CHoRUS B2AI Standards Module Office Hours Transcript

June 15, 2023

0:0:0.0 --> 0:0:1.250
Alvarez, Marta
However, Gina, how are you?

0:0:6.770 --> 0:0:9.510
Alvarez, Marta
You're on mute, but I I heard you say good so.

0:0:11.20 --> 0:0:11.240
Alvarez, Marta
How?

0:0:13.410 --> 0:0:14.400
Alvarez, Marta
Welcome, Regina.

0:0:14.410 --> 0:0:18.460
Alvarez, Marta
I I I know that I think this is your first time joining, right? Yes.

0:0:21.500 --> 0:0:22.220
Alvarez, Marta
Hey, Randall.

0:0:22.690 --> 0:0:23.310
Alvarez, Marta
Nice to see you.

0:0:26.860 --> 0:0:27.850
Moorman, Joseph Randall (rm3h)
It's nice to be here.

0:0:27.900 --> 0:0:30.520
Moorman, Joseph Randall (rm3h)
I may not stay for the whole thing, but I thought I would check in and.

0:0:31.730 --> 0:0:32.420
Alvarez, Marta
That'd be great.

0:0:32.510 --> 0:0:33.330
Alvarez, Marta
Yeah, absolutely.

0:0:35.670 --> 0:0:48.760
Alvarez, Marta
Jared is our new to our team at Tufts, Randall, and you may not have been here before, but Umm Jared Randall works with chill on the in the data acquisition module.

0:0:50.130 --> 0:0:50.720
Houghtaling, Jared
Alright, OK.

0:0:49.570 --> 0:0:51.60
Moorman, Joseph Randall (rm3h)
I do indeed, dear.

0:0:51.70 --> 0:0:51.840
Moorman, Joseph Randall (rm3h)
It's nice to meet you.

0:0:52.630 --> 0:0:53.630
Houghtaling, Jared
Nice to meet you as well. Thanks.

0:1:0.20 --> 0:1:1.370
Alvarez, Marta
Wait a few more minutes.

0:1:1.380 --> 0:1:2.820
Alvarez, Marta
Have see who else can join.

0:1:29.640 --> 0:1:39.690
Alvarez, Marta
Since we have a few minutes and there's not many people on, we wanna do a quick round of introductions while we're waiting for a few people to to join Regina.

0:1:39.700 --> 0:1:40.490
Alvarez, Marta
Do you want to start?

0:1:40.500 --> 0:1:42.520
Alvarez, Marta
Since it's your first time today.

0:1:42.150 --> 0:1:42.730
Regina Williams
Sure.

0:1:43.310 --> 0:1:48.460
Regina Williams
My name is Regina Williams and I am the project manager for the Duke site.

0:1:49.720 --> 0:1:50.120
Alvarez, Marta
Awesome.

0:1:49.650 --> 0:1:50.590
Regina Williams
It's nice to meet you all.

0:1:51.350 --> 0:1:52.50
Alvarez, Marta
Nice to meet you too.

0:1:51.760 --> 0:1:54.410
Moorman, Joseph Randall (rm3h)
I am a former Duke person.

0:1:54.420 --> 0:2:0.500
Moorman, Joseph Randall (rm3h)
Probably before you were born, 1978 to 1985, there are times of the year that I bleed blue.

0:2:3.960 --> 0:2:5.110
Regina Williams
That's a good color to bleed.

0:2:8.380 --> 0:2:9.550
Alvarez, Marta
I'm Jared.

0:2:9.560 --> 0:2:11.40
Alvarez, Marta
Do you want to introduce yourself quick?

0:2:12.500 --> 0:2:13.430
Houghtaling, Jared
Yeah, absolutely.

0:2:13.660 --> 0:2:21.800
Houghtaling, Jared
So I'm Jared totaling I just joined as, as Marty said, the the tough CTSI informatics core as a software developer.

0:2:22.660 --> 0:2:23.650
Houghtaling, Jared
But three weeks ago?

0:2:23.230 --> 0:2:24.200
Regina Williams
But you know.

0:2:24.70 --> 0:2:36.560
Houghtaling, Jared
Umm, I my PhD at the University of Michigan in biomedical engineering, looking at protein characterization and and some single processing and and feature extraction methods related to that.

0:2:38.210 --> 0:2:52.490
Houghtaling, Jared
And then I worked for a company that that was heavily involved in harmonizing medical or observational health data into this home up common data model across different projects and and groups and things like that.

0:2:52.500 --> 0:2:57.470
Houghtaling, Jared
So that's where I'm coming in to to touch, to try to help out with similar type tasks.

0:3:1.440 --> 0:3:1.970
Alvarez, Marta
Thank you.

0:3:2.760 --> 0:3:8.460
Alvarez, Marta
Jeff, do you wanna introduce yourself, then I I think I I remember your name for sure.

0:3:8.470 --> 0:3:10.300
Alvarez, Marta
I'm not sure if you've Nope.

0:3:10.310 --> 0:3:11.320
Alvarez, Marta
OK, he may have dropped.

0:3:12.330 --> 0:3:15.820
Alvarez, Marta
Alright, manelick.

0:3:19.410 --> 0:3:20.120
Manlik Kwong
Everyone.

0:3:20.450 --> 0:3:21.780
Manlik Kwong
Malik long uh.

0:3:22.230 --> 0:3:38.310
Manlik Kwong
I'm the senior IT advisor at the CTSI, contributing in the standards module and background in medical devices, development algorithm, signal processing and data acquisition.

0:3:40.920 --> 0:3:41.550
Alvarez, Marta
Excellent.

0:3:41.600 --> 0:3:42.30
Alvarez, Marta
Thank you.

0:3:43.490 --> 0:3:44.790
Alvarez, Marta
Jeff, do you wanna try that again?

0:3:44.800 --> 0:3:46.560
Alvarez, Marta
Do you wanna introduce yourself?

0:3:46.610 --> 0:3:47.600
Alvarez, Marta
We lost you there for a minute.

0:3:48.10 --> 0:3:48.640
Jeff Gardner
Yeah. Sorry.

0:3:48.690 --> 0:3:49.280
Jeff Gardner
Yeah.

0:3:49.350 --> 0:3:51.460
Jeff Gardner
I'm Jeff Duke University.

0:3:51.930 --> 0:3:56.960
Jeff Gardner
I work on Regina's per genus team on my team manager for anesthesiology.

