You know what we're really talking about.

NOTE Confidence: 0.90845822

00:05:03.340 --> 00:05:05.720 Or abnormalities in sleep duration

NOTE Confidence: 0.90845822

00:05:05.720 --> 00:05:06.708 in the chronic literature.

NOTE Confidence: 0.90845822

00:05:06.708 --> 00:05:08.190 This can be short or long.

NOTE Confidence: 0.90845822

00:05:08.190 --> 00:05:09.888 In the ICU we most typically

NOTE Confidence: 0.90845822

00:05:09.888 --> 00:05:11.020 talk about short sleep.

NOTE Confidence: 0.90845822

00:05:11.020 --> 00:05:13.348 Also issues with sleep quality that

NOTE Confidence: 0.90845822

00:05:13.348 --> 00:05:15.780 encompass changes in sleep architecture,

NOTE Confidence: 0.90845822

00:05:15.780 --> 00:05:18.126 notably differences in REM and slow

NOTE Confidence: 0.90845822

00:05:18.126 --> 00:05:19.804 wave sleep increases in arousal

NOTE Confidence: 0.90845822

00:05:19.804 --> 00:05:21.890 that can be quite dramatic to the

NOTE Confidence: 0.90845822

00:05:21.948 --> 00:05:23.844 tune of 30 to 40 arousals per hour

NOTE Confidence: 0.90845822

00:05:23.844 --> 00:05:25.866 of sleep and also very importantly

NOTE Confidence: 0.90845822

00:05:25.866 --> 00:05:27.354 patient perception of sleep.

NOTE Confidence: 0.90845822

00:05:27.360 --> 00:05:29.047 And so there is this real disconnect

NOTE Confidence: 0.90845822

00:05:29.047 --> 00:05:31.008 between what we can measure with our

NOTE Confidence: 0.90845822

00:05:31.008 --> 00:05:32.790 objective tools and what patients perceive,

NOTE Confidence: 0.90845822

00:05:32.790 --> 00:05:34.270 and both of those.

NOTE Confidence: 0.90845822

00:05:34.270 --> 00:05:36.490 Entities can be linked to outcomes.

NOTE Confidence: 0.90845822

00:05:36.490 --> 00:05:38.706 We also know that sleep timing is an

NOTE Confidence: 0.90845822

00:05:38.706 --> 00:05:40.410 important part of sleep deficiency,

NOTE Confidence: 0.90845822

00:05:40.410 --> 00:05:42.288 and in this case we're talking

NOTE Confidence: 0.90845822

00:05:42.288 --> 00:05:44.253 about sleep that does not occur

NOTE Confidence: 0.90845822

00:05:44.253 --> 00:05:45.878 during the biological night or

NOTE Confidence: 0.90845822

00:05:45.878 --> 00:05:47.999 the time that melatonin is high.

NOTE Confidence: 0.90845822

00:05:48.000 --> 00:05:49.416 Try to keep that term consistent.

NOTE Confidence: 0.90845822

00:05:49.420 --> 00:05:51.120 I sometimes call that circadian

NOTE Confidence: 0.90845822

00:05:51.120 --> 00:05:52.140 night as well,

NOTE Confidence: 0.90845822

00:05:52.140 --> 00:05:54.138 and So what I mean and that is the

NOTE Confidence: 0.90845822

00:05:54.138 --> 00:05:55.882 time that melatonin is high and

NOTE Confidence: 0.90845822

00:05:55.882 --> 00:05:57.931 that your body is really cute to

NOTE Confidence: 0.90845822

00:05:57.931 --> 00:05:59.793 be sleeping and also in and sleep.

NOTE Confidence: 0.90845822

00:05:59.800 --> 00:06:02.240 Deficiency is some aspect of

NOTE Confidence: 0.90845822

00:06:02.240 --> 00:06:03.698 daytime function I think.

NOTE Confidence: 0.90845822

00:06:03.698 --> 00:06:05.610 For the ICU I most readily think of

NOTE Confidence: 0.90845822

00:06:05.670 --> 00:06:07.630 things like alertness and cognition.

NOTE Confidence: 0.90845822

00:06:07.630 --> 00:06:09.196 This can be more expanded in

NOTE Confidence: 0.90845822

00:06:09.196 --> 00:06:10.465 the outpatient setting and all

NOTE Confidence: 0.90845822

00:06:10.465 --> 00:06:11.817 of us are most of us are or.

NOTE Confidence: 0.90845822

00:06:11.820 --> 00:06:12.071 Sorry,

NOTE Confidence: 0.90845822

00:06:12.071 --> 00:06:14.079 I'm sure many of us are familiar with

NOTE Confidence: 0.90845822

00:06:14.079 --> 00:06:16.065 the many cognitive domains that have

NOTE Confidence: 0.90845822

00:06:16.065 --> 00:06:18.010 been tested in sleep deficiency and.

NOTE Confidence: 0.90845822

00:06:18.010 --> 00:06:20.131 And how those can be impacted by

NOTE Confidence: 0.90845822

00:06:20.131 --> 00:06:22.329 short sleep or slow sleep quality?

NOTE Confidence: 0.90845822

00:06:22.330 --> 00:06:24.286 I think it's important at this

NOTE Confidence: 0.90845822

00:06:24.286 --> 00:06:26.683 juncture to to say that we really

NOTE Confidence: 0.90845822

00:06:26.683 --> 00:06:28.388 don't know what is normal,

NOTE Confidence: 0.90845822

00:06:28.390 --> 00:06:30.442 and therefore it's very hard to

NOTE Confidence: 0.90845822

00:06:30.442 --> 00:06:32.110 define what is abnormally ICU.

NOTE Confidence: 0.90845822

00:06:32.110 --> 00:06:34.385 There is some consideration that

NOTE Confidence: 0.90845822

00:06:34.385 --> 00:06:36.205 especially disruptions in circadian

NOTE Confidence: 0.90845822

00:06:36.205 --> 00:06:39.094 rhythm might both be an innate aspect of

NOTE Confidence: 0.90845822

00:06:39.094 --> 00:06:41.208 acute critical illness and brain injury,

NOTE Confidence: 0.90845822

00:06:41.210 --> 00:06:42.342 as might sleep disruptions,

NOTE Confidence: 0.90845822

00:06:42.342 --> 00:06:44.968 but also that some of it may be adaptive.

NOTE Confidence: 0.90845822

00:06:44.970 --> 00:06:45.233 So,

NOTE Confidence: 0.90845822

00:06:45.233 --> 00:06:45.759 for example,

NOTE Confidence: 0.90845822

00:06:45.759 --> 00:06:48.030 it may be that loss of circadian rhythmicity

NOTE Confidence: 0.90845822

00:06:48.030 --> 00:06:50.620 is in fact adaptive during acute infection.

NOTE Confidence: 0.90845822

00:06:50.620 --> 00:06:52.684 There is very little evidence in this regard.

NOTE Confidence: 0.90845822

00:06:52.690 --> 00:06:55.330 It really is not known.

NOTE Confidence: 0.889279159166667

00:06:55.330 --> 00:06:58.046 But I share with you really this

NOTE Confidence: 0.889279159166667

00:06:58.046 --> 00:06:59.980 fundamental question of the field.

NOTE Confidence: 0.889279159166667

00:06:59.980 --> 00:07:00.990 But I think there is.

NOTE Confidence: 0.889279159166667

00:07:00.990 --> 00:07:01.846 On the flip side,

NOTE Confidence: 0.889279159166667

00:07:01.846 --> 00:07:03.527 a sense that we know acute sleep

NOTE Confidence: 0.889279159166667

00:07:03.527 --> 00:07:05.267 deprivation can be quite detrimental,

NOTE Confidence: 0.889279159166667

00:07:05.270 --> 00:07:06.662 and while some of this might

NOTE Confidence: 0.889279159166667

00:07:06.662 --> 00:07:08.010 be innate to critical illness,

NOTE Confidence: 0.889279159166667

00:07:08.010 --> 00:07:10.539 it can't possibly be good to be waking our

NOTE Confidence: 0.889279159166667

00:07:10.539 --> 00:07:12.805 patients up purposely several times an hour,

NOTE Confidence: 0.889279159166667

00:07:12.810 --> 00:07:14.928 and so there's a balance there,

NOTE Confidence: 0.889279159166667

00:07:14.930 --> 00:07:16.298 and a lot to be untangled.

NOTE Confidence: 0.889279159166667

00:07:16.300 --> 00:07:18.160 But that's the context that

NOTE Confidence: 0.889279159166667

00:07:18.160 --> 00:07:19.648 we're working in today.

NOTE Confidence: 0.889279159166667

00:07:19.650 --> 00:07:22.274 We know, so that was a general description

NOTE Confidence: 0.889279159166667

00:07:22.274 --> 00:07:24.879 of the domains of sleep deficiency.

NOTE Confidence: 0.889279159166667

00:07:24.880 --> 00:07:27.136 We know when the ICU that patients in

NOTE Confidence: 0.889279159166667

00:07:27.136 --> 00:07:29.178 general have a shorter sleep duration,

NOTE Confidence: 0.889279159166667

00:07:29.180 --> 00:07:31.756 and even if their duration approaches normal,

NOTE Confidence: 0.889279159166667

00:07:31.760 --> 00:07:34.854 it does not occur occur in a

NOTE Confidence: 0.889279159166667

00:07:34.854 --> 00:07:37.225 consolidated time or generally considered

NOTE Confidence: 0.889279159166667

00:07:37.225 --> 00:07:40.195 occurs across the 24 hour period.

NOTE Confidence: 0.889279159166667

00:07:40.200 --> 00:07:41.935 We also know that patients

NOTE Confidence: 0.889279159166667

00:07:41.935 --> 00:07:43.323 have problems initiating sleep.

NOTE Confidence: 0.889279159166667

00:07:43.330 --> 00:07:45.385 They have the increased number

NOTE Confidence: 0.889279159166667

00:07:45.385 --> 00:07:47.440 of arousals that I mentioned

NOTE Confidence: 0.889279159166667

00:07:47.511 --> 00:07:49.809 decrease REM and slow wave sleep.

NOTE Confidence: 0.889279159166667

00:07:49.810 --> 00:07:50.882 Sleep occurs equally during

NOTE Confidence: 0.889279159166667

00:07:50.882 --> 00:07:51.954 the day and night.

NOTE Confidence: 0.889279159166667

00:07:51.960 --> 00:07:53.316 So while patients maybe get get

NOTE Confidence: 0.889279159166667

00:07:53.316 --> 00:07:54.919 six or even in some studies,

NOTE Confidence: 0.889279159166667

00:07:54.920 --> 00:07:55.996 7 hours of sleep,

NOTE Confidence: 0.889279159166667

00:07:55.996 --> 00:07:57.956 they're getting three or four at night

NOTE Confidence: 0.889279159166667

00:07:57.956 --> 00:07:59.937 and three or four during the daytime

NOTE Confidence: 0.889279159166667

00:07:59.940 --> 00:08:02.796 and we daytime function is also abnormal,

NOTE Confidence: 0.889279159166667

00:08:02.800 --> 00:08:06.050 and I think all of all of those who have.

NOTE Confidence: 0.889279159166667

00:08:06.050 --> 00:08:08.745 Being providers in the ICU or who

NOTE Confidence: 0.889279159166667

00:08:08.745 --> 00:08:11.153 have visited friends or family in the

NOTE Confidence: 0.889279159166667

00:08:11.153 --> 00:08:13.840 ICU can see that this is quite clear.

NOTE Confidence: 0.889279159166667

00:08:13.840 --> 00:08:17.000 We also know that.

NOTE Confidence: 0.889279159166667

00:08:17.000 --> 00:08:19.430 ICU patients are generally have a

NOTE Confidence: 0.889279159166667

00:08:19.430 --> 00:08:21.444 delayed phase of circadian alignment

NOTE Confidence: 0.889279159166667

00:08:21.444 --> 00:08:24.036 and this is a very nice early study

NOTE Confidence: 0.889279159166667

00:08:24.036 --> 00:08:26.319 by Brian Gehlbach and his group

NOTE Confidence: 0.889279159166667

00:08:26.320 --> 00:08:28.602 and what he has demonstrated for us

NOTE Confidence: 0.889279159166667

00:08:28.602 --> 00:08:31.150 here is is really just a simple.

NOTE Confidence: 0.889279159166667

00:08:31.150 --> 00:08:32.806 Illustration of alignment and so on.

NOTE Confidence: 0.889279159166667

00:08:32.810 --> 00:08:35.848 The X axis he's placed clock time.

NOTE Confidence: 0.889279159166667

00:08:35.850 --> 00:08:37.810 He started in the evening at 1800

NOTE Confidence: 0.889279159166667

00:08:37.810 --> 00:08:39.670 and then preceded to the next evening

NOTE Confidence: 0.889279159166667

00:08:39.670 --> 00:08:41.458 of 1800 and then in that solid

NOTE Confidence: 0.889279159166667

00:08:41.458 --> 00:08:43.418 black rectangle that you see at the

NOTE Confidence: 0.889279159166667

00:08:43.418 --> 00:08:45.856 bottom of the screen with radiating

NOTE Confidence: 0.889279159166667

00:08:45.856 --> 00:08:49.270 dashed lines that I confess I added.

NOTE Confidence: 0.889279159166667

00:08:49.270 --> 00:08:50.817 He has just drawn and what he

NOTE Confidence: 0.889279159166667

00:08:50.817 --> 00:08:52.510 thinks is a normal sleep time,

NOTE Confidence: 0.889279159166667

00:08:52.510 --> 00:08:54.400 and so he's trying to Orient

NOTE Confidence: 0.889279159166667

00:08:54.400 --> 00:08:56.628 us to when the sleep period,

NOTE Confidence: 0.889279159166667

00:08:56.628 --> 00:08:59.232 and also when the melatonin elevation should

NOTE Confidence: 0.889279159166667

00:08:59.232 --> 00:09:01.350 be or the biologic night as I called her.

NOTE Confidence: 0.889279159166667

00:09:01.350 --> 00:09:02.582 Earlier in this talk,

NOTE Confidence: 0.889279159166667

00:09:02.582 --> 00:09:04.430 and then each of these striped

NOTE Confidence: 0.889279159166667

00:09:04.497 --> 00:09:06.420 record rectangles represents a

NOTE Confidence: 0.889279159166667

00:09:06.420 --> 00:09:07.720 subject that he took urinary,

NOTE Confidence: 0.889279159166667

00:09:07.720 --> 00:09:08.060 excel,

NOTE Confidence: 0.889279159166667

00:09:08.060 --> 00:09:08.400 photography,

NOTE Confidence: 0.889279159166667

00:09:08.400 --> 00:09:10.440 melatonin and made an estimate of

NOTE Confidence: 0.889279159166667

00:09:10.440 --> 00:09:12.388 when their biologic night would be

NOTE Confidence: 0.889279159166667

00:09:12.388 --> 00:09:14.206 when their time of high melatonin

NOTE Confidence: 0.889279159166667

00:09:14.259 --> 00:09:15.981 would be and what he's illustrating

NOTE Confidence: 0.889279159166667

00:09:15.981 --> 00:09:17.880 and then excuse me and then he

NOTE Confidence: 0.889279159166667

00:09:17.880 --> 00:09:19.630 put him in in order of estimated

NOTE Confidence: 0.889279159166667

00:09:19.691 --> 00:09:21.167 dim light melatonin onset.

NOTE Confidence: 0.889279159166667

00:09:21.170 --> 00:09:23.450 So what he's illustrating really is

NOTE Confidence: 0.889279159166667

00:09:23.450 --> 00:09:26.063 that these bottom two individuals are

NOTE Confidence: 0.889279159166667

00:09:26.063 --> 00:09:29.117 perhaps slightly advanced compared to normal.

NOTE Confidence: 0.889279159166667

00:09:29.120 --> 00:09:30.290 The next few,

NOTE Confidence: 0.889279159166667

00:09:30.290 --> 00:09:32.240 the next two or three.

NOTE Confidence: 0.889279159166667

00:09:32.240 --> 00:09:34.310 Maybe four if you're generous,

NOTE Confidence: 0.889279159166667

00:09:34.310 --> 00:09:35.288 are normally aligned,

NOTE Confidence: 0.889279159166667

00:09:35.288 --> 00:09:37.570 and they have a dim light melatonin

NOTE Confidence: 0.889279159166667

00:09:37.628 --> 00:09:39.784 onset not too far away from that

NOTE Confidence: 0.889279159166667

00:09:39.784 --> 00:09:41.060 first vertical dashed line,

NOTE Confidence: 0.889279159166667

00:09:41.060 --> 00:09:42.608 but then the remainder of the

NOTE Confidence: 0.889279159166667

00:09:42.608 --> 00:09:44.507 subjects as you go up further on

NOTE Confidence: 0.889279159166667

00:09:44.507 --> 00:09:46.390 the graph are really delayed all the

NOTE Confidence: 0.9081542956

00:09:46.447 --> 00:09:47.737 way to the last subject,

NOTE Confidence: 0.9081542956

00:09:47.740 --> 00:09:49.588 who is almost eight or nine hours delayed.

NOTE Confidence: 0.9081542956

00:09:49.590 --> 00:09:52.803 And So what he's trying to convey is the

NOTE Confidence: 0.9081542956

00:09:52.803 --> 00:09:55.647 spectrum of of circadian alignment in ICU.

NOTE Confidence: 0.9081542956

00:09:55.650 --> 00:09:57.938 In this small study, and also to demonstrate,

NOTE Confidence: 0.9081542956

00:09:57.940 --> 00:10:00.040 as I said at the start of this slide that

NOTE Confidence: 0.9081542956

00:10:00.096 --> 00:10:02.144 most patients in the ICU have a delayed.

NOTE Confidence: 0.9081542956

00:10:02.150 --> 00:10:04.326 Phenotype and this makes a lot of sense

NOTE Confidence: 0.9081542956

00:10:04.326 --> 00:10:06.805 when you think about the light patterns and

NOTE Confidence: 0.9081542956

00:10:06.805 --> 00:10:09.644 exposures in the ICU in the fact that it is

NOTE Confidence: 0.9081542956

00:10:09.644 --> 00:10:13.070 easier to delay humans in circadian phase.

NOTE Confidence: 0.9081542956

00:10:13.070 --> 00:10:15.135 This is another study done by Kyle

NOTE Confidence: 0.9081542956

00:10:15.135 --> 00:10:17.409 goes in them at all these studies.

NOTE Confidence: 0.9081542956

00:10:17.410 --> 00:10:19.795 Patients have been in the ICU for quite a

NOTE Confidence: 0.9081542956

00:10:19.795 --> 00:10:22.235 bit of time on average of 20 or 30 days,

NOTE Confidence: 0.9081542956

00:10:22.240 --> 00:10:24.578 but they looked at core body temperature

NOTE Confidence: 0.9081542956

00:10:24.578 --> 00:10:27.381 and so I've just have a descriptive table

NOTE Confidence: 0.9081542956

00:10:27.381 --> 00:10:30.221 here on the left telling you a little

NOTE Confidence: 0.9081542956

00:10:30.221 --> 00:10:32.650 bit about the patients whose 21 subjects.

NOTE Confidence: 0.9081542956

00:10:32.650 --> 00:10:33.776 They were.

NOTE Confidence: 0.9081542956

00:10:33.776 --> 00:10:38.280 About roughly half and Half Men and women,

NOTE Confidence: 0.9081542956

00:10:38.280 --> 00:10:40.450 they were in their 60s.

NOTE Confidence: 0.9081542956

00:10:40.450 --> 00:10:44.546 They had a Apache three score around 49.

NOTE Confidence: 0.9081542956

00:10:44.550 --> 00:10:46.080 And at the bottom here,

NOTE Confidence: 0.9081542956

00:10:46.080 --> 00:10:48.061 the first day of core body temperature

NOTE Confidence: 0.9081542956

00:10:48.061 --> 00:10:49.589 recording was an average day.

NOTE Confidence: 0.9081542956

00:10:49.590 --> 00:10:50.550 Twenty of their admission.

NOTE Confidence: 0.9081542956

00:10:50.550 --> 00:10:52.672 So a bit of a different population from

NOTE Confidence: 0.9081542956

00:10:52.672 --> 00:10:54.550 with Doctor Gehlbach shared with us.

NOTE Confidence: 0.9081542956

00:10:54.550 --> 00:10:56.405 But what they show on this right

NOTE Confidence: 0.9081542956

00:10:56.405 --> 00:10:58.319 hand panel that I've included is

NOTE Confidence: 0.9081542956

00:10:58.319 --> 00:11:01.031 that on the X axis is the Apache

NOTE Confidence: 0.9081542956

00:11:01.031 --> 00:11:03.250 Three score 0 being low acuity,

NOTE Confidence: 0.9081542956

00:11:03.250 --> 00:11:05.320 low severity of illness and 100

NOTE Confidence: 0.9081542956

00:11:05.397 --> 00:11:07.497 being high severity of illness.

NOTE Confidence: 0.9081542956

00:11:07.500 --> 00:11:09.804 And then on the Y axis degree of

NOTE Confidence: 0.9081542956

00:11:09.804 --> 00:11:11.225 circadian displacement in hours and

NOTE Confidence: 0.9081542956

00:11:11.225 --> 00:11:12.797 what the authors want to impress

NOTE Confidence: 0.9081542956

00:11:12.797 --> 00:11:14.688 upon you is that the more severely.

NOTE Confidence: 0.9081542956

00:11:14.690 --> 00:11:16.840 Our patients have much more

NOTE Confidence: 0.9081542956

00:11:16.840 --> 00:11:17.700 circadian displacement,

NOTE Confidence: 0.9081542956

00:11:17.700 --> 00:11:20.948 so this attempt to to look together at

NOTE Confidence: 0.9081542956

00:11:20.948 --> 00:11:23.893 how circadian delay may be associated

NOTE Confidence: 0.9081542956

00:11:23.893 --> 00:11:26.453 with increased severity of illness.

NOTE Confidence: 0.9081542956

00:11:26.460 --> 00:11:27.376 And since that time,

NOTE Confidence: 0.9081542956

00:11:27.376 --> 00:11:29.180 these are two of the earlier studies.

NOTE Confidence: 0.9081542956

00:11:29.180 --> 00:11:31.598 There's there's been a fair amount

NOTE Confidence: 0.9081542956

00:11:31.600 --> 00:11:32.985 of work really demonstrating that

NOTE Confidence: 0.9081542956

00:11:32.985 --> 00:11:35.099 in a wide variety of ICU patients.

NOTE Confidence: 0.9081542956

00:11:35.100 --> 00:11:36.600 Neurologic, critical illness,

NOTE Confidence: 0.9081542956

00:11:36.600 --> 00:11:38.100 surgical critical illness,

NOTE Confidence: 0.9081542956

00:11:38.100 --> 00:11:39.324 medical critical illness,

NOTE Confidence: 0.9081542956

00:11:39.324 --> 00:11:41.772 that there is considerable loss of

NOTE Confidence: 0.9081542956

00:11:41.772 --> 00:11:43.468 circadian amplitude and rhythm,

NOTE Confidence: 0.9081542956

00:11:43.470 --> 00:11:46.880 but also delay and misalignments.

