WEBVTT

NOTE duration: ”00:22:23.232”

NOTE Confidence: 0.9400745

00:00:00.000 --> 00:00:01.040 I'm gonna introduce the next

NOTE Confidence: 0.9400745

00:00:01.040 --> 00:00:02.879 speaker, Li Ying Guan, so

NOTE Confidence: 0.9400745

00:00:02.879 --> 00:00:04.880 who graduated from Tsinghua University

NOTE Confidence: 0.9400745

00:00:04.880 --> 00:00:05.920 and got her PhD in

NOTE Confidence: 0.9400745

00:00:05.920 --> 00:00:07.140 statistics from Stanford.

NOTE Confidence: 0.9605214

00:00:07.600 --> 00:00:09.440 And, right after that, she

NOTE Confidence: 0.9605214

00:00:09.440 --> 00:00:11.300 joined, the department of biostatistics

NOTE Confidence: 0.99547434

00:00:12.080 --> 00:00:13.280 here at the Yale School

NOTE Confidence: 0.99547434

00:00:13.280 --> 00:00:13.935 of Public Health.

NOTE Confidence: 0.95627964

00:00:14.895 --> 00:00:15.375 She,

NOTE Confidence: 0.99931014

00:00:15.855 --> 00:00:17.635 her research focuses on

NOTE Confidence: 0.99792624

00:00:17.935 --> 00:00:20.114 robust predictive modeling and

NOTE Confidence: 0.9927602

00:00:20.415 --> 00:00:21.555 uncertainty quantification,

NOTE Confidence: 0.9551477

00:00:22.494 --> 00:00:24.335 model development for complex data,

NOTE Confidence: 0.9551477

00:00:24.335 --> 00:00:26.335 including multiomics data, single cell

NOTE Confidence: 0.9551477

00:00:26.335 --> 00:00:26.835 data,

NOTE Confidence: 0.99615055

00:00:27.180 --> 00:00:28.800 and to apply modern statistical

NOTE Confidence: 0.99615055

00:00:28.860 --> 00:00:30.780 ideas and machine learning approaches

NOTE Confidence: 0.99615055

00:00:30.780 --> 00:00:32.560 for improved data driven immunological

NOTE Confidence: 0.9943223

00:00:32.940 --> 00:00:33.440 discoveries.

NOTE Confidence: 0.99949586

00:00:33.820 --> 00:00:34.320 Welcome.

NOTE Confidence: 0.9859708

00:00:37.420 --> 00:00:38.700 Thank you, John. Thank you,

NOTE Confidence: 0.9859708

00:00:38.700 --> 00:00:39.200 everyone.

NOTE Confidence: 0.910256

00:00:40.445 --> 00:00:42.125 I'm really excited to share

NOTE Confidence: 0.910256

00:00:42.125 --> 00:00:43.645 my, one of my recent

NOTE Confidence: 0.910256

00:00:43.645 --> 00:00:45.905 work, with the audience here

NOTE Confidence: 0.910256

00:00:46.205 --> 00:00:47.725 and which is also a

NOTE Confidence: 0.910256

00:00:47.725 --> 00:00:49.325 good example of how I

NOTE Confidence: 0.910256

00:00:49.325 --> 00:00:51.405 apply the combined, model machine

NOTE Confidence: 0.910256

00:00:51.405 --> 00:00:51.905 learning,

NOTE Confidence: 0.85237426

00:00:52.445 --> 00:00:54.125 in data driven in logical

NOTE Confidence: 0.85237426

00:00:54.125 --> 00:00:54.625 research.

NOTE Confidence: 0.95203114

00:00:57.560 --> 00:00:58.060 Thanks.

NOTE Confidence: 0.92369336

00:01:00.920 --> 00:01:02.440 So, today, I'm gonna talk

NOTE Confidence: 0.92369336

00:01:02.440 --> 00:01:04.380 about how we utilize longitudinal

NOTE Confidence: 0.8094258

00:01:04.680 --> 00:01:06.520 multi arms data to conduct

NOTE Confidence: 0.8094258

00:01:06.520 --> 00:01:07.020 unsupervised,

NOTE Confidence: 0.99728644

00:01:07.880 --> 00:01:08.380 disease

NOTE Confidence: 0.99348366

00:01:08.795 --> 00:01:09.295 subtype

NOTE Confidence: 0.97977036

00:01:09.994 --> 00:01:11.615 discovery. The data we're using

NOTE Confidence: 0.97977036

00:01:11.674 --> 00:01:13.295 is from this impact cohort.

NOTE Confidence: 0.91459596

00:01:14.314 --> 00:01:15.994 So, in this cohort, like,

NOTE Confidence: 0.91459596

00:01:15.994 --> 00:01:17.935 we generalize the data for

NOTE Confidence: 0.91459596

00:01:18.155 --> 00:01:19.615 more than a thousand hospitalized

NOTE Confidence: 0.91459596

00:01:19.755 --> 00:01:21.354 COVID nineteen patients and the

NOTE Confidence: 0.91459596

00:01:21.354 --> 00:01:22.895 collected longitudinal samples,

NOTE Confidence: 0.9578956

00:01:23.280 --> 00:01:24.260 during their hospitalization

NOTE Confidence: 0.8474214

00:01:24.959 --> 00:01:25.280 on,

NOTE Confidence: 0.6107011

00:01:25.760 --> 00:01:27.540 PBMC and the insert transomics,

NOTE Confidence: 0.7752788

00:01:28.000 --> 00:01:30.340 serum protein, plasma protein tablets,

NOTE Confidence: 0.88673824

00:01:30.880 --> 00:01:32.480 large, body of data, as

NOTE Confidence: 0.88673824

00:01:32.480 --> 00:01:34.400 well as antibody, viral loads,

NOTE Confidence: 0.88673824

00:01:34.400 --> 00:01:35.140 and others.

NOTE Confidence: 0.9386688

00:01:35.944 --> 00:01:37.625 Along with this, deep immunofield

NOTE Confidence: 0.9386688

00:01:37.625 --> 00:01:39.065 typing, we also collected a

NOTE Confidence: 0.9386688

00:01:39.065 --> 00:01:40.525 lot of clinical measures,

NOTE Confidence: 0.8107115

00:01:41.145 --> 00:01:42.505 both from a prior to,

NOTE Confidence: 0.8107115

00:01:42.905 --> 00:01:44.685 infection or during acute infection,

NOTE Confidence: 0.9344161

00:01:45.065 --> 00:01:46.104 as well as a one

NOTE Confidence: 0.9344161

00:01:46.104 --> 00:01:47.965 year follow-up after discharge,

NOTE Confidence: 0.931298

00:01:48.920 --> 00:01:50.619 on their post acute recovery

NOTE Confidence: 0.931298

00:01:50.759 --> 00:01:52.679 based on, self reported patient

NOTE Confidence: 0.931298

00:01:52.679 --> 00:01:53.179 survey.

NOTE Confidence: 0.96765774

00:01:55.240 --> 00:01:57.259 So this rich, data resource

NOTE Confidence: 0.96765774

00:01:57.319 --> 00:01:59.159 actually, is very valuable and

NOTE Confidence: 0.96765774

00:01:59.159 --> 00:02:00.859 allows us to reliably

NOTE Confidence: 0.948621

00:02:01.319 --> 00:02:02.939 identify or confirm immunosignatures

NOTE Confidence: 0.87243634

00:02:03.719 --> 00:02:05.505 associated with the primary clinical

NOTE Confidence: 0.87243634

00:02:05.505 --> 00:02:07.265 endpoints such as acute disease

NOTE Confidence: 0.87243634

00:02:07.265 --> 00:02:07.765 severity,

NOTE Confidence: 0.78940815

00:02:08.224 --> 00:02:10.065 measuring primarily based on risk

NOTE Confidence: 0.78940815

00:02:10.065 --> 00:02:11.905 for status. For example, like,

NOTE Confidence: 0.78940815

00:02:12.065 --> 00:02:13.264 previously we'll have done a

NOTE Confidence: 0.78940815

00:02:13.264 --> 00:02:14.084 per assay,

NOTE Confidence: 0.6844659

00:02:14.544 --> 00:02:15.044 immunosertial

NOTE Confidence: 0.9823914

00:02:15.345 --> 00:02:15.845 identification

NOTE Confidence: 0.81640846

00:02:16.465 --> 00:02:17.764 as well as an integrated

NOTE Confidence: 0.81640846

00:02:17.905 --> 00:02:19.444 manner saying what are the

NOTE Confidence: 0.88091415

00:02:19.750 --> 00:02:21.690 multi omics programs or cascade

NOTE Confidence: 0.88091415

00:02:21.989 --> 00:02:24.310 associated with, mortality or their

NOTE Confidence: 0.88091415

00:02:24.310 --> 00:02:24.810 severity.

NOTE Confidence: 0.92317736

00:02:27.349 --> 00:02:28.709 One thing is, although this

NOTE Confidence: 0.92317736

00:02:28.709 --> 00:02:29.989 is very meaningful, like, to

NOTE Confidence: 0.92317736

00:02:29.989 --> 00:02:31.669 identify the immune correlates with

NOTE Confidence: 0.92317736

00:02:31.669 --> 00:02:32.330 a particular,

NOTE Confidence: 0.8999909

00:02:32.885 --> 00:02:34.405 clinical endpoint. We know that

NOTE Confidence: 0.8999909

00:02:34.405 --> 00:02:35.625 patient are very heterogeneous.

NOTE Confidence: 0.98492765

00:02:36.405 --> 00:02:37.364 If we look at their

NOTE Confidence: 0.98492765

00:02:37.364 --> 00:02:38.344 clinical characterization,

NOTE Confidence: 0.9300662

00:02:39.525 --> 00:02:40.644 in panel a, it is

NOTE Confidence: 0.9300662

00:02:40.644 --> 00:02:42.405 like the primary clinical endpoint

NOTE Confidence: 0.9300662

00:02:42.405 --> 00:02:43.525 will have been considered in

NOTE Confidence: 0.9300662

00:02:43.525 --> 00:02:44.584 a lot of our previous,

NOTE Confidence: 0.9724275

00:02:45.310 --> 00:02:45.810 analysis

NOTE Confidence: 0.8317297

00:02:46.110 --> 00:02:47.389 is called something called a

NOTE Confidence: 0.8317297

00:02:47.389 --> 00:02:49.169 clinical tragedy group, which is,

NOTE Confidence: 0.68146497

00:02:50.510 --> 00:02:51.389 disease group,

NOTE Confidence: 0.83633244

00:02:51.710 --> 00:02:53.710 defined by our clinical team

NOTE Confidence: 0.83633244

00:02:53.710 --> 00:02:55.550 based on longitudinal response data

NOTE Confidence: 0.83633244

00:02:55.550 --> 00:02:56.450 still in hospitalization

NOTE Confidence: 0.8765781

00:02:56.990 --> 00:02:58.030 from t g one to

NOTE Confidence: 0.8765781

00:02:58.030 --> 00:02:59.389 t g five in indicate

NOTE Confidence: 0.8765781

00:02:59.389 --> 00:03:00.290 increased severity.