0:3:59.360 --> 0:3:59.820
Alvarez, Marta
Awesome.

0:3:59.830 --> 0:4:0.410
Alvarez, Marta
Thank you.

0:4:1.140 --> 0:4:9.540
Alvarez, Marta
And I am not sure if you go by Ian, but I think you're the third person on that on that list, right? Yeah.

0:4:10.410 --> 0:4:11.0
A. Ian Wong, M.D., Ph.D.
Correct.

0:4:11.570 --> 0:4:19.660
A. Ian Wong, M.D., Ph.D.
Hi, Ian Wong, Duke University clinical care could see everyone again and enjoy the informatics.

0:4:20.920 --> 0:4:21.330
Alvarez, Marta
Thank you.

0:4:22.970 --> 0:4:23.810
Alvarez, Marta
Uh Ashok.

0:4:25.940 --> 0:4:27.970
Ashok Bhatta
Hey, good morning, good afternoon everybody.

0:4:28.440 --> 0:4:31.250
Ashok Bhatta
Yeah, I also work at Duke.

0:4:31.320 --> 0:4:32.180
Ashok Bhatta
I'm data analyst.

0:4:33.210 --> 0:4:33.540
Ashok Bhatta
Yeah.

0:4:33.550 --> 0:4:35.510
Ashok Bhatta
We are like four or five.

0:4:35.520 --> 0:4:36.480
Ashok Bhatta
Well, today, thanks.

0:4:37.120 --> 0:4:37.610
Alvarez, Marta
Awesome.

0:4:38.60 --> 0:4:38.430
Alvarez, Marta
Thank you.

0:4:39.580 --> 0:4:39.950
Alvarez, Marta
Umm.

0:4:39.960 --> 0:4:42.860
Alvarez, Marta
Dan, no, I know you, but for other people.

0:4:43.730 --> 0:4:45.140
Nametz, Daniel C.
I I'm down.

0:4:45.150 --> 0:4:48.140
Nametz, Daniel C.
I'm a research assistant at Columbia University.

0:4:48.150 --> 0:4:48.500
Nametz, Daniel C.
Uh.

0:4:48.510 --> 0:4:51.630
Nametz, Daniel C.
Working under Doctor Park and I work a lot with our OMAP data set.

0:4:52.690 --> 0:4:53.120
Alvarez, Marta
Awesome.

0:4:53.130 --> 0:4:53.500
Alvarez, Marta
Thank you.

0:4:55.0 --> 0:4:56.720
Alvarez, Marta
And Kyle?

0:5:5.320 --> 0:5:5.560
Alvarez, Marta
Uh-huh.

0:4:59.240 --> 0:5:6.120
Zollo-Venecek, Kyle A
Everyone, Kyle, I work at Tufts CTSI with Marty, Jared, Andrew, man like, and Helena.

0:5:9.460 --> 0:5:10.20
Alvarez, Marta
And Paulina.

0:5:12.690 --> 0:5:20.160
Talapova, Polina
Hello everyone I am Obsidian and some applicability consultant at that city site.

0:5:20.650 --> 0:5:40.340
Talapova, Polina
I have domain expertise in medical science and pathologists by training and I'm here to help with mappings in terms of their creation, evaluation and also development of new content for the normal vocabulary.

0:5:41.480 --> 0:5:41.920
Talapova, Polina
Thank you.

0:5:42.980 --> 0:5:45.90
Alvarez, Marta
Thanks Paulina Randall.

0:5:45.100 --> 0:5:48.280
Alvarez, Marta
Do you wanna do an intro now since there's more people again?

0:5:47.490 --> 0:5:48.560
Moorman, Joseph Randall (rm3h)
Sure, I'm a cardiologist.

0:5:48.930 --> 0:5:54.350
Moorman, Joseph Randall (rm3h)
I'm a cardiologist at the University of Virginia and with Geo Claremont also on the call collide.

0:5:54.360 --> 0:5:57.460
Moorman, Joseph Randall (rm3h)
The data acquisition side, there are a lot of Duke people.

0:5:57.470 --> 0:6:3.310
Moorman, Joseph Randall (rm3h)
For those of you that didn't know it, this, this this is a wall entitled.

0:6:3.320 --> 0:6:7.100
Moorman, Joseph Randall (rm3h)
The older I get, the better I was and it's all Duke stuff so.

0:6:8.480 --> 0:6:8.700
Alvarez, Marta
And.

0:6:11.260 --> 0:6:12.480
Alvarez, Marta
Does she do you wanna do a quick intro?

0:6:15.310 --> 0:6:15.900
Moorman, Joseph Randall (rm3h)
You're muted.

0:6:17.90 --> 0:6:17.390
Alvarez, Marta
Yeah.

0:6:18.980 --> 0:6:25.30
Clermont, Gilles
No, I was just introduced by Randall, so University of Pittsburgh Critical care physician Cooley.

0:6:25.40 --> 0:6:26.530
Clermont, Gilles
The data acquisition as well.

0:6:26.900 --> 0:6:27.210
Clermont, Gilles
Thank you.

0:6:29.370 --> 0:6:31.570
Alvarez, Marta
And Andrew, for a few new people on our call today.

0:6:33.370 --> 0:6:38.800
Williams, Andrew E
Andrew Williams, psychologist by training, Khalid the standards module at Tufts.

0:6:41.20 --> 0:6:41.490
Alvarez, Marta
Awesome.

0:6:42.50 --> 0:6:42.690
Alvarez, Marta
Thank you.

0:6:43.120 --> 0:6:44.650
Alvarez, Marta
Thanks everyone for doing the intros.

0:6:44.660 --> 0:6:49.690
Alvarez, Marta
I promise we'll stop doing those once it gets, you know, I think it's nice to do it.

0:6:49.700 --> 0:6:56.140
Alvarez, Marta
Sometimes just to get everyone on the same page, especially when there's so many new people today who faces so.

0:6:56.180 --> 0:7:1.860
Alvarez, Marta
OK, I'll hand it over to Jared, who's gonna be talking today about your quality dashboard.

0:7:4.40 --> 0:7:4.460
Houghtaling, Jared
Great.

0:7:4.470 --> 0:7:4.890
Houghtaling, Jared
Thanks.

0:7:5.0 --> 0:7:9.110
Houghtaling, Jared
Very nice to see new faces on the call and to me to meet people so looking forward to this.