NOTE Confidence: 0.9081542956

00:11:46.880 --> 00:11:48.700 I included this slide just to remind

NOTE Confidence: 0.9081542956

00:11:48.700 --> 00:11:50.714 us of the fundamentals of the two

NOTE Confidence: 0.9081542956

00:11:50.714 --> 00:11:53.043 process model and so this is a cartoon

NOTE Confidence: 0.9081542956

00:11:53.043 --> 00:11:54.821 along the again along the X axis

NOTE Confidence: 0.9081542956

00:11:54.821 --> 00:11:56.844 is time starting the even boxes we

NOTE Confidence: 0.9081542956

00:11:56.844 --> 00:11:58.725 starting in the morning going into

NOTE Confidence: 0.9081542956

00:11:58.725 --> 00:12:00.651 the evening and then double plotted

NOTE Confidence: 0.9081542956

00:12:00.651 --> 00:12:03.360 so repetition we have the homeostatic

NOTE Confidence: 0.9081542956

00:12:03.360 --> 00:12:06.450 sleep drive in purple coming up,

NOTE Confidence: 0.9081542956

00:12:06.450 --> 00:12:09.012 peaking right at bedtime and then

NOTE Confidence: 0.9081542956

00:12:09.012 --> 00:12:11.262 decreasing during the the illustrated

NOTE Confidence: 0.9081542956

00:12:11.262 --> 00:12:14.082 period of this patient sleep and

NOTE Confidence: 0.9081542956

00:12:14.082 --> 00:12:16.508 then underlying that we also have.

NOTE Confidence: 0.9081542956

00:12:16.510 --> 00:12:19.550 Process see the circadian process

NOTE Confidence: 0.9081542956

00:12:19.550 --> 00:12:21.539 and the reason I like to see the two

NOTE Confidence: 0.9081542956

00:12:21.539 --> 00:12:22.822 process model in this illustrated

NOTE Confidence: 0.9081542956

00:12:22.822 --> 00:12:24.707 way is that I can really imagine

NOTE Confidence: 0.9081542956

00:12:24.707 --> 00:12:26.621 that this arousal drive from the

NOTE Confidence: 0.9081542956

00:12:26.621 --> 00:12:28.286 circadian system is tagging along

NOTE Confidence: 0.9081542956

00:12:28.286 --> 00:12:30.338 with a homeostatic drive and fighting

NOTE Confidence: 0.9081542956

00:12:30.338 --> 00:12:32.574 it all along the day so that there's

NOTE Confidence: 0.9081542956

00:12:32.574 --> 00:12:34.450 no sense of sleep pressure or no

NOTE Confidence: 0.9081542956

00:12:34.511 --> 00:12:35.627 gap between the two.

NOTE Confidence: 0.9081542956

00:12:35.630 --> 00:12:38.246 And it's not until the circadian

NOTE Confidence: 0.9081542956

00:12:38.246 --> 00:12:39.990 system cycles off close

NOTE Confidence: 0.871034260769231

00:12:40.077 --> 00:12:42.660 to habitual bedtime at that dim light

NOTE Confidence: 0.871034260769231

00:12:42.660 --> 00:12:44.900 melatonin onset that you lose that alertness,

NOTE Confidence: 0.871034260769231

00:12:44.900 --> 00:12:45.980 and all of a sudden there's

NOTE Confidence: 0.871034260769231

00:12:45.980 --> 00:12:46.700 this very big difference.

NOTE Confidence: 0.871034260769231

00:12:46.700 --> 00:12:48.840 Between homeostatic Dr and circadian

NOTE Confidence: 0.871034260769231

00:12:48.840 --> 00:12:51.508 driving that that creates an opportunity

NOTE Confidence: 0.871034260769231

00:12:51.508 --> 00:12:54.182 for sleep and what I really want to

NOTE Confidence: 0.871034260769231

00:12:54.182 --> 00:12:56.640 say here is that in the ICU it is

NOTE Confidence: 0.871034260769231

00:12:56.640 --> 00:12:58.200 very difficult to predict when when

NOTE Confidence: 0.871034260769231

00:12:58.200 --> 00:13:00.013 this is happening because it's very

NOTE Confidence: 0.871034260769231

00:13:00.013 --> 00:13:02.234 difficult to know in real time with

NOTE Confidence: 0.871034260769231

00:13:02.234 --> 00:13:04.118 the person circadian phases and it's

NOTE Confidence: 0.871034260769231

00:13:04.118 --> 00:13:06.244 therefore hard to know when to promote

NOTE Confidence: 0.871034260769231

00:13:06.244 --> 00:13:08.020 sleep and it's also therefore hard

NOTE Confidence: 0.871034260769231

00:13:08.077 --> 00:13:09.979 to coordinate a number of biologic

NOTE Confidence: 0.871034260769231

00:13:09.979 --> 00:13:11.869 functions such as eating and exercise

NOTE Confidence: 0.871034260769231

00:13:11.869 --> 00:13:13.829 that will talk about a little bit

NOTE Confidence: 0.871034260769231

00:13:13.829 --> 00:13:16.375 later and make these things happen

NOTE Confidence: 0.871034260769231

00:13:16.375 --> 00:13:18.640 during the right biologic time.

NOTE Confidence: 0.871034260769231

00:13:18.640 --> 00:13:21.588 And finally, you know,

NOTE Confidence: 0.871034260769231

00:13:21.588 --> 00:13:24.110 I I show this slide often in my talks.

NOTE Confidence: 0.871034260769231

00:13:24.110 --> 00:13:25.881 Just a reminder at the things that

NOTE Confidence: 0.871034260769231

00:13:25.881 --> 00:13:27.843 drive the circadian system and so the

NOTE Confidence: 0.871034260769231

00:13:27.843 --> 00:13:29.278 site gamers are incredibly important,

NOTE Confidence: 0.871034260769231

00:13:29.280 --> 00:13:31.194 and so inasmuch as circadian health

NOTE Confidence: 0.871034260769231

00:13:31.194 --> 00:13:32.920 is important for sleep health,

NOTE Confidence: 0.871034260769231

00:13:32.920 --> 00:13:34.128 azeite keepers are important

NOTE Confidence: 0.871034260769231

00:13:34.128 --> 00:13:35.034 for circadian health.

NOTE Confidence: 0.871034260769231

00:13:35.040 --> 00:13:36.696 And we know that light is the primary side.

NOTE Confidence: 0.871034260769231

00:13:36.700 --> 00:13:38.600 Gave are traveling in the

NOTE Confidence: 0.871034260769231

00:13:38.600 --> 00:13:40.500 eye to the master clock.

NOTE Confidence: 0.871034260769231

00:13:40.500 --> 00:13:42.505 The central clock that then

NOTE Confidence: 0.871034260769231

00:13:42.505 --> 00:13:43.708 promotes synchronization across

NOTE Confidence: 0.871034260769231

00:13:43.708 --> 00:13:45.609 the bodies peripheral clocks,

NOTE Confidence: 0.871034260769231

00:13:45.610 --> 00:13:47.647 but also that there are non voting

NOTE Confidence: 0.871034260769231

00:13:47.647 --> 00:13:49.494 site cavers. Or sleep wake itself.

NOTE Confidence: 0.871034260769231

00:13:49.494 --> 00:13:50.126 Physical activity,

NOTE Confidence: 0.871034260769231

00:13:50.130 --> 00:13:52.120 social time and meals that

NOTE Confidence: 0.871034260769231

00:13:52.120 --> 00:13:53.314 are very important.

NOTE Confidence: 0.871034260769231

00:13:53.320 --> 00:13:55.156 And with all of that said,

NOTE Confidence: 0.871034260769231

00:13:55.160 --> 00:13:56.651 I don't think it's very surprising that

NOTE Confidence: 0.871034260769231

00:13:56.651 --> 00:13:58.218 we have sleep deficiency in the ICU.

NOTE Confidence: 0.871034260769231

00:13:58.220 --> 00:14:01.156 We have a real lack of sleep opportunity.

NOTE Confidence: 0.871034260769231

00:14:01.160 --> 00:14:03.128 We have incredible interruptions,

NOTE Confidence: 0.871034260769231

00:14:03.128 --> 00:14:05.580 sound, light.

NOTE Confidence: 0.871034260769231

00:14:05.580 --> 00:14:08.296 Painful stimuli lab draws and so on,

NOTE Confidence: 0.871034260769231

00:14:08.300 --> 00:14:10.708 but we also have all these abnormal

NOTE Confidence: 0.871034260769231

00:14:10.708 --> 00:14:12.762 side keepers feeding light exposures.

NOTE Confidence: 0.871034260769231

00:14:12.762 --> 00:14:15.828 This particular picture that is not

NOTE Confidence: 0.871034260769231

00:14:15.828 --> 00:14:18.840 our ICU notably doesn't have a windows.

NOTE Confidence: 0.871034260769231

00:14:18.840 --> 00:14:20.420 There's no natural sunlight even,

NOTE Confidence: 0.871034260769231

00:14:20.420 --> 00:14:22.208 and so it's not something that

NOTE Confidence: 0.871034260769231

00:14:22.210 --> 00:14:23.798 that is counter intuitive.

NOTE Confidence: 0.871034260769231

00:14:23.798 --> 00:14:26.627 But there's a lot of opportunity here

NOTE Confidence: 0.871034260769231

00:14:26.627 --> 00:14:28.877 to improve sleep for our patients.

NOTE Confidence: 0.871034260769231

00:14:28.880 --> 00:14:30.880 And so I'll circle back to a case.

NOTE Confidence: 0.871034260769231

00:14:30.880 --> 00:14:31.554 And again,

NOTE Confidence: 0.871034260769231

00:14:31.554 --> 00:14:34.250 this is a case that I have presented

NOTE Confidence: 0.871034260769231

00:14:34.330 --> 00:14:36.548 quite a bit in my talks and I

NOTE Confidence: 0.871034260769231

00:14:36.548 --> 00:14:37.660 remember this patient distinctly.

NOTE Confidence: 0.871034260769231

00:14:37.660 --> 00:14:39.403 He was one of the first patients

NOTE Confidence: 0.871034260769231

00:14:39.403 --> 00:14:40.699 I enrolled as a fellow,

NOTE Confidence: 0.871034260769231

00:14:40.700 --> 00:14:42.527 but I think his story tells so

NOTE Confidence: 0.871034260769231

00:14:42.527 --> 00:14:44.623 many so many of the lessons of

NOTE Confidence: 0.871034260769231

00:14:44.623 --> 00:14:46.178 sleep deficiency in the ICU.

NOTE Confidence: 0.871034260769231

00:14:46.180 --> 00:14:48.076 So he was an elderly gentleman.

NOTE Confidence: 0.871034260769231

00:14:48.080 --> 00:14:49.480 He came in with a critical care.

NOTE Confidence: 0.871034260769231

00:14:49.480 --> 00:14:51.168 Chief complaint of Shock

NOTE Confidence: 0.871034260769231

00:14:51.168 --> 00:14:52.434 and respiratory failure.

NOTE Confidence: 0.871034260769231

00:14:52.440 --> 00:14:54.757 He presented to the emergency room because

NOTE Confidence: 0.871034260769231

00:14:54.757 --> 00:14:57.238 of an altered mental status and fever.

NOTE Confidence: 0.871034260769231

00:14:57.240 --> 00:14:58.250 His evaluation.

NOTE Confidence: 0.871034260769231

00:14:58.250 --> 00:15:00.270 Was not super abnormal.

NOTE Confidence: 0.871034260769231

00:15:00.270 --> 00:15:01.886 It showed that he had low blood pressure.

NOTE Confidence: 0.871034260769231

00:15:01.890 --> 00:15:04.802 He did for some medical reasons have an

NOTE Confidence: 0.871034260769231

00:15:04.802 --> 00:15:07.007 indwelling Foley that there was clear

NOTE Confidence: 0.871034260769231

00:15:07.007 --> 00:15:09.096 there was evidence not clear cloudy

NOTE Confidence: 0.871034260769231

00:15:09.096 --> 00:15:11.308 urine and also an elevated White County.

NOTE Confidence: 0.871034260769231

00:15:11.310 --> 00:15:13.800 A lactate in a positive urinalysis.

NOTE Confidence: 0.871034260769231

00:15:13.800 --> 00:15:15.588 Ultimately he was admitted to make

NOTE Confidence: 0.871034260769231

00:15:15.588 --> 00:15:17.520 you around 3:00 in the morning.

NOTE Confidence: 0.871034260769231

00:15:17.520 --> 00:15:19.626 The team's assessment was at his

NOTE Confidence: 0.871034260769231

00:15:19.626 --> 00:15:22.129 euro sepsis and this was complicated

NOTE Confidence: 0.871034260769231

00:15:22.129 --> 00:15:23.677 by respiratory failure.

NOTE Confidence: 0.871034260769231

00:15:23.680 --> 00:15:25.152 He was mechanically ventilated.

NOTE Confidence: 0.871034260769231

00:15:25.152 --> 00:15:26.340 He went, unfortunately,

NOTE Confidence: 0.871034260769231

00:15:26.340 --> 00:15:28.140 required renal replacement basis,

NOTE Confidence: 0.871034260769231

00:15:28.140 --> 00:15:29.766 suppressor vasopressors,

NOTE Confidence: 0.871034260769231

00:15:29.766 --> 00:15:31.392 support antibiotics,

NOTE Confidence: 0.871034260769231

00:15:31.392 --> 00:15:33.018 continuous sedation,

NOTE Confidence: 0.911085258333333

00:15:33.020 --> 00:15:34.325 continues to feeding,

NOTE Confidence: 0.911085258333333

00:15:34.325 --> 00:15:36.500 and software Swiss wrist restraints

NOTE Confidence: 0.911085258333333

00:15:36.500 --> 00:15:39.350 out of concern that he would

NOTE Confidence: 0.911085258333333

00:15:39.350 --> 00:15:41.254 discontinue his medical equipment.

NOTE Confidence: 0.911085258333333

00:15:41.260 --> 00:15:43.040 His hospital course was notable

NOTE Confidence: 0.911085258333333

00:15:43.040 --> 00:15:45.250 for nursing reports of poor sleep.

NOTE Confidence: 0.911085258333333

00:15:45.250 --> 00:15:46.438 Family reports that the

NOTE Confidence: 0.911085258333333

00:15:46.438 --> 00:15:47.923 patient was sleeping all day,

NOTE Confidence: 0.911085258333333

00:15:47.930 --> 00:15:49.935 delirium a delay mobility because

NOTE Confidence: 0.911085258333333

00:15:49.935 --> 00:15:52.550 of his medical severity of illness.

NOTE Confidence: 0.911085258333333

00:15:52.550 --> 00:15:54.830 He had a fib with RVR.

NOTE Confidence: 0.911085258333333

00:15:54.830 --> 00:15:57.605 Uhm, he had hyperglycemia prolonged

NOTE Confidence: 0.911085258333333

00:15:57.605 --> 00:15:59.270 mechanical ventilation course

NOTE Confidence: 0.911085258333333

00:15:59.270 --> 00:16:01.448 and ultimately was discharged

NOTE Confidence: 0.911085258333333

00:16:01.448 --> 00:16:03.436 to skilled nursing facility.

NOTE Confidence: 0.911085258333333

00:16:03.440 --> 00:16:05.792 And often when I talk about

NOTE Confidence: 0.911085258333333

00:16:05.792 --> 00:16:07.750 sleep deficiency in the ICU,

NOTE Confidence: 0.911085258333333

00:16:07.750 --> 00:16:09.647 my early work and I think I

NOTE Confidence: 0.911085258333333

00:16:09.647 --> 00:16:11.549 mean I agree a major target,

NOTE Confidence: 0.911085258333333

00:16:11.550 --> 00:16:14.198 a sleep efficiency in the ICU is delirium,

NOTE Confidence: 0.911085258333333

00:16:14.200 --> 00:16:16.485 and what what happens with

NOTE Confidence: 0.911085258333333

00:16:16.485 --> 00:16:18.313 sleep deficiency and cognition?

NOTE Confidence: 0.911085258333333

00:16:18.320 --> 00:16:20.448 But what I'd like to talk about today

NOTE Confidence: 0.911085258333333

00:16:20.448 --> 00:16:22.424 is some things that are that are

NOTE Confidence: 0.911085258333333

00:16:22.424 --> 00:16:24.999 important to us as ICU clinicians and are.

NOTE Confidence: 0.911085258333333

00:16:25.000 --> 00:16:26.800 Also probably related to sleep and

NOTE Confidence: 0.911085258333333

00:16:26.800 --> 00:16:28.250 circadian disruption in the ICU,

NOTE Confidence: 0.911085258333333

00:16:28.250 --> 00:16:30.482 and so he also had delayed

NOTE Confidence: 0.911085258333333

00:16:30.482 --> 00:16:31.598 mobility atrial fibrillation,

NOTE Confidence: 0.911085258333333

00:16:31.600 --> 00:16:32.920 rapid ventricular response,

NOTE Confidence: 0.911085258333333

00:16:32.920 --> 00:16:33.360 hyperglycemia,

NOTE Confidence: 0.911085258333333

00:16:33.360 --> 00:16:35.560 the prolongation of his mechanical

NOTE Confidence: 0.911085258333333

00:16:35.560 --> 00:16:37.439 ventilation and was discharged to sniff.

NOTE Confidence: 0.911085258333333

00:16:37.440 --> 00:16:38.448 And I would argue,

NOTE Confidence: 0.911085258333333

00:16:38.448 --> 00:16:40.657 and my thesis for this talk that these

NOTE Confidence: 0.911085258333333

00:16:40.657 --> 00:16:42.876 are also related to his sleep deficiency.

NOTE Confidence: 0.911085258333333

00:16:42.880 --> 00:16:44.800 I certainly am not going to trip attribute

NOTE Confidence: 0.911085258333333

00:16:44.800 --> 00:16:46.557 all of this to sleep deficiency,

NOTE Confidence: 0.911085258333333

00:16:46.560 --> 00:16:49.104 but I do think there are some associations

NOTE Confidence: 0.911085258333333

00:16:49.104 --> 00:16:51.208 here that we should keep in mind.

NOTE Confidence: 0.911085258333333

00:16:51.210 --> 00:16:53.406 So I'll end my background session

NOTE Confidence: 0.911085258333333

00:16:53.406 --> 00:16:55.921 with would just touching on a little

NOTE Confidence: 0.911085258333333

00:16:55.921 --> 00:16:57.895 bit of what's known about outcomes,

NOTE Confidence: 0.911085258333333

00:16:57.900 --> 00:17:00.196 and I'll pick the the ultimate MCU outcome,

NOTE Confidence: 0.911085258333333

00:17:00.200 --> 00:17:01.223 which is mortality.

NOTE Confidence: 0.911085258333333

00:17:01.223 --> 00:17:03.960 And still I have two studies that were

NOTE Confidence: 0.911085258333333

00:17:03.960 --> 00:17:06.142 done at Yale with my group showing

NOTE Confidence: 0.911085258333333

00:17:06.142 --> 00:17:08.502 that an association between sleep

NOTE Confidence: 0.911085258333333

00:17:08.502 --> 00:17:10.816 deficiency and and mortality in the hospital.

NOTE Confidence: 0.911085258333333

00:17:10.820 --> 00:17:12.512 The first we did meet significance

NOTE Confidence: 0.911085258333333

00:17:12.512 --> 00:17:14.533 and so I can formally say that

NOTE Confidence: 0.911085258333333

00:17:14.533 --> 00:17:16.465 the second I it was a trend.

NOTE Confidence: 0.911085258333333

00:17:16.470 --> 00:17:18.115 But I'll share with you that work

NOTE Confidence: 0.911085258333333

00:17:18.115 --> 00:17:19.973 and then we'll dive into some of the

NOTE Confidence: 0.911085258333333

00:17:19.973 --> 00:17:21.569 things that I think are going on.

NOTE Confidence: 0.911085258333333

00:17:21.570 --> 00:17:24.405 So first was a study of sleep loss and

NOTE Confidence: 0.911085258333333

00:17:24.405 --> 00:17:26.519 specifically abnormal sleep architecture,

NOTE Confidence: 0.911085258333333

00:17:26.520 --> 00:17:28.644 and this was a study in which I was

NOTE Confidence: 0.911085258333333

00:17:28.644 --> 00:17:30.412 assessing patients for what is called

NOTE Confidence: 0.911085258333333

00:17:30.412 --> 00:17:32.347 atypical sleep and then make you the

NOTE Confidence: 0.911085258333333

00:17:32.347 --> 00:17:34.076 most cardinal feature of which is a

NOTE Confidence: 0.911085258333333

00:17:34.076 --> 00:17:36.150 loss of stage and two sleep features,

NOTE Confidence: 0.911085258333333

00:17:36.150 --> 00:17:39.270 and so this was a 93.

NOTE Confidence: 0.911085258333333

00:17:39.270 --> 00:17:40.305 93 subject cohorts.

NOTE Confidence: 0.911085258333333

00:17:40.305 --> 00:17:42.375 It was from apparent cohort of

NOTE Confidence: 0.911085258333333

00:17:42.375 --> 00:17:44.116 medical ICU patients who got

NOTE Confidence: 0.911085258333333

00:17:44.116 --> 00:17:45.781 who receives continuous EEG as

NOTE Confidence: 0.911085258333333

00:17:45.781 --> 00:17:47.488 part of their routine care.

NOTE Confidence: 0.911085258333333

00:17:47.490 --> 00:17:48.878 So a very unique.

NOTE Confidence: 0.8472702245

00:17:52.970 --> 00:17:55.448 Shouldn't we excluded acute brain injury

NOTE Confidence: 0.8472702245

00:17:55.448 --> 00:17:58.195 such as folks who are post cardiac

NOTE Confidence: 0.8472702245

00:17:58.195 --> 00:18:02.010 arrest and we looked at the EG. For EG.

NOTE Confidence: 0.8472702245

00:18:02.010 --> 00:18:04.715 And cephalad encephalography encephalopathy

NOTE Confidence: 0.8472702245

00:18:04.715 --> 00:18:08.740 features as well as her sleep criteria.

NOTE Confidence: 0.8472702245

00:18:08.740 --> 00:18:11.134 And what we found I thought was

NOTE Confidence: 0.8472702245

00:18:11.134 --> 00:18:14.330 pretty interesting. One was.

NOTE Confidence: 0.8472702245

00:18:14.330 --> 00:18:16.234 Excuse me, just gonna move my here.

NOTE Confidence: 0.8472702245

00:18:16.240 --> 00:18:19.030 We go. One was the length of MCU and

NOTE Confidence: 0.8472702245

00:18:19.030 --> 00:18:21.778 hospital stay was quite different between

NOTE Confidence: 0.8472702245

00:18:21.778 --> 00:18:25.130 patients who had retained K complexes.

NOTE Confidence: 0.8472702245

00:18:25.130 --> 00:18:27.281 So as a marker of stage two had retained

NOTE Confidence: 0.8472702245

00:18:27.281 --> 00:18:29.337 their K complexes and those who had not.