NOTE Confidence: 0.9460167

00:03:01.095 --> 00:03:02.375 This is very convenient for

NOTE Confidence: 0.9460167

00:03:02.375 --> 00:03:03.415 us to do our analysis,

NOTE Confidence: 0.9460167

00:03:03.415 --> 00:03:04.614 but as you can see,

NOTE Confidence: 0.9460167

00:03:04.614 --> 00:03:05.834 a patient can be characterized

NOTE Confidence: 0.9460167

00:03:05.974 --> 00:03:07.014 by a lot of different

NOTE Confidence: 0.9460167

00:03:07.014 --> 00:03:07.514 aspects.

NOTE Confidence: 0.941165

00:03:07.894 --> 00:03:08.614 If we you look at

NOTE Confidence: 0.941165

00:03:08.614 --> 00:03:10.215 the panel say, here is

NOTE Confidence: 0.941165

00:03:10.215 --> 00:03:11.495 a very simple example where

NOTE Confidence: 0.941165

00:03:11.495 --> 00:03:13.194 we show the prior, like

NOTE Confidence: 0.57942

00:03:13.560 --> 00:03:14.060 probabilities

NOTE Confidence: 0.9708694

00:03:14.520 --> 00:03:16.380 and other, demographic information.

NOTE Confidence: 0.7849761

00:03:16.680 --> 00:03:17.640 I highlight here, like, there's

NOTE Confidence: 0.7849761

00:03:17.640 --> 00:03:18.300 a chronic,

NOTE Confidence: 0.90822726

00:03:18.680 --> 00:03:20.760 lung disease role here. You

NOTE Confidence: 0.90822726

00:03:20.760 --> 00:03:22.360 can say even, the most

NOTE Confidence: 0.90822726

00:03:22.360 --> 00:03:23.880 moderate group, there is some

NOTE Confidence: 0.90822726

00:03:23.880 --> 00:03:24.600 portion of,

NOTE Confidence: 0.91236585

00:03:25.535 --> 00:03:27.535 chronic lung disease. And among

NOTE Confidence: 0.91236585

00:03:27.535 --> 00:03:28.895 the two very severe group

NOTE Confidence: 0.91236585

00:03:28.895 --> 00:03:29.655 like t g five and

NOTE Confidence: 0.91236585

00:03:29.655 --> 00:03:30.415 t g four, t g

NOTE Confidence: 0.91236585

00:03:30.415 --> 00:03:31.775 five is mortality, t g

NOTE Confidence: 0.91236585

00:03:31.775 --> 00:03:33.135 four is very, very poor

NOTE Confidence: 0.91236585

00:03:33.135 --> 00:03:34.895 recovery during acute infection. It

NOTE Confidence: 0.91236585

00:03:34.895 --> 00:03:36.175 is not necessarily true that,

NOTE Confidence: 0.91236585

00:03:36.175 --> 00:03:37.855 like, all the two most

NOTE Confidence: 0.91236585

00:03:37.855 --> 00:03:39.775 severe group actually have less,

NOTE Confidence: 0.8824405

00:03:40.220 --> 00:03:41.840 common ability compared to others.

NOTE Confidence: 0.8824405

00:03:41.980 --> 00:03:42.940 Although the overall,

NOTE Confidence: 0.93051106

00:03:43.340 --> 00:03:45.020 there is association between t

NOTE Confidence: 0.93051106

00:03:45.020 --> 00:03:46.380 g group and the chronic

NOTE Confidence: 0.93051106

00:03:46.380 --> 00:03:47.120 lung disease.

NOTE Confidence: 0.8988957

00:03:47.500 --> 00:03:48.380 The same thing is true

NOTE Confidence: 0.8988957

00:03:48.380 --> 00:03:49.900 for complications, which I didn't

NOTE Confidence: 0.8988957

00:03:49.900 --> 00:03:51.500 show here. And also we

NOTE Confidence: 0.8988957

00:03:51.500 --> 00:03:52.540 can if we want to

NOTE Confidence: 0.8988957

00:03:52.540 --> 00:03:54.560 look beyond the acute infection,

NOTE Confidence: 0.8988957

00:03:54.780 --> 00:03:56.185 one interesting thing, like, we

NOTE Confidence: 0.8988957

00:03:56.424 --> 00:03:57.064 you know, I want the

NOTE Confidence: 0.8988957

00:03:57.064 --> 00:03:57.944 previous work,

NOTE Confidence: 0.84634304

00:03:58.584 --> 00:04:00.265 observed is actually there's a

NOTE Confidence: 0.84634304

00:04:00.265 --> 00:04:01.004 very little,

NOTE Confidence: 0.92160565

00:04:01.465 --> 00:04:03.385 almost no association between the

NOTE Confidence: 0.92160565

00:04:03.385 --> 00:04:04.284 acute infection

NOTE Confidence: 0.8445377

00:04:04.825 --> 00:04:06.905 severity and the, post acute

NOTE Confidence: 0.8445377

00:04:06.905 --> 00:04:08.504 recovery, which is kind of,

NOTE Confidence: 0.8445377

00:04:08.745 --> 00:04:11.224 very, very surprising thing we

NOTE Confidence: 0.8445377

00:04:11.224 --> 00:04:11.885 we saw.

NOTE Confidence: 0.95391434

00:04:14.080 --> 00:04:15.360 The same thing happens for

NOTE Confidence: 0.95391434

00:04:15.360 --> 00:04:16.419 the immune response.

NOTE Confidence: 0.8799403

00:04:17.440 --> 00:04:19.620 Not only the clinical characterization

NOTE Confidence: 0.8799403

00:04:19.680 --> 00:04:20.980 can be quite high hygienous

NOTE Confidence: 0.8799403

00:04:21.200 --> 00:04:22.400 and it cannot be not

NOTE Confidence: 0.8799403

00:04:22.400 --> 00:04:23.920 be easily captured by one

NOTE Confidence: 0.8799403

00:04:23.920 --> 00:04:25.460 single clinical parameter.

NOTE Confidence: 0.85976505

00:04:26.025 --> 00:04:27.145 The same thing happens for

NOTE Confidence: 0.85976505

00:04:27.145 --> 00:04:28.585 their immune response. Here is

NOTE Confidence: 0.85976505

00:04:28.585 --> 00:04:30.025 a severity factor, which is

NOTE Confidence: 0.85976505

00:04:30.025 --> 00:04:31.785 a one highlighted factor in,

NOTE Confidence: 0.85976505

00:04:32.025 --> 00:04:34.265 the integrated, integrated analysis manual

NOTE Confidence: 0.85976505

00:04:34.265 --> 00:04:34.765 script.

NOTE Confidence: 0.8525828

00:04:35.145 --> 00:04:36.185 As you can see, both

NOTE Confidence: 0.8525828

00:04:36.185 --> 00:04:37.065 at the base of one,

NOTE Confidence: 0.8525828

00:04:37.065 --> 00:04:38.665 which is panel a baseline

NOTE Confidence: 0.8525828

00:04:38.665 --> 00:04:40.240 visit and And over time,

NOTE Confidence: 0.8525828

00:04:40.240 --> 00:04:41.680 there is it is indeed

NOTE Confidence: 0.8525828

00:04:41.680 --> 00:04:43.360 true that this severity factor

NOTE Confidence: 0.8525828

00:04:43.360 --> 00:04:44.819 captures acute severity

NOTE Confidence: 0.9301525

00:04:45.279 --> 00:04:46.240 very well. There is a

NOTE Confidence: 0.9301525

00:04:46.240 --> 00:04:47.599 very clear increase in trend

NOTE Confidence: 0.9301525

00:04:47.599 --> 00:04:48.560 from t g one to

NOTE Confidence: 0.9301525

00:04:48.560 --> 00:04:49.919 t g five. And over

NOTE Confidence: 0.9301525

00:04:49.919 --> 00:04:51.839 time, the we also see

NOTE Confidence: 0.9301525

00:04:51.839 --> 00:04:53.039 a divergence between t g

NOTE Confidence: 0.9301525

00:04:53.039 --> 00:04:54.099 five and t g five.

NOTE Confidence: 0.89466375

00:04:55.264 --> 00:04:56.625 But again, you can say

NOTE Confidence: 0.89466375

00:04:56.625 --> 00:04:57.585 there is a lot of

NOTE Confidence: 0.89466375

00:04:57.585 --> 00:04:58.085 variability

NOTE Confidence: 0.95474464

00:04:58.544 --> 00:05:00.065 here. As John mentioned, maybe

NOTE Confidence: 0.95474464

00:05:00.065 --> 00:05:01.205 variability is a hallmark

NOTE Confidence: 0.8697137

00:05:01.585 --> 00:05:02.725 of in your response.

NOTE Confidence: 0.979439

00:05:03.585 --> 00:05:04.085 So,

NOTE Confidence: 0.82997286

00:05:04.464 --> 00:05:06.065 motivated by this observation, so

NOTE Confidence: 0.82997286

00:05:06.065 --> 00:05:07.633 we decided to take a

NOTE Confidence: 0.82997286

00:05:07.633 --> 00:05:08.430 different approach. Can we just

NOTE Confidence: 0.82997286

00:05:08.430 --> 00:05:08.680 directly understand the heterogeneity among

NOTE Confidence: 0.82997286

00:05:08.680 --> 00:05:09.279 the host immune response characterized

NOTE Confidence: 0.82997286

00:05:09.500 --> 00:05:10.300 by this super high dimension

NOTE Confidence: 0.82997286

00:05:10.300 --> 00:05:12.240 of our comprehensive molecular isis

NOTE Confidence: 0.82997286

00:05:12.300 --> 00:05:14.380 that is not self reported

NOTE Confidence: 0.82997286

00:05:14.380 --> 00:05:15.200 from the,

NOTE Confidence: 0.875249

00:05:15.740 --> 00:05:17.040 lab measures?

NOTE Confidence: 0.8899364

00:05:20.944 --> 00:05:22.145 And this can be very

NOTE Confidence: 0.8899364

00:05:22.145 --> 00:05:23.664 useful because this if we

NOTE Confidence: 0.8899364

00:05:23.664 --> 00:05:24.944 can done this correct, like,

NOTE Confidence: 0.93198276

00:05:25.664 --> 00:05:27.685 if the result is, good,

NOTE Confidence: 0.93198276

00:05:27.824 --> 00:05:29.904 then we can actually link

NOTE Confidence: 0.93198276

00:05:29.904 --> 00:05:31.764 the web the immune response

NOTE Confidence: 0.93198276

00:05:31.985 --> 00:05:32.485 heterogeneity

NOTE Confidence: 0.80311364

00:05:32.785 --> 00:05:33.450 to all kinds

NOTE Confidence: 0.88966274

00:05:34.090 --> 00:05:35.370 clinical measures in a very

NOTE Confidence: 0.88966274

00:05:35.370 --> 00:05:36.270 unified framework.