0:7:10.680 --> 0:7:21.730
Houghtaling, Jared
Alright, so I will present today a little bit about the data quality dashboard tool from the Odyssey community and I'll share some slides here just a second.

0:7:21.740 --> 0:7:38.800
Houghtaling, Jared
But we're I I think based on previous office hours, I will try to keep it to about 20 minutes, 25 minutes, including the demonstration and hopefully this time for discussion and questions and and kind of some more exploratory topics, things like that.

0:7:38.810 --> 0:7:42.570
Houghtaling, Jared
So I'll jump right into it now, which is.

0:7:50.150 --> 0:7:50.860
Houghtaling, Jared
Can you all see this?

0:7:53.290 --> 0:7:53.410
Moorman, Joseph Randall (rm3h)
Yes.

0:7:53.430 --> 0:7:53.530
Alvarez, Marta
Yes.

0:7:54.590 --> 0:7:54.940
Houghtaling, Jared
Right.

0:7:55.630 --> 0:8:17.790
Houghtaling, Jared

OK, so indeed so using data quality dashboard which is it's both the dashboard and a set of checks to validate or verify that the data that you've transformed into the OMAP common data model conforms with with convention and and kind of makes sense practically.

0:8:17.800 --> 0:8:32.570
Houghtaling, Jared
I'll get more into detail of what that actually means and just a second, so if I go down here, so I I gave a talk a couple weeks ago about some experience setting up a a Federated network in Africa and kind of what was involved in that.

0:8:32.580 --> 0:8:36.930
Houghtaling, Jared
And during that talk, I I kind of gave a brief introduction into data harmonization.

0:8:36.940 --> 0:8:39.450
Houghtaling, Jared
So I'm not gonna revive that.

0:8:39.880 --> 0:8:42.370
Houghtaling, Jared
If you wanna look back at the recording, I think it should be posted.

0:8:42.460 --> 0:8:44.910
Houghtaling, Jared
If it's not already, you're quite soon.

0:8:44.920 --> 0:8:53.100
Houghtaling, Jared
But what I will do is I'll kind of give a bit of a primer into data harmonization is kind of a segue into why you would even want to use this data quality dashboard.

0:8:53.830 --> 0:8:54.180
Houghtaling, Jared
Uh.

0:8:54.250 --> 0:8:59.480
Houghtaling, Jared
Then I'll go into the Odyssey tooling that's available and talk a little bit about setting up your environment.

0:8:59.490 --> 0:9:6.0
Houghtaling, Jared
For those of you who uh might or might not know, getting that configured with Hades is not necessarily the most straightforward.

0:9:6.10 --> 0:9:16.990
Houghtaling, Jared
If you try to go it alone, uh, and then kind of an introduction into these, I have Achilles actually on here, but mostly just data quality dashboard and they'll give you a demo of what that actually looks like.

0:9:17.0 --> 0:9:27.920
Houghtaling, Jared
So once you have transformed your source data into this kind of relational format, how you can investigate that that source data in terms of its quality issues and things like that?

0:9:29.890 --> 0:9:30.520
Houghtaling, Jared
OK.

0:9:31.370 --> 0:9:40.200
Houghtaling, Jared
So and when we talk about data harmonization, it's this process of taking source data, whether it be an epic or any of these other hospital EHR systems.

0:9:40.270 --> 0:9:43.660
Houghtaling, Jared
That's transforming it, combining it, mapping it.

0:9:43.670 --> 0:10:1.840
Houghtaling, Jared
All of these things that we've heard mentioned into the, the OMAP common data model in this case and along that way along the way there is there these kind of iterative side loops where you transform the data, you review it, you see OK, this doesn't make sense or what's wrong here.

0:10:1.930 --> 0:10:3.740
Houghtaling, Jared
Why am I not getting the proper cowards?

0:10:3.750 --> 0:10:14.800
Houghtaling, Jared
Things like that and then you update accordingly and then and then kind of keep looking through umm data quality dashboard is of course a tool that's involved in that process.

0:10:14.910 --> 0:10:18.220
Houghtaling, Jared
And so if I if I zoom in on on just.

0:10:18.390 --> 0:10:40.940
Houghtaling, Jared
Sorry I have through that quickly but if I zoom in just on this kind of iterative loop here and one piece of this whole harmonization process, it's designing and creating your transformation and how you do that of course is it can vary depending on what technologies or languages you can use and then evaluating how that transformation actually happened.

0:10:40.950 --> 0:10:42.910
Houghtaling, Jared
Evaluating the output from that transformation.

0:10:45.770 --> 0:11:6.780
Houghtaling, Jared
And like I guess the key the key points here are this is this is not a simple process and this is something that takes time and effort and iterations and data quality dashboard helps expedite the iterations helps and speed up or or facilitate that process to make it a bit more the objective and and and and this kind of thing.

0:11:9.580 --> 0:11:23.130
Houghtaling, Jared
Alright, so odyssey, this odyssey community has, if you haven't been to the GitHub page, very active community developing tools to interact with and extract insight from the OMOP common data model.

0:11:25.310 --> 0:11:42.870
Houghtaling, Jared
This is, I would recommend bookmarking this page if you don't have it bookmarked already and it's also interesting to see this is of course a very active repository and there's people that are constantly making updates and you can see the new tooling that's being developed, but one of kind of the that's the original odyssey tools is actually data quality dashboard that dates back.

0:11:42.880 --> 0:11:51.470
Houghtaling, Jared
I don't know how many versions and years, but it's been around the while and it has undergone a lot of development to get to where it is today. Umm.

0:11:53.690 --> 0:12:2.200
Houghtaling, Jared
Before we dive into the data quality dashboard though, if you do not have so, first of all, it's a tool that relies on R so it's it's.

0:12:2.210 --> 0:12:34.50
Houghtaling, Jared
It's built in both R and I think there's JavaScript in there as well, but it's you can install it as an R package, and if you are new to R or just getting it up and running this Hades installation guide for our which is I have linked down there at the bottom this I highly recommend following this guide like to the T because if you do not you will run into lots of issues with with your Java versioning and your versioning and you have to reinstall this thing like 5 or 6 times and it can get very frustrating.

0:12:34.60 --> 0:12:46.910
Houghtaling, Jared
But this guide is thankfully very detailed and explicit in terms of how to set this up, so definitely take a look at that before trying this out on your own if you don't already have a working R installation with Haiti's and things like that.