NOTE Confidence: 0.8472702245

00:18:29.340 --> 00:18:30.540 So this is an association,

NOTE Confidence: 0.8472702245

00:18:30.540 --> 00:18:31.356 not causation.

NOTE Confidence: 0.8472702245

00:18:31.356 --> 00:18:33.396 We don't know the directionality,

NOTE Confidence: 0.8472702245

00:18:33.400 --> 00:18:35.605 but we see that our patients who

NOTE Confidence: 0.8472702245

00:18:35.605 --> 00:18:37.263 maintained their sleep architecture or

NOTE Confidence: 0.8472702245

00:18:37.263 --> 00:18:39.871 in the MCU and hospital for much shorter,

NOTE Confidence: 0.8472702245

00:18:39.880 --> 00:18:42.166 and that is the red highlighted box that I've

NOTE Confidence: 0.8472702245

00:18:42.166 --> 00:18:44.940 shared with you and then on the flip side.

NOTE Confidence: 0.8472702245

00:18:44.940 --> 00:18:45.606 Quite remarkably,

NOTE Confidence: 0.8472702245

00:18:45.606 --> 00:18:47.937 all of the deaths in our cohort

NOTE Confidence: 0.8472702245

00:18:47.937 --> 00:18:49.898 segregated to the folks who had

NOTE Confidence: 0.8472702245

00:18:49.898 --> 00:18:51.154 lost their sleep architecture,

NOTE Confidence: 0.8472702245

00:18:51.160 --> 00:18:54.894 and so we had 36% of those folks who

NOTE Confidence: 0.8472702245

00:18:54.894 --> 00:18:56.700 had in hospital in hospital death,

NOTE Confidence: 0.8472702245

00:18:56.700 --> 00:19:00.108 whereas 0% of the folks who maintain their

NOTE Confidence: 0.8472702245

00:19:00.108 --> 00:19:02.529 safe architecture died in the hospital.

NOTE Confidence: 0.8472702245

00:19:02.530 --> 00:19:04.385 When we used logistic regression

NOTE Confidence: 0.8472702245

00:19:04.385 --> 00:19:06.999 techniques to model this and to look

NOTE Confidence: 0.8472702245

00:19:06.999 --> 00:19:08.734 in control for other covariates,

NOTE Confidence: 0.8472702245

00:19:08.740 --> 00:19:10.840 we found that this retained

NOTE Confidence: 0.8472702245

00:19:10.840 --> 00:19:12.346 significance and that had,

NOTE Confidence: 0.8472702245

00:19:12.346 --> 00:19:14.518 while a very broad confidence interval

NOTE Confidence: 0.8472702245

00:19:14.518 --> 00:19:16.937 and odds ratio close to 19 for folks

NOTE Confidence: 0.8472702245

00:19:16.937 --> 00:19:19.478 who are who are no longer maintained,

NOTE Confidence: 0.8472702245

00:19:19.480 --> 00:19:20.404 typical sleep architecture.

NOTE Confidence: 0.8472702245

00:19:20.404 --> 00:19:22.560 So we thought this is very important,

NOTE Confidence: 0.8472702245

00:19:22.560 --> 00:19:23.744 very interesting,

NOTE Confidence: 0.8472702245

00:19:23.744 --> 00:19:26.210 and we're very happy to follow

NOTE Confidence: 0.8472702245

00:19:26.210 --> 00:19:28.130 up on this with subsequent work.

NOTE Confidence: 0.8472702245

00:19:28.130 --> 00:19:28.435 Uhm?

NOTE Confidence: 0.8472702245

00:19:28.435 --> 00:19:30.875 Looking at the other side of the coin,

NOTE Confidence: 0.8472702245

00:19:30.880 --> 00:19:32.488 the circadian side of the coin,

NOTE Confidence: 0.8472702245

00:19:32.490 --> 00:19:35.004 we've been able to leverage continuous

NOTE Confidence: 0.8472702245

00:19:35.004 --> 00:19:37.329 heart rate data here at Yale.

NOTE Confidence: 0.8472702245

00:19:37.330 --> 00:19:38.460 This is data that is.

NOTE Confidence: 0.8472702245

00:19:38.460 --> 00:19:41.564 This is hardly data taken every five seconds

NOTE Confidence: 0.8472702245

00:19:41.564 --> 00:19:43.200 automatically via our telemetry monitors,

NOTE Confidence: 0.8472702245

00:19:43.200 --> 00:19:45.438 so it's very nice inasmuch as it's

NOTE Confidence: 0.8472702245

00:19:45.438 --> 00:19:46.722 available for essentially all

NOTE Confidence: 0.8472702245

00:19:46.722 --> 00:19:48.694 patients in the ICU have telemetry

NOTE Confidence: 0.8472702245

00:19:48.694 --> 00:19:50.560 as part of their routine care,

NOTE Confidence: 0.8472702245

00:19:50.560 --> 00:19:53.386 and this small sample when this

NOTE Confidence: 0.8472702245

00:19:53.386 --> 00:19:54.799 technology became available.

NOTE Confidence: 0.8472702245

00:19:54.800 --> 00:19:56.315 That we had some clinical

NOTE Confidence: 0.8472702245

00:19:56.315 --> 00:19:58.233 characterization of due to a ongoing

NOTE Confidence: 0.8472702245

00:19:58.233 --> 00:20:00.285 biorepository were able to look at

NOTE Confidence: 0.8472702245

00:20:00.285 --> 00:20:02.329 these patients and ask the question.

NOTE Confidence: 0.8472702245

00:20:02.330 --> 00:20:04.960 Are there clinical clinical outcomes

NOTE Confidence: 0.8472702245

00:20:04.960 --> 00:20:07.970 associated with with patients who have

NOTE Confidence: 0.8472702245

00:20:07.970 --> 00:20:09.960 their circadian diurnal variation of

NOTE Confidence: 0.8472702245

00:20:09.960 --> 00:20:12.610 heart rates that have maintained it in

NOTE Confidence: 0.8472702245

00:20:12.610 --> 00:20:14.717 an aligned manner in a misaligned manner?

NOTE Confidence: 0.8472702245

00:20:14.720 --> 00:20:16.255 Or patients who have really

NOTE Confidence: 0.8472702245

00:20:16.255 --> 00:20:17.483 lost that diurnal variation?

NOTE Confidence: 0.8472702245

00:20:17.490 --> 00:20:19.898 We're very pleased to see that regardless

NOTE Confidence: 0.8472702245

00:20:19.898 --> 00:20:21.685 of vasopressors and other arrhythmias,

NOTE Confidence: 0.8472702245

00:20:21.685 --> 00:20:25.005 patients we were able to see these signals.

NOTE Confidence: 0.8472702245

00:20:25.010 --> 00:20:27.201 We were able to do cocinar analysis

NOTE Confidence: 0.8472702245

00:20:27.201 --> 00:20:29.391 and see if this variation maintained

NOTE Confidence: 0.8472702245

00:20:29.391 --> 00:20:32.149 and so here I have three samples

NOTE Confidence: 0.8472702245

00:20:32.224 --> 00:20:34.520 and so in panel a I'm sharing with

NOTE Confidence: 0.8472702245

00:20:34.520 --> 00:20:37.282 you a patient who had normal aligned

NOTE Confidence: 0.8472702245

00:20:37.282 --> 00:20:39.770 diurnal variation of their heart rate.

NOTE Confidence: 0.8472702245

00:20:39.770 --> 00:20:41.575 Reflecting but not directly telling

NOTE Confidence: 0.8472702245

00:20:41.575 --> 00:20:44.299 us the alignment of the central clock,

NOTE Confidence: 0.8472702245

00:20:44.300 --> 00:20:45.884 I don't want to overstate what

NOTE Confidence: 0.8472702245

00:20:45.884 --> 00:20:46.940 we're looking at here,

NOTE Confidence: 0.8472702245

00:20:46.940 --> 00:20:48.650 but certainly hopefully

NOTE Confidence: 0.8472702245

00:20:48.650 --> 00:20:50.492 associated with in panel B.

NOTE Confidence: 0.8472702245

00:20:50.492 --> 00:20:52.130 I have a patient who is misaligned,

NOTE Confidence: 0.8472702245

00:20:52.130 --> 00:20:54.035 so they've maintained that diurnal

NOTE Confidence: 0.8472702245

00:20:54.035 --> 00:20:55.940 variation in this particular example.

NOTE Confidence: 0.864230691428571

00:20:55.940 --> 00:20:58.040 Their amplitude is a little bit lower,

NOTE Confidence: 0.864230691428571

00:20:58.040 --> 00:21:00.476 but that was not true across

NOTE Confidence: 0.864230691428571

00:21:00.476 --> 00:21:01.694 all misaligned patients,

NOTE Confidence: 0.864230691428571

00:21:01.700 --> 00:21:03.684 and this was the majority of our patients.

NOTE Confidence: 0.864230691428571

00:21:03.690 --> 00:21:06.738 So of the 53 we had,

NOTE Confidence: 0.864230691428571

00:21:06.740 --> 00:21:09.492 4039 patients who are misaligned and then.

NOTE Confidence: 0.864230691428571

00:21:09.492 --> 00:21:10.320 Actually, a minority,

NOTE Confidence: 0.864230691428571

00:21:10.320 --> 00:21:14.368 only eight of the 53 with who had no no.

NOTE Confidence: 0.864230691428571

00:21:14.368 --> 00:21:16.520 No detectable cocinar pattern,

NOTE Confidence: 0.864230691428571

00:21:16.520 --> 00:21:20.010 and no detectable diurnal variation.

NOTE Confidence: 0.864230691428571

00:21:20.010 --> 00:21:21.564 Again, when we looked in this group,

NOTE Confidence: 0.864230691428571

00:21:21.570 --> 00:21:22.734 another striking segregation,

NOTE Confidence: 0.864230691428571

00:21:22.734 --> 00:21:25.062 and so the patients who had

NOTE Confidence: 0.864230691428571

00:21:25.062 --> 00:21:26.566 diurnal variation that was

NOTE Confidence: 0.864230691428571

00:21:26.566 --> 00:21:28.672 aligned had no deaths in hospital,

NOTE Confidence: 0.864230691428571

00:21:28.680 --> 00:21:30.588 whereas we saw all of our

NOTE Confidence: 0.864230691428571

00:21:30.588 --> 00:21:31.860 desks in the misaligned,

NOTE Confidence: 0.864230691428571

00:21:31.860 --> 00:21:33.460 and the lacking variation groups,

NOTE Confidence: 0.864230691428571

00:21:33.460 --> 00:21:34.888 and so this was a trend.

NOTE Confidence: 0.864230691428571

00:21:34.890 --> 00:21:35.892 It missed significance.

NOTE Confidence: 0.864230691428571

00:21:35.892 --> 00:21:38.018 But again, as we are able to gather

NOTE Confidence: 0.864230691428571

00:21:38.018 --> 00:21:39.850 more patients in a larger cohort,

NOTE Confidence: 0.864230691428571

00:21:39.850 --> 00:21:43.090 we look forward to following up on this.

NOTE Confidence: 0.864230691428571

00:21:43.090 --> 00:21:44.530 And so this is, I think,

NOTE Confidence: 0.864230691428571

00:21:44.530 --> 00:21:45.638 hopefully adequate background to

NOTE Confidence: 0.864230691428571

00:21:45.638 --> 00:21:47.630 Orient you to what I think about.

NOTE Confidence: 0.864230691428571

00:21:47.630 --> 00:21:49.230 When I think about sleep

NOTE Confidence: 0.864230691428571

00:21:49.230 --> 00:21:50.510 deficiency in the ICU,

NOTE Confidence: 0.864230691428571

00:21:50.510 --> 00:21:52.757 but also that this is significant and

NOTE Confidence: 0.864230691428571

00:21:52.757 --> 00:21:54.888 something that is at least associated

NOTE Confidence: 0.864230691428571

00:21:54.888 --> 00:21:56.916 with poor outcomes in in much of

NOTE Confidence: 0.864230691428571

00:21:56.916 --> 00:21:58.963 of the work that I look forward to

NOTE Confidence: 0.864230691428571

00:21:58.963 --> 00:22:01.084 doing is trying to figure out what

NOTE Confidence: 0.864230691428571

00:22:01.084 --> 00:22:03.377 the directions and causalities are.

NOTE Confidence: 0.864230691428571

00:22:03.380 --> 00:22:04.652 So I want to talk now about some

NOTE Confidence: 0.864230691428571

00:22:04.652 --> 00:22:05.989 of the functional consequences.

NOTE Confidence: 0.864230691428571

00:22:05.990 --> 00:22:07.922 Setting aside the very important and

NOTE Confidence: 0.864230691428571

00:22:07.922 --> 00:22:10.289 I think very real problem of sleep,

NOTE Confidence: 0.864230691428571

00:22:10.290 --> 00:22:11.406 deficiency and cognition,

NOTE Confidence: 0.864230691428571

00:22:11.406 --> 00:22:13.266 but just setting it aside.

NOTE Confidence: 0.864230691428571

00:22:13.270 --> 00:22:14.060 For the next little bit,

NOTE Confidence: 0.864230691428571

00:22:14.060 --> 00:22:16.130 and looking at some of the

NOTE Confidence: 0.864230691428571

00:22:16.130 --> 00:22:17.165 other functional outcomes.

NOTE Confidence: 0.864230691428571

00:22:17.170 --> 00:22:20.334 So I'll touch on these three areas.

NOTE Confidence: 0.864230691428571

00:22:20.340 --> 00:22:22.878 There are many areas so metabolic

NOTE Confidence: 0.864230691428571

00:22:22.878 --> 00:22:24.570 respiratory and cardiac function

NOTE Confidence: 0.864230691428571

00:22:24.638 --> 00:22:26.368 seems to be pretty clearly,

NOTE Confidence: 0.864230691428571

00:22:26.370 --> 00:22:28.325 at least in healthy populations

NOTE Confidence: 0.864230691428571

00:22:28.325 --> 00:22:30.280 affected by acute sleep deficiency,

NOTE Confidence: 0.864230691428571

00:22:30.280 --> 00:22:32.690 mostly acute sleep deprivation models.

NOTE Confidence: 0.864230691428571

00:22:32.690 --> 00:22:34.534 There's some very nice

NOTE Confidence: 0.864230691428571

00:22:34.534 --> 00:22:36.378 misalignment models as well.

NOTE Confidence: 0.864230691428571

00:22:36.380 --> 00:22:38.228 Looking at metabolic function,

NOTE Confidence: 0.864230691428571

00:22:38.228 --> 00:22:41.551 I'll share with you this early sort

NOTE Confidence: 0.864230691428571

00:22:41.551 --> 00:22:44.857 of classic definition or excuse me.

NOTE Confidence: 0.864230691428571

00:22:44.860 --> 00:22:47.050 This early classic work by Spiegel

NOTE Confidence: 0.864230691428571

00:22:47.050 --> 00:22:49.354 at all in even Cutters Group

NOTE Confidence: 0.864230691428571

00:22:49.354 --> 00:22:51.634 looking at 11 healthy men who

NOTE Confidence: 0.864230691428571

00:22:51.634 --> 00:22:54.269 came in for some baseline nights

NOTE Confidence: 0.864230691428571

00:22:54.269 --> 00:22:56.509 and had some recovery nights.

NOTE Confidence: 0.864230691428571

00:22:56.510 --> 00:22:59.102 But the core of this experiment was six

NOTE Confidence: 0.864230691428571

00:22:59.102 --> 00:23:01.936 nights of four hours of sleep opportunity.

NOTE Confidence: 0.864230691428571

00:23:01.940 --> 00:23:04.280 They did maintain circadian alignment by

NOTE Confidence: 0.864230691428571

00:23:04.280 --> 00:23:06.888 keeping the sleep midpoint at the same time.

NOTE Confidence: 0.864230691428571

00:23:06.890 --> 00:23:07.398 Uhm,

NOTE Confidence: 0.864230691428571

00:23:07.398 --> 00:23:10.954 and they looked then at glucose tolerance.

NOTE Confidence: 0.864230691428571

00:23:10.960 --> 00:23:11.334 Sorry,

NOTE Confidence: 0.864230691428571

00:23:11.334 --> 00:23:13.204 just they looked at glucose

NOTE Confidence: 0.864230691428571

00:23:13.204 --> 00:23:15.110 tolerance and what the authors

NOTE Confidence: 0.864230691428571

00:23:15.110 --> 00:23:17.455 want to share with you in these

NOTE Confidence: 0.864230691428571

00:23:17.455 --> 00:23:19.594 panels that I've selected is what

NOTE Confidence: 0.864230691428571

00:23:19.594 --> 00:23:21.498 happens in the sleep debt and in

NOTE Confidence: 0.864230691428571

00:23:21.498 --> 00:23:23.175 the sleep recovery conditions and

NOTE Confidence: 0.864230691428571

00:23:23.175 --> 00:23:25.820 so in the top panel they're showing

NOTE Confidence: 0.864230691428571

00:23:25.820 --> 00:23:27.740 an intravenous glucose challenge.

NOTE Confidence: 0.864230691428571

00:23:27.740 --> 00:23:29.906 I apologize for the image quality.

NOTE Confidence: 0.951083047142857

00:23:31.990 --> 00:23:33.474 And what they want you to appreciate?

NOTE Confidence: 0.951083047142857

00:23:33.480 --> 00:23:34.336 I think it is.

NOTE Confidence: 0.951083047142857

00:23:34.336 --> 00:23:36.796 It is subtle, but the glucose is

NOTE Confidence: 0.951083047142857

00:23:36.796 --> 00:23:40.230 higher and the at this the slope.

NOTE Confidence: 0.951083047142857

00:23:40.230 --> 00:23:42.010 Under the Sleep conduct,

NOTE Confidence: 0.951083047142857

00:23:42.010 --> 00:23:45.860 sleep debt condition is a is more shallow,

NOTE Confidence: 0.951083047142857

00:23:45.860 --> 00:23:49.070 representing a slower glucose taught

NOTE Confidence: 0.951083047142857

00:23:49.070 --> 00:23:50.930 me a slower glucose tolerance,

NOTE Confidence: 0.951083047142857

00:23:50.930 --> 00:23:53.432 and that's the second bullet point

NOTE Confidence: 0.951083047142857

00:23:53.432 --> 00:23:55.919 that glucose clearance with Ivy glucose

NOTE Confidence: 0.951083047142857

00:23:55.919 --> 00:23:58.662 challenge is 40% slower after sleep debt,

NOTE Confidence: 0.951083047142857

00:23:58.662 --> 00:24:00.274 and happily this resolves

NOTE Confidence: 0.951083047142857

00:24:00.274 --> 00:24:01.730 after sleep recovery,

NOTE Confidence: 0.951083047142857

00:24:01.730 --> 00:24:03.977 but is certainly present in that condition.

NOTE Confidence: 0.951083047142857

00:24:03.980 --> 00:24:05.632 And then in the lower panel that

NOTE Confidence: 0.951083047142857

00:24:05.632 --> 00:24:07.169 I selected to share with you,

NOTE Confidence: 0.951083047142857

00:24:07.170 --> 00:24:09.004 they are looking at a standard meal

NOTE Confidence: 0.951083047142857

00:24:09.004 --> 00:24:10.778 and so going via the GI tract.

NOTE Confidence: 0.951083047142857

00:24:10.780 --> 00:24:11.768 Just have some difference.

NOTE Confidence: 0.902604578333334

00:24:13.840 --> 00:24:15.584 Different signaling and usually

NOTE Confidence: 0.902604578333334

00:24:15.584 --> 00:24:17.764 is better at addressing glucose

NOTE Confidence: 0.902604578333334

00:24:17.764 --> 00:24:19.731 challenges and what they want you

NOTE Confidence: 0.902604578333334

00:24:19.731 --> 00:24:21.737 to appreciate in the second panel is

NOTE Confidence: 0.902604578333334

00:24:21.737 --> 00:24:23.438 that in the sleep debt condition.

NOTE Confidence: 0.902604578333334

00:24:23.438 --> 00:24:25.280 The area under the curve that

NOTE Confidence: 0.902604578333334

00:24:25.340 --> 00:24:27.050 they defined as the first 90

NOTE Confidence: 0.902604578333334

00:24:27.050 --> 00:24:28.820 minutes after the meal is greater

NOTE Confidence: 0.902604578333334

00:24:28.820 --> 00:24:30.395 in the sleep debt condition.

NOTE Confidence: 0.881799673214286

00:24:40.240 --> 00:24:42.424 OK, so that was sleep that alone and

NOTE Confidence: 0.881799673214286

00:24:42.424 --> 00:24:44.994 they authors took care in those cases to

NOTE Confidence: 0.881799673214286

00:24:44.994 --> 00:24:46.675 maintain circadian alignment by keeping

NOTE Confidence: 0.881799673214286

00:24:46.675 --> 00:24:48.817 the sleep midpoint at the same time.

NOTE Confidence: 0.881799673214286

00:24:48.820 --> 00:24:51.196 In this experiment we look only

NOTE Confidence: 0.881799673214286

00:24:51.196 --> 00:24:52.384 at circadian misalignment.

NOTE Confidence: 0.881799673214286

00:24:52.390 --> 00:24:55.510 So sleep is maintained and looking here again

NOTE Confidence: 0.881799673214286

00:24:55.510 --> 00:24:58.739 at glucose intolerance rather than tolerance.

NOTE Confidence: 0.881799673214286

00:24:58.740 --> 00:25:01.924 And this was six healthy adults and they

NOTE Confidence: 0.881799673214286

00:25:01.924 --> 00:25:05.128 were exposed to a shift broke protocol that.

NOTE Confidence: 0.881799673214286

00:25:05.130 --> 00:25:06.994 The goal of which is to have sleep

NOTE Confidence: 0.881799673214286

00:25:06.994 --> 00:25:08.190 and circadian processes together

NOTE Confidence: 0.881799673214286

00:25:08.190 --> 00:25:10.230 during the beginning of the protocol.

NOTE Confidence: 0.881799673214286

00:25:10.230 --> 00:25:12.480 Then there is a forestway period

NOTE Confidence: 0.881799673214286

00:25:12.480 --> 00:25:16.790 and then a separate and then 88.

NOTE Confidence: 0.881799673214286

00:25:16.790 --> 00:25:19.340 The last period there's sleep that

NOTE Confidence: 0.881799673214286

00:25:19.340 --> 00:25:22.613 occurs and during biologic days and then

NOTE Confidence: 0.881799673214286

00:25:22.613 --> 00:25:24.605 circuits Arcadian process continues.

NOTE Confidence: 0.881799673214286

00:25:24.610 --> 00:25:25.501 During the night.

NOTE Confidence: 0.881799673214286

00:25:25.501 --> 00:25:27.580 The point being that in that first

NOTE Confidence: 0.881799673214286

00:25:27.645 --> 00:25:29.685 testing period sleep in certain

NOTE Confidence: 0.881799673214286

00:25:29.685 --> 00:25:30.909 processes occur together.