NOTE Confidence: 0.9251612

00:05:36.650 --> 00:05:38.410 And also it also offers,

NOTE Confidence: 0.9251612

00:05:38.410 --> 00:05:40.010 like, not only offers more

NOTE Confidence: 0.9251612

00:05:40.010 --> 00:05:40.510 comprehensive

NOTE Confidence: 0.88578993

00:05:40.970 --> 00:05:42.650 understanding on the host immune,

NOTE Confidence: 0.88578993

00:05:42.890 --> 00:05:45.050 heterogeneity, but also potentially offer

NOTE Confidence: 0.88578993

00:05:45.050 --> 00:05:46.570 more insights into personal and

NOTE Confidence: 0.88578993

00:05:46.570 --> 00:05:48.464 the treatment because different, immune

NOTE Confidence: 0.88578993

00:05:48.464 --> 00:05:49.444 response may,

NOTE Confidence: 0.9980855

00:05:49.904 --> 00:05:51.025 indicate a different type of

NOTE Confidence: 0.9980855

00:05:51.025 --> 00:05:51.525 treatment.

NOTE Confidence: 0.8996116

00:05:55.824 --> 00:05:57.104 When we go so the

NOTE Confidence: 0.8996116

00:05:57.104 --> 00:05:58.224 first step we're going to

NOTE Confidence: 0.8996116

00:05:58.224 --> 00:05:59.664 do is the major analysis

NOTE Confidence: 0.8996116

00:05:59.664 --> 00:06:00.705 step is we want to

NOTE Confidence: 0.8996116

00:06:00.705 --> 00:06:01.205 identify,

NOTE Confidence: 0.52825546

00:06:02.064 --> 00:06:02.944 immunophenone that,

NOTE Confidence: 0.78074574

00:06:03.979 --> 00:06:05.259 these are subtypes based on

NOTE Confidence: 0.78074574

00:06:05.259 --> 00:06:07.520 this longitudinal molecular high dimensional

NOTE Confidence: 0.78074574

00:06:07.580 --> 00:06:08.080 profiles.

NOTE Confidence: 0.9949023

00:06:08.460 --> 00:06:09.979 There are two challenges here.

NOTE Confidence: 0.9949023

00:06:09.979 --> 00:06:10.479 First,

NOTE Confidence: 0.9021904

00:06:11.419 --> 00:06:12.300 there is a lot of

NOTE Confidence: 0.9021904

00:06:12.539 --> 00:06:13.259 we have,

NOTE Confidence: 0.85228276

00:06:13.740 --> 00:06:15.570 several high dimensional assays from

NOTE Confidence: 0.85228276

00:06:15.570 --> 00:06:16.960 a transtomics, proteomics,

NOTE Confidence: 0.933491

00:06:18.275 --> 00:06:19.235 and each of them has

NOTE Confidence: 0.933491

00:06:19.235 --> 00:06:20.835 many, many features. So it

NOTE Confidence: 0.933491

00:06:20.835 --> 00:06:22.275 is very important for us

NOTE Confidence: 0.933491

00:06:22.275 --> 00:06:24.515 to be able to, identify

NOTE Confidence: 0.933491

00:06:24.515 --> 00:06:26.214 the most you most meaningful

NOTE Confidence: 0.933491

00:06:26.435 --> 00:06:27.255 and coherent

NOTE Confidence: 0.922862

00:06:27.714 --> 00:06:29.315 information from the high dimensional

NOTE Confidence: 0.922862

00:06:29.315 --> 00:06:29.815 assays.

NOTE Confidence: 0.8751734

00:06:30.180 --> 00:06:31.460 The second challenge is this

NOTE Confidence: 0.8751734

00:06:31.460 --> 00:06:33.460 longitudinal data. Of course, like

NOTE Confidence: 0.8751734

00:06:33.460 --> 00:06:35.060 we can do a subtyping

NOTE Confidence: 0.8751734

00:06:35.060 --> 00:06:36.500 for with one sample. Of

NOTE Confidence: 0.8751734

00:06:36.500 --> 00:06:37.700 course, we can do that,

NOTE Confidence: 0.8751734

00:06:37.700 --> 00:06:38.820 but that will be a

NOTE Confidence: 0.8751734

00:06:38.820 --> 00:06:40.420 miss a lost information when

NOTE Confidence: 0.8751734

00:06:40.420 --> 00:06:41.860 we're trying to characterize each

NOTE Confidence: 0.8751734

00:06:41.860 --> 00:06:43.305 participant and their similarity.

NOTE Confidence: 0.9295324

00:06:43.605 --> 00:06:44.725 We want to use all

NOTE Confidence: 0.9295324

00:06:44.725 --> 00:06:46.565 the visits when determining the

NOTE Confidence: 0.9295324

00:06:46.565 --> 00:06:47.945 similarity between two,

NOTE Confidence: 0.966705

00:06:48.725 --> 00:06:50.105 two participants here.

NOTE Confidence: 0.9055893

00:06:50.565 --> 00:06:51.925 And, to do this, like,

NOTE Confidence: 0.9055893

00:06:51.925 --> 00:06:53.625 with with some dimension reduction

NOTE Confidence: 0.9055893

00:06:53.685 --> 00:06:55.860 technique to identify the multi

NOTE Confidence: 0.9055893

00:06:55.860 --> 00:06:57.940 omics factors capturing the co

NOTE Confidence: 0.9055893

00:06:57.940 --> 00:07:00.440 varying patterns across multiple omics.

NOTE Confidence: 0.9055893

00:07:00.660 --> 00:07:01.620 So this help us to

NOTE Confidence: 0.9055893

00:07:01.620 --> 00:07:03.060 reduce the dimension and then

NOTE Confidence: 0.9055893

00:07:03.060 --> 00:07:04.440 focus on the most important,

NOTE Confidence: 0.9420671

00:07:04.900 --> 00:07:06.040 multi omics factors.

NOTE Confidence: 0.9805341

00:07:06.740 --> 00:07:08.440 The second issue is the

NOTE Confidence: 0.9436753

00:07:09.404 --> 00:07:10.385 time series aspect.

NOTE Confidence: 0.88629144

00:07:10.765 --> 00:07:11.805 And this is not only

NOTE Confidence: 0.88629144

00:07:11.805 --> 00:07:12.925 a time series data. This

NOTE Confidence: 0.88629144

00:07:12.925 --> 00:07:14.365 is a time series data

NOTE Confidence: 0.88629144

00:07:14.365 --> 00:07:16.365 with very strong messiness, very

NOTE Confidence: 0.88629144

00:07:16.365 --> 00:07:17.965 high messiness. As you can

NOTE Confidence: 0.88629144

00:07:17.965 --> 00:07:19.805 see here, wide vessel one

NOTE Confidence: 0.88629144

00:07:19.805 --> 00:07:21.565 among a multiple, like,

NOTE Confidence: 0.9714268

00:07:23.020 --> 00:07:24.539 one thousand one hundred forty

NOTE Confidence: 0.9714268

00:07:24.539 --> 00:07:25.779 eight participants out of the

NOTE Confidence: 0.9714268

00:07:25.900 --> 00:07:27.039 in total, one hundred

NOTE Confidence: 0.8406562

00:07:27.340 --> 00:07:28.780 one thousand one hundred fifty

NOTE Confidence: 0.8406562

00:07:28.780 --> 00:07:30.379 two participants have vessel one

NOTE Confidence: 0.8406562

00:07:30.379 --> 00:07:31.740 samples. As a way to

NOTE Confidence: 0.8406562

00:07:31.740 --> 00:07:33.419 increase, like, the number of

NOTE Confidence: 0.8406562

00:07:33.419 --> 00:07:35.360 samples available just sharply.

NOTE Confidence: 0.9979872

00:07:35.854 --> 00:07:38.415 And, what's more troublesome here

NOTE Confidence: 0.9979872

00:07:38.415 --> 00:07:39.235 is this

NOTE Confidence: 0.63642794

00:07:39.854 --> 00:07:41.134 this missusness is not just

NOTE Confidence: 0.63642794

00:07:41.134 --> 00:07:41.634 random.

NOTE Confidence: 0.99336934

00:07:42.095 --> 00:07:43.715 This is actually severely,

NOTE Confidence: 0.93617284

00:07:44.495 --> 00:07:47.155 confounded by their, actually, patient

NOTE Confidence: 0.9433594

00:07:47.615 --> 00:07:49.074 status. If you,

NOTE Confidence: 0.89845467

00:07:49.729 --> 00:07:51.009 will recur if the patient

NOTE Confidence: 0.89845467

00:07:51.009 --> 00:07:52.690 recovered very quickly and then

NOTE Confidence: 0.89845467

00:07:52.690 --> 00:07:53.970 discharged, then you may not

NOTE Confidence: 0.89845467

00:07:53.970 --> 00:07:55.650 have sample measure. If the

NOTE Confidence: 0.89845467

00:07:55.650 --> 00:07:57.570 patient, actually were have very

NOTE Confidence: 0.89845467

00:07:57.570 --> 00:07:59.330 poor recovery in diet. Right?

NOTE Confidence: 0.89845467

00:07:59.330 --> 00:08:00.449 So we won't have any

NOTE Confidence: 0.89845467

00:08:00.449 --> 00:08:00.949 measurements.

NOTE Confidence: 0.84700984

00:08:02.385 --> 00:08:03.345 Due to this kind of

NOTE Confidence: 0.84700984

00:08:03.345 --> 00:08:04.385 bias and missingness and it

NOTE Confidence: 0.84700984

00:08:04.385 --> 00:08:06.005 is a high proportion missingness,

NOTE Confidence: 0.9590039

00:08:06.625 --> 00:08:07.125 we

NOTE Confidence: 0.9369523

00:08:07.505 --> 00:08:08.785 we don't really want to

NOTE Confidence: 0.9369523

00:08:08.785 --> 00:08:09.985 do, say, like, very,

NOTE Confidence: 0.9848613

00:08:11.105 --> 00:08:12.405 intensive data imputation

NOTE Confidence: 0.8203697

00:08:12.705 --> 00:08:13.905 because who knows what the

NOTE Confidence: 0.8203697

00:08:13.905 --> 00:08:15.525 impute quality will be like.