0:12:47.700 --> 0:12:49.80
Houghtaling, Jared
But that's just a bit of an aside.

0:12:50.340 --> 0:12:50.520
Houghtaling, Jared
Yeah.

0:12:52.170 --> 0:12:54.520
Houghtaling, Jared
OK, but the data quality dashboard, what is it?

0:12:54.530 --> 0:12:58.220
Houghtaling, Jared
First of all, uh, it's it.

0:12:58.230 --> 0:13:15.600
Houghtaling, Jared
It is a set of checks that's follow the so called con principles, so there's this this guy in 2016 outlined a set of three uh types of of and say quality rules are or standards to to to say validates.

0:13:15.610 --> 0:13:40.340
Houghtaling, Jared
I think it was, you know, observational health data, one of which are is is, in this case conformance so or my values conforming to what I would expect based on the model and you'll see when it in a second when I show the the the tool that it does, let's say separate its various checks into categories and one of which is conformance and this kind of gives some examples of what those checks are.

0:13:40.650 --> 0:13:43.520
Houghtaling, Jared
So, for instance, do my values conform to what's expected?

0:13:43.590 --> 0:13:56.620
Houghtaling, Jared
I know that's a that in this case it it, it should be only a single ASCII character for for a data value for instance, or my relations consistent with what I would expect.

0:13:56.630 --> 0:14:1.740
Houghtaling, Jared
Do I have a single medical record identifier associated with a single patient?

0:14:1.750 --> 0:14:2.620
Houghtaling, Jared
Those types of things.

0:14:2.630 --> 0:14:10.120
Houghtaling, Jared
So it runs checks on your data with those things in mind, and both to verify that they're in place.

0:14:10.130 --> 0:14:14.510
Houghtaling, Jared
And then effectively to to validate that they are they have have been done.

0:14:17.910 --> 0:14:18.470
Houghtaling, Jared
And the second.

0:14:18.820 --> 0:14:19.400
Houghtaling, Jared
Yep. Sorry.

0:14:17.540 --> 0:14:20.570
Williams, Andrew E
Can I stop you for just a a SEC charity.

0:14:20.580 --> 0:14:24.980
Williams, Andrew E
So I was involved in the development of this framework and it was.

0:14:24.990 --> 0:14:58.260
Williams, Andrew E
It's just worth knowing that I think we had five different efforts to come up with a comprehensive way of understanding all the different data quality issues that pertain to observational health data from EHR's that went into the group, all the contained all the authors of those, those frameworks working iteratively to say what are the common ways that, you know, we've thought about this and and then what are the standard checks that have been developed and the different EHR based research communities.

0:14:58.270 --> 0:15:8.70
Williams, Andrew E
And it was a long iterative process to come up with this sort of comprehensive, overarching framework and and a lot of the different rule checks that are implemented in this dashboard.

0:15:8.80 --> 0:15:21.60
Williams, Andrew E
That's where it began, and it's only worth noting because it was it was a very sort of thoughtful process and there's there's corresponding papers to it and to reporting requirements.

0:15:21.140 --> 0:15:31.220
Williams, Andrew E
You know, if you want to, if you want to publish results and be as explicit as possible about what the data quality issues are, and something like a consort diagram, there's another paper that goes along with it.

0:15:31.230 --> 0:15:33.280
Williams, Andrew E
So that's just relevant background.

0:15:33.290 --> 0:15:36.180
Williams, Andrew E
It wasn't, umm, kind of a casual thing.

0:15:36.590 --> 0:15:37.620
Williams, Andrew E
That's all, I guess.

0:15:37.630 --> 0:15:38.0
Williams, Andrew E
Maybe.

0:15:38.310 --> 0:15:40.740
Williams, Andrew E
Maybe I could have just stopped there, OK.

0:15:41.400 --> 0:15:41.790
Houghtaling, Jared
Awesome.

0:15:41.850 --> 0:15:42.180
Houghtaling, Jared
Thank you.

0:15:43.410 --> 0:15:44.630
Houghtaling, Jared
Umm. Alright.

0:15:45.690 --> 0:15:58.290
Houghtaling, Jared
So yeah, so so in in, in these, umm, in these principles, of course, have the first one is conformance the 2nd in this case is is completeness, which I guess is somewhat self explanatory here.

0:15:58.400 --> 0:16:4.970
Houghtaling, Jared
Making sure that the fields that you can fill or that are available to be filled are filled and filled appropriately.

0:16:5.640 --> 0:16:16.370
Houghtaling, Jared
You'll see and and what you actually will see when you run these checks a lot of times is you'll end up with with failed checks for for tables that you simply don't have in your source data, and even of course adjust that in.

0:16:16.390 --> 0:16:24.440
Houghtaling, Jared
I'll get to that second, but the the checks will will make sure that the tables that you can fill are filled, and if they're not, it's gonna.

0:16:24.450 --> 0:16:38.460
Houghtaling, Jared
It's gonna alert you and then also the field values in those tables and in the third third piece here is is plausibility and this is I think for me the where it starts getting toward the.

0:16:42.420 --> 0:16:49.100
Houghtaling, Jared
You start looking at at really the source data in a different way where you start to think, OK, I've now mapped these particular procedures.

0:16:50.990 --> 0:17:2.490
Houghtaling, Jared
Let's say in one way but but my my data quality is suggesting that hey these procedures are only valid for pediatric patients and you have them in your data.

0:17:2.500 --> 0:17:8.530
Houghtaling, Jared
For whatever reason, they're applied to people ages 16 and older, and there's a lot of them checks like that.

0:17:8.540 --> 0:17:12.200
Houghtaling, Jared
Does that are really does your does your data make sense?

0:17:13.590 --> 0:17:16.960
Houghtaling, Jared
And then this is I guess what I just gave is, is a temporal plausibility.

0:17:18.170 --> 0:17:27.700
Houghtaling, Jared
But then in terms of the the timing of things, I mean or or things happening sequentially as you expect, you have records of things happening after somebody dies and things like that.

0:17:28.90 --> 0:17:32.100
Houghtaling, Jared
So it's running in a variety of different checks with this idea of.

0:17:32.270 --> 0:17:37.680
Houghtaling, Jared
Is this feasible or are the events that we see in our OMOP data plausible?