NOTE Confidence: 0.881799673214286

00:25:30.910 --> 00:25:32.440 There's the transition and then in

NOTE Confidence: 0.881799673214286

00:25:32.440 --> 00:25:33.792 that second period the statement

NOTE Confidence: 0.881799673214286

00:25:33.792 --> 00:25:35.222 circadian process are separated so

NOTE Confidence: 0.881799673214286

00:25:35.222 --> 00:25:37.102 that you're able to look at things

NOTE Confidence: 0.881799673214286

00:25:37.102 --> 00:25:38.247 that are related to sleep.

NOTE Confidence: 0.881799673214286

00:25:38.250 --> 00:25:40.212 Things that are related to Kenyan

NOTE Confidence: 0.881799673214286

00:25:40.212 --> 00:25:42.363 and you're also allowed able to in

NOTE Confidence: 0.881799673214286

00:25:42.363 --> 00:25:44.875 this case put time meals in a way

NOTE Confidence: 0.881799673214286

00:25:44.875 --> 00:25:47.689 that you can ask questions about

NOTE Confidence: 0.881799673214286

00:25:47.689 --> 00:25:48.627 circadian misalignment.

NOTE Confidence: 0.881799673214286

00:25:48.630 --> 00:25:51.042 And so in this case the author is used,

NOTE Confidence: 0.881799673214286

00:25:51.050 --> 00:25:53.095 fixed meals and challenged their

NOTE Confidence: 0.881799673214286

00:25:53.095 --> 00:25:55.803 subjects with it and what they show

NOTE Confidence: 0.881799673214286

00:25:55.803 --> 00:25:58.171 here on the left hand panel a as

NOTE Confidence: 0.881799673214286

00:25:58.244 --> 00:26:00.610 glucose and on the right hand panel

NOTE Confidence: 0.881799673214286

00:26:00.610 --> 00:26:02.626 B is insulin and they want you

NOTE Confidence: 0.881799673214286

00:26:02.626 --> 00:26:04.120 to appreciate that in both cases

NOTE Confidence: 0.881799673214286

00:26:04.174 --> 00:26:05.569 with circadian misalignment,

NOTE Confidence: 0.881799673214286

00:26:05.570 --> 00:26:08.405 the glucose area under the curve is

NOTE Confidence: 0.881799673214286

00:26:08.405 --> 00:26:10.812 much greater and the insulin area

NOTE Confidence: 0.881799673214286

00:26:10.812 --> 00:26:13.940 under the curve is also much greater.

NOTE Confidence: 0.881799673214286

00:26:13.940 --> 00:26:16.859 And not only are these values higher,

NOTE Confidence: 0.881799673214286

00:26:16.860 --> 00:26:19.037 but you would seem that with greater

NOTE Confidence: 0.881799673214286

00:26:19.037 --> 00:26:20.751 insulin you should actually get

NOTE Confidence: 0.881799673214286

00:26:20.751 --> 00:26:21.666 better glucose levels,

NOTE Confidence: 0.881799673214286

00:26:21.666 --> 00:26:23.612 and so they also want you to

NOTE Confidence: 0.881799673214286

00:26:23.612 --> 00:26:25.160 understand that this is also there.

NOTE Confidence: 0.881799673214286

00:26:25.160 --> 00:26:26.520 Is there an insulin resistance,

NOTE Confidence: 0.881799673214286

00:26:26.520 --> 00:26:28.685 or an insensitivity that's going

NOTE Confidence: 0.881799673214286

00:26:28.685 --> 00:26:30.392 on in this case?

NOTE Confidence: 0.881799673214286

00:26:30.392 --> 00:26:31.240 And finally,

NOTE Confidence: 0.881799673214286

00:26:31.240 --> 00:26:33.837 I wanted to show you an experiment

NOTE Confidence: 0.881799673214286

00:26:33.837 --> 00:26:36.240 that put these together and so.

NOTE Confidence: 0.881799673214286

00:26:36.240 --> 00:26:38.382 These authors put together a short

NOTE Confidence: 0.881799673214286

00:26:38.382 --> 00:26:40.304 sleep in misalignment and again

NOTE Confidence: 0.881799673214286

00:26:40.304 --> 00:26:42.020 looked at glucose intolerance,

NOTE Confidence: 0.881799673214286

00:26:42.020 --> 00:26:43.470 so this was 26 adults.

NOTE Confidence: 0.881799673214286

00:26:43.470 --> 00:26:45.502 I apologize, healthy adults,

NOTE Confidence: 0.881799673214286

00:26:45.502 --> 00:26:46.518 healthy adults.

NOTE Confidence: 0.881799673214286

00:26:46.520 --> 00:26:48.812 They did sleep restriction with and

NOTE Confidence: 0.881799673214286

00:26:48.812 --> 00:26:50.832 without misalignment and then looked

NOTE Confidence: 0.881799673214286

00:26:50.832 --> 00:26:52.977 at insulin sensitivity and they

NOTE Confidence: 0.881799673214286

00:26:52.977 --> 00:26:54.693 concluded that insulin sensitivity

NOTE Confidence: 0.881799673214286

00:26:54.756 --> 00:26:56.666 was decreased by sleep restriction

NOTE Confidence: 0.881799673214286

00:26:56.666 --> 00:26:59.193 and the effect was exaggerated under

NOTE Confidence: 0.881799673214286

00:26:59.193 --> 00:27:03.484 circadia misalignment and so here they are.

NOTE Confidence: 0.853723165

00:27:05.530 --> 00:27:08.845 Skip, sorry. Here they're showing

NOTE Confidence: 0.853723165

00:27:08.845 --> 00:27:11.216 in the far left hand panel. Again,

NOTE Confidence: 0.853723165

00:27:11.216 --> 00:27:14.855 these are glucose and the far left is the

NOTE Confidence: 0.853723165

00:27:14.855 --> 00:27:17.330 arrested condition and we have a profile

NOTE Confidence: 0.853723165

00:27:17.330 --> 00:27:19.994 of glucose in an area under the curve.

NOTE Confidence: 0.853723165

00:27:20.000 --> 00:27:21.296 They would like you to appreciate.

NOTE Confidence: 0.853723165

00:27:21.300 --> 00:27:23.330 The authors are likely to appreciate under

NOTE Confidence: 0.853723165

00:27:23.330 --> 00:27:25.139 sleep restriction with circadian alignment,

NOTE Confidence: 0.853723165

00:27:25.140 --> 00:27:27.412 that this area under the curve is is

NOTE Confidence: 0.853723165

00:27:27.412 --> 00:27:29.460 greater and that this is emphasized.

NOTE Confidence: 0.853723165

00:27:29.460 --> 00:27:31.812 So I do think it's subtle with circadian

NOTE Confidence: 0.853723165

00:27:31.812 --> 00:27:33.196 misalignment and sleep restriction,

NOTE Confidence: 0.853723165

00:27:33.200 --> 00:27:35.396 and because it's it's visually complicated.

NOTE Confidence: 0.853723165

00:27:35.400 --> 00:27:38.190 I included here as well.

NOTE Confidence: 0.853723165

00:27:38.190 --> 00:27:39.339 Then the numeric.

NOTE Confidence: 0.853723165

00:27:39.339 --> 00:27:41.254 The numbers behind those curves,

NOTE Confidence: 0.853723165

00:27:41.260 --> 00:27:42.928 and so this is as I,

NOTE Confidence: 0.853723165

00:27:42.930 --> 00:27:46.829 which is a measure of insulin sensitivity.

NOTE Confidence: 0.853723165

00:27:46.830 --> 00:27:49.002 And in this case,

NOTE Confidence: 0.853723165

00:27:49.002 --> 00:27:51.488 they're showing only patients who

NOTE Confidence: 0.853723165

00:27:51.488 --> 00:27:53.780 are sleep restricted and then

NOTE Confidence: 0.853723165

00:27:53.780 --> 00:27:55.115 comparing circadian alignment

NOTE Confidence: 0.853723165

00:27:55.115 --> 00:27:56.450 versus circadian misalignment.

NOTE Confidence: 0.853723165

00:27:56.450 --> 00:27:58.322 So you can have some hard numbers to look

NOTE Confidence: 0.853723165

00:27:58.322 --> 00:28:01.476 at that and so here in all subjects.

NOTE Confidence: 0.853723165

00:28:01.480 --> 00:28:03.750 When folks were circadian aligned,

NOTE Confidence: 0.853723165

00:28:03.750 --> 00:28:06.856 they had eight 834% decrement

NOTE Confidence: 0.853723165

00:28:06.856 --> 00:28:08.470 in insulin sensitivity,

NOTE Confidence: 0.853723165

00:28:08.470 --> 00:28:11.792 which will worsen to 47% in the

NOTE Confidence: 0.853723165

00:28:11.792 --> 00:28:13.176 case of circadian misalignment.

NOTE Confidence: 0.853723165

00:28:13.180 --> 00:28:15.252 So you can see that that hard change

NOTE Confidence: 0.853723165

00:28:15.252 --> 00:28:17.352 from one to the other and then they

NOTE Confidence: 0.853723165

00:28:17.352 --> 00:28:19.180 had mostly men in their cohort,

NOTE Confidence: 0.853723165

00:28:19.180 --> 00:28:20.170 and so they did take.

NOTE Confidence: 0.853723165

00:28:20.170 --> 00:28:22.514 They did pull out that single sex and

NOTE Confidence: 0.853723165

00:28:22.514 --> 00:28:24.839 showed that there was very similar data.

NOTE Confidence: 0.853723165

00:28:24.840 --> 00:28:27.666 A 32% decrement in circadian alignments,

NOTE Confidence: 0.853723165

00:28:27.670 --> 00:28:29.588 and maybe a little bit exactly a

NOTE Confidence: 0.853723165

00:28:29.588 --> 00:28:31.788 little bit more exaggerated effects of.

NOTE Confidence: 0.853723165

00:28:31.790 --> 00:28:33.602 58% decrement under circadian

NOTE Confidence: 0.853723165

00:28:33.602 --> 00:28:34.508 misalignment conditions.

NOTE Confidence: 0.884024663333333

00:28:36.920 --> 00:28:39.140 And so, with this in mind,

NOTE Confidence: 0.884024663333333

00:28:39.140 --> 00:28:41.387 all of these are all these experiments

NOTE Confidence: 0.884024663333333

00:28:41.387 --> 00:28:44.257 I told you about are in healthy adults.

NOTE Confidence: 0.884024663333333

00:28:44.260 --> 00:28:46.451 To to then frame that onto how

NOTE Confidence: 0.884024663333333

00:28:46.451 --> 00:28:48.200 we feed patients in the ICU,

NOTE Confidence: 0.884024663333333

00:28:48.200 --> 00:28:49.621 or at least how we feed into

NOTE Confidence: 0.884024663333333

00:28:49.621 --> 00:28:50.629 baited patients in the ICU.

NOTE Confidence: 0.884024663333333

00:28:50.630 --> 00:28:54.656 We do 24 hour continuous feeding.

NOTE Confidence: 0.884024663333333

00:28:54.660 --> 00:28:55.914 And so really,

NOTE Confidence: 0.884024663333333

00:28:55.914 --> 00:28:57.586 we're overlapping sleep deficiency,

NOTE Confidence: 0.884024663333333

00:28:57.590 --> 00:28:58.994 circadian misalignment and

NOTE Confidence: 0.884024663333333

00:28:58.994 --> 00:29:01.334 feeding all the same time.

NOTE Confidence: 0.884024663333333

00:29:01.340 --> 00:29:03.685 And so one thing that we're interested

NOTE Confidence: 0.884024663333333

00:29:03.685 --> 00:29:06.498 in looking at is time restricted feeding.

NOTE Confidence: 0.884024663333333

00:29:06.500 --> 00:29:08.980 And so as you may or may not be familiar,

NOTE Confidence: 0.884024663333333

00:29:08.980 --> 00:29:10.330 it is a general practice.

NOTE Confidence: 0.884024663333333

00:29:10.330 --> 00:29:12.430 May I ask you to feed patients

NOTE Confidence: 0.884024663333333

00:29:12.430 --> 00:29:14.160 continuously over 24 hour periods?

NOTE Confidence: 0.884024663333333

00:29:14.160 --> 00:29:16.374 This involves giving them food at

NOTE Confidence: 0.884024663333333

00:29:16.374 --> 00:29:19.228 very low and very low constant rate.

NOTE Confidence: 0.884024663333333

00:29:19.230 --> 00:29:22.674 There was concern and there is historical

NOTE Confidence: 0.884024663333333

00:29:22.674 --> 00:29:25.769 concern about bolus feeding or feeding.

NOTE Confidence: 0.884024663333333

00:29:25.770 --> 00:29:27.330 Meals at intermittent times,

NOTE Confidence: 0.884024663333333

00:29:27.330 --> 00:29:30.390 but really at that time with that meant

NOTE Confidence: 0.884024663333333

00:29:30.390 --> 00:29:33.380 was putting in food at quite a rapid rate,

NOTE Confidence: 0.884024663333333

00:29:33.380 --> 00:29:34.952 and so there was concern for

NOTE Confidence: 0.884024663333333

00:29:34.952 --> 00:29:36.718 aspiration and sort of in this move.

NOTE Confidence: 0.884024663333333

00:29:36.720 --> 00:29:38.305 With the advent of feeding

NOTE Confidence: 0.884024663333333

00:29:38.305 --> 00:29:39.573 pumps to continuous feeding,

NOTE Confidence: 0.884024663333333

00:29:39.580 --> 00:29:41.524 and so there's sort of this

NOTE Confidence: 0.884024663333333

00:29:41.524 --> 00:29:42.820 logistic and historical construct

NOTE Confidence: 0.884024663333333

00:29:42.876 --> 00:29:44.622 that has LED us to do what we do.

NOTE Confidence: 0.884024663333333

00:29:44.630 --> 00:29:46.950 There's not a lot of if you look through it,

NOTE Confidence: 0.884024663333333

00:29:46.950 --> 00:29:48.715 there's a a decent literature

NOTE Confidence: 0.884024663333333

00:29:48.715 --> 00:29:49.774 of meta analysis.

NOTE Confidence: 0.884024663333333

00:29:49.780 --> 00:29:51.544 There's not a lot of safety concerns,

NOTE Confidence: 0.884024663333333

00:29:51.550 --> 00:29:53.958 and so folks are starting to swing

NOTE Confidence: 0.884024663333333

00:29:53.958 --> 00:29:55.510 back towards intermittent feeding.

NOTE Confidence: 0.884024663333333

00:29:55.510 --> 00:29:58.608 Mostly based on concerns around how

NOTE Confidence: 0.884024663333333

00:29:58.608 --> 00:30:00.912 the gut works and strap the need for

NOTE Confidence: 0.884024663333333

00:30:00.912 --> 00:30:03.479 stretch and the need for feeding and fasting.

NOTE Confidence: 0.884024663333333

00:30:03.480 --> 00:30:04.684 What I would add to this or

NOTE Confidence: 0.884024663333333

00:30:04.684 --> 00:30:05.809 what I would advocate for,

NOTE Confidence: 0.884024663333333

00:30:05.810 --> 00:30:07.595 is that this should not just be

NOTE Confidence: 0.884024663333333

00:30:07.595 --> 00:30:08.891 intermittent feeding as I've drawn

NOTE Confidence: 0.884024663333333

00:30:08.891 --> 00:30:10.337 in the middle here with meal

NOTE Confidence: 0.884024663333333

00:30:10.337 --> 00:30:11.748 space around the 24 hour period,

NOTE Confidence: 0.884024663333333

00:30:11.750 --> 00:30:13.706 but that this be time restricted

NOTE Confidence: 0.884024663333333

00:30:13.706 --> 00:30:15.933 to what we estimate is circadian

NOTE Confidence: 0.884024663333333

00:30:15.933 --> 00:30:17.645 daytime or biologic daytime,

NOTE Confidence: 0.884024663333333

00:30:17.650 --> 00:30:19.876 or when the melatonin is low.

NOTE Confidence: 0.884024663333333

00:30:19.880 --> 00:30:22.696 So this is something that I and

NOTE Confidence: 0.884024663333333

00:30:22.696 --> 00:30:23.708 other groups are interested,

NOTE Confidence: 0.884024663333333

00:30:23.710 --> 00:30:25.800 and so we have a.

NOTE Confidence: 0.884024663333333

00:30:25.800 --> 00:30:27.116 Randomized controlled trial ongoing

NOTE Confidence: 0.884024663333333

00:30:27.116 --> 00:30:29.593 and I will be very excited in a

NOTE Confidence: 0.884024663333333

00:30:29.593 --> 00:30:31.154 few years to tell you the results

NOTE Confidence: 0.884024663333333

00:30:31.154 --> 00:30:32.920 are hopefully shorter than that,

NOTE Confidence: 0.884024663333333

00:30:32.920 --> 00:30:35.088 but I think this is a really important

NOTE Confidence: 0.884024663333333

00:30:35.088 --> 00:30:36.730 Ave to improve glycemic control in

NOTE Confidence: 0.884024663333333

00:30:36.730 --> 00:30:39.354 the ICU and it may also I've put that

NOTE Confidence: 0.884024663333333

00:30:39.354 --> 00:30:41.136 little picture of the site gathers

NOTE Confidence: 0.884024663333333

00:30:41.196 --> 00:30:43.212 up on the top of my slide just to

NOTE Confidence: 0.884024663333333

00:30:43.212 --> 00:30:45.168 remind us that it may also have

NOTE Confidence: 0.884024663333333

00:30:45.168 --> 00:30:47.099 beneficial effects in terms of orienting,

NOTE Confidence: 0.884024663333333

00:30:47.100 --> 00:30:48.668 underlining the peripheral clocks

NOTE Confidence: 0.884024663333333

00:30:48.668 --> 00:30:51.020 that are responsive to food to

NOTE Confidence: 0.884024663333333

00:30:51.082 --> 00:30:52.917 food intake and food schedule,

NOTE Confidence: 0.884024663333333

00:30:52.920 --> 00:30:55.111 and so it may have more than

NOTE Confidence: 0.884024663333333

00:30:55.111 --> 00:30:56.050 one beneficial effect.

NOTE Confidence: 0.921826300588235

00:30:59.810 --> 00:31:01.742 This is one small study that they

NOTE Confidence: 0.921826300588235

00:31:01.742 --> 00:31:04.316 did were able to look at continuous

NOTE Confidence: 0.921826300588235

00:31:04.316 --> 00:31:05.576 versus intermittent feeding.

NOTE Confidence: 0.921826300588235

00:31:05.580 --> 00:31:06.590 It was a nice crowd.

NOTE Confidence: 0.921826300588235

00:31:06.590 --> 00:31:08.516 It was a randomized crossover study

NOTE Confidence: 0.921826300588235

00:31:08.516 --> 00:31:11.106 and what the authors report here is a

NOTE Confidence: 0.921826300588235

00:31:11.106 --> 00:31:12.966 little hint at what I'm hypothesizing

NOTE Confidence: 0.921826300588235

00:31:12.970 --> 00:31:15.450 is that they are able to reduce glycemic

NOTE Confidence: 0.921826300588235

00:31:15.450 --> 00:31:17.888 need by doing intermittent feeding.

NOTE Confidence: 0.921826300588235

00:31:17.890 --> 00:31:20.350 This was not timed time restricted,

NOTE Confidence: 0.921826300588235

00:31:20.350 --> 00:31:21.660 intermittent feeding,

NOTE Confidence: 0.921826300588235

00:31:21.660 --> 00:31:24.280 just intermittent feeding alone.

NOTE Confidence: 0.921826300588235

00:31:24.280 --> 00:31:25.918 And so they did a pilot trial.

NOTE Confidence: 0.921826300588235

00:31:25.920 --> 00:31:27.312 They as they show here in

NOTE Confidence: 0.921826300588235

00:31:27.312 --> 00:31:28.240 the left hand panel,

NOTE Confidence: 0.921826300588235

00:31:28.240 --> 00:31:31.880 randomized patients either to continuous

NOTE Confidence: 0.921826300588235

00:31:31.880 --> 00:31:35.968 goal goal feeds or intermittent goal feeds.

NOTE Confidence: 0.921826300588235

00:31:35.970 --> 00:31:37.180 They let the patients attain,

NOTE Confidence: 0.921826300588235

00:31:37.180 --> 00:31:38.736 attain a steady states.

NOTE Confidence: 0.921826300588235

00:31:38.736 --> 00:31:40.681 They take their four hours

NOTE Confidence: 0.921826300588235

00:31:40.681 --> 00:31:42.319 of data collection.

NOTE Confidence: 0.921826300588235

00:31:42.320 --> 00:31:43.400 How much insulin do they need

NOTE Confidence: 0.921826300588235

00:31:43.400 --> 00:31:44.340 during this period of time?

NOTE Confidence: 0.921826300588235

00:31:44.340 --> 00:31:45.204 And so on.

NOTE Confidence: 0.921826300588235

00:31:45.204 --> 00:31:46.356 And then they crossover.

NOTE Confidence: 0.921826300588235

00:31:46.360 --> 00:31:48.840 So the folks who are continuously fed are

NOTE Confidence: 0.921826300588235

00:31:48.840 --> 00:31:50.497 now intermittently fed and vice versa.

NOTE Confidence: 0.921826300588235

00:31:50.500 --> 00:31:52.720 They repeat their data collection

NOTE Confidence: 0.921826300588235

00:31:52.720 --> 00:31:54.940 and then end the study.

NOTE Confidence: 0.921826300588235

00:31:54.940 --> 00:31:57.140 And the right hand panel in more detail.

NOTE Confidence: 0.921826300588235

00:31:57.140 --> 00:31:59.079 They've showed each of their 15 patients.

NOTE Confidence: 0.921826300588235

00:31:59.080 --> 00:32:00.916 So the small study,

NOTE Confidence: 0.921826300588235

00:32:00.916 --> 00:32:03.670 and they've again ranked the patients

NOTE Confidence: 0.921826300588235

00:32:03.670 --> 00:32:06.310 from most from the patients who

NOTE Confidence: 0.921826300588235

00:32:06.310 --> 00:32:08.735 needed more insulin during the

NOTE Confidence: 0.921826300588235

00:32:08.735 --> 00:32:11.076 intermittent feeding period to the

NOTE Confidence: 0.921826300588235

00:32:11.076 --> 00:32:12.804 patients who needed them the most

NOTE Confidence: 0.921826300588235

00:32:12.804 --> 00:32:14.520 during the continuous feeding.

NOTE Confidence: 0.921826300588235

00:32:14.520 --> 00:32:17.226 And so the idea is that.

NOTE Confidence: 0.921826300588235

00:32:17.230 --> 00:32:19.630 You can ask the question visually

NOTE Confidence: 0.921826300588235

00:32:19.630 --> 00:32:21.298 how many of the patients needed

NOTE Confidence: 0.921826300588235

00:32:21.298 --> 00:32:23.061 more more insulin during that that

NOTE Confidence: 0.921826300588235

00:32:23.061 --> 00:32:24.253 intermittent feeding and really

NOTE Confidence: 0.921826300588235

00:32:24.253 --> 00:32:25.445 it was just these.