NOTE Confidence: 0.93250316

00:08:15.950 --> 00:08:16.910 So to do this, we

NOTE Confidence: 0.93250316

00:08:16.910 --> 00:08:18.590 conduct we we actually did

NOTE Confidence: 0.93250316

00:08:18.590 --> 00:08:21.170 some, imputation free, longitudinal,

NOTE Confidence: 0.932785

00:08:22.190 --> 00:08:22.690 subtyping.

NOTE Confidence: 0.89088094

00:08:23.230 --> 00:08:24.370 We are we actually,

NOTE Confidence: 0.89165616

00:08:25.790 --> 00:08:26.990 get some kind of pairwise

NOTE Confidence: 0.89165616

00:08:26.990 --> 00:08:28.910 distance between two patients based

NOTE Confidence: 0.89165616

00:08:28.910 --> 00:08:30.910 on their available samples only

NOTE Confidence: 0.89165616

00:08:30.910 --> 00:08:32.645 across the Bay and then

NOTE Confidence: 0.89165616

00:08:32.645 --> 00:08:33.445 conducted some,

NOTE Confidence: 0.8103589

00:08:34.405 --> 00:08:35.445 class run based on the

NOTE Confidence: 0.8103589

00:08:35.445 --> 00:08:36.345 pairwise distance.

NOTE Confidence: 0.98822045

00:08:37.765 --> 00:08:39.525 And this enabled us to

NOTE Confidence: 0.98822045

00:08:39.525 --> 00:08:40.025 identify,

NOTE Confidence: 0.99520695

00:08:40.885 --> 00:08:41.705 six subtypes

NOTE Confidence: 0.8581451

00:08:42.085 --> 00:08:44.105 based on using some automated

NOTE Confidence: 0.5608146

00:08:44.829 --> 00:08:45.570 decision criteria.

NOTE Confidence: 0.87406826

00:08:46.190 --> 00:08:47.790 And the subtype one to

NOTE Confidence: 0.87406826

00:08:47.790 --> 00:08:48.929 subtype f.

NOTE Confidence: 0.89687765

00:08:49.950 --> 00:08:51.570 And, panel a shows,

NOTE Confidence: 0.9199935

00:08:52.350 --> 00:08:54.029 like, how does each point

NOTE Confidence: 0.9199935

00:08:54.029 --> 00:08:54.929 means a participant

NOTE Confidence: 0.9384884

00:08:55.389 --> 00:08:56.925 and how the participant looks

NOTE Confidence: 0.9384884

00:08:56.925 --> 00:08:58.205 like when we project it,

NOTE Confidence: 0.9384884

00:08:58.445 --> 00:09:00.045 each each participant into this

NOTE Confidence: 0.9384884

00:09:00.045 --> 00:09:01.425 two dimensional space using,

NOTE Confidence: 0.87253344

00:09:02.205 --> 00:09:02.705 multidimensional,

NOTE Confidence: 0.9848753

00:09:03.485 --> 00:09:03.985 scaling.

NOTE Confidence: 0.972483

00:09:04.765 --> 00:09:05.265 And,

NOTE Confidence: 0.87964934

00:09:06.045 --> 00:09:07.245 and so we can say,

NOTE Confidence: 0.943973

00:09:07.725 --> 00:09:09.725 although there's some overlapping, but

NOTE Confidence: 0.943973

00:09:09.725 --> 00:09:11.165 it is very clear that

NOTE Confidence: 0.943973

00:09:11.165 --> 00:09:12.145 the different subtypes,

NOTE Confidence: 0.9477315

00:09:12.750 --> 00:09:14.350 they they occupy very different

NOTE Confidence: 0.9477315

00:09:14.350 --> 00:09:15.890 space, in this two dimensional,

NOTE Confidence: 0.99935436

00:09:16.830 --> 00:09:17.570 space here.

NOTE Confidence: 0.96923673

00:09:18.190 --> 00:09:19.150 And then the next thing

NOTE Confidence: 0.96923673

00:09:19.150 --> 00:09:20.450 we want to check is,

NOTE Confidence: 0.9254828

00:09:21.790 --> 00:09:23.230 sure. So this participant, they

NOTE Confidence: 0.9254828

00:09:23.230 --> 00:09:24.750 have a very different, host

NOTE Confidence: 0.9254828

00:09:24.750 --> 00:09:25.250 response.

NOTE Confidence: 0.98705286

00:09:26.030 --> 00:09:26.530 But

NOTE Confidence: 0.84576774

00:09:27.325 --> 00:09:29.245 this host response difference actually

NOTE Confidence: 0.84576774

00:09:29.245 --> 00:09:30.845 meaningful and being reflected in

NOTE Confidence: 0.84576774

00:09:30.845 --> 00:09:32.225 various clinical measures.

NOTE Confidence: 0.934197

00:09:33.165 --> 00:09:34.365 So the first thing we

NOTE Confidence: 0.934197

00:09:34.365 --> 00:09:36.285 check is our primary clinical

NOTE Confidence: 0.934197

00:09:36.285 --> 00:09:36.785 endpoints,

NOTE Confidence: 0.88989115

00:09:37.404 --> 00:09:38.684 used in previous study, which

NOTE Confidence: 0.88989115

00:09:38.684 --> 00:09:40.144 is a clinical trial group,

NOTE Confidence: 0.68227565

00:09:40.925 --> 00:09:41.425 defined,

NOTE Confidence: 0.8599385

00:09:42.045 --> 00:09:44.630 from the mixed mixed modeling

NOTE Confidence: 0.8599385

00:09:44.790 --> 00:09:46.390 longitudinal mixed modeling using the

NOTE Confidence: 0.8599385

00:09:46.390 --> 00:09:48.070 respiratory status over time during

NOTE Confidence: 0.8599385

00:09:48.070 --> 00:09:48.570 hospitalization.

NOTE Confidence: 0.90741104

00:09:49.190 --> 00:09:50.390 And as I mentioned, from

NOTE Confidence: 0.90741104

00:09:50.390 --> 00:09:51.190 t g one to t

NOTE Confidence: 0.90741104

00:09:51.190 --> 00:09:52.490 g five, it's a increase

NOTE Confidence: 0.90741104

00:09:52.710 --> 00:09:53.910 in severity. With the t

NOTE Confidence: 0.90741104

00:09:53.910 --> 00:09:55.190 g one two three, they

NOTE Confidence: 0.90741104

00:09:55.190 --> 00:09:56.630 tend to have, like, better,

NOTE Confidence: 0.90741104

00:09:56.630 --> 00:09:58.345 like, quick fast recovery. T

NOTE Confidence: 0.90741104

00:09:58.345 --> 00:09:59.944 g five, like, people all

NOTE Confidence: 0.90741104

00:09:59.944 --> 00:10:01.464 die here. And then t

NOTE Confidence: 0.90741104

00:10:01.464 --> 00:10:02.665 g four is a group

NOTE Confidence: 0.90741104

00:10:02.665 --> 00:10:03.165 where,

NOTE Confidence: 0.8864651

00:10:04.264 --> 00:10:05.225 they didn't die in the

NOTE Confidence: 0.8864651

00:10:05.225 --> 00:10:06.904 acute infection, but maybe that

NOTE Confidence: 0.8864651

00:10:06.904 --> 00:10:07.404 later.

NOTE Confidence: 0.94732654

00:10:07.865 --> 00:10:09.304 And and the recoveries are

NOTE Confidence: 0.94732654

00:10:09.304 --> 00:10:11.005 quite poor. Like, they usually

NOTE Confidence: 0.94732654

00:10:11.065 --> 00:10:12.684 tend to have prolonged hospital

NOTE Confidence: 0.94732654

00:10:12.745 --> 00:10:13.170 stay.

NOTE Confidence: 0.84676427

00:10:14.130 --> 00:10:15.730 And, panel in panel b,

NOTE Confidence: 0.84676427

00:10:15.730 --> 00:10:16.929 you can say when we

NOTE Confidence: 0.84676427

00:10:16.929 --> 00:10:18.389 plot the distribution

NOTE Confidence: 0.9279316

00:10:18.769 --> 00:10:20.790 of different TG group here,

NOTE Confidence: 0.9279316

00:10:20.850 --> 00:10:22.050 we can say it's very

NOTE Confidence: 0.9279316

00:10:22.050 --> 00:10:23.410 clear that there is,

NOTE Confidence: 0.84843856

00:10:23.970 --> 00:10:25.750 different subtypes that are enriched,

NOTE Confidence: 0.8810458

00:10:26.865 --> 00:10:28.865 have differential enrichment in the,

NOTE Confidence: 0.8810458

00:10:29.184 --> 00:10:30.165 t g group.

NOTE Confidence: 0.8604093

00:10:30.625 --> 00:10:31.665 And you can say that

NOTE Confidence: 0.8604093

00:10:31.665 --> 00:10:33.425 the ABC subtype ABC, they

NOTE Confidence: 0.8604093

00:10:33.425 --> 00:10:35.025 tend to be more enriched.

NOTE Confidence: 0.8604093

00:10:35.025 --> 00:10:36.545 They have, like, very few

NOTE Confidence: 0.8604093

00:10:36.545 --> 00:10:37.045 mortality

NOTE Confidence: 0.8135522

00:10:37.505 --> 00:10:39.745 and then primarily consists of,

NOTE Confidence: 0.88896924

00:10:40.220 --> 00:10:41.420 t g one, two, three.

NOTE Confidence: 0.88896924

00:10:41.420 --> 00:10:42.380 And t g one and

NOTE Confidence: 0.88896924

00:10:42.380 --> 00:10:43.820 five, they are very, very,

NOTE Confidence: 0.88896924

00:10:43.820 --> 00:10:45.340 very severe. They have a

NOTE Confidence: 0.88896924

00:10:45.340 --> 00:10:46.860 lot of mortality and primarily

NOTE Confidence: 0.88896924

00:10:46.860 --> 00:10:47.900 consider t g four and

NOTE Confidence: 0.88896924

00:10:47.900 --> 00:10:48.640 t g five.

NOTE Confidence: 0.77772707

00:10:49.260 --> 00:10:50.620 And t, and then some

NOTE Confidence: 0.77772707

00:10:50.620 --> 00:10:51.340 type d.

NOTE Confidence: 0.8738089

00:10:51.660 --> 00:10:52.780 It it's kind of more

NOTE Confidence: 0.8738089

00:10:52.940 --> 00:10:53.740 on the one hand, in

NOTE Confidence: 0.8738089

00:10:53.740 --> 00:10:55.635 the modeling towards the, less

NOTE Confidence: 0.8738089

00:10:55.635 --> 00:10:57.235 severe side. On the other

NOTE Confidence: 0.8738089

00:10:57.235 --> 00:10:58.115 hand, it also has a

NOTE Confidence: 0.8738089

00:10:58.115 --> 00:10:59.635 decent amount of mortality. So

NOTE Confidence: 0.8738089

00:10:59.635 --> 00:11:00.915 we consider this one be

NOTE Confidence: 0.8738089

00:11:00.915 --> 00:11:01.895 a mixed group.