0:17:38.190 --> 0:17:55.800
Houghtaling, Jared
And and so I'll I'll switch my screens here that I have now just a demo of what this looks like, so I'm not going to get too long winded here, but I'll show how you can actually execute this thing and what it looks like.

0:17:56.0 --> 0:17:56.460
Houghtaling, Jared
I don't know.

0:17:56.470 --> 0:17:58.570
Houghtaling, Jared
I think it's alright.

0:17:58.580 --> 0:17:59.500
Houghtaling, Jared
Can you see my screen?

0:18:1.720 --> 0:18:1.950
Houghtaling, Jared
Thanks.

0:18:2.400 --> 0:18:2.520
Alvarez, Marta
Yes.

0:18:3.310 --> 0:18:3.590
Houghtaling, Jared
Great.

0:18:4.260 --> 0:18:5.490
Houghtaling, Jared
OK, so this is a.

0:18:5.550 --> 0:18:9.660
Houghtaling, Jared
This is our studio running here and.

0:18:11.880 --> 0:18:23.730
Houghtaling, Jared
The so the data quality dashboard GitHub which is this is then here has of course some some documentation and scripts and it will just kind of walk you through what commands need to be run.

0:18:24.830 --> 0:18:40.460
Houghtaling, Jared
I'm not going to run it here with you, but effectively you need to to connect to your database and then specify some various parameters and then here this is again just the kind of the template file that they provide, and then you effectively execute that.

0:18:40.630 --> 0:18:50.190
Houghtaling, Jared
So you're executing this this package against your data that exists in a database, and you can of course tweak which checks are executed.

0:18:50.200 --> 0:18:53.460
Houghtaling, Jared
There's there's three different levels of checks as well.

0:18:53.650 --> 0:19:4.400
Houghtaling, Jared
I kind of glossed over that, but you have checks that are executed against the tables themselves, checks against the fields in those tables, and then checks at the actual concept level.

0:19:4.410 --> 0:19:7.440
Houghtaling, Jared
And you can also specify which of those checks you want to be run.

0:19:9.380 --> 0:19:15.70
Houghtaling, Jared
There was then you can even more fine tune your, let's say filtering of of checks.

0:19:15.80 --> 0:19:16.480
Houghtaling, Jared
You can specify which ones to run.

0:19:16.490 --> 0:19:19.970
Houghtaling, Jared
You can also specify which tables to exclude and which checks to exclude.

0:19:20.220 --> 0:19:28.200
Houghtaling, Jared
There's a lot of you can imagine a lot of custom customized customization or configurability possible with this, but then you run it.

0:19:28.270 --> 0:19:39.100
Houghtaling, Jared
And of course, depending on your machine, it's and and data size and can take anywhere from 20 minutes to a few hours, let's say, and it's going to then spit out for you.

0:19:39.430 --> 0:19:45.760
Houghtaling, Jared
Typically, the results condensed into a JSON file and that file is something like 5 megabytes.

0:19:45.810 --> 0:19:56.690
Houghtaling, Jared
It's fairly big, but the file itself can be visualized using a shiny application, which is also part of the the our package.

0:19:57.240 --> 0:20:12.920
Houghtaling, Jared
So it's an R shiny application and when you do that, when you visualize it and I've done this prior to the demo, you get to this point, and if so, everything worked in in your your checks executed successfully and the package was successful and it's and it's run.

0:20:13.780 --> 0:20:34.620
Houghtaling, Jared
You get here and what you'll see then is it's a stratification of checks and kind of that's that con principle structure that I was, I was discussing a second ago there and this is overview is giving you the number of checks which passed number that failed across the various categories.

0:20:35.110 --> 0:20:36.280
Houghtaling, Jared
So this is very high level.

0:20:36.550 --> 0:20:52.40
Houghtaling, Jared
I will say that most data, I mean this is kind of an inflated past percentage 98 looks pretty good, but it's quick to get to let's say 95% conformance and the last few checks are often can be quite challenging.

0:20:52.50 --> 0:20:59.850
Houghtaling, Jared
So it's likely you'll see a fairly high number here, and then it's it takes a while to to to get everything else sorted.

0:21:0.770 --> 0:21:2.920
Houghtaling, Jared
Uh, OK.

0:21:3.180 --> 0:21:5.200
Houghtaling, Jared
But that's that's kind of your introduction to it.

0:21:5.250 --> 0:21:15.320
Houghtaling, Jared
And then in the results and this is where I think the tool has maybe the most power is you, you get a list of results and you can filter this list.

0:21:15.330 --> 0:21:24.470
Houghtaling, Jared
So you'll see that each one of these rows corresponds to all of the 3951 checks that were executed and in our case?

0:21:24.480 --> 0:21:30.700
Houghtaling, Jared
What we want to do is we want to look at the failed ones and I like to actually shift.

0:21:30.710 --> 0:21:34.720
Houghtaling, Jared
So I'm going kind of quickly through this at you.

0:21:34.730 --> 0:21:44.920
Houghtaling, Jared
Apologize, but if you look at the failed checks, you can see first which table the check corresponded to which category that that check fell in.

0:21:44.930 --> 0:21:50.450
Houghtaling, Jared
So in this case, we're looking at completeness checks and and then you can have like sub categories.

0:21:50.460 --> 0:21:58.770
Houghtaling, Jared
So this is again breaking down by those principles and then the level at which the check was was executed on.

0:21:58.780 --> 0:22:9.680
Houghtaling, Jared
So that table concept, field level certification and in this case I'm I'm failing these checks with my fake data set because I simply just don't have data in those tables.

0:22:10.250 --> 0:22:14.570
Houghtaling, Jared
But if I come, I kind of peruse back further here into my checks.

0:22:14.580 --> 0:22:15.630
Houghtaling, Jared
I think maybe start at the back.

0:22:17.230 --> 0:22:19.440
Houghtaling, Jared
I see here this is an interesting one.

0:22:19.990 --> 0:22:32.930
Houghtaling, Jared
I actually have a drug exposure check that says something like one in five of my entries in the drug exposure table do not have a standard concept in their drug concept ID field.

0:22:32.940 --> 0:22:40.190
Houghtaling, Jared
So the drug concept ID fields referring of course to the drug that was administered or or or, yeah, yeah.

0:22:40.520 --> 0:22:48.130
Houghtaling, Jared
Given to the patient and so I see already from the check I can get some information about what what's is wrong.

0:22:48.180 --> 0:22:50.560
Houghtaling, Jared
Something like 30,000 rows in my data set or or?