NOTE Confidence: 0.921826300588235

00:32:25.450 --> 00:32:27.200 First these first few in which you

NOTE Confidence: 0.921826300588235

00:32:27.200 --> 00:32:29.393 can say well you know what during

NOTE Confidence: 0.921826300588235

00:32:29.393 --> 00:32:31.123 that intermittent feeding period they

NOTE Confidence: 0.921826300588235

00:32:31.123 --> 00:32:33.224 really required more insulin units.

NOTE Confidence: 0.921826300588235

00:32:33.224 --> 00:32:35.734 Patient five is equivocal and

NOTE Confidence: 0.921826300588235

00:32:35.734 --> 00:32:38.712 then really an impatient 6 through

NOTE Confidence: 0.921826300588235

00:32:38.712 --> 00:32:41.486 15 appears to need clearly more

NOTE Confidence: 0.921826300588235

00:32:41.486 --> 00:32:43.338 more insulin during continuous

NOTE Confidence: 0.921826300588235

00:32:43.338 --> 00:32:45.190 feeding rather than intermittent.

NOTE Confidence: 0.921826300588235

00:32:45.190 --> 00:32:46.014 What I don't know,

NOTE Confidence: 0.921826300588235

00:32:46.014 --> 00:32:48.009 and I think what we would be interesting.

NOTE Confidence: 0.921826300588235

00:32:48.010 --> 00:32:49.220 What was the circadian phase

NOTE Confidence: 0.921826300588235

00:32:49.220 --> 00:32:49.946 of these patients?

NOTE Confidence: 0.921826300588235

00:32:49.950 --> 00:32:52.030 And so this was not the focus of this study,

NOTE Confidence: 0.921826300588235

00:32:52.030 --> 00:32:53.848 but I think there's a lot of work to

NOTE Confidence: 0.921826300588235

00:32:53.848 --> 00:32:55.982 do here and a little hint that if we

NOTE Confidence: 0.921826300588235

00:32:55.982 --> 00:32:57.446 can guess correctly when biologic day,

NOTE Confidence: 0.921826300588235

00:32:57.450 --> 00:32:59.730 as we can make some strides in terms

NOTE Confidence: 0.921826300588235

00:32:59.730 --> 00:33:02.167 of how we're feeding our patients.

NOTE Confidence: 0.921826300588235

00:33:02.170 --> 00:33:02.506 OK,

NOTE Confidence: 0.921826300588235

00:33:02.506 --> 00:33:04.522 I'm gonna switch gears to respiratory

NOTE Confidence: 0.921826300588235

00:33:04.522 --> 00:33:05.904 function and sleep deficiency

NOTE Confidence: 0.921826300588235

00:33:05.904 --> 00:33:07.160 and this is also.

NOTE Confidence: 0.921826300588235

00:33:07.160 --> 00:33:09.620 Uhm, there's there's road to go,

NOTE Confidence: 0.921826300588235

00:33:09.620 --> 00:33:12.483 but I think one of our more

NOTE Confidence: 0.921826300588235

00:33:12.483 --> 00:33:14.844 developed areas of sleep deficiency

NOTE Confidence: 0.921826300588235

00:33:14.844 --> 00:33:17.976 and organ function in the ICU.

NOTE Confidence: 0.921826300588235

00:33:17.980 --> 00:33:18.740 So again,

NOTE Confidence: 0.921826300588235

00:33:18.740 --> 00:33:21.780 we're going to go back to healthy controls.

NOTE Confidence: 0.921826300588235

00:33:21.780 --> 00:33:25.830 And in this, in this case,

NOTE Confidence: 0.921826300588235

00:33:25.830 --> 00:33:27.768 our authors right at all did

NOTE Confidence: 0.921826300588235

00:33:27.768 --> 00:33:29.060 this very nice study,

NOTE Confidence: 0.921826300588235

00:33:29.060 --> 00:33:31.940 in which they took 19 subjects.

NOTE Confidence: 0.921826300588235

00:33:31.940 --> 00:33:34.540 Healthy volunteers again and had

NOTE Confidence: 0.921826300588235

00:33:34.540 --> 00:33:36.620 them breathe against resistance

NOTE Confidence: 0.921826300588235

00:33:36.620 --> 00:33:38.519 for up to 60 minutes.

NOTE Confidence: 0.921826300588235

00:33:38.520 --> 00:33:40.893 But they were to breathe against exist

NOTE Confidence: 0.921826300588235

00:33:40.893 --> 00:33:42.560 against resistance until exhaustion.

NOTE Confidence: 0.921826300588235

00:33:42.560 --> 00:33:44.832 And So what you see on the X

NOTE Confidence: 0.921826300588235

00:33:44.832 --> 00:33:46.279 axis is the sleep,

NOTE Confidence: 0.921826300588235

00:33:46.280 --> 00:33:48.500 normal sleep and sleep deprivation condition,

NOTE Confidence: 0.921826300588235

00:33:48.500 --> 00:33:51.020 same subject, and then on the Y axis,

NOTE Confidence: 0.921826300588235

00:33:51.020 --> 00:33:51.904 how long they were.

NOTE Confidence: 0.921826300588235

00:33:51.904 --> 00:33:53.554 Able to last and so these three

NOTE Confidence: 0.921826300588235

00:33:53.554 --> 00:33:55.444 parallel lines at the Tippy Tippy top.

NOTE Confidence: 0.921826300588235

00:33:55.450 --> 00:33:57.220 Here are folks that were able

NOTE Confidence: 0.921826300588235

00:33:57.220 --> 00:33:58.400 to go the full

NOTE Confidence: 0.911460239090909

00:33:58.471 --> 00:34:00.150 hour and then everyone else are.

NOTE Confidence: 0.911460239090909

00:34:00.150 --> 00:34:02.194 These are paired plots of how much

NOTE Confidence: 0.911460239090909

00:34:02.194 --> 00:34:04.323 filter would be able to do in

NOTE Confidence: 0.911460239090909

00:34:04.323 --> 00:34:05.813 the normal sleep condition versus

NOTE Confidence: 0.911460239090909

00:34:05.813 --> 00:34:08.204 how much they were able to do

NOTE Confidence: 0.911460239090909

00:34:08.204 --> 00:34:09.560 and sleep deprivation condition.

NOTE Confidence: 0.911460239090909

00:34:09.560 --> 00:34:12.066 It was a single night of sleep

NOTE Confidence: 0.911460239090909

00:34:12.066 --> 00:34:13.519 deprivation and they showed that

NOTE Confidence: 0.911460239090909

00:34:13.519 --> 00:34:14.734 there's really a significant difference,

NOTE Confidence: 0.911460239090909

00:34:14.740 --> 00:34:16.208 and it's significant decrements

NOTE Confidence: 0.911460239090909

00:34:16.208 --> 00:34:18.410 and what what subjects are able

NOTE Confidence: 0.911460239090909

00:34:18.477 --> 00:34:20.927 to do with sleep and without so

NOTE Confidence: 0.911460239090909

00:34:20.927 --> 00:34:21.977 very important implications.

NOTE Confidence: 0.911460239090909

00:34:21.980 --> 00:34:24.105 I think for ICU patients with

NOTE Confidence: 0.911460239090909

00:34:24.105 --> 00:34:25.630 a single subjects here towards

NOTE Confidence: 0.911460239090909

00:34:25.630 --> 00:34:27.591 the middle who was able actually

NOTE Confidence: 0.911460239090909

00:34:27.591 --> 00:34:29.286 just to have an improvement.

NOTE Confidence: 0.811477493

00:34:32.750 --> 00:34:34.210 The author is then followed

NOTE Confidence: 0.811477493

00:34:34.210 --> 00:34:35.670 up in the same cohort,

NOTE Confidence: 0.811477493

00:34:35.670 --> 00:34:38.001 but they were able to include twenty

NOTE Confidence: 0.811477493

00:34:38.001 --> 00:34:41.030 subjects and they looked here at

NOTE Confidence: 0.811477493

00:34:41.030 --> 00:34:43.502 subjective feelings of air hunger,

NOTE Confidence: 0.811477493

00:34:43.502 --> 00:34:46.400 but also subjective feelings of breathing

NOTE Confidence: 0.811477493

00:34:46.475 --> 00:34:49.240 efforts, and this is very interesting.

NOTE Confidence: 0.811477493

00:34:49.240 --> 00:34:51.216 But what they found was that in the

NOTE Confidence: 0.811477493

00:34:51.216 --> 00:34:53.154 case of questions around air hunger

NOTE Confidence: 0.811477493

00:34:53.154 --> 00:34:55.224 and the sensation of air hunger,

NOTE Confidence: 0.811477493

00:34:55.230 --> 00:34:59.016 the patients again in general had

NOTE Confidence: 0.811477493

00:34:59.016 --> 00:35:00.960 increased perception of error.

NOTE Confidence: 0.811477493

00:35:00.960 --> 00:35:02.392 Hunger after sick deprivation.

NOTE Confidence: 0.811477493

00:35:02.392 --> 00:35:04.780 There are a few exceptions with it,

NOTE Confidence: 0.811477493

00:35:04.780 --> 00:35:07.366 but overall this difference was significant,

NOTE Confidence: 0.811477493

00:35:07.370 --> 00:35:09.194 but they did not perceive a

NOTE Confidence: 0.811477493

00:35:09.194 --> 00:35:10.410 difference in breathing effort,

NOTE Confidence: 0.811477493

00:35:10.410 --> 00:35:12.020 and so this is also,

NOTE Confidence: 0.811477493

00:35:12.020 --> 00:35:13.001 I think, important.

NOTE Confidence: 0.811477493

00:35:13.001 --> 00:35:14.963 It's a little hint about how

NOTE Confidence: 0.811477493

00:35:14.963 --> 00:35:16.698 we perceive sleep today,

NOTE Confidence: 0.811477493

00:35:16.700 --> 00:35:18.264 how we perceive breathing

NOTE Confidence: 0.811477493

00:35:18.264 --> 00:35:19.437 and worker breathing,

NOTE Confidence: 0.811477493

00:35:19.440 --> 00:35:23.087 and to consider folks who are maybe

NOTE Confidence: 0.811477493

00:35:23.090 --> 00:35:25.300 evolving respiratory failure or evolving

NOTE Confidence: 0.811477493

00:35:25.300 --> 00:35:28.540 their illness to then become sleep deprived.

NOTE Confidence: 0.811477493

00:35:28.540 --> 00:35:30.704 This may have significant

NOTE Confidence: 0.811477493

00:35:30.704 --> 00:35:32.868 impact on their care.

NOTE Confidence: 0.811477493

00:35:32.870 --> 00:35:34.740 Now transitioning into the ICU,

NOTE Confidence: 0.811477493

00:35:34.740 --> 00:35:36.714 we also know that eight to focal

NOTE Confidence: 0.811477493

00:35:36.714 --> 00:35:38.015 sleep predicts late failure

NOTE Confidence: 0.811477493

00:35:38.015 --> 00:35:39.619 and non invasive ventilation,

NOTE Confidence: 0.811477493

00:35:39.620 --> 00:35:41.440 and so if you'll recall I had

NOTE Confidence: 0.811477493

00:35:41.440 --> 00:35:43.523 presented my own work on patients who

NOTE Confidence: 0.811477493

00:35:43.523 --> 00:35:45.389 had lost their stage two features.

NOTE Confidence: 0.811477493

00:35:45.390 --> 00:35:48.606 They looked lost their K complexes.

NOTE Confidence: 0.811477493

00:35:48.610 --> 00:35:50.434 And that this was part of a syndrome

NOTE Confidence: 0.811477493

00:35:50.434 --> 00:35:52.250 that we called atypical sleep that

NOTE Confidence: 0.811477493

00:35:52.250 --> 00:35:54.390 was inclusive of losing spindles and

NOTE Confidence: 0.811477493

00:35:54.390 --> 00:35:56.910 having very very little slow wave

NOTE Confidence: 0.811477493

00:35:56.910 --> 00:35:59.850 sleep and very very little REM sleep.

NOTE Confidence: 0.811477493

00:35:59.850 --> 00:36:02.908 And so in this group in this study,

NOTE Confidence: 0.811477493

00:36:02.908 --> 00:36:03.720 excuse me,

NOTE Confidence: 0.811477493

00:36:03.720 --> 00:36:05.555 the authors separated folks who

NOTE Confidence: 0.811477493

00:36:05.555 --> 00:36:07.896 came in and respiratory failure and

NOTE Confidence: 0.811477493

00:36:07.896 --> 00:36:09.668 required non invasive ventilation.

NOTE Confidence: 0.811477493

00:36:09.670 --> 00:36:11.788 They did Poly sonography on these

NOTE Confidence: 0.811477493

00:36:11.788 --> 00:36:14.068 patients and then ask the question

NOTE Confidence: 0.811477493

00:36:14.068 --> 00:36:16.456 which of these patients graduated and

NOTE Confidence: 0.811477493

00:36:16.456 --> 00:36:18.250 then became independent of ventilation.

NOTE Confidence: 0.811477493

00:36:18.250 --> 00:36:19.240 Which of those?

NOTE Confidence: 0.811477493

00:36:19.240 --> 00:36:19.654 Failed,

NOTE Confidence: 0.811477493

00:36:19.654 --> 00:36:22.138 which they definitely defined as needing

NOTE Confidence: 0.811477493

00:36:22.138 --> 00:36:24.868 to be intubated in the in the 24 hour.

NOTE Confidence: 0.811477493

00:36:24.870 --> 00:36:27.166 The subsequent 24 hours,

NOTE Confidence: 0.811477493

00:36:27.166 --> 00:36:28.946 the success versus failure

NOTE Confidence: 0.811477493

00:36:28.946 --> 00:36:30.554 was pretty evenly balanced,

NOTE Confidence: 0.811477493

00:36:30.560 --> 00:36:32.338 and what they identified is that the

NOTE Confidence: 0.811477493

00:36:32.338 --> 00:36:33.978 folks who had this atypical sleep

NOTE Confidence: 0.811477493

00:36:33.978 --> 00:36:35.896 that I've touched upon a few times

NOTE Confidence: 0.811477493

00:36:35.956 --> 00:36:38.688 during the talk really a much higher

NOTE Confidence: 0.811477493

00:36:38.688 --> 00:36:41.148 proportion of the late failures

NOTE Confidence: 0.811477493

00:36:41.148 --> 00:36:44.966 had a typical sleep in and and in a

NOTE Confidence: 0.811477493

00:36:44.966 --> 00:36:48.512 related matter at differences in their sleep.

NOTE Confidence: 0.811477493

00:36:48.512 --> 00:36:49.764 Timing is so different.

NOTE Confidence: 0.811477493

00:36:49.770 --> 00:36:51.560 In their night versus day,

NOTE Confidence: 0.811477493

00:36:51.560 --> 00:36:52.664 total sleep ratio.

NOTE Confidence: 0.811477493

00:36:52.664 --> 00:36:53.400 And so.

NOTE Confidence: 0.811477493

00:36:53.400 --> 00:36:57.128 If you can imagine night is the denominator,

NOTE Confidence: 0.811477493

00:36:57.130 --> 00:36:59.008 day is the new excuse me,

NOTE Confidence: 0.811477493

00:36:59.010 --> 00:37:00.396 night is the numerator in today.

NOTE Confidence: 0.811477493

00:37:00.400 --> 00:37:01.270 Is the denominator,

NOTE Confidence: 0.811477493

00:37:01.270 --> 00:37:03.010 a higher number means more nighttime

NOTE Confidence: 0.811477493

00:37:03.010 --> 00:37:04.428 sleep and less daytime sleep,

NOTE Confidence: 0.811477493

00:37:04.430 --> 00:37:05.879 so more normal.

NOTE Confidence: 0.811477493

00:37:05.879 --> 00:37:08.777 And again in our failure group

NOTE Confidence: 0.811477493

00:37:08.777 --> 00:37:11.159 that ratio is decreased,

NOTE Confidence: 0.811477493

00:37:11.160 --> 00:37:12.575 suggesting that these folks are

NOTE Confidence: 0.811477493

00:37:12.575 --> 00:37:14.333 not getting naked time sleep but

NOTE Confidence: 0.811477493

00:37:14.333 --> 00:37:15.788 rather daytime or abnormal sleep.

NOTE Confidence: 0.811477493

00:37:15.790 --> 00:37:18.142 So I think those pieces of evidence

NOTE Confidence: 0.811477493

00:37:18.142 --> 00:37:20.459 hang together very well and then again.

NOTE Confidence: 0.811477493

00:37:20.460 --> 00:37:23.682 Highlighted in yellow down here one

NOTE Confidence: 0.811477493

00:37:23.682 --> 00:37:25.554 of the phenomenon of atypical sleep

NOTE Confidence: 0.811477493

00:37:25.554 --> 00:37:27.898 is a very low round proportion,

NOTE Confidence: 0.811477493

00:37:27.900 --> 00:37:30.420 and again you see that those.

NOTE Confidence: 0.811477493

00:37:30.420 --> 00:37:32.466 Those folks were able to liberate

NOTE Confidence: 0.811477493

00:37:32.466 --> 00:37:35.017 from the base of ventilation were

NOTE Confidence: 0.811477493

00:37:35.017 --> 00:37:37.219 had a higher proportion of RAM,

NOTE Confidence: 0.811477493

00:37:37.220 --> 00:37:39.158 had a higher proportion of RAM.

NOTE Confidence: 0.811477493

00:37:39.160 --> 00:37:40.725 It should be not proportionate

NOTE Confidence: 0.811477493

00:37:40.725 --> 00:37:41.977 to minutes of RAM,

NOTE Confidence: 0.848461171

00:37:41.980 --> 00:37:43.425 whereas those who had failure

NOTE Confidence: 0.848461171

00:37:43.425 --> 00:37:44.870 had lower minutes of RAM.

NOTE Confidence: 0.898943881428571

00:37:48.300 --> 00:37:51.177 And then this is even more different.

NOTE Confidence: 0.898943881428571

00:37:51.180 --> 00:37:53.847 So this is the odds ratio products,

NOTE Confidence: 0.898943881428571

00:37:53.850 --> 00:37:57.438 which is an automated EEG metric

NOTE Confidence: 0.898943881428571

00:37:57.438 --> 00:37:59.554 reflecting alertness with higher

NOTE Confidence: 0.898943881428571

00:37:59.554 --> 00:38:02.448 numbers in the threshold being 2.2,

NOTE Confidence: 0.898943881428571

00:38:02.448 --> 00:38:04.880 indicating a sensually wake.

NOTE Confidence: 0.898943881428571

00:38:04.880 --> 00:38:07.580 And I'll, uh, I'll beg.

NOTE Confidence: 0.898943881428571

00:38:07.580 --> 00:38:09.344 Forgiveness of experts in the crowd

NOTE Confidence: 0.898943881428571

00:38:09.344 --> 00:38:11.794 with that very crude explanation of RP.

NOTE Confidence: 0.898943881428571

00:38:11.794 --> 00:38:14.595 But basically the authors in this study

NOTE Confidence: 0.898943881428571

00:38:14.595 --> 00:38:16.740 are asking, what if it's not sleep?

NOTE Confidence: 0.898943881428571

00:38:16.740 --> 00:38:18.357 Or what if the domain of sleep?

NOTE Confidence: 0.898943881428571

00:38:18.360 --> 00:38:21.084 The important is is the wake

NOTE Confidence: 0.898943881428571

00:38:21.084 --> 00:38:22.900 domain so functional alertness,

NOTE Confidence: 0.898943881428571

00:38:22.900 --> 00:38:26.708 ability to be vigilant, and so on.

NOTE Confidence: 0.898943881428571

00:38:26.710 --> 00:38:27.724 That's very important,

NOTE Confidence: 0.898943881428571

00:38:27.724 --> 00:38:29.414 so they use the odds,

NOTE Confidence: 0.898943881428571

00:38:29.420 --> 00:38:31.238 odds ratio product as their proxy.

NOTE Confidence: 0.898943881428571

00:38:31.240 --> 00:38:34.365 For this they divided their

NOTE Confidence: 0.898943881428571

00:38:34.365 --> 00:38:37.490 patients into those who spent.

NOTE Confidence: 0.898943881428571

00:38:37.490 --> 00:38:40.354 Less less than point less of their time.

NOTE Confidence: 0.898943881428571

00:38:40.360 --> 00:38:42.831 Above that alertness threshold that I told

NOTE Confidence: 0.898943881428571

00:38:42.831 --> 00:38:45.800 you about a middle amount of their time.

NOTE Confidence: 0.898943881428571

00:38:45.800 --> 00:38:48.552 Sort of an average RP if you score

NOTE Confidence: 0.898943881428571

00:38:48.552 --> 00:38:50.564 if you will and then the group

NOTE Confidence: 0.898943881428571

00:38:50.564 --> 00:38:51.694 that spent their highest proportion

NOTE Confidence: 0.898943881428571

00:38:51.694 --> 00:38:53.117 of their time with those higher,

NOTE Confidence: 0.898943881428571

00:38:53.120 --> 00:38:55.034 more alert or peas and then

NOTE Confidence: 0.898943881428571

00:38:55.034 --> 00:38:56.999 they asked for each of those.

NOTE Confidence: 0.898943881428571

00:38:57.000 --> 00:38:58.890 What was the probability of success

NOTE Confidence: 0.898943881428571

00:38:58.890 --> 00:39:01.528 that they would be passed a spontaneous

NOTE Confidence: 0.898943881428571

00:39:01.528 --> 00:39:03.718 breathing trial followed by extubation,

NOTE Confidence: 0.898943881428571

00:39:03.720 --> 00:39:06.978 and so really the the gold

NOTE Confidence: 0.898943881428571

00:39:06.978 --> 00:39:10.010 standard of success from from a.

NOTE Confidence: 0.898943881428571

00:39:10.010 --> 00:39:12.026 Vent dependent respiratory failure

NOTE Confidence: 0.898943881428571

00:39:12.026 --> 00:39:14.546 perspective and they showed that

NOTE Confidence: 0.898943881428571

00:39:14.546 --> 00:39:16.800 the alertness as as defined by

NOTE Confidence: 0.898943881428571

00:39:16.800 --> 00:39:18.954 the RP predicted your ability to

NOTE Confidence: 0.898943881428571

00:39:18.954 --> 00:39:20.809 be excavated from the ventilator.

NOTE Confidence: 0.898943881428571

00:39:20.810 --> 00:39:22.842 I can imagine a lot of ways that

NOTE Confidence: 0.898943881428571

00:39:22.842 --> 00:39:25.128 this could be interpreted. Is this a?

NOTE Confidence: 0.898943881428571

00:39:25.128 --> 00:39:26.508 Is this something about sedation?

NOTE Confidence: 0.898943881428571

00:39:26.510 --> 00:39:28.230 Is this something about sleepiness?

NOTE Confidence: 0.898943881428571

00:39:28.230 --> 00:39:29.114 Excuse me,

NOTE Confidence: 0.898943881428571

00:39:29.114 --> 00:39:31.766 is this something about drug induced?

NOTE Confidence: 0.898943881428571

00:39:31.770 --> 00:39:33.102 Lower levels of consciousness?

NOTE Confidence: 0.898943881428571

00:39:33.102 --> 00:39:35.100 Or is it really the domain?