NOTE Confidence: 0.97155917

00:11:02.675 --> 00:11:03.815 And later,

NOTE Confidence: 0.92458355

00:11:04.275 --> 00:11:05.715 so so the same message

NOTE Confidence: 0.92458355

00:11:05.715 --> 00:11:06.915 can be confirmed if we

NOTE Confidence: 0.92458355

00:11:06.915 --> 00:11:07.815 look at their,

NOTE Confidence: 0.79698163

00:11:08.435 --> 00:11:10.615 survival curve, beyond the acute

NOTE Confidence: 0.9073368

00:11:11.370 --> 00:11:12.270 acute infection,

NOTE Confidence: 0.957703

00:11:12.730 --> 00:11:13.610 we can say that,

NOTE Confidence: 0.9070866

00:11:14.490 --> 00:11:16.410 subtype f is very enriched

NOTE Confidence: 0.9070866

00:11:16.410 --> 00:11:18.030 in the mortality, like the

NOTE Confidence: 0.9070866

00:11:18.090 --> 00:11:20.030 head ratio is, very high

NOTE Confidence: 0.9070866

00:11:20.250 --> 00:11:21.630 and then followed by subtype

NOTE Confidence: 0.9070866

00:11:21.690 --> 00:11:23.450 e. Subtype d, although it

NOTE Confidence: 0.9070866

00:11:23.450 --> 00:11:24.330 has a lot of,

NOTE Confidence: 0.96391886

00:11:25.214 --> 00:11:26.995 less severe, participants,

NOTE Confidence: 0.97342855

00:11:27.454 --> 00:11:28.675 it also has,

NOTE Confidence: 0.8633804

00:11:29.615 --> 00:11:30.735 appear to have some kind

NOTE Confidence: 0.8633804

00:11:30.735 --> 00:11:32.175 of enrichment in the mortality,

NOTE Confidence: 0.8633804

00:11:32.175 --> 00:11:33.375 and ABC is also

NOTE Confidence: 0.9782211

00:11:34.014 --> 00:11:35.394 they also have less mortality

NOTE Confidence: 0.9782211

00:11:35.454 --> 00:11:35.954 here.

NOTE Confidence: 0.87295103

00:11:36.894 --> 00:11:38.574 And, although subtype d can

NOTE Confidence: 0.87295103

00:11:38.574 --> 00:11:39.934 be very interesting to to

NOTE Confidence: 0.87295103

00:11:39.934 --> 00:11:41.620 to be investigated, it's a

NOTE Confidence: 0.87295103

00:11:41.620 --> 00:11:42.580 mix and it's kind of

NOTE Confidence: 0.87295103

00:11:42.580 --> 00:11:44.100 interesting. But we decided to

NOTE Confidence: 0.87295103

00:11:44.100 --> 00:11:45.940 focus on ABC and EF

NOTE Confidence: 0.87295103

00:11:45.940 --> 00:11:47.559 because they have more participants.

NOTE Confidence: 0.87819815

00:11:48.260 --> 00:11:49.380 And it's easier for us

NOTE Confidence: 0.87819815

00:11:49.380 --> 00:11:50.500 to do a later analysis

NOTE Confidence: 0.87819815

00:11:50.500 --> 00:11:51.700 of when we have going

NOTE Confidence: 0.87819815

00:11:51.700 --> 00:11:52.820 to have more recent data

NOTE Confidence: 0.87819815

00:11:52.820 --> 00:11:53.320 later.

NOTE Confidence: 0.8707555

00:11:55.675 --> 00:11:57.115 So, just to summary, we

NOTE Confidence: 0.8707555

00:11:57.115 --> 00:11:59.214 decided to we we identified

NOTE Confidence: 0.9286527

00:11:59.755 --> 00:12:00.255 four

NOTE Confidence: 0.9621295

00:12:00.714 --> 00:12:01.535 five major,

NOTE Confidence: 0.8999369

00:12:03.355 --> 00:12:04.255 molecular subtypes

NOTE Confidence: 0.98045945

00:12:04.635 --> 00:12:06.475 with three being severe, sub

NOTE Confidence: 0.98045945

00:12:06.475 --> 00:12:08.154 a, sub b, sub c,

NOTE Confidence: 0.98045945

00:12:08.154 --> 00:12:09.934 and two being very critical,

NOTE Confidence: 0.98045945

00:12:10.220 --> 00:12:11.040 sub e

NOTE Confidence: 0.979878

00:12:11.532 --> 00:12:12.032 and

NOTE Confidence: 0.96756357

00:12:12.524 --> 00:12:13.024 sub

NOTE Confidence: 0.9928946

00:12:13.516 --> 00:12:14.016 f.

NOTE Confidence: 0.97867906

00:12:14.508 --> 00:12:15.008 And,

NOTE Confidence: 0.9320854

00:12:15.740 --> 00:12:17.260 these subtypes not only,

NOTE Confidence: 0.92457265

00:12:17.740 --> 00:12:19.340 have strong associations with the

NOTE Confidence: 0.92457265

00:12:19.340 --> 00:12:20.700 primary clinical points as we

NOTE Confidence: 0.92457265

00:12:20.700 --> 00:12:22.300 mentioned. They also showed a

NOTE Confidence: 0.92457265

00:12:22.300 --> 00:12:24.800 very strong association patterns between,

NOTE Confidence: 0.90572417

00:12:25.725 --> 00:12:28.684 with, other clinical characterizations including

NOTE Confidence: 0.90572417

00:12:28.684 --> 00:12:29.985 demographics, comorbidities,

NOTE Confidence: 0.86404914

00:12:30.445 --> 00:12:31.345 and the complications.

NOTE Confidence: 0.9567399

00:12:32.204 --> 00:12:33.745 For example, you can say,

NOTE Confidence: 0.8680967

00:12:35.804 --> 00:12:36.925 sub e is actually the

NOTE Confidence: 0.8680967

00:12:36.925 --> 00:12:38.365 group has the oldest age

NOTE Confidence: 0.8680967

00:12:38.365 --> 00:12:39.644 even though sub f is

NOTE Confidence: 0.8680967

00:12:39.644 --> 00:12:41.265 more severe seems to be.

NOTE Confidence: 0.9036764

00:12:41.750 --> 00:12:43.029 And then sub a and

NOTE Confidence: 0.9036764

00:12:43.029 --> 00:12:44.230 b, they they are tend

NOTE Confidence: 0.9036764

00:12:44.230 --> 00:12:44.970 to be younger.

NOTE Confidence: 0.87229234

00:12:45.429 --> 00:12:46.790 They also show some difference

NOTE Confidence: 0.87229234

00:12:46.790 --> 00:12:49.050 in the ethnic ethnicity distribution.

NOTE Confidence: 0.93657374

00:12:49.589 --> 00:12:50.950 And regarding the sex, so

NOTE Confidence: 0.93657374

00:12:50.950 --> 00:12:51.990 we can say sub c

NOTE Confidence: 0.93657374

00:12:51.990 --> 00:12:53.610 has a very high enrichment

NOTE Confidence: 0.93657374

00:12:53.830 --> 00:12:55.589 in female and then sub

NOTE Confidence: 0.93657374

00:12:55.589 --> 00:12:56.630 a and sub c has

NOTE Confidence: 0.93657374

00:12:56.630 --> 00:12:57.370 less females.

NOTE Confidence: 0.89026105

00:12:57.885 --> 00:12:59.485 There are many comorbidities and

NOTE Confidence: 0.89026105

00:12:59.485 --> 00:13:01.405 any complications. Just overall, I

NOTE Confidence: 0.89026105

00:13:01.405 --> 00:13:02.765 do not dig into one

NOTE Confidence: 0.89026105

00:13:02.765 --> 00:13:03.805 by one. But you can

NOTE Confidence: 0.89026105

00:13:03.805 --> 00:13:05.485 say, although sub c is,

NOTE Confidence: 0.9367907

00:13:06.125 --> 00:13:07.165 on a more a more,

NOTE Confidence: 0.9367907

00:13:07.165 --> 00:13:08.765 like, severe side, not critical

NOTE Confidence: 0.9367907

00:13:08.765 --> 00:13:10.285 side, sub c and sub

NOTE Confidence: 0.9367907

00:13:10.285 --> 00:13:11.405 e and f, they both

NOTE Confidence: 0.9367907

00:13:11.405 --> 00:13:12.959 have more prior comorbidities,

NOTE Confidence: 0.8723634

00:13:13.500 --> 00:13:15.200 because it's in their, population.

NOTE Confidence: 0.93674856

00:13:15.740 --> 00:13:16.620 And when we look at,

NOTE Confidence: 0.93674856

00:13:16.779 --> 00:13:17.820 sub a and sub b,

NOTE Confidence: 0.93674856

00:13:17.820 --> 00:13:19.019 they are, they tend to

NOTE Confidence: 0.93674856

00:13:19.019 --> 00:13:21.339 be more healthy regarding the

NOTE Confidence: 0.93674856

00:13:21.339 --> 00:13:23.100 prior conditions. When we look

NOTE Confidence: 0.93674856

00:13:23.100 --> 00:13:23.839 at the complications,

NOTE Confidence: 0.8601763

00:13:24.140 --> 00:13:25.425 like, beyond risk for status,

NOTE Confidence: 0.8601763

00:13:25.505 --> 00:13:26.705 status, we can say sub

NOTE Confidence: 0.8601763

00:13:26.705 --> 00:13:27.985 e and sub f especially

NOTE Confidence: 0.8601763

00:13:27.985 --> 00:13:29.925 sub f has strong enrichment

NOTE Confidence: 0.8601763

00:13:29.985 --> 00:13:30.964 in different complications.

NOTE Confidence: 0.9710183

00:13:32.144 --> 00:13:33.285 And, we,

NOTE Confidence: 0.93318623

00:13:33.985 --> 00:13:35.745 we decide to from now

NOTE Confidence: 0.93318623

00:13:35.745 --> 00:13:37.125 on, let's focus more

NOTE Confidence: 0.92885303

00:13:37.820 --> 00:13:39.500 on the comparison between among

NOTE Confidence: 0.92885303

00:13:39.500 --> 00:13:41.279 APC and among EF because,

NOTE Confidence: 0.85789174

00:13:41.660 --> 00:13:43.100 there's a tons of work

NOTE Confidence: 0.85789174

00:13:43.100 --> 00:13:45.020 separating, like, severe versus the

NOTE Confidence: 0.85789174

00:13:45.020 --> 00:13:46.720 critical. But the characterization

NOTE Confidence: 0.91592914

00:13:47.260 --> 00:13:49.040 between within, participants,

NOTE Confidence: 0.8921226

00:13:50.334 --> 00:13:52.415 expecting similar severity levels is

NOTE Confidence: 0.8921226

00:13:52.415 --> 00:13:54.595 actually less, available out there.