0:22:50.570 --> 0:23:14.390
Houghtaling, Jared
I have an issue and if I Scroll down even more I see this is the sequel query that was that was executed in order to to to get that result and I can actually copy this SQL query and like done that already here and what you can see and actually I I have a different example, maybe I'll show one page back.

0:23:15.170 --> 0:23:16.760
Houghtaling, Jared
So after realizing that spent time.

0:23:23.240 --> 0:23:24.160
Houghtaling, Jared
The.

0:23:27.490 --> 0:23:29.80
Houghtaling, Jared
Or, you know, let's let's actually just review.

0:23:30.970 --> 0:23:31.420
Houghtaling, Jared
Script.

0:23:32.480 --> 0:23:41.980
Houghtaling, Jared
Umm, so copy my my query there and I can come over here and this is just a a Julian notebook that I'm running.

0:23:42.750 --> 0:23:52.350
Houghtaling, Jared
Uh just explained that here and I can paste in my query directly from DQD, so this is just connected to my database.

0:23:54.80 --> 0:23:55.690
Houghtaling, Jared
If I hit run on that actually.

0:23:56.890 --> 0:24:7.760
Houghtaling, Jared
One problem, but we should get is the same result that we just had here and and we should get something like 17% of our rooms have issues.

0:24:8.210 --> 0:24:8.420
Houghtaling, Jared
Yeah.

0:24:8.430 --> 0:24:15.90
Houghtaling, Jared
And we do so 30,000 rows and have violation 17% of those rows or so.

0:24:15.100 --> 0:24:27.550
Houghtaling, Jared
It's 17% of the total rows, but what I mentioned on the call or what was mentioned I guess on the call on Tuesday for those of you who are there is the the nested queries are are worth noting here.

0:24:27.560 --> 0:24:33.870
Houghtaling, Jared
And and this is where you actually kind of getting the meat of what you what you wanna investigate right?

0:24:33.880 --> 0:24:39.540
Houghtaling, Jared
Because this is this high level overview is connect giving you an idea of how bad the issue is?

0:24:39.550 --> 0:24:45.200
Houghtaling, Jared
Let's say, but when you wanna resolve it, it's useful to look at the actual rows of violations.

0:24:45.250 --> 0:24:46.0
Houghtaling, Jared
I should say so.

0:24:46.10 --> 0:24:47.910
Houghtaling, Jared
If you copy this guy out.

0:24:51.650 --> 0:24:52.560
Houghtaling, Jared
I did that actually.

0:24:52.570 --> 0:24:54.750
Houghtaling, Jared
So let's see you copy this out.

0:24:54.870 --> 0:25:1.50
Houghtaling, Jared
I'm not gonna do this right now, but you you copy them out and then you paste them in another window.

0:25:1.60 --> 0:25:10.250
Houghtaling, Jared
What you can see is and in this case I wanted to group by the violating rows and you can then start to investigate what things are issues based on just this simple query.

0:25:11.730 --> 0:25:14.460
Houghtaling, Jared
So I will actually just do this one, it's.

0:25:17.110 --> 0:25:22.360
Houghtaling, Jared
And so this inner queries joining our drug exposure table against the concept table in order to.

0:25:24.910 --> 0:25:31.610
Houghtaling, Jared
You want to see which actual concepts are standard, so it's it's saying, uh, let's see.

0:25:32.40 --> 0:25:33.400
Houghtaling, Jared
So and I think.

0:25:36.290 --> 0:25:37.240
Houghtaling, Jared
We're going to just get.

0:25:37.250 --> 0:25:38.160
Houghtaling, Jared
Yeah, that's something work.

0:25:48.280 --> 0:25:51.630
Houghtaling, Jared
E and this is gonna be a lot of rows, so it's not going to give me that.

0:25:52.510 --> 0:25:54.490
Houghtaling, Jared
But what I can then do is say.

0:25:56.510 --> 0:25:59.300
Houghtaling, Jared
This is, I think, gonna be joining on the concept table.

0:25:59.310 --> 0:26:2.440
Houghtaling, Jared
So in theory squirrel.

0:26:25.280 --> 0:26:25.780
Houghtaling, Jared
Yeah.

0:26:25.820 --> 0:26:34.980
Houghtaling, Jared
OK, So what we see is we've taken now just from our uh or query that says hey, 17% of your drugs have issues.

0:26:35.290 --> 0:26:36.60
Houghtaling, Jared
Now we can see.

0:26:36.110 --> 0:26:49.660
Houghtaling, Jared
Actually, it's all just a single drug concept ID for all 30,000 records with issues and it is this 216-0504 to and then you can even add an additional cell down here and you can look and see what actually that concept is.

0:26:50.140 --> 0:26:52.400
Houghtaling, Jared
And actually I can do that here without adding a cell.

0:26:56.370 --> 0:26:56.770
Houghtaling, Jared
That's.

0:27:5.550 --> 0:27:10.620
Houghtaling, Jared
And it is apparently corticosteroids, but it's not standard in my vocabulary version.

0:27:11.110 --> 0:27:18.470
Houghtaling, Jared
This content, uh, and then this kind of point you in the right direction to say OK is an issue with my mappings.

0:27:18.580 --> 0:27:20.120
Houghtaling, Jared
Do I have an issue with my data source?

0:27:20.130 --> 0:27:27.440
Houghtaling, Jared
Where can I actually resolve this and make sure that I don't either map to the proper uh and the the proper?

0:27:30.530 --> 0:27:34.890
Houghtaling, Jared
Yes, standard concept or I can I can take a look at my source date and see what's what's going on there.

0:27:36.470 --> 0:27:37.70
Houghtaling, Jared
Umm.

0:27:37.270 --> 0:27:51.770
Houghtaling, Jared
And so I think this combination of using the data quality dashboard together with some way to execute queries on your database, whether that's a notebook like structure or you can also do it of course within our studio itself.

0:27:51.780 --> 0:27:54.330
Houghtaling, Jared
But there's lots of tools for that if you prefer that.

0:27:55.890 --> 0:28:1.860
Houghtaling, Jared
That's that becomes the very powerful to to to execute these queries and try to identify where the data quality issues locked.

0:28:4.170 --> 0:28:10.220
Houghtaling, Jared
One last thing I will say and I know I I don't wanna go too deep into this, but this was also mentioned on the call last week.