NOTE Confidence: 0.898943881428571

00:39:35.100 --> 00:39:36.829 Awake is important as we are beginning

NOTE Confidence: 0.898943881428571

00:39:36.829 --> 00:39:38.949 to suspect it is and are starting to

NOTE Confidence: 0.898943881428571

00:39:38.949 --> 00:39:40.279 study in our healthy populations.

NOTE Confidence: 0.8696354885

00:39:42.380 --> 00:39:45.380 I am going to continue to switch gears

NOTE Confidence: 0.8696354885

00:39:45.380 --> 00:39:48.196 still in the respiratory domain but

NOTE Confidence: 0.8696354885

00:39:48.196 --> 00:39:51.166 now breezing through a really rich,

NOTE Confidence: 0.8696354885

00:39:51.170 --> 00:39:54.236 very meticulous literature of how we

NOTE Confidence: 0.8696354885

00:39:54.236 --> 00:39:57.631 can adjust the event to improve sleep

NOTE Confidence: 0.8696354885

00:39:57.631 --> 00:40:00.722 and so that there's been some very

NOTE Confidence: 0.8696354885

00:40:00.722 --> 00:40:03.470 careful tracing with PSG and ventilator

NOTE Confidence: 0.8696354885

00:40:03.547 --> 00:40:06.389 reporting to look at what aspects of

NOTE Confidence: 0.8696354885

00:40:06.389 --> 00:40:08.869 the ventilator can interrupt sleep.

NOTE Confidence: 0.8696354885

00:40:08.870 --> 00:40:12.462 And usually we look at elements as.

NOTE Confidence: 0.8696354885

00:40:12.462 --> 00:40:13.845 Ventilator events like

NOTE Confidence: 0.8696354885

00:40:13.845 --> 00:40:15.228 asynchronous and arousals,

NOTE Confidence: 0.8696354885

00:40:15.230 --> 00:40:17.430 but we also look at things like architecture,

NOTE Confidence: 0.8696354885

00:40:17.430 --> 00:40:19.382 RAM, proportion, slow way,

NOTE Confidence: 0.8696354885

00:40:19.382 --> 00:40:21.692 sleep proportion and so it seems

NOTE Confidence: 0.8696354885

00:40:21.692 --> 00:40:24.164 true at this point that there's three

NOTE Confidence: 0.8696354885

00:40:24.164 --> 00:40:26.546 main themes that lead to ventilator

NOTE Confidence: 0.8696354885

00:40:26.546 --> 00:40:29.019 or the related sleep deficiency.

NOTE Confidence: 0.8696354885

00:40:29.020 --> 00:40:31.568 In the ICU one is increased work

NOTE Confidence: 0.8696354885

00:40:31.568 --> 00:40:33.878 of breathing so under support if

NOTE Confidence: 0.8696354885

00:40:33.878 --> 00:40:35.788 you will and other is ineffective

NOTE Confidence: 0.8696354885

00:40:35.788 --> 00:40:36.936 triggering of the ventilator.

NOTE Confidence: 0.8696354885

00:40:36.940 --> 00:40:40.210 So what we call a synchrony and then

NOTE Confidence: 0.8696354885

00:40:40.210 --> 00:40:42.010 also ventilator over assistance in this.

NOTE Confidence: 0.688731715

00:40:44.670 --> 00:40:49.690 Sees me. OK, the ventilator over assistance,

NOTE Confidence: 0.688731715

00:40:49.690 --> 00:40:52.426 which needs several more more steps,

NOTE Confidence: 0.688731715

00:40:52.430 --> 00:40:54.010 but that leads to hyperventilation.

NOTE Confidence: 0.688731715

00:40:54.010 --> 00:40:56.638 Decreased carbon dioxide and then central

NOTE Confidence: 0.688731715

00:40:56.638 --> 00:40:59.170 apneas which ultimately lead to arousals.

NOTE Confidence: 0.688731715

00:40:59.170 --> 00:41:00.927 And so these are the three main

NOTE Confidence: 0.688731715

00:41:00.927 --> 00:41:02.824 buckets that we think a lot about

NOTE Confidence: 0.688731715

00:41:02.824 --> 00:41:04.456 when we think about adjusting the

NOTE Confidence: 0.688731715

00:41:04.516 --> 00:41:06.436 ventilator for the benefit of sleep.

NOTE Confidence: 0.688731715

00:41:06.440 --> 00:41:08.232 It's a one line of evidence supports

NOTE Confidence: 0.688731715

00:41:08.232 --> 00:41:10.148 that if we can increase arrest,

NOTE Confidence: 0.688731715

00:41:10.150 --> 00:41:14.050 so we address this first problem

NOTE Confidence: 0.688731715

00:41:14.050 --> 00:41:16.100 of increased work of breathing,

NOTE Confidence: 0.688731715

00:41:16.100 --> 00:41:18.074 and so an acute hypercapnic respiratory

NOTE Confidence: 0.688731715

00:41:18.074 --> 00:41:20.101 failure or sleep quality was improved

NOTE Confidence: 0.688731715

00:41:20.101 --> 00:41:22.069 when patients were supported with NID,

NOTE Confidence: 0.688731715

00:41:22.070 --> 00:41:24.074 noninvasive ventilation versus not.

NOTE Confidence: 0.688731715

00:41:24.074 --> 00:41:25.577 And then also,

NOTE Confidence: 0.688731715

00:41:25.580 --> 00:41:27.330 if pressure control ventilation was

NOTE Confidence: 0.688731715

00:41:27.330 --> 00:41:29.533 titrated to the point that patients

NOTE Confidence: 0.688731715

00:41:29.533 --> 00:41:31.508 became passive on the ventilator,

NOTE Confidence: 0.688731715

00:41:31.510 --> 00:41:34.198 that also improved sleep sleep efficiency.

NOTE Confidence: 0.688731715

00:41:34.200 --> 00:41:37.648 So this idea that folks, if they need it.

NOTE Confidence: 0.688731715

00:41:37.648 --> 00:41:39.408 Taking away their effort of

NOTE Confidence: 0.688731715

00:41:39.408 --> 00:41:41.010 breathing may improve sleep,

NOTE Confidence: 0.688731715

00:41:41.010 --> 00:41:42.480 but I remind you of the dangers

NOTE Confidence: 0.688731715

00:41:42.480 --> 00:41:43.779 of the third bullet point,

NOTE Confidence: 0.688731715

00:41:43.780 --> 00:41:45.965 which is we cannot over

NOTE Confidence: 0.688731715

00:41:45.965 --> 00:41:47.276 ventilate these patients.

NOTE Confidence: 0.688731715

00:41:47.280 --> 00:41:48.755 It also seems clear that

NOTE Confidence: 0.688731715

00:41:48.755 --> 00:41:49.935 increased Synchrony is helpful,

NOTE Confidence: 0.688731715

00:41:49.940 --> 00:41:51.845 and that proportional modes of

NOTE Confidence: 0.688731715

00:41:51.845 --> 00:41:54.590 ventilation such as PV and NAD A can

NOTE Confidence: 0.688731715

00:41:54.590 --> 00:41:57.170 which have been shown to decrease,

NOTE Confidence: 0.688731715

00:41:57.170 --> 00:42:00.700 decrease asynchrony.

NOTE Confidence: 0.688731715

00:42:00.700 --> 00:42:02.541 May be helpful, and so in one

NOTE Confidence: 0.688731715

00:42:02.541 --> 00:42:04.180 study PV improves sleep quality,

NOTE Confidence: 0.688731715

00:42:04.180 --> 00:42:05.784 view VR fewer arousals,

NOTE Confidence: 0.688731715

00:42:05.784 --> 00:42:08.552 which is what we would imagine would

NOTE Confidence: 0.688731715

00:42:08.552 --> 00:42:11.086 happen as there have been links between

NOTE Confidence: 0.688731715

00:42:11.086 --> 00:42:12.649 those distinct asynchrony events

NOTE Confidence: 0.688731715

00:42:12.649 --> 00:42:15.351 and linked arousal as well as fewer

NOTE Confidence: 0.688731715

00:42:15.351 --> 00:42:17.738 awakenings per hour and greater rent sleep.

NOTE Confidence: 0.688731715

00:42:17.740 --> 00:42:19.365 But this is this result

NOTE Confidence: 0.688731715

00:42:19.365 --> 00:42:20.665 has not been consistent,

NOTE Confidence: 0.688731715

00:42:20.670 --> 00:42:23.304 so the Bosma reference I've

NOTE Confidence: 0.688731715

00:42:23.304 --> 00:42:24.964 included here did have success,

NOTE Confidence: 0.688731715

00:42:24.970 --> 00:42:27.290 but Hux uploaded not and then Na BA

NOTE Confidence: 0.688731715

00:42:27.290 --> 00:42:29.878 has also been associated with increased

NOTE Confidence: 0.688731715

00:42:29.878 --> 00:42:32.298 RAM and lesser sleep fragmentation.

NOTE Confidence: 0.91457878

00:42:34.910 --> 00:42:39.326 And so. This also I think.

NOTE Confidence: 0.91457878

00:42:39.330 --> 00:42:41.386 Is not ready for primetime if you will.

NOTE Confidence: 0.91457878

00:42:41.390 --> 00:42:43.510 Much like the feeding literature,

NOTE Confidence: 0.91457878

00:42:43.510 --> 00:42:45.603 we have a lot of small studies

NOTE Confidence: 0.91457878

00:42:45.603 --> 00:42:46.500 and inconsistent studies.

NOTE Confidence: 0.91457878

00:42:46.500 --> 00:42:47.940 The direction of causation

NOTE Confidence: 0.91457878

00:42:47.940 --> 00:42:49.740 remains unclear and I think.

NOTE Confidence: 0.940208755

00:42:51.920 --> 00:42:52.556 At the end of the day,

NOTE Confidence: 0.940208755

00:42:52.560 --> 00:42:53.592 it will be bidirectional,

NOTE Confidence: 0.940208755

00:42:53.592 --> 00:42:55.140 and so we'll know that respiratory

NOTE Confidence: 0.940208755

00:42:55.191 --> 00:42:56.721 failure can contribute to sleep

NOTE Confidence: 0.940208755

00:42:56.721 --> 00:42:57.945 deficiencies and sleep deficiencies

NOTE Confidence: 0.940208755

00:42:57.945 --> 00:42:59.460 can worsen respiratory failure,

NOTE Confidence: 0.940208755

00:42:59.460 --> 00:43:02.772 and so untangling that will certainly be a

NOTE Confidence: 0.940208755

00:43:02.772 --> 00:43:04.560 challenge for the novel ventilator modes.

NOTE Confidence: 0.940208755

00:43:04.560 --> 00:43:06.198 I just have some logistic concerns.

NOTE Confidence: 0.940208755

00:43:06.200 --> 00:43:07.940 We really need provider familiarity

NOTE Confidence: 0.940208755

00:43:07.940 --> 00:43:10.100 with some of the newer modes.

NOTE Confidence: 0.940208755

00:43:10.100 --> 00:43:11.978 Some of the algorithms are proprietary,

NOTE Confidence: 0.940208755

00:43:11.980 --> 00:43:13.900 so hard to know what's under the hood

NOTE Confidence: 0.940208755

00:43:13.900 --> 00:43:15.566 and we just need to integrate these

NOTE Confidence: 0.940208755

00:43:15.566 --> 00:43:17.354 with our lung protective strategies and

NOTE Confidence: 0.940208755

00:43:17.354 --> 00:43:19.394 so some logistic hurdles to overcome.

NOTE Confidence: 0.940208755

00:43:19.400 --> 00:43:21.766 And finally, I think the question is.

NOTE Confidence: 0.940208755

00:43:21.770 --> 00:43:23.940 As with other issues with

NOTE Confidence: 0.940208755

00:43:23.940 --> 00:43:24.808 mechanical ventilation,

NOTE Confidence: 0.940208755

00:43:24.810 --> 00:43:26.514 is is it the mode or is it

NOTE Confidence: 0.940208755

00:43:26.514 --> 00:43:27.809 what we're doing with it?

NOTE Confidence: 0.940208755

00:43:27.810 --> 00:43:30.295 So do we really need to predict

NOTE Confidence: 0.940208755

00:43:30.300 --> 00:43:33.340 select the correct mode or do we just

NOTE Confidence: 0.940208755

00:43:33.340 --> 00:43:36.380 need to achieve the Physiology of?

NOTE Confidence: 0.940208755

00:43:36.380 --> 00:43:38.963 Matching the patients need but not over

NOTE Confidence: 0.940208755

00:43:38.963 --> 00:43:41.333 ventilating and improving asynchrony, it's.

NOTE Confidence: 0.940208755

00:43:41.333 --> 00:43:44.198 So those questions remain there.

NOTE Confidence: 0.940208755

00:43:44.200 --> 00:43:46.400 OK, one last switching of gears and I

NOTE Confidence: 0.940208755

00:43:46.400 --> 00:43:48.708 wanted to touch just on cardiovascular

NOTE Confidence: 0.940208755

00:43:48.708 --> 00:43:51.910 function and sleep deficiency and so this is,

NOTE Confidence: 0.940208755

00:43:51.910 --> 00:43:55.140 I think a step behind the metabolic

NOTE Confidence: 0.940208755

00:43:55.140 --> 00:43:57.620 and respiratory data that I've

NOTE Confidence: 0.940208755

00:43:57.712 --> 00:44:00.106 shared with you and so here.

NOTE Confidence: 0.940208755

00:44:00.110 --> 00:44:01.580 This is short sleep duration,

NOTE Confidence: 0.940208755

00:44:01.580 --> 00:44:03.971 but this is even chronic and in

NOTE Confidence: 0.940208755

00:44:03.971 --> 00:44:05.526 outpatient populations and so I

NOTE Confidence: 0.940208755

00:44:05.526 --> 00:44:07.778 think we know this as a as a group,

NOTE Confidence: 0.940208755

00:44:07.780 --> 00:44:08.325 right?

NOTE Confidence: 0.940208755

00:44:08.325 --> 00:44:12.140 We know that sleep duration short sleep.

NOTE Confidence: 0.940208755

00:44:12.140 --> 00:44:14.044 Is bad for health outcomes and so

NOTE Confidence: 0.940208755

00:44:14.044 --> 00:44:15.825 this very large meta analysis that

NOTE Confidence: 0.940208755

00:44:15.825 --> 00:44:17.925 I picked out shows that short sleep

NOTE Confidence: 0.940208755

00:44:17.989 --> 00:44:19.657 was associated with mortality,

NOTE Confidence: 0.940208755

00:44:19.660 --> 00:44:22.950 diabetes relevant to cardiovascular bucket

NOTE Confidence: 0.940208755

00:44:22.950 --> 00:44:24.438 hypertension, cardiovascular diseases,

NOTE Confidence: 0.940208755

00:44:24.438 --> 00:44:26.190 corner heart disease, and obesity.

NOTE Confidence: 0.940208755

00:44:26.190 --> 00:44:27.975 So this really is not a surprise

NOTE Confidence: 0.940208755

00:44:27.975 --> 00:44:28.819 to any of us.

NOTE Confidence: 0.940208755

00:44:28.820 --> 00:44:31.052 But this is chronic and so I think

NOTE Confidence: 0.940208755

00:44:31.052 --> 00:44:32.895 what's important to ask is what

NOTE Confidence: 0.940208755

00:44:32.895 --> 00:44:34.123 about acute sleep deprivation?

NOTE Confidence: 0.940208755

00:44:34.130 --> 00:44:37.259 Is that one night that few nights

NOTE Confidence: 0.940208755

00:44:37.259 --> 00:44:39.630 of short sleep have real?

NOTE Confidence: 0.940208755

00:44:39.630 --> 00:44:41.330 Impact on cardiovascular events

NOTE Confidence: 0.940208755

00:44:41.330 --> 00:44:42.180 and certainly.

NOTE Confidence: 0.956810683333333

00:44:44.280 --> 00:44:46.038 When I asked this question I,

NOTE Confidence: 0.956810683333333

00:44:46.040 --> 00:44:48.322 I think of the daylight savings time

NOTE Confidence: 0.956810683333333

00:44:48.322 --> 00:44:50.117 literature because it really is an

NOTE Confidence: 0.956810683333333

00:44:50.117 --> 00:44:52.450 acute several nights of short sleep,

NOTE Confidence: 0.956810683333333

00:44:52.450 --> 00:44:53.798 not dramatically shorter sleep

NOTE Confidence: 0.956810683333333

00:44:53.798 --> 00:44:55.483 for it's usually you know,

NOTE Confidence: 0.956810683333333

00:44:55.490 --> 00:44:58.427 associated with an hour or two and change

NOTE Confidence: 0.956810683333333

00:44:58.427 --> 00:45:01.906 in sleep duration for that spring forward.

NOTE Confidence: 0.956810683333333

00:45:01.910 --> 00:45:04.150 But I think there's it's suggestion there,

NOTE Confidence: 0.956810683333333

00:45:04.150 --> 00:45:06.150 and so I I bring that literature up

NOTE Confidence: 0.956810683333333

00:45:06.150 --> 00:45:09.195 just to say that I do think in that

NOTE Confidence: 0.956810683333333

00:45:09.195 --> 00:45:10.260 outpatient epidemiologic setting.

NOTE Confidence: 0.956810683333333

00:45:10.260 --> 00:45:11.490 We're seeing some hints at this.

NOTE Confidence: 0.956810683333333

00:45:11.490 --> 00:45:14.248 And there's there's more data out there.

NOTE Confidence: 0.956810683333333

00:45:14.250 --> 00:45:15.782 Didn't then this just?

NOTE Confidence: 0.956810683333333

00:45:15.782 --> 00:45:19.179 So I think we can move forward into

NOTE Confidence: 0.956810683333333

00:45:19.179 --> 00:45:22.137 ICU population saying that acute sleep

NOTE Confidence: 0.956810683333333

00:45:22.137 --> 00:45:25.083 deprivation does matter in terms of

NOTE Confidence: 0.956810683333333

00:45:25.083 --> 00:45:26.983 cardiovascular and arrhythmia risk.

NOTE Confidence: 0.956810683333333

00:45:26.990 --> 00:45:30.546 I present here a nice echo Echocardiographic

NOTE Confidence: 0.956810683333333

00:45:30.546 --> 00:45:33.980 study of 32 healthy individuals.

NOTE Confidence: 0.956810683333333

00:45:33.980 --> 00:45:37.046 They had two echocardiograms in a row.

NOTE Confidence: 0.956810683333333

00:45:37.050 --> 00:45:38.315 One was after regular sleep

NOTE Confidence: 0.956810683333333

00:45:38.315 --> 00:45:39.580 and was after short sleeve.

NOTE Confidence: 0.956810683333333

00:45:39.580 --> 00:45:41.617 Short sleeve was quite short just 2

NOTE Confidence: 0.956810683333333

00:45:41.617 --> 00:45:43.910 1/2 hours and what they saw was changes

NOTE Confidence: 0.956810683333333

00:45:43.910 --> 00:45:46.163 in the mechanics of the heart and so

NOTE Confidence: 0.956810683333333

00:45:46.163 --> 00:45:48.157 this one was focused on left atrial

NOTE Confidence: 0.956810683333333

00:45:48.157 --> 00:45:50.323 mechanics so they had a prolonged

NOTE Confidence: 0.956810683333333

00:45:50.323 --> 00:45:52.901 deceleration time and increased 80 prime.

NOTE Confidence: 0.956810683333333

00:45:52.901 --> 00:45:57.230 And I mean ally passive the amine passive.

NOTE Confidence: 0.956810683333333

00:45:57.230 --> 00:45:59.399 Yep, was lower.

NOTE Confidence: 0.956810683333333

00:45:59.400 --> 00:46:00.936 I know these terms are not

NOTE Confidence: 0.956810683333333

00:46:00.936 --> 00:46:02.580 super familiar to a lot of us,

NOTE Confidence: 0.956810683333333

00:46:02.580 --> 00:46:04.518 so I appreciate the author's conclusion.

NOTE Confidence: 0.956810683333333

00:46:04.520 --> 00:46:07.580 This is really consistent with

NOTE Confidence: 0.956810683333333

00:46:07.580 --> 00:46:09.416 subclinical diastolic dysfunction.

NOTE Confidence: 0.956810683333333

00:46:09.420 --> 00:46:11.260 The LA and so it's a stiffer hard.

NOTE Confidence: 0.956810683333333

00:46:11.260 --> 00:46:13.114 It's a heart that's not gonna work as well.

NOTE Confidence: 0.956810683333333

00:46:13.120 --> 00:46:15.800 And in fact there's a very similar study

NOTE Confidence: 0.956810683333333

00:46:15.800 --> 00:46:19.310 that looks at the at the LV and again says,

NOTE Confidence: 0.956810683333333

00:46:19.310 --> 00:46:20.330 you know,

NOTE Confidence: 0.956810683333333

00:46:20.330 --> 00:46:24.924 this is along the lines of left of left,

NOTE Confidence: 0.956810683333333

00:46:24.924 --> 00:46:25.946 ventricular dysfunction

NOTE Confidence: 0.956810683333333

00:46:25.946 --> 00:46:26.974 and diastolic dysfunction.

NOTE Confidence: 0.956810683333333

00:46:26.974 --> 00:46:28.773 But when we think about the patients

NOTE Confidence: 0.956810683333333

00:46:28.773 --> 00:46:30.250 were seen in the ICU, this is.

NOTE Confidence: 0.956810683333333

00:46:30.250 --> 00:46:32.370 This is clearly relevant to us and these

NOTE Confidence: 0.956810683333333

00:46:32.427 --> 00:46:34.331 are the sorts of issues that we battle

NOTE Confidence: 0.956810683333333

00:46:34.331 --> 00:46:36.380 as we struggled to control volume,

NOTE Confidence: 0.956810683333333

00:46:36.380 --> 00:46:39.050 respiratory failure and so on.

NOTE Confidence: 0.956810683333333

00:46:39.050 --> 00:46:42.417 And then in terms of arrhythmia risk,

NOTE Confidence: 0.956810683333333

00:46:42.420 --> 00:46:45.420 we know that sleep deprivation is

NOTE Confidence: 0.956810683333333

00:46:45.420 --> 00:46:47.592 a high sympathetic tone condition,

NOTE Confidence: 0.956810683333333

00:46:47.592 --> 00:46:49.682 and there's concern for arrhythmia.

NOTE Confidence: 0.956810683333333

00:46:49.690 --> 00:46:52.580 And I thought this study.

NOTE Confidence: 0.956810683333333

00:46:52.580 --> 00:46:54.988 Was was very elegant and very interesting,

NOTE Confidence: 0.956810683333333

00:46:54.990 --> 00:46:56.934 so this group just looked at

NOTE Confidence: 0.956810683333333

00:46:56.934 --> 00:46:58.816 the number of nocturnal overhead

NOTE Confidence: 0.956810683333333

00:46:58.816 --> 00:47:00.908 announcements in their hospitals,

NOTE Confidence: 0.956810683333333

00:47:00.910 --> 00:47:04.186 or an acute acutely ill population,

NOTE Confidence: 0.956810683333333

00:47:04.190 --> 00:47:06.340 not necessarily in the ICU.