NOTE Confidence: 0.94642913

00:13:55.135 --> 00:13:55.934 So when we look at

NOTE Confidence: 0.94642913

00:13:55.934 --> 00:13:56.654 the for example, when we

NOTE Confidence: 0.94642913

00:13:56.654 --> 00:13:57.554 look at the complications

NOTE Confidence: 0.86899453

00:13:58.095 --> 00:13:59.774 and let's say comparing the

NOTE Confidence: 0.86899453

00:13:59.774 --> 00:14:01.135 comparison between EF and the

NOTE Confidence: 0.86899453

00:14:01.135 --> 00:14:03.199 comparison between among ABC.

NOTE Confidence: 0.86439437

00:14:03.740 --> 00:14:04.620 We we can say that

NOTE Confidence: 0.86439437

00:14:04.620 --> 00:14:06.139 it is indeed like there's

NOTE Confidence: 0.86439437

00:14:06.139 --> 00:14:07.600 a lot of statistical significance,

NOTE Confidence: 0.9621216

00:14:08.379 --> 00:14:10.620 regarding the elevated complication in

NOTE Confidence: 0.9621216

00:14:10.620 --> 00:14:12.220 subtype f compared to subtype

NOTE Confidence: 0.9621216

00:14:12.220 --> 00:14:14.240 e. And even among ABC,

NOTE Confidence: 0.8935873

00:14:15.100 --> 00:14:16.319 all of the pattern is

NOTE Confidence: 0.8935873

00:14:16.459 --> 00:14:16.939 less,

NOTE Confidence: 0.941819

00:14:17.675 --> 00:14:19.115 less obvious because they tend

NOTE Confidence: 0.941819

00:14:19.115 --> 00:14:20.795 to have less complication overall.

NOTE Confidence: 0.941819

00:14:20.795 --> 00:14:22.235 We still see something very

NOTE Confidence: 0.941819

00:14:22.235 --> 00:14:24.074 interesting. For example, we say,

NOTE Confidence: 0.941819

00:14:24.314 --> 00:14:25.995 overall, like, subtype c seem

NOTE Confidence: 0.941819

00:14:25.995 --> 00:14:27.214 to, have

NOTE Confidence: 0.79744333

00:14:27.595 --> 00:14:29.514 a slightly higher cardiac con

NOTE Confidence: 0.79744333

00:14:29.675 --> 00:14:31.295 complications, especially the CHF.

NOTE Confidence: 0.9508168

00:14:31.829 --> 00:14:33.750 And it also has, higher

NOTE Confidence: 0.9508168

00:14:33.750 --> 00:14:34.649 renal complications.

NOTE Confidence: 0.96313983

00:14:36.149 --> 00:14:37.910 Although subtype c is also

NOTE Confidence: 0.96313983

00:14:37.910 --> 00:14:38.790 the one that has the

NOTE Confidence: 0.96313983

00:14:38.790 --> 00:14:40.550 least amount of, pulmonary, the

NOTE Confidence: 0.96313983

00:14:40.550 --> 00:14:42.149 lung related complications. So there

NOTE Confidence: 0.96313983

00:14:42.149 --> 00:14:43.990 is some difference between other

NOTE Confidence: 0.96313983

00:14:43.990 --> 00:14:45.269 organs and the lung here,

NOTE Confidence: 0.96313983

00:14:45.509 --> 00:14:46.810 for the subtype c.

NOTE Confidence: 0.9125565

00:14:51.645 --> 00:14:53.405 What's more interesting is we

NOTE Confidence: 0.9125565

00:14:53.405 --> 00:14:54.845 mentioned when we compare the

NOTE Confidence: 0.9125565

00:14:54.845 --> 00:14:56.845 acute infection severity and the

NOTE Confidence: 0.9125565

00:14:56.845 --> 00:14:59.085 PAS, our previous work actually

NOTE Confidence: 0.9125565

00:14:59.085 --> 00:15:01.725 identified almost none association at

NOTE Confidence: 0.9125565

00:15:01.725 --> 00:15:03.300 all, not even, like, significant.

NOTE Confidence: 0.6979079

00:15:04.500 --> 00:15:05.640 Weak in effect size.

NOTE Confidence: 0.93839955

00:15:06.820 --> 00:15:08.420 What's interesting is when we,

NOTE Confidence: 0.93839955

00:15:08.899 --> 00:15:10.519 check the task,

NOTE Confidence: 0.92273843

00:15:10.980 --> 00:15:12.500 self reported task and the

NOTE Confidence: 0.92273843

00:15:12.500 --> 00:15:14.180 subtype we define, there is

NOTE Confidence: 0.92273843

00:15:14.180 --> 00:15:14.680 actually

NOTE Confidence: 0.9177858

00:15:15.395 --> 00:15:16.755 quite a strong enrichment in

NOTE Confidence: 0.9177858

00:15:16.755 --> 00:15:18.355 certain sense. As you can

NOTE Confidence: 0.9177858

00:15:18.355 --> 00:15:20.295 see for, when we're comparing,

NOTE Confidence: 0.9177858

00:15:20.355 --> 00:15:22.195 like, each subtype against others,

NOTE Confidence: 0.9177858

00:15:22.195 --> 00:15:23.415 we overall,

NOTE Confidence: 0.7386258

00:15:23.795 --> 00:15:25.075 there is a strong, there's

NOTE Confidence: 0.7386258

00:15:25.075 --> 00:15:27.655 this this is statistical significance,

NOTE Confidence: 0.95647407

00:15:28.595 --> 00:15:30.540 regarding, like, subtype f, subtype

NOTE Confidence: 0.95647407

00:15:30.540 --> 00:15:31.840 c, and subtype a,

NOTE Confidence: 0.98417544

00:15:32.220 --> 00:15:34.060 which have, like, very different

NOTE Confidence: 0.98417544

00:15:34.060 --> 00:15:35.660 distribution compared to the,

NOTE Confidence: 0.98192376

00:15:36.060 --> 00:15:38.160 global distribution of the past.

NOTE Confidence: 0.9786416

00:15:39.340 --> 00:15:39.980 So the,

NOTE Confidence: 0.9947356

00:15:40.700 --> 00:15:41.020 let's

NOTE Confidence: 0.86269695

00:15:41.580 --> 00:15:43.100 what are the past category

NOTE Confidence: 0.86269695

00:15:43.100 --> 00:15:44.885 here? So minimum past here

NOTE Confidence: 0.86269695

00:15:44.885 --> 00:15:46.185 can be viewed as,

NOTE Confidence: 0.8421495

00:15:46.565 --> 00:15:48.265 the recovered convalescent.

NOTE Confidence: 0.9324429

00:15:48.885 --> 00:15:50.985 And then the, physical cognitive

NOTE Confidence: 0.9324429

00:15:51.045 --> 00:15:52.405 multiple, just three kinds of

NOTE Confidence: 0.9324429

00:15:52.405 --> 00:15:54.485 different past characterization by clinical

NOTE Confidence: 0.9324429

00:15:54.485 --> 00:15:56.005 team. And the multiple means

NOTE Confidence: 0.9324429

00:15:56.005 --> 00:15:57.205 that it has all kinds

NOTE Confidence: 0.9324429

00:15:57.205 --> 00:15:58.025 of deficits.

NOTE Confidence: 0.91016376

00:15:58.980 --> 00:15:59.779 When we look at the

NOTE Confidence: 0.91016376

00:15:59.779 --> 00:16:01.220 distribution, we can say that

NOTE Confidence: 0.91016376

00:16:01.220 --> 00:16:02.339 the the subtype a is

NOTE Confidence: 0.91016376

00:16:02.339 --> 00:16:03.779 actually a subtype that has,

NOTE Confidence: 0.9081674

00:16:04.740 --> 00:16:06.740 much more minimal deficits and

NOTE Confidence: 0.9081674

00:16:06.740 --> 00:16:07.640 the less other,

NOTE Confidence: 0.9830836

00:16:08.100 --> 00:16:09.000 task groups.

NOTE Confidence: 0.97761947

00:16:09.380 --> 00:16:11.380 And then, subtype c is

NOTE Confidence: 0.97761947

00:16:11.380 --> 00:16:12.660 the one that is more

NOTE Confidence: 0.97761947

00:16:12.660 --> 00:16:13.640 enriched in,

NOTE Confidence: 0.86733526

00:16:14.065 --> 00:16:15.665 like, long COVID and the

NOTE Confidence: 0.86733526

00:16:15.665 --> 00:16:17.185 less has less, like, comes

NOTE Confidence: 0.86733526

00:16:17.425 --> 00:16:17.925 convalescent,

NOTE Confidence: 0.5719863

00:16:18.945 --> 00:16:19.445 but

NOTE Confidence: 0.94139737

00:16:20.144 --> 00:16:21.345 and driven mostly by the

NOTE Confidence: 0.94139737

00:16:21.345 --> 00:16:22.384 physical and a little bit

NOTE Confidence: 0.94139737

00:16:22.384 --> 00:16:23.685 by the multiple deficit.

NOTE Confidence: 0.9412339

00:16:24.625 --> 00:16:26.100 Subtype f is also a

NOTE Confidence: 0.9412339

00:16:26.180 --> 00:16:27.860 a subtype that is, has

NOTE Confidence: 0.9412339

00:16:27.860 --> 00:16:29.779 more past compared to others

NOTE Confidence: 0.9412339

00:16:29.779 --> 00:16:31.300 and particularly compared to subtype

NOTE Confidence: 0.9412339

00:16:31.300 --> 00:16:32.500 e. You can we can

NOTE Confidence: 0.9412339

00:16:32.500 --> 00:16:33.779 say it has, like, much

NOTE Confidence: 0.9412339

00:16:33.779 --> 00:16:36.420 fewer, minimal deficit, mainly driven

NOTE Confidence: 0.9412339

00:16:36.420 --> 00:16:37.800 by the enrichment of cognitive

NOTE Confidence: 0.9412339

00:16:37.940 --> 00:16:38.440 deficit.