0:28:10.230 --> 0:28:36.710
Houghtaling, Jared
Is is this Aries tool and as part of I guess this, this this consortium areas is also going to be kind of a an A tool that's offered or recommended for for data quality and what areas does is is pretty similar to this but it doesn't on a let's say a network level where you can not only look at the individual source that that you have.

0:28:37.50 --> 0:28:37.360
Houghtaling, Jared
Alright.

0:28:38.30 --> 0:28:39.200
Houghtaling, Jared
Uh just executed.

0:28:39.590 --> 0:28:46.140
Houghtaling, Jared
You can also look at prior releases and and check out what their data quality looks like, so I'll show that here quickly.

0:28:46.290 --> 0:28:48.60
Houghtaling, Jared
So this view showed that familiar right?

0:28:48.970 --> 0:28:57.580
Houghtaling, Jared
This is exactly what I was just showing you here in the data quality dashboard view, but just in Aries instead where you can go in and look at your failed checks.

0:28:57.810 --> 0:29:4.430
Houghtaling, Jared
And again, you can copy the SQL directly from from areas, but then you can also look at different source releases and I don't have anything.

0:29:4.440 --> 0:29:6.90
Houghtaling, Jared
I don't have multiple releases in this case.

0:29:6.100 --> 0:29:15.330
Houghtaling, Jared
I we do have an areas of on at Tufts with lots of releases where we can go and see which checks failed and which ones we've.

0:29:15.340 --> 0:29:19.650
Houghtaling, Jared
We've managed to either resolve or or kind of override if they're not relevant.

0:29:20.980 --> 0:29:23.590
Houghtaling, Jared
Along the course of kind of the ETL development process.

0:29:24.880 --> 0:29:25.290
Houghtaling, Jared
Umm.

0:29:25.840 --> 0:29:41.370
Houghtaling, Jared
So not only does this areas give you kind of a view on data quality that the data quality dashboard type view, I guess of a single release, but also of multiple releases and of a full network where you have multiple things going on and you can buckets.

0:29:43.640 --> 0:29:47.130
Houghtaling, Jared
Again, these data quality issues of of different sources.

0:29:47.190 --> 0:29:58.580
Houghtaling, Jared
This but it it's not not to talk about areas just to kind of show how it how it is, I'd say visualized or how it integrates together with this other other tool.

0:30:0.430 --> 0:30:0.650
Houghtaling, Jared
OK.

0:30:1.740 --> 0:30:5.990
Houghtaling, Jared
Yeah, that, that I I guess is is we'll stop at least for now.

0:30:6.850 --> 0:30:7.760
Houghtaling, Jared
I realize it again.

0:30:7.840 --> 0:30:17.690
Houghtaling, Jared
I went through a lot of material there and and the quick amount of time, but hopefully it was a nice introduction to what it actually means to run the data quality dashboard.

0:30:17.750 --> 0:30:30.120
Houghtaling, Jared
How you might be able to do it and how maybe you can execute a A of a workflow in terms of your ETL development and and OMOP data quality optimization right?

0:30:30.170 --> 0:30:31.230
Houghtaling, Jared
So with that, I will start.

0:30:31.330 --> 0:30:32.380
Houghtaling, Jared
Uh, yeah.

0:30:32.420 --> 0:30:32.710
Houghtaling, Jared
Thank you.

0:30:42.850 --> 0:30:43.260
Houghtaling, Jared
No.

0:30:46.240 --> 0:30:54.250
Houghtaling, Jared
This anyone have have questions on that or or any of the other kind of things that I mentioned offhand that probably develop more time too.

0:30:58.820 --> 0:30:59.410
Williams, Andrew E
Gorgeous things.

0:30:59.420 --> 0:31:3.270
Williams, Andrew E
You want feedback and advice from us on in general.

0:31:3.280 --> 0:31:6.390
Williams, Andrew E
I mean that's, you know, we're we're here.

0:31:6.400 --> 0:31:24.470
Williams, Andrew E
We're here to answer your your questions broadly and uh, yes, that especially all the stuff having to do with what Jared said, but any kind of questions that you have, we're here to answer and going forward will be as Jared said, preserving time to make sure that you know you can come here and just say what's this is where we're at.

0:31:24.480 --> 0:31:28.700
Williams, Andrew E
We don't really know what to do here or we need general orientation to this or specific help with that etcetera.

0:31:31.50 --> 0:31:32.950
Houghtaling, Jared
She always see your your question in the chat.

0:31:33.670 --> 0:31:38.90
Houghtaling, Jared
So Eris itself is actually two applications.

0:31:38.100 --> 0:31:58.930
Houghtaling, Jared
Officially it's an indexer which is an R package, and that that's an R package that takes output from Achilles that I mentioned briefly and output from from DQD, which is that JSON file that I referred to and it processes it and creates kind of an index that compares different sources and and different source releases and things like that.

0:31:58.940 --> 0:32:19.230
Houghtaling, Jared
So the index are just creates kind of a nice directory structure with different JSON and CSV files that then can be read by the second part of areas which is a a I think view JS web application that then is simply just visualizing the static directory of these quality check files that have been exported.

0:32:21.200 --> 0:32:29.300
Houghtaling, Jared
So partially in R and then the visualization aspect is not an R it's it's it's to JavaScript.

0:32:41.490 --> 0:32:42.800
Houghtaling, Jared
Also, a fantastic question.

0:32:42.810 --> 0:32:42.960
Houghtaling, Jared
What?

0:32:42.970 --> 0:32:43.300
Houghtaling, Jared
What is?

0:32:43.310 --> 0:32:43.970
Houghtaling, Jared
What is good enough?

0:32:45.670 --> 0:32:46.230
Houghtaling, Jared
Yeah, that's.

0:32:47.190 --> 0:33:5.920
Houghtaling, Jared
I think the way that I on projects at least that I've been on, uh, we typically or like the the data owner has typically gone through a number of iterations to where you feel fairly confident that the OMOP data is representative of the source data.

0:33:15.760 --> 0:33:16.130
Moorman, Joseph Randall (rm3h)
Ha.

0:33:6.290 --> 0:33:19.760
Houghtaling, Jared

I think that's kind of the the preliminary thing that you're trying to capture that that's what events are captured there in in Omar makes sense and they they, they they correspond effectively to what's in your source.

0:33:20.680 --> 0:33:20.970
Houghtaling, Jared
Uh.