NOTE Confidence: 0.956810683333333

00:47:06.340 --> 00:47:07.441 And they said.

NOTE Confidence: 0.956810683333333

00:47:07.441 --> 00:47:09.276 Depending on how many overnight

NOTE Confidence: 0.956810683333333

00:47:09.276 --> 00:47:11.039 overhead pages happen at night,

NOTE Confidence: 0.956810683333333

00:47:11.040 --> 00:47:13.933 what do we see is terms of PDC's per hour?

NOTE Confidence: 0.956810683333333

00:47:13.933 --> 00:47:16.435 And what do we see in terms of

NOTE Confidence: 0.956810683333333

00:47:16.435 --> 00:47:18.420 cardiac arrests during the following

NOTE Confidence: 0.956810683333333

00:47:18.420 --> 00:47:20.964 day and looked at this over?

NOTE Confidence: 0.956810683333333

00:47:20.964 --> 00:47:22.708 A three year period?

NOTE Confidence: 0.956810683333333

00:47:22.710 --> 00:47:24.618 Excuse me in three months period.

NOTE Confidence: 0.956810683333333

00:47:24.620 --> 00:47:25.015 Uhm,

NOTE Confidence: 0.956810683333333

00:47:25.015 --> 00:47:27.780 excuse the typo and so they looked

NOTE Confidence: 0.956810683333333

00:47:27.780 --> 00:47:29.908 at 2600 hours of telemetry.

NOTE Confidence: 0.956810683333333

00:47:29.908 --> 00:47:32.500 Was almost 90 patients that they

NOTE Confidence: 0.956810683333333

00:47:32.578 --> 00:47:34.336 looked at and they looked at

NOTE Confidence: 0.956810683333333

00:47:34.336 --> 00:47:36.334 nights that had less than less than

NOTE Confidence: 0.956810683333333

00:47:36.334 --> 00:47:37.939 or equal to two announcements.

NOTE Confidence: 0.956810683333333

00:47:37.940 --> 00:47:40.320 And they said with low number of

NOTE Confidence: 0.956810683333333

00:47:40.320 --> 00:47:43.030 announcements the number of PVCS per

NOTE Confidence: 0.956810683333333

00:47:43.030 --> 00:47:45.400 hour decreased during that night.

NOTE Confidence: 0.956810683333333

00:47:45.400 --> 00:47:47.920 And then remained 30% lower during

NOTE Confidence: 0.956810683333333

00:47:47.920 --> 00:47:50.200 the following day time period,

NOTE Confidence: 0.956810683333333

00:47:50.200 --> 00:47:52.520 which I found remarkable the

NOTE Confidence: 0.956810683333333

00:47:52.520 --> 00:47:54.376 nights that had more

NOTE Confidence: 0.886102057

00:47:54.380 --> 00:47:56.708 equal or more than four announcements

NOTE Confidence: 0.886102057

00:47:56.708 --> 00:48:01.950 had an increased by 23% versus.

NOTE Confidence: 0.886102057

00:48:01.950 --> 00:48:04.148 23% and then it was further increased

NOTE Confidence: 0.886102057

00:48:04.150 --> 00:48:06.502 85% the next day and sorry I should

NOTE Confidence: 0.886102057

00:48:06.502 --> 00:48:08.342 mention the reference was three

NOTE Confidence: 0.886102057

00:48:08.342 --> 00:48:10.202 announcements per night so that

NOTE Confidence: 0.886102057

00:48:10.202 --> 00:48:11.990 the number that's missing for.

NOTE Confidence: 0.886102057

00:48:11.990 --> 00:48:13.320 Furthermore, uhm.

NOTE Confidence: 0.886102057

00:48:13.320 --> 00:48:17.822 If they looked at cardiac arrests and they

NOTE Confidence: 0.886102057

00:48:17.822 --> 00:48:20.200 looked at daytime hours from 6:00 AM to 2200,

NOTE Confidence: 0.886102057

00:48:20.200 --> 00:48:23.560 so this is not come.

NOTE Confidence: 0.886102057

00:48:23.560 --> 00:48:25.310 Staff distraction this is not,

NOTE Confidence: 0.886102057

00:48:25.310 --> 00:48:27.081 you know, something going on with the

NOTE Confidence: 0.886102057

00:48:27.081 --> 00:48:28.329 announcements during the night time.

NOTE Confidence: 0.886102057

00:48:28.330 --> 00:48:30.034 This is the following day that

NOTE Confidence: 0.886102057

00:48:30.034 --> 00:48:32.026 the nights that had for whatever

NOTE Confidence: 0.886102057

00:48:32.026 --> 00:48:33.856 reason 0 announcements the cardiac

NOTE Confidence: 0.886102057

00:48:33.856 --> 00:48:35.831 arrest rate per day was .3.

NOTE Confidence: 0.886102057

00:48:35.831 --> 00:48:37.736 If it was one announcement.

NOTE Confidence: 0.886102057

00:48:37.740 --> 00:48:41.514 It was .339 almost .4 and if it

NOTE Confidence: 0.886102057

00:48:41.514 --> 00:48:43.794 was two announcements it was .47.

NOTE Confidence: 0.886102057

00:48:43.794 --> 00:48:46.850 And this was significant.

NOTE Confidence: 0.886102057

00:48:46.850 --> 00:48:49.993 And then they had a natural experiment

NOTE Confidence: 0.886102057

00:48:49.993 --> 00:48:52.600 in which they added an additional

NOTE Confidence: 0.886102057

00:48:52.600 --> 00:48:54.450 criterion for overhead pages and

NOTE Confidence: 0.886102057

00:48:54.450 --> 00:48:56.480 it resulted in announcements.

NOTE Confidence: 0.897182042

00:49:00.470 --> 00:49:04.587 They look looked at periods when the average

NOTE Confidence: 0.897182042

00:49:04.587 --> 00:49:06.510 increase from one per day to sticks per day.

NOTE Confidence: 0.897182042

00:49:06.510 --> 00:49:08.925 Due to this change in hospital protocols

NOTE Confidence: 0.897182042

00:49:08.930 --> 00:49:11.322 and they saw that the frequency of cardiac

NOTE Confidence: 0.897182042

00:49:11.322 --> 00:49:13.505 arrest went from an overall global average

NOTE Confidence: 0.897182042

00:49:13.505 --> 00:49:17.306 of .46 to .62 with a very significant P.

NOTE Confidence: 0.897182042

00:49:17.310 --> 00:49:19.068 I think it's a very, you know, there's

NOTE Confidence: 0.897182042

00:49:19.068 --> 00:49:20.930 a lot of questions is observation ULL.

NOTE Confidence: 0.897182042

00:49:20.930 --> 00:49:22.760 This is certainly not conclusive and

NOTE Confidence: 0.897182042

00:49:22.760 --> 00:49:25.052 mechanisms are a little unclear, but it's

NOTE Confidence: 0.897182042

00:49:25.052 --> 00:49:26.888 very interesting and a very convincing.

NOTE Confidence: 0.897182042

00:49:26.890 --> 00:49:29.578 It hangs together as a pattern.

NOTE Confidence: 0.897182042

00:49:29.580 --> 00:49:31.476 However, I'm not really sure what to do.

NOTE Confidence: 0.897182042

00:49:31.480 --> 00:49:33.724 I mean, that hospital should definitely

NOTE Confidence: 0.897182042

00:49:33.724 --> 00:49:35.220 stop their overhead announcements,

NOTE Confidence: 0.897182042

00:49:35.220 --> 00:49:38.097 but I'm not really sure other than

NOTE Confidence: 0.897182042

00:49:38.097 --> 00:49:40.304 sleep promotion. What we can do?

NOTE Confidence: 0.897182042

00:49:40.304 --> 00:49:41.688 They imagine mechanisms are

NOTE Confidence: 0.897182042

00:49:41.688 --> 00:49:43.419 inflammation and sympathetic tone.

NOTE Confidence: 0.897182042

00:49:43.420 --> 00:49:45.244 I mean going after those medically

NOTE Confidence: 0.897182042

00:49:45.244 --> 00:49:46.857 seems quite dangerous in terms

NOTE Confidence: 0.897182042

00:49:46.857 --> 00:49:48.217 of unintended side effects,

NOTE Confidence: 0.897182042

00:49:48.220 --> 00:49:50.800 but I think it's an interesting

NOTE Confidence: 0.897182042

00:49:50.800 --> 00:49:52.090 area to explore.

NOTE Confidence: 0.897182042

00:49:52.090 --> 00:49:52.654 With that,

NOTE Confidence: 0.897182042

00:49:52.654 --> 00:49:54.628 I'll summarize and so you know many

NOTE Confidence: 0.897182042

00:49:54.628 --> 00:49:56.630 functions are affected by sleep deficiency.

NOTE Confidence: 0.897182042

00:49:56.630 --> 00:49:59.346 I've alluded to this throughout the talk.

NOTE Confidence: 0.897182042

00:49:59.350 --> 00:50:01.093 I think there's been a lot of

NOTE Confidence: 0.897182042

00:50:01.093 --> 00:50:02.390 appropriate focus on cognition,

NOTE Confidence: 0.897182042

00:50:02.390 --> 00:50:04.406 mood, and vigilance for our patients.

NOTE Confidence: 0.897182042

00:50:04.410 --> 00:50:07.290 In our case, ICU delirium.

NOTE Confidence: 0.897182042

00:50:07.290 --> 00:50:09.537 And we are seeing some strides in

NOTE Confidence: 0.897182042

00:50:09.537 --> 00:50:11.025 which sleep promotion interventions

NOTE Confidence: 0.897182042

00:50:11.025 --> 00:50:13.650 are decreasing delirium in our

NOTE Confidence: 0.897182042

00:50:13.650 --> 00:50:15.750 in our ICU patients.

NOTE Confidence: 0.897182042

00:50:15.750 --> 00:50:18.744 As I presented them and I,

NOTE Confidence: 0.897182042

00:50:18.744 --> 00:50:21.523 I think it's it's a reasonable statement.

NOTE Confidence: 0.897182042

00:50:21.530 --> 00:50:23.810 I think the metabolic and respiratory

NOTE Confidence: 0.897182042

00:50:23.810 --> 00:50:26.055 domains of decreased function in the

NOTE Confidence: 0.897182042

00:50:26.055 --> 00:50:28.059 setting of sleep deficiency are probably

NOTE Confidence: 0.897182042

00:50:28.059 --> 00:50:30.710 the closest store prime time we have

NOTE Confidence: 0.897182042

00:50:30.710 --> 00:50:32.246 active randomized controlled trials.

NOTE Confidence: 0.897182042

00:50:32.250 --> 00:50:35.570 We have a pretty robust.

NOTE Confidence: 0.897182042

00:50:35.570 --> 00:50:38.825 Healthy volunteer disease models to look at.

NOTE Confidence: 0.897182042

00:50:38.830 --> 00:50:40.654 And really some some concrete things

NOTE Confidence: 0.897182042

00:50:40.654 --> 00:50:43.070 that we can do in the ICU to test.

NOTE Confidence: 0.897182042

00:50:43.070 --> 00:50:45.005 Really in the next few years and figure out

NOTE Confidence: 0.897182042

00:50:45.005 --> 00:50:47.003 if we can help our patients in this way.

NOTE Confidence: 0.897182042

00:50:47.010 --> 00:50:49.575 I think what's coming down the Pike is the

NOTE Confidence: 0.897182042

00:50:49.575 --> 00:50:51.167 cardiovascular data that I touched upon,

NOTE Confidence: 0.897182042

00:50:51.170 --> 00:50:52.910 which we really just have hints.

NOTE Confidence: 0.897182042

00:50:52.910 --> 00:50:53.810 That is important,

NOTE Confidence: 0.897182042

00:50:53.810 --> 00:50:55.610 but it's a little unclear how

NOTE Confidence: 0.897182042

00:50:55.610 --> 00:50:56.740 to move forward.

NOTE Confidence: 0.897182042

00:50:56.740 --> 00:51:00.358 There is also some very interesting.

NOTE Confidence: 0.897182042

00:51:00.360 --> 00:51:01.180 Bidirectional relationships

NOTE Confidence: 0.897182042

00:51:01.180 --> 00:51:03.230 with sleep and immune system.

NOTE Confidence: 0.897182042

00:51:03.230 --> 00:51:05.042 We know that in the setting

NOTE Confidence: 0.897182042

00:51:05.042 --> 00:51:06.779 of sleep deprivation we have

NOTE Confidence: 0.897182042

00:51:06.779 --> 00:51:08.159 worsened vaccine response.

NOTE Confidence: 0.897182042

00:51:08.160 --> 00:51:09.992 We have higher clinical

NOTE Confidence: 0.897182042

00:51:09.992 --> 00:51:11.366 vulnerability to colds,

NOTE Confidence: 0.897182042

00:51:11.370 --> 00:51:13.610 but we really have a lot to explore

NOTE Confidence: 0.897182042

00:51:13.610 --> 00:51:16.729 in the ICU in terms of how supporting

NOTE Confidence: 0.897182042

00:51:16.729 --> 00:51:18.849 sleeping circadian function can maybe

NOTE Confidence: 0.897182042

00:51:18.849 --> 00:51:21.567 boost immune function and then also this,

NOTE Confidence: 0.897182042

00:51:21.567 --> 00:51:23.769 there's a fair amount of interaction

NOTE Confidence: 0.897182042

00:51:23.769 --> 00:51:25.370 between skeletal muscle strength

NOTE Confidence: 0.897182042

00:51:25.370 --> 00:51:27.080 and sleep and sleep deficiency.

NOTE Confidence: 0.897182042

00:51:27.080 --> 00:51:28.664 And we can imagine how important

NOTE Confidence: 0.897182042

00:51:28.664 --> 00:51:30.270 that can be for recovery.

NOTE Confidence: 0.897182042

00:51:30.270 --> 00:51:32.604 Come from critical illness and so

NOTE Confidence: 0.897182042

00:51:32.604 --> 00:51:35.010 I think that's that's the future.

NOTE Confidence: 0.897182042

00:51:35.010 --> 00:51:37.376 With that, I will think as always,

NOTE Confidence: 0.897182042

00:51:37.380 --> 00:51:39.410 my mentors and my funders,

NOTE Confidence: 0.897182042

00:51:39.410 --> 00:51:41.560 who have been phenomenal supporters

NOTE Confidence: 0.897182042

00:51:41.560 --> 00:51:44.564 of me and really willing to step

NOTE Confidence: 0.897182042

00:51:44.564 --> 00:51:46.886 outside the box and ask some

NOTE Confidence: 0.897182042

00:51:46.886 --> 00:51:48.529 unusual questions in the ICU.

NOTE Confidence: 0.897182042

00:51:48.530 --> 00:51:50.455 And I'm also happy to take questions.

NOTE Confidence: 0.897182042

00:51:50.460 --> 00:51:51.240 Thanks so much.

NOTE Confidence: 0.931741661428571

00:51:55.320 --> 00:51:56.376 Thank you very much.

NOTE Confidence: 0.931741661428571

00:51:56.376 --> 00:51:57.597 That was terrific, really.

NOTE Confidence: 0.931741661428571

00:51:57.597 --> 00:52:00.159 A great overview and I certainly

NOTE Confidence: 0.931741661428571

00:52:00.159 --> 00:52:02.216 learned a lot. I am going to.

NOTE Confidence: 0.931741661428571

00:52:02.216 --> 00:52:04.124 I got well I got a fantastic talk

NOTE Confidence: 0.931741661428571

00:52:04.124 --> 00:52:06.158 already but I had one question.

NOTE Confidence: 0.931741661428571

00:52:06.160 --> 00:52:08.032 While people are thinking of their

NOTE Confidence: 0.931741661428571

00:52:08.032 --> 00:52:10.209 their questions so you know your study

NOTE Confidence: 0.931741661428571

00:52:10.209 --> 00:52:11.949 that you're doing with the feeding

NOTE Confidence: 0.931741661428571

00:52:11.949 --> 00:52:14.403 in the ICU where you want to do the

NOTE Confidence: 0.931741661428571

00:52:14.403 --> 00:52:17.830 time restricted intermittent feeding.

NOTE Confidence: 0.931741661428571

00:52:17.830 --> 00:52:19.342 Of course you want to feed these

NOTE Confidence: 0.931741661428571

00:52:19.342 --> 00:52:20.870 people during the circadian day, right?

NOTE Confidence: 0.931741661428571

00:52:20.870 --> 00:52:22.710 And you're going to try to do that,

NOTE Confidence: 0.931741661428571

00:52:22.710 --> 00:52:24.490 but you, previous to that,

NOTE Confidence: 0.931741661428571

00:52:24.490 --> 00:52:26.265 explain that patients in the

NOTE Confidence: 0.931741661428571

00:52:26.265 --> 00:52:28.450 ICU you know they're not they.

NOTE Confidence: 0.931741661428571

00:52:28.450 --> 00:52:30.102 It's hard to predict when their circadian

NOTE Confidence: 0.931741661428571

00:52:30.102 --> 00:52:31.996 day is and some are on a advanced

NOTE Confidence: 0.931741661428571

00:52:31.996 --> 00:52:33.590 schedule and some on normal schedule,

NOTE Confidence: 0.931741661428571

00:52:33.590 --> 00:52:35.150 and the majority are delayed.

NOTE Confidence: 0.931741661428571

00:52:35.150 --> 00:52:37.215 So how are you deciding

NOTE Confidence: 0.931741661428571

00:52:37.215 --> 00:52:38.867 when circadian day is?

NOTE Confidence: 0.931741661428571

00:52:38.870 --> 00:52:42.970 Are you doing salivary melatonin?

NOTE Confidence: 0.931741661428571

00:52:42.970 --> 00:52:45.020 You know core body temperature,

NOTE Confidence: 0.931741661428571

00:52:45.020 --> 00:52:46.044 just guessing what's your?

NOTE Confidence: 0.931741661428571

00:52:46.044 --> 00:52:47.940 What are you going to be doing?

NOTE Confidence: 0.931741661428571

00:52:47.940 --> 00:52:48.290 Yeah,

NOTE Confidence: 0.883899935

00:52:48.300 --> 00:52:50.343 so fantastic question.

NOTE Confidence: 0.883899935

00:52:50.343 --> 00:52:53.626 So we come. There's there's

NOTE Confidence: 0.883899935

00:52:53.626 --> 00:52:56.716 currently no real time solution.

NOTE Confidence: 0.883899935

00:52:56.720 --> 00:52:59.444 I think the real time solution

NOTE Confidence: 0.883899935

00:52:59.444 --> 00:53:01.260 ultimately will hopefully be

NOTE Confidence: 0.883899935

00:53:01.343 --> 00:53:04.037 something like real time heart rate

NOTE Confidence: 0.883899935

00:53:04.040 --> 00:53:05.828 detection of diurnal variation,

NOTE Confidence: 0.883899935

00:53:05.828 --> 00:53:09.149 but for this study it is a guest

NOTE Confidence: 0.883899935

00:53:09.150 --> 00:53:10.389 and I am basing it on that.

NOTE Confidence: 0.883899935

00:53:10.390 --> 00:53:13.876 Most of them are delayed and so.

NOTE Confidence: 0.883899935

00:53:13.880 --> 00:53:17.190 I have arranged it that.

NOTE Confidence: 0.883899935

00:53:17.190 --> 00:53:19.443 Uhm, we start.

NOTE Confidence: 0.883899935

00:53:19.443 --> 00:53:23.083 Don't correct me, we started eight.

NOTE Confidence: 0.883899935

00:53:23.083 --> 00:53:25.478 We do formulas eight we started

NOTE Confidence: 0.883899935

00:53:25.478 --> 00:53:27.670 first meal at 8:00 AM and we end

NOTE Confidence: 0.883899935

00:53:27.734 --> 00:53:30.022 our last meal at 8:00 PM and so

NOTE Confidence: 0.883899935

00:53:30.022 --> 00:53:31.750 it's actually a 13 hour period.

NOTE Confidence: 0.883899935

00:53:31.750 --> 00:53:32.431 I debated it.

NOTE Confidence: 0.883899935

00:53:32.431 --> 00:53:34.020 We debated it for a long time.

NOTE Confidence: 0.883899935

00:53:34.020 --> 00:53:36.636 I was very tempted to do

NOTE Confidence: 0.883899935

00:53:36.636 --> 00:53:38.320 a much more constricted,

NOTE Confidence: 0.883899935

00:53:38.320 --> 00:53:39.430 like three meals,

NOTE Confidence: 0.883899935

00:53:39.430 --> 00:53:41.650 just to sort of guarantee that

NOTE Confidence: 0.883899935

00:53:41.711 --> 00:53:43.409 I was in that biologic date.

NOTE Confidence: 0.883899935

00:53:43.410 --> 00:53:45.834 But for logistic reasons it made the meal

NOTE Confidence: 0.883899935

00:53:45.834 --> 00:53:48.329 volume very big and made folks more nervous.

NOTE Confidence: 0.883899935

00:53:48.330 --> 00:53:48.930 'cause it was.

NOTE Confidence: 0.883899935

00:53:48.930 --> 00:53:50.030 You know, pretty big,

NOTE Confidence: 0.883899935

00:53:50.030 --> 00:53:51.080 and so on.

NOTE Confidence: 0.883899935

00:53:51.080 --> 00:53:53.432 So right now we have what is

NOTE Confidence: 0.883899935

00:53:53.432 --> 00:53:55.465 essentially a 13 hour feeding

NOTE Confidence: 0.883899935

00:53:55.465 --> 00:53:57.740 period 888 AM to 9:00 AM to 9:00 PM.

NOTE Confidence: 0.876484596

00:53:58.510 --> 00:53:59.986 Alright, terrific thanks, thanks.

NOTE Confidence: 0.876484596

00:53:59.986 --> 00:54:02.200 Alright so I'm getting some questions.

NOTE Confidence: 0.876484596

00:54:02.200 --> 00:54:04.711 Add question here it says so it should be

NOTE Confidence: 0.876484596

00:54:04.711 --> 00:54:07.052 fair to say that the New England Journal

NOTE Confidence: 0.876484596

00:54:07.052 --> 00:54:09.406 paper a few years ago about holding

NOTE Confidence: 0.876484596

00:54:09.406 --> 00:54:11.554 sedation in the ICU had physiologic

NOTE Confidence: 0.876484596

00:54:11.560 --> 00:54:12.889 sleep architecture improvement.

NOTE Confidence: 0.876484596

00:54:12.889 --> 00:54:15.547 What is the basis for that?

NOTE Confidence: 0.876484596

00:54:15.550 --> 00:54:17.629 I think that is what I meant to see.

NOTE Confidence: 0.88126373

00:54:19.880 --> 00:54:20.876 Does that make sense?

NOTE Confidence: 0.88126373

00:54:20.876 --> 00:54:22.710 Do you know about this New England

NOTE Confidence: 0.88126373

00:54:22.761 --> 00:54:24.508 Journal paper? A few years old?

NOTE Confidence: 0.938437708

00:54:24.620 --> 00:54:26.612 Yeah, I'm I'm not clear about

NOTE Confidence: 0.938437708

00:54:26.612 --> 00:54:28.430 what the question is. Sorry,

NOTE Confidence: 0.931334307272727

00:54:28.680 --> 00:54:30.012 OK, maybe I can.