NOTE Confidence: 0.9434717

00:16:41.435 --> 00:16:42.475 And when we,

NOTE Confidence: 0.9234784

00:16:43.355 --> 00:16:45.435 so we also check whether

NOTE Confidence: 0.9234784

00:16:45.435 --> 00:16:47.214 utilizing the molecular profile

NOTE Confidence: 0.94300514

00:16:47.515 --> 00:16:49.195 can improve over a pure,

NOTE Confidence: 0.94300514

00:16:49.515 --> 00:16:51.214 clinical model that utilize

NOTE Confidence: 0.8338267

00:16:51.675 --> 00:16:53.435 age, sex, which, can be

NOTE Confidence: 0.8338267

00:16:53.435 --> 00:16:54.795 potentially be related to past,

NOTE Confidence: 0.714466

00:16:55.480 --> 00:16:55.980 prediction,

NOTE Confidence: 0.6516372

00:16:56.280 --> 00:16:57.740 and comability probabilities

NOTE Confidence: 0.87839454

00:16:58.680 --> 00:16:59.720 as well as a viral

NOTE Confidence: 0.87839454

00:16:59.720 --> 00:17:01.560 load and antibody because in

NOTE Confidence: 0.87839454

00:17:01.560 --> 00:17:02.220 the previous,

NOTE Confidence: 0.91881806

00:17:03.000 --> 00:17:04.700 study, like, we we identified

NOTE Confidence: 0.91881806

00:17:04.760 --> 00:17:06.220 this as an early correlative

NOTE Confidence: 0.91881806

00:17:06.440 --> 00:17:07.560 PASC. So you can say

NOTE Confidence: 0.91881806

00:17:07.560 --> 00:17:09.275 we're a little bit, not

NOTE Confidence: 0.91881806

00:17:09.275 --> 00:17:10.875 one hundred percent fair to

NOTE Confidence: 0.91881806

00:17:10.875 --> 00:17:12.635 other models. The clinical model

NOTE Confidence: 0.91881806

00:17:12.635 --> 00:17:14.554 has been selecting the most

NOTE Confidence: 0.91881806

00:17:14.554 --> 00:17:16.234 important predictors from from our

NOTE Confidence: 0.91881806

00:17:16.234 --> 00:17:18.335 previous study. But, anyway, so,

NOTE Confidence: 0.9475565

00:17:19.355 --> 00:17:20.715 that that's okay because if

NOTE Confidence: 0.9475565

00:17:20.715 --> 00:17:21.914 we can improve this model,

NOTE Confidence: 0.9475565

00:17:21.914 --> 00:17:23.775 it's the improvement is real.

NOTE Confidence: 0.9144225

00:17:24.155 --> 00:17:26.769 So, we we we consider

NOTE Confidence: 0.9144225

00:17:26.769 --> 00:17:27.809 two models. One is a

NOTE Confidence: 0.9144225

00:17:27.809 --> 00:17:28.789 clinical model

NOTE Confidence: 0.8945696

00:17:29.330 --> 00:17:31.250 plus only one additional feature,

NOTE Confidence: 0.8945696

00:17:31.250 --> 00:17:32.070 just our subtype.

NOTE Confidence: 0.9319234

00:17:32.529 --> 00:17:33.570 The other is a clinical

NOTE Confidence: 0.9319234

00:17:33.570 --> 00:17:35.169 model plus subtype and plus

NOTE Confidence: 0.9319234

00:17:35.169 --> 00:17:36.549 the multi omics features

NOTE Confidence: 0.8917473

00:17:37.010 --> 00:17:38.630 because our subtype is unsupervised

NOTE Confidence: 0.8917473

00:17:38.929 --> 00:17:39.090 and

NOTE Confidence: 0.96526444

00:17:40.144 --> 00:17:40.644 okay,

NOTE Confidence: 0.88784957

00:17:41.024 --> 00:17:41.984 and then we want to

NOTE Confidence: 0.88784957

00:17:41.984 --> 00:17:43.184 say whether we miss anything.

NOTE Confidence: 0.88784957

00:17:43.184 --> 00:17:44.625 So the result is very,

NOTE Confidence: 0.88784957

00:17:44.865 --> 00:17:45.904 that that is a very

NOTE Confidence: 0.88784957

00:17:45.904 --> 00:17:47.424 challenging task. So but we

NOTE Confidence: 0.88784957

00:17:47.424 --> 00:17:49.044 can see that there's improvement

NOTE Confidence: 0.88784957

00:17:49.264 --> 00:17:51.505 comparing clinical plus subtype versus

NOTE Confidence: 0.88784957

00:17:51.505 --> 00:17:53.505 clinical, clinical plus subtype, and

NOTE Confidence: 0.88784957

00:17:53.505 --> 00:17:54.920 the plus means additional,

NOTE Confidence: 0.8887107

00:17:55.400 --> 00:17:57.480 other factors. They both improve

NOTE Confidence: 0.8887107

00:17:57.480 --> 00:17:59.160 clinical and the, the statistical

NOTE Confidence: 0.8887107

00:17:59.160 --> 00:18:00.520 significance of the real. So

NOTE Confidence: 0.8887107

00:18:00.520 --> 00:18:02.200 this is the evaluative test

NOTE Confidence: 0.8887107

00:18:02.200 --> 00:18:03.559 data that haven't been touched

NOTE Confidence: 0.8887107

00:18:03.559 --> 00:18:04.299 on the training.

NOTE Confidence: 0.9855162

00:18:05.480 --> 00:18:05.880 And,

NOTE Confidence: 0.83400774

00:18:06.920 --> 00:18:08.200 so the model we use

NOTE Confidence: 0.83400774

00:18:08.200 --> 00:18:08.440 is,

NOTE Confidence: 0.94011354

00:18:09.234 --> 00:18:10.755 is the kernel SVM, and

NOTE Confidence: 0.94011354

00:18:10.755 --> 00:18:12.034 then we can also use

NOTE Confidence: 0.94011354

00:18:12.034 --> 00:18:13.734 in the recently, like, popular

NOTE Confidence: 0.94011354

00:18:13.875 --> 00:18:15.234 measure, like, the shape value

NOTE Confidence: 0.94011354

00:18:15.234 --> 00:18:16.514 to identify what are the

NOTE Confidence: 0.94011354

00:18:16.514 --> 00:18:18.034 important features for our model

NOTE Confidence: 0.94011354

00:18:18.034 --> 00:18:19.554 prediction. We can say there

NOTE Confidence: 0.94011354

00:18:19.554 --> 00:18:20.994 are some clinical measures, but,

NOTE Confidence: 0.94011354

00:18:20.994 --> 00:18:22.434 like, it's the subtype is

NOTE Confidence: 0.94011354

00:18:22.434 --> 00:18:23.475 one of the top features

NOTE Confidence: 0.94011354

00:18:23.475 --> 00:18:24.855 here that is,

NOTE Confidence: 0.91456944

00:18:25.930 --> 00:18:27.290 very important for our model

NOTE Confidence: 0.91456944

00:18:27.290 --> 00:18:28.890 prediction in the last model

NOTE Confidence: 0.91456944

00:18:28.890 --> 00:18:31.150 including everything. And when we

NOTE Confidence: 0.91456944

00:18:31.290 --> 00:18:33.050 plot the percent of,

NOTE Confidence: 0.87539864

00:18:33.930 --> 00:18:35.369 shift value on the test

NOTE Confidence: 0.87539864

00:18:35.369 --> 00:18:36.890 sample only, and we can

NOTE Confidence: 0.87539864

00:18:36.890 --> 00:18:37.869 say that indeed,

NOTE Confidence: 0.9141628

00:18:38.645 --> 00:18:40.804 their improvement their contribution from

NOTE Confidence: 0.9141628

00:18:40.804 --> 00:18:42.325 this the subtype and some

NOTE Confidence: 0.9141628

00:18:42.325 --> 00:18:43.705 other top top features,

NOTE Confidence: 0.73778284

00:18:44.005 --> 00:18:44.744 they actually,

NOTE Confidence: 0.72486925

00:18:46.325 --> 00:18:47.924 strongly associated with the task,

NOTE Confidence: 0.75877964

00:18:48.804 --> 00:18:50.265 on all the sample evaluation.

NOTE Confidence: 0.9928472

00:18:52.080 --> 00:18:52.580 Okay.

NOTE Confidence: 0.9769057

00:18:53.040 --> 00:18:53.540 So

NOTE Confidence: 0.90125954

00:18:53.920 --> 00:18:55.619 to summarize, like, we identify

NOTE Confidence: 0.90125954

00:18:55.679 --> 00:18:57.200 the molecular subtypes that are

NOTE Confidence: 0.90125954

00:18:57.200 --> 00:18:58.720 not only separate severe and

NOTE Confidence: 0.90125954

00:18:58.720 --> 00:19:00.100 critical, but also

NOTE Confidence: 0.87431526

00:19:00.400 --> 00:19:01.760 associated with a bunch of

NOTE Confidence: 0.87431526

00:19:01.760 --> 00:19:03.540 different, clinical calculations

NOTE Confidence: 0.8303629

00:19:04.240 --> 00:19:05.280 as well as long as

NOTE Confidence: 0.8303629

00:19:05.280 --> 00:19:05.940 long COVID.

NOTE Confidence: 0.90583205

00:19:07.664 --> 00:19:08.625 I want I don't have

NOTE Confidence: 0.90583205

00:19:08.625 --> 00:19:09.585 time to tell you the

NOTE Confidence: 0.90583205

00:19:09.585 --> 00:19:11.265 details about what the immune

NOTE Confidence: 0.90583205

00:19:11.265 --> 00:19:12.625 implication is, but there are

NOTE Confidence: 0.90583205

00:19:12.625 --> 00:19:14.225 actually many interesting things we

NOTE Confidence: 0.90583205

00:19:14.225 --> 00:19:16.465 found. And we and, again,

NOTE Confidence: 0.90583205

00:19:16.465 --> 00:19:17.904 I you said the last

NOTE Confidence: 0.90583205

00:19:17.904 --> 00:19:18.945 two minutes. I won't talk

NOTE Confidence: 0.90583205

00:19:18.945 --> 00:19:20.225 about difference between APs and

NOTE Confidence: 0.90583205

00:19:20.225 --> 00:19:21.825 EF because it's very clear.

NOTE Confidence: 0.90583205

00:19:21.825 --> 00:19:24.220 The only systematic inflate inflammation,

NOTE Confidence: 0.886614

00:19:24.919 --> 00:19:27.159 is very hallmark for separating

NOTE Confidence: 0.886614

00:19:27.159 --> 00:19:29.080 critical against severe. But there

NOTE Confidence: 0.886614

00:19:29.080 --> 00:19:29.879 are also a lot of

NOTE Confidence: 0.886614

00:19:29.879 --> 00:19:32.600 interesting things, separating ABC and

NOTE Confidence: 0.886614

00:19:32.600 --> 00:19:34.139 the second EF. Particularly,

NOTE Confidence: 0.89612156

00:19:34.440 --> 00:19:35.639 in ABC, when we look

NOTE Confidence: 0.89612156

00:19:35.639 --> 00:19:36.539 at the serology

NOTE Confidence: 0.8188791

00:19:36.840 --> 00:19:37.960 and the set off and

NOTE Confidence: 0.8188791

00:19:37.960 --> 00:19:40.435 the, like, different, cytokine chemokines,

NOTE Confidence: 0.8188791

00:19:40.655 --> 00:19:42.355 we we saw, like, subtype

NOTE Confidence: 0.8188791

00:19:42.575 --> 00:19:44.335 ABC, they actually have strong

NOTE Confidence: 0.8188791

00:19:44.335 --> 00:19:45.455 shape to the in their

NOTE Confidence: 0.8188791

00:19:45.455 --> 00:19:47.615 antiviral immune response, particularly sub

NOTE Confidence: 0.8188791

00:19:47.615 --> 00:19:49.535 a has much stronger humoral

NOTE Confidence: 0.8188791

00:19:49.535 --> 00:19:50.975 response compared to sub c

NOTE Confidence: 0.8188791

00:19:50.975 --> 00:19:52.335 where sub c has very

NOTE Confidence: 0.8188791

00:19:52.335 --> 00:19:54.035 early strong T cell response

NOTE Confidence: 0.8188791

00:19:54.289 --> 00:19:55.970 as T cell cytotoxic response,

NOTE Confidence: 0.8188791

00:19:55.970 --> 00:19:57.250 but it's a hormone response

NOTE Confidence: 0.8188791

00:19:57.250 --> 00:19:58.770 just somehow do not work

NOTE Confidence: 0.8188791

00:19:58.770 --> 00:19:59.809 very well. And it also

NOTE Confidence: 0.8188791

00:19:59.809 --> 00:20:00.929 has a very slow var

NOTE Confidence: 0.8188791

00:20:01.010 --> 00:20:01.909 varial clearance.

NOTE Confidence: 0.93833816

00:20:02.450 --> 00:20:04.450 And the difference between between

NOTE Confidence: 0.93833816

00:20:04.450 --> 00:20:05.570 sub e and sub f

NOTE Confidence: 0.93833816

00:20:05.570 --> 00:20:06.865 is also is, you know,

NOTE Confidence: 0.93833816

00:20:06.865 --> 00:20:08.465 is very different story. They

NOTE Confidence: 0.93833816

00:20:08.465 --> 00:20:09.345 are both in a very

NOTE Confidence: 0.93833816

00:20:09.345 --> 00:20:09.845 hyperinflammation

NOTE Confidence: 0.94332093

00:20:10.225 --> 00:20:11.345 state, but the sub e

NOTE Confidence: 0.94332093

00:20:11.345 --> 00:20:12.945 somehow tend to be adapting

NOTE Confidence: 0.94332093

00:20:12.945 --> 00:20:13.765 to it better.

NOTE Confidence: 0.8938637

00:20:14.225 --> 00:20:15.505 For example, where they are

NOTE Confidence: 0.8938637

00:20:15.505 --> 00:20:17.184 both, in a hyperinflammation state

NOTE Confidence: 0.8938637

00:20:17.184 --> 00:20:18.645 with a lot of calculation,

NOTE Confidence: 0.76840365

00:20:19.505 --> 00:20:20.005 regulation,

NOTE Confidence: 0.55479306

00:20:21.019 --> 00:20:22.000 calculation complement,

NOTE Confidence: 0.60265315

00:20:23.100 --> 00:20:23.600 protein.

NOTE Confidence: 0.9027605

00:20:24.380 --> 00:20:25.580 Sub e is actually the

NOTE Confidence: 0.9027605

00:20:25.580 --> 00:20:27.200 one that also has, associating

NOTE Confidence: 0.77973175

00:20:28.299 --> 00:20:30.480 alongside with, anti coagulation components.

NOTE Confidence: 0.77973175

00:20:30.539 --> 00:20:31.659 But the sub eigen just

NOTE Confidence: 0.77973175

00:20:31.659 --> 00:20:33.519 given up very strong coagulation

NOTE Confidence: 0.8804242

00:20:33.820 --> 00:20:35.500 complement, but the anti coagulation

NOTE Confidence: 0.8804242

00:20:35.500 --> 00:20:36.320 is just silent.

NOTE Confidence: 0.8574679

00:20:36.685 --> 00:20:37.725 I don't know why that

NOTE Confidence: 0.8574679

00:20:37.885 --> 00:20:39.905 that's what happening. And, also,

NOTE Confidence: 0.8574679

00:20:40.125 --> 00:20:41.405 sub although, you know, in

NOTE Confidence: 0.8574679

00:20:41.484 --> 00:20:43.244 during this hyper inflammation state,

NOTE Confidence: 0.8574679

00:20:43.244 --> 00:20:44.525 sub e is, has,

NOTE Confidence: 0.79367644

00:20:44.925 --> 00:20:46.705 less ox oxidative stress,

NOTE Confidence: 0.92518246

00:20:47.405 --> 00:20:49.025 indicated by both its complications,

NOTE Confidence: 0.9428688

00:20:49.325 --> 00:20:50.065 its metabolites,

NOTE Confidence: 0.93726796

00:20:50.619 --> 00:20:52.220 and protein levels. And the

NOTE Confidence: 0.93726796

00:20:52.220 --> 00:20:53.659 sub f is has, like,

NOTE Confidence: 0.93726796

00:20:53.659 --> 00:20:55.500 higher oxidative stress and with

NOTE Confidence: 0.93726796

00:20:55.500 --> 00:20:56.640 a higher n,

NOTE Confidence: 0.95180136

00:20:57.740 --> 00:20:59.260 n six to n three,

NOTE Confidence: 0.95180136

00:20:59.260 --> 00:20:59.760 like,

NOTE Confidence: 0.7200081

00:21:00.940 --> 00:21:02.399 on certain fatty acid ratios,

NOTE Confidence: 0.958999

00:21:03.115 --> 00:21:04.875 anemia, and all kinds of

NOTE Confidence: 0.958999

00:21:04.875 --> 00:21:06.015 things. So,

NOTE Confidence: 0.88541734

00:21:06.794 --> 00:21:08.475 this this is very essentially,

NOTE Confidence: 0.88541734

00:21:08.475 --> 00:21:09.674 very we found this very

NOTE Confidence: 0.88541734

00:21:09.674 --> 00:21:11.274 interesting. Just this kind of

NOTE Confidence: 0.88541734

00:21:11.274 --> 00:21:12.794 different in immune responses that

NOTE Confidence: 0.88541734

00:21:12.794 --> 00:21:13.534 can potentially

NOTE Confidence: 0.95592296

00:21:13.835 --> 00:21:15.355 be explaining why they're so

NOTE Confidence: 0.95592296

00:21:15.355 --> 00:21:16.794 different in many different aspects

NOTE Confidence: 0.95592296

00:21:16.794 --> 00:21:18.095 and even in long COVID.

NOTE Confidence: 0.89311296

00:21:18.500 --> 00:21:19.460 So lastly, so this is

NOTE Confidence: 0.89311296

00:21:19.460 --> 00:21:20.600 the work. It's a teamwork.

NOTE Confidence: 0.89311296

00:21:20.740 --> 00:21:21.780 It's part of the impact

NOTE Confidence: 0.89311296

00:21:21.780 --> 00:21:23.300 project, and we also have,

NOTE Confidence: 0.89311296

00:21:23.380 --> 00:21:24.660 many PIs from the EL

NOTE Confidence: 0.89311296

00:21:24.660 --> 00:21:25.859 sites as I listed here

NOTE Confidence: 0.89311296

00:21:25.859 --> 00:21:27.460 and other people. And also,

NOTE Confidence: 0.89311296

00:21:27.460 --> 00:21:29.140 like, this, here are the

NOTE Confidence: 0.89311296

00:21:29.140 --> 00:21:30.740 six lead authors, student authors,

NOTE Confidence: 0.89311296

00:21:30.740 --> 00:21:31.560 and the collaborators

NOTE Confidence: 0.8595193

00:21:31.940 --> 00:21:33.619 that, without whose help this

NOTE Confidence: 0.8595193

00:21:33.619 --> 00:21:35.125 project won't be possible. Thank

NOTE Confidence: 0.93808943

00:21:40.945 --> 00:21:42.405 you. Thank you, Liying.

NOTE Confidence: 0.9760867

00:21:42.865 --> 00:21:44.165 Maybe time for one

NOTE Confidence: 0.8926711

00:21:45.105 --> 00:21:46.325 any pressing question?

NOTE Confidence: 0.7994865

00:21:48.869 --> 00:21:50.310 Not actually one quick one.

NOTE Confidence: 0.94976765

00:21:51.190 --> 00:21:52.550 I see that the percent

NOTE Confidence: 0.94976765

00:21:52.550 --> 00:21:53.450 of PACE,

NOTE Confidence: 0.9965533

00:21:54.869 --> 00:21:55.369 it's

NOTE Confidence: 0.9420234

00:21:55.990 --> 00:21:57.750 it's highest in CNF. Right?

NOTE Confidence: 0.9420234

00:21:57.750 --> 00:21:59.109 So and then you have

NOTE Confidence: 0.9420234

00:21:59.109 --> 00:22:00.390 a gradient sort of going

NOTE Confidence: 0.9420234

00:22:00.390 --> 00:22:01.109 up from a, b, c

NOTE Confidence: 0.9420234

00:22:01.109 --> 00:22:02.630 to e, f. And then

NOTE Confidence: 0.9420234

00:22:02.630 --> 00:22:03.670 within each one of those

NOTE Confidence: 0.9420234

00:22:03.670 --> 00:22:05.534 two sub subgroups, you know,

NOTE Confidence: 0.9420234

00:22:05.534 --> 00:22:06.655 is it the same gradient,

NOTE Confidence: 0.9420234

00:22:06.655 --> 00:22:07.775 but just more intense in

NOTE Confidence: 0.9420234

00:22:07.775 --> 00:22:08.755 the e, f group?

NOTE Confidence: 0.93657416

00:22:09.534 --> 00:22:10.414 I didn't check. That's a

NOTE Confidence: 0.93657416

00:22:10.414 --> 00:22:11.695 good question. I didn't exactly

NOTE Confidence: 0.93657416

00:22:11.695 --> 00:22:12.195 check

NOTE Confidence: 0.78632325

00:22:12.494 --> 00:22:13.475 the ratio in

NOTE Confidence: 0.85784084

00:22:13.775 --> 00:22:14.434 the decrease.

NOTE Confidence: 0.92438847

00:22:16.666 --> 00:22:17.887 Yeah. But we can see.

NOTE Confidence: 0.92438847

00:22:17.946 --> 00:22:19.166 But there is a decrease.

NOTE Confidence: 0.92438847

00:22:19.226 --> 00:22:20.747 Yeah. Okay. Thank you. Thank

NOTE Confidence: 0.92438847

00:22:20.747 --> 00:22:21.566 you. Okay.

NOTE Confidence: 0.93268204

00:22:22.106 --> 00:22:23.007 Thanks again.