NOTE Confidence: 0.931334307272727

00:54:30.012 --> 00:54:32.580 I can try to unmute this person

NOTE Confidence: 0.931334307272727

00:54:32.580 --> 00:54:34.686 asked to unmute, let me see.

NOTE Confidence: 0.931334307272727

00:54:34.690 --> 00:54:37.639 It's William Rodriguez.

NOTE Confidence: 0.931334307272727

00:54:37.640 --> 00:54:39.030 Are you able to clarify?

NOTE Confidence: 0.77263542

00:54:40.210 --> 00:54:41.230 Oh hi, can you hear me?

NOTE Confidence: 0.77263542

00:54:41.230 --> 00:54:43.211 Hi yes yeah perfect no.

NOTE Confidence: 0.77263542

00:54:43.211 --> 00:54:45.416 Basically that that are that

NOTE Confidence: 0.77263542

00:54:45.416 --> 00:54:47.730 the manuscript went over about.

NOTE Confidence: 0.77263542

00:54:47.730 --> 00:54:50.286 I mean having patients being off

NOTE Confidence: 0.77263542

00:54:50.290 --> 00:54:52.680 sedation I mean benzodiazepine's etc.

NOTE Confidence: 0.77263542

00:54:52.680 --> 00:54:54.286 And we know the effect of the events of

NOTE Confidence: 0.77263542

00:54:54.286 --> 00:54:56.310 the last episode on the architecture.

NOTE Confidence: 0.77263542

00:54:56.310 --> 00:54:59.309 So it was sort of I was protecting.

NOTE Confidence: 0.77263542

00:54:59.310 --> 00:55:01.190 I am taking it as we were

NOTE Confidence: 0.77263542

00:55:01.190 --> 00:55:03.078 by holiday situation. We

NOTE Confidence: 0.898166681428571

00:55:03.090 --> 00:55:05.078 are sort of protecting the patients from

NOTE Confidence: 0.700057315

00:55:05.310 --> 00:55:07.298 having a different sleep

NOTE Confidence: 0.90040110125

00:55:07.310 --> 00:55:07.577 architecture.

NOTE Confidence: 0.90040110125

00:55:07.577 --> 00:55:09.446 I mean trying to make more normal.

NOTE Confidence: 0.90040110125

00:55:09.450 --> 00:55:10.738 I don't know if you can get my.

NOTE Confidence: 0.90040110125

00:55:10.740 --> 00:55:11.870 My message what I'm saying.

NOTE Confidence: 0.938382275

00:55:13.340 --> 00:55:15.678 So. I don't. I don't know the

NOTE Confidence: 0.938382275

00:55:15.678 --> 00:55:17.769 paper that we're talking about,

NOTE Confidence: 0.938382275

00:55:17.770 --> 00:55:19.258 but I think the so yes.

NOTE Confidence: 0.938382275

00:55:19.260 --> 00:55:21.425 So benzos and narcotics are

NOTE Confidence: 0.938382275

00:55:21.425 --> 00:55:23.276 terrible for sleep. That's it?

NOTE Confidence: 0.938382275

00:55:23.276 --> 00:55:24.368 That's a technical description.

NOTE Confidence: 0.885241484285714

00:55:26.660 --> 00:55:31.490 And so. Sedation holidays should benefit it.

NOTE Confidence: 0.885241484285714

00:55:31.490 --> 00:55:35.162 But we it what? Is unclear as if that

NOTE Confidence: 0.885241484285714

00:55:35.162 --> 00:55:38.149 sedation holiday like daily station

NOTE Confidence: 0.885241484285714

00:55:38.149 --> 00:55:40.932 holidays are generally brief, right?

NOTE Confidence: 0.885241484285714

00:55:40.932 --> 00:55:42.976 So either they're brief and the patient

NOTE Confidence: 0.885241484285714

00:55:42.976 --> 00:55:45.210 fails and they need to be re sedated

NOTE Confidence: 0.885241484285714

00:55:45.210 --> 00:55:46.639 or lightened or whatever it is,

NOTE Confidence: 0.885241484285714

00:55:46.640 --> 00:55:51.820 or they liberate and and so there is not.

NOTE Confidence: 0.885241484285714

00:55:51.820 --> 00:55:53.384 That should benefit sleep.

NOTE Confidence: 0.885241484285714

00:55:53.384 --> 00:55:55.339 In in the global sense,

NOTE Confidence: 0.885241484285714

00:55:55.340 --> 00:55:59.866 but there have not been studies to date

NOTE Confidence: 0.885241484285714

00:55:59.866 --> 00:56:02.914 saying does the sedation holiday of an

NOTE Confidence: 0.885241484285714

00:56:02.914 --> 00:56:05.402 hour so improve sleep is that yeah,

NOTE Confidence: 0.885241484285714

00:56:05.402 --> 00:56:07.376 but I'm saying at the time what?

NOTE Confidence: 0.885241484285714

00:56:07.380 --> 00:56:09.270 What show the study was that patients

NOTE Confidence: 0.885241484285714

00:56:09.270 --> 00:56:11.088 were weaned off the band easily

NOTE Confidence: 0.746382691666667

00:56:11.100 --> 00:56:13.630 earlier. They come off the bench better

NOTE Confidence: 0.768581166666667

00:56:13.890 --> 00:56:16.230 so, but the article did

NOTE Confidence: 0.768581166666667

00:56:16.230 --> 00:56:18.102 not analyze any aspect

NOTE Confidence: 0.826803888571429

00:56:18.120 --> 00:56:20.220 of sleep architecture. So in a way

NOTE Confidence: 0.697157204285714

00:56:20.300 --> 00:56:22.435 they were right, but they reach a

NOTE Confidence: 0.697157204285714

00:56:22.440 --> 00:56:23.946 conclusion through a different way.

NOTE Confidence: 0.697157204285714

00:56:23.946 --> 00:56:26.130 That's fine. So yeah, so I don't.

NOTE Confidence: 0.697157204285714

00:56:26.130 --> 00:56:28.440 Yeah, so I think all of these are,

NOTE Confidence: 0.697157204285714

00:56:28.440 --> 00:56:31.242 you know, that's a great question, you know.

NOTE Confidence: 0.697157204285714

00:56:31.242 --> 00:56:33.147 The It's the same though

NOTE Confidence: 0.697157204285714

00:56:33.147 --> 00:56:34.830 for the feeding right?

NOTE Confidence: 0.697157204285714

00:56:34.830 --> 00:56:36.860 So the feeding the intermittent

NOTE Confidence: 0.697157204285714

00:56:36.860 --> 00:56:38.890 feeding also has benefits for

NOTE Confidence: 0.697157204285714

00:56:38.961 --> 00:56:41.080 protein synthesis and gut you know

NOTE Confidence: 0.697157204285714

00:56:41.080 --> 00:56:42.520 all the normal functions of the

NOTE Confidence: 0.697157204285714

00:56:42.520 --> 00:56:44.105 gut and so so on and so forth.

NOTE Confidence: 0.697157204285714

00:56:44.110 --> 00:56:46.126 And so I don't and mobility,

NOTE Confidence: 0.697157204285714

00:56:46.130 --> 00:56:48.314 which I think is going to be really

NOTE Confidence: 0.697157204285714

00:56:48.314 --> 00:56:49.843 important for sleep promotion and

NOTE Confidence: 0.697157204285714

00:56:49.843 --> 00:56:52.270 is and I think also is going to be

NOTE Confidence: 0.697157204285714

00:56:52.270 --> 00:56:53.967 bidirectional that getting your skeletal

NOTE Confidence: 0.697157204285714

00:56:53.967 --> 00:56:56.232 muscle strength back is going to be

NOTE Confidence: 0.697157204285714

00:56:56.232 --> 00:56:57.960 important for sleep and vice versa,

NOTE Confidence: 0.697157204285714

00:56:57.960 --> 00:57:00.312 but I'm certainly not going to assert that

NOTE Confidence: 0.697157204285714

00:57:00.312 --> 00:57:02.860 sleep is the whole story of the situation.

NOTE Confidence: 0.697157204285714

00:57:02.860 --> 00:57:05.290 Holiday rates sedatives have many effects.

NOTE Confidence: 0.697157204285714

00:57:05.290 --> 00:57:06.240 Sleep is one of them,

NOTE Confidence: 0.697157204285714

00:57:06.240 --> 00:57:09.372 and so I think a lot of the early

NOTE Confidence: 0.697157204285714

00:57:09.372 --> 00:57:12.209 mobility studies the sedation studies.

NOTE Confidence: 0.697157204285714

00:57:12.210 --> 00:57:14.191 Some of the time restricted feeding studies

NOTE Confidence: 0.697157204285714

00:57:14.191 --> 00:57:16.360 are going to have not looked at sleep,

NOTE Confidence: 0.697157204285714

00:57:16.360 --> 00:57:18.166 and it's going to turn out that

NOTE Confidence: 0.697157204285714

00:57:18.166 --> 00:57:20.099 that was part of their mechanism.

NOTE Confidence: 0.697157204285714

00:57:20.100 --> 00:57:20.450 Great

NOTE Confidence: 0.900201705714286

00:57:20.460 --> 00:57:25.346 thanks, there is another question and this.

NOTE Confidence: 0.900201705714286

00:57:25.350 --> 00:57:27.191 The question is, can you talk about

NOTE Confidence: 0.900201705714286

00:57:27.191 --> 00:57:28.288 the difference between peripheral

NOTE Confidence: 0.900201705714286

00:57:28.288 --> 00:57:29.836 clocks and central clocks and what

NOTE Confidence: 0.900201705714286

00:57:29.836 --> 00:57:31.481 some of the intervention and what

NOTE Confidence: 0.900201705714286

00:57:31.481 --> 00:57:33.113 are some of the interventions that

NOTE Confidence: 0.900201705714286

00:57:33.113 --> 00:57:35.160 can be leveraged to target these?

NOTE Confidence: 0.91715529375

00:57:35.950 --> 00:57:39.006 OK, so I think that the best example

NOTE Confidence: 0.91715529375

00:57:39.006 --> 00:57:42.483 for that is is certainly the peripheral

NOTE Confidence: 0.91715529375

00:57:42.483 --> 00:57:45.010 clocks that are associated with feeding

NOTE Confidence: 0.91715529375

00:57:45.010 --> 00:57:48.145 and so stepping back very big picture

NOTE Confidence: 0.91715529375

00:57:48.145 --> 00:57:51.800 central clock brain tide to light

NOTE Confidence: 0.91715529375

00:57:51.800 --> 00:57:53.720 peripheral clocks everywhere else in

NOTE Confidence: 0.91715529375

00:57:53.720 --> 00:57:55.920 the body and they certainly get signal.

NOTE Confidence: 0.91715529375

00:57:55.920 --> 00:57:57.340 From the central clock melatonin,

NOTE Confidence: 0.91715529375

00:57:57.340 --> 00:57:59.024 certainly a coordinating signal,

NOTE Confidence: 0.91715529375

00:57:59.024 --> 00:58:00.708 but they also have.

NOTE Confidence: 0.91715529375

00:58:00.710 --> 00:58:02.862 I can't, I think of them as functionally

NOTE Confidence: 0.91715529375

00:58:02.862 --> 00:58:04.079 relevant peripheral clock signals,

NOTE Confidence: 0.91715529375

00:58:04.080 --> 00:58:07.224 and so the gut the pancreas and liver

NOTE Confidence: 0.91715529375

00:58:07.224 --> 00:58:09.399 are tremendously influenced by feeding

NOTE Confidence: 0.91715529375

00:58:09.399 --> 00:58:12.021 schedule and so you could imagine

NOTE Confidence: 0.91715529375

00:58:12.021 --> 00:58:15.350 that in shift work for example.

NOTE Confidence: 0.91715529375

00:58:15.350 --> 00:58:17.222 You have one set of signals from light

NOTE Confidence: 0.91715529375

00:58:17.222 --> 00:58:19.072 and maybe you eat a big meal in the

NOTE Confidence: 0.91715529375

00:58:19.072 --> 00:58:21.109 middle of the night of your biologic night,

NOTE Confidence: 0.91715529375

00:58:21.110 --> 00:58:22.958 'cause you're up and your gut saying it's

NOTE Confidence: 0.91715529375

00:58:22.958 --> 00:58:24.688 a different time than your brain saying,

NOTE Confidence: 0.91715529375

00:58:24.690 --> 00:58:26.825 and so you can get these internal

NOTE Confidence: 0.91715529375

00:58:26.830 --> 00:58:30.726 desynchrony and so one thing that we think

NOTE Confidence: 0.91715529375

00:58:30.726 --> 00:58:34.857 about in the ICU is if we try are trying.

NOTE Confidence: 0.91715529375

00:58:34.860 --> 00:58:37.422 Uhm, to target these things we want

NOTE Confidence: 0.91715529375

00:58:37.422 --> 00:58:40.848 to do it in a in a organized manner,

NOTE Confidence: 0.91715529375

00:58:40.850 --> 00:58:42.894 and so the feeding the time restricted

NOTE Confidence: 0.91715529375

00:58:42.894 --> 00:58:44.815 feeding that I suggested certainly is

NOTE Confidence: 0.91715529375

00:58:44.815 --> 00:58:47.125 going to have the effect of orienting

NOTE Confidence: 0.91715529375

00:58:47.186 --> 00:58:49.122 the gut and the liver and the pancreas

NOTE Confidence: 0.91715529375

00:58:49.122 --> 00:58:51.238 to my feeding schedule and hopefully

NOTE Confidence: 0.91715529375

00:58:51.238 --> 00:58:54.136 that is the same because I'm also

NOTE Confidence: 0.91715529375

00:58:54.136 --> 00:58:56.416 promoting sleep during the night and

NOTE Confidence: 0.91715529375

00:58:56.416 --> 00:58:59.202 and I'm doing mobility during the day

NOTE Confidence: 0.91715529375

00:58:59.202 --> 00:59:01.538 and so hopefully a kinda Janet question.

NOTE Confidence: 0.91715529375

00:59:01.538 --> 00:59:02.399 I'm guessing right,

NOTE Confidence: 0.91715529375

00:59:02.400 --> 00:59:03.700 but I'm also hopefully giving

NOTE Confidence: 0.91715529375

00:59:03.700 --> 00:59:05.270 coordinated signals and so the time.

NOTE Confidence: 0.91715529375

00:59:05.270 --> 00:59:07.088 Doing the same signal through a

NOTE Confidence: 0.91715529375

00:59:07.088 --> 00:59:08.606 different messenger to the peripheral

NOTE Confidence: 0.91715529375

00:59:08.606 --> 00:59:10.384 clocks as I am to the brain.

NOTE Confidence: 0.91715529375

00:59:10.390 --> 00:59:11.618 Hopefully that makes sense.

NOTE Confidence: 0.906439613

00:59:14.140 --> 00:59:16.092 Thanks, and I think we have time for

NOTE Confidence: 0.906439613

00:59:16.092 --> 00:59:18.173 one more question and this is I think

NOTE Confidence: 0.906439613

00:59:18.173 --> 00:59:20.332 a difficult one to in the COVID era.

NOTE Confidence: 0.906439613

00:59:20.332 --> 00:59:22.030 There are many patients requiring high

NOTE Confidence: 0.906439613

00:59:22.089 --> 00:59:24.366 levels of sedation for a long period of time.

NOTE Confidence: 0.906439613

00:59:24.370 --> 00:59:25.996 How do you approach sleep management

NOTE Confidence: 0.906439613

00:59:25.996 --> 00:59:27.590 in these types of patients?

NOTE Confidence: 0.846119808695652

00:59:27.740 --> 00:59:30.080 I have no idea, so you know at the Clover

NOTE Confidence: 0.846119808695652

00:59:30.146 --> 00:59:32.386 things the kovid issue has been really

NOTE Confidence: 0.846119808695652

00:59:32.386 --> 00:59:34.498 hard 'cause we've had drug shortages,

NOTE Confidence: 0.846119808695652

00:59:34.500 --> 00:59:37.676 so we've picked a lot of drugs that a lot of

NOTE Confidence: 0.846119808695652

00:59:37.676 --> 00:59:40.372 us would not take off the shelf otherwise.

NOTE Confidence: 0.846119808695652

00:59:40.380 --> 00:59:43.089 Lot of lot more use of benzos,

NOTE Confidence: 0.846119808695652

00:59:43.090 --> 00:59:44.530 especially in the surge one

NOTE Confidence: 0.846119808695652

00:59:44.530 --> 00:59:46.260 because that was all we had.

NOTE Confidence: 0.846119808695652

00:59:46.260 --> 00:59:48.588 And so the question is sort of academic

NOTE Confidence: 0.846119808695652

00:59:48.588 --> 00:59:50.698 in terms of the major said it is.

NOTE Confidence: 0.846119808695652

00:59:50.700 --> 00:59:53.193 I think the there's a little teeny bit of

NOTE Confidence: 0.846119808695652

00:59:53.193 --> 00:59:55.360 propofol evidence and probably more robust

NOTE Confidence: 0.846119808695652

00:59:55.360 --> 00:59:57.758 Dex medata mediene evidence that that is

NOTE Confidence: 0.846119808695652

00:59:57.758 --> 00:59:59.798 the best thing if you need a sedative.

NOTE Confidence: 0.846119808695652

00:59:59.800 --> 01:00:01.536 That is the best thing you can do

NOTE Confidence: 0.846119808695652

01:00:01.536 --> 01:00:03.368 in terms of sleep architecture and

NOTE Confidence: 0.846119808695652

01:00:03.368 --> 01:00:05.352 so it's not so much the COVID era.

NOTE Confidence: 0.846119808695652

01:00:05.360 --> 01:00:07.880 I think that the question can

NOTE Confidence: 0.846119808695652

01:00:07.880 --> 01:00:09.140 just be rephrased.

NOTE Confidence: 0.846119808695652

01:00:09.140 --> 01:00:11.092 To what do you do when you need

NOTE Confidence: 0.846119808695652

01:00:11.092 --> 01:00:12.688 deep sedation to keep the patient

NOTE Confidence: 0.846119808695652

01:00:12.688 --> 01:00:14.870 safe and one is I challenged you?

NOTE Confidence: 0.846119808695652

01:00:14.870 --> 01:00:15.670 Do you really need to?

NOTE Confidence: 0.846119808695652

01:00:15.670 --> 01:00:17.062 Do you really need deep sedation

NOTE Confidence: 0.846119808695652

01:00:17.062 --> 01:00:18.260 to keep the patient safe?

NOTE Confidence: 0.846119808695652

01:00:18.260 --> 01:00:19.862 There's certainly a subset of patients

NOTE Confidence: 0.846119808695652

01:00:19.862 --> 01:00:21.699 that that's true for for those folks,

NOTE Confidence: 0.846119808695652

01:00:21.700 --> 01:00:22.756 I think you start with Dex,

NOTE Confidence: 0.846119808695652

01:00:22.760 --> 01:00:24.020 Medata, mediene and you,

NOTE Confidence: 0.846119808695652

01:00:24.020 --> 01:00:26.375 and then you end up following the

NOTE Confidence: 0.846119808695652

01:00:26.375 --> 01:00:28.793 PADIS guidelines of using the minimal

NOTE Confidence: 0.846119808695652

01:00:28.793 --> 01:00:31.032 necessary narcotic sedation that you can

NOTE Confidence: 0.846119808695652

01:00:31.032 --> 01:00:32.976 because there's no other good choice.

NOTE Confidence: 0.846119808695652

01:00:32.980 --> 01:00:34.072 There's nothing and there's

NOTE Confidence: 0.846119808695652

01:00:34.072 --> 01:00:36.016 nothing else you can do, and,

NOTE Confidence: 0.846119808695652

01:00:36.016 --> 01:00:38.896 and I think this is.

NOTE Confidence: 0.846119808695652

01:00:38.900 --> 01:00:41.156 This is one of our great challenges is

NOTE Confidence: 0.846119808695652

01:00:41.156 --> 01:00:43.630 what do you do when when your desire

NOTE Confidence: 0.846119808695652

01:00:43.630 --> 01:00:45.560 to promote sleep runs up against

NOTE Confidence: 0.846119808695652

01:00:45.560 --> 01:00:47.720 other ICU needs and that's just that,

NOTE Confidence: 0.846119808695652

01:00:47.720 --> 01:00:49.220 you just have to compromise,

NOTE Confidence: 0.846119808695652

01:00:49.220 --> 01:00:51.140 but I would start with DXM in automating,

NOTE Confidence: 0.846119808695652

01:00:51.140 --> 01:00:53.569 then go to narcotic and avoid benzos.

NOTE Confidence: 0.846119808695652

01:00:53.570 --> 01:00:56.436 But that's more based on that based

NOTE Confidence: 0.846119808695652

01:00:56.436 --> 01:00:57.804 on the decks management is based

NOTE Confidence: 0.846119808695652

01:00:57.804 --> 01:00:58.880 on sleep architecture.

NOTE Confidence: 0.846119808695652

01:00:58.880 --> 01:01:01.182 The rest is based on PADIS guidelines.

NOTE Confidence: 0.846119808695652

01:01:01.182 --> 01:01:02.928 'cause that's where the evidence is

NOTE Confidence: 0.88901292

01:01:03.440 --> 01:01:04.670 great. Thank you. Thank you.

NOTE Confidence: 0.88901292

01:01:04.670 --> 01:01:06.150 Gotta thank you for that.

NOTE Confidence: 0.88901292

01:01:06.150 --> 01:01:07.740 Well, this is really been terrific.

NOTE Confidence: 0.88901292

01:01:07.740 --> 01:01:09.366 I really I've learned so much.

NOTE Confidence: 0.88901292

01:01:09.370 --> 01:01:11.169 I think everyone in the audience has

NOTE Confidence: 0.88901292

01:01:11.169 --> 01:01:13.562 learned a lot and it's in great talk

NOTE Confidence: 0.88901292

01:01:13.562 --> 01:01:14.818 and under extreme circumstances.

NOTE Confidence: 0.88901292

01:01:14.820 --> 01:01:16.130 Being in the ICU yourself.

NOTE Confidence: 0.88901292

01:01:16.130 --> 01:01:17.770 So really we appreciate it.

NOTE Confidence: 0.88901292

01:01:17.770 --> 01:01:19.845 So thanks everybody for attending everyone.

NOTE Confidence: 0.88901292

01:01:19.845 --> 01:01:21.240 We don't have conference.

NOTE Confidence: 0.88901292

01:01:21.240 --> 01:01:23.160 Next week is Thanksgiving so happy

NOTE Confidence: 0.88901292

01:01:23.160 --> 01:01:24.253 Thanksgiving everyone and will

NOTE Confidence: 0.88901292

01:01:24.253 --> 01:01:25.947 convene again in a couple of weeks.

NOTE Confidence: 0.88901292

01:01:25.950 --> 01:01:26.700 Bye bye everyone

NOTE Confidence: 0.840026064

01:01:27.110 --> 01:01:30.000 sounds good. Take care everyone.