0:33:22.30 --> 0:33:23.410
Houghtaling, Jared
Within typically happens though is.

0:33:23.420 --> 0:33:29.760
Houghtaling, Jared
You get to this confident point and then you start to try to run a study or create a set of cohorts that you know should be.

0:33:31.990 --> 0:33:32.260
Houghtaling, Jared
Yeah.

0:33:32.270 --> 0:33:40.60
Houghtaling, Jared
You know exact counts of what they should be based on your source data, and it turns out that those cohorts are potentially different than what you would expect.

0:33:40.190 --> 0:33:48.380
Houghtaling, Jared
And then it becomes a bit of a a kind of cat and mouse game where you're trying to chase down whatever issue is is causing that this discrepancy.

0:33:48.770 --> 0:33:55.960
Houghtaling, Jared
So I would say get to the point that you feel that the OMOP data is representative and and and that you're confident of that.

0:33:56.490 --> 0:34:4.300
Houghtaling, Jared
Then you'll try to run something and do something with it, and you'll need to probably go back and and investigate some very small edge cases or things like that.

0:34:4.310 --> 0:34:13.340
Houghtaling, Jared
That's either didn't come up in one of these checks, or that are quite relevant to them for a study that you're trying to run that's at least in my experience.

0:34:12.400 --> 0:34:13.360
Williams, Andrew E
And the emphasis?

0:34:13.940 --> 0:34:14.280
Williams, Andrew E
Yeah.

0:34:14.290 --> 0:34:29.70
Williams, Andrew E
Emphasis so far in our conversations, you know, in bridge two AI on uh defining phenotypes that we want to make sure it can be represented with confidence in the data that we're producing is exactly with this goal in mind.

0:34:29.80 --> 0:34:56.840
Williams, Andrew E
So which areas process we're talking about is saying your initial scan of an entire data instance of OMOP is going to include so many concepts in so many records and so many fields across, often across different settings, that all you can do all you can hope to do in any way that's useful is to give a very broad picture of these things are just clearly wrong.

0:34:56.850 --> 0:35:4.300
Williams, Andrew E
It doesn't conform with the specifications of the data model or all these things are clearly out of any kind of plausible range for your lab values.

0:35:4.310 --> 0:35:4.660
Williams, Andrew E
And so on.

0:35:4.990 --> 0:35:20.320
Williams, Andrew E
Those broad swipes are easy to do at that very global level, but for the intended actual uses, you need to get to grips with much more specific uses, like the ones that are likely to be used in studies.

0:35:20.330 --> 0:35:36.520
Williams, Andrew E
And so having this Delphi process that we're going through to kind of say these are the things that we want feeds into this data quality aspect of the ETL development, because you can use this tool, Ares to say these are the concepts.

0:35:36.530 --> 0:35:41.930
Williams, Andrew E
It'll one of the things didn't get to yet in that area's thing is you're not just looking at that broad set.

0:35:41.940 --> 0:35:43.870
Williams, Andrew E
You can say I need.

0:35:45.240 --> 0:35:52.80
Williams, Andrew E

Let's say there's, you know, 13 ways you could develop a sofascore, and they might or might not involve any of these data elements.

0:35:52.90 --> 0:36:8.830
Williams, Andrew E
From these sources you can put all the different concepts and stuff associated with all those different ways of coming up with a definition of a sofa score into one run and say OK, at this site you have these data quality issues or there just isn't very much data there.

0:36:8.840 --> 0:36:25.370
Williams, Andrew E
It'll look at those very specifically and then you can make with a more specific criteria in mind, a judgment about whether it's good enough the the overall question of data quality and these kinds of contexts.

0:36:25.380 --> 0:36:31.380
Williams, Andrew E
You're aware is fitness for use and if you don't have a specific use case in mind, you can't say what fitness means.

0:36:31.570 --> 0:36:36.400
Williams, Andrew E
It doesn't have any persistent global definition, right?

0:36:36.490 --> 0:36:45.40
Williams, Andrew E
It's only in a particular context where you want to use some data to do something that it takes on meaning, and so you have to have that use case.

0:36:45.50 --> 0:37:17.290
Williams, Andrew E
This specific phenotype that you want to be able to develop, or some variations on it to motivate what it means to say that the data are good enough and that's what we're so we're working with you all and everybody to kind of figure out what those high high importance you know, phenotype definitions need to come out of bridge to AI and what the candidate concepts that might go in and then we can feed it into this ETL process to help make sure sites are getting the data they need up to the standard that makes sense as we look at them.

0:37:17.300 --> 0:37:19.240
Williams, Andrew E
That's the broader context.

0:37:19.250 --> 0:37:19.850
Williams, Andrew E
That makes sense.

0:37:19.860 --> 0:37:21.130
Williams, Andrew E
Jill, I'm sorry.

0:37:21.140 --> 0:37:23.240
Williams, Andrew E
Randall, you're on unmuted.

0:37:24.790 --> 0:37:27.920
Moorman, Joseph Randall (rm3h)
Well, let me ask some embarrassingly dumb questions.

0:37:28.140 --> 0:37:48.200
Moorman, Joseph Randall (rm3h)
So, so so the the workflow side by side is that there's someone at each site and that is tasked with taking let's start with structured EHR data because that's a known quantity and extracting it into this common data model OMOP.

0:37:50.770 --> 0:37:51.470
Williams, Andrew E
5.4.

0:37:48.210 --> 0:37:53.80
Moorman, Joseph Randall (rm3h)
And remind me of the version just so that I don't sound 5.4 very good.

0:37:53.350 --> 0:37:59.860
Moorman, Joseph Randall (rm3h)
And so once, once that has is thought to have been accomplished then then the data dashboard is running.

0:37:59.870 --> 0:38:0.600
Moorman, Joseph Randall (rm3h)
I'm and again.

0:38:4.190 --> 0:38:4.300
Williams, Andrew E
Yes.

0:38:0.610 --> 0:38:20.280
Moorman, Joseph Randall (rm3h)
Am I right that that's a local operation still and then and then the results such as Jared Show showed are are looked at and everyone has an emotional reaction and then either dives back in to remap things that that got screwed up or takes a round of applause.

0:38:20.290 --> 0:38:30.550
Moorman, Joseph Randall (rm3h)
If, if, if they got it exactly right and and then and only then does it move forward to the it's final resting place, do I do I have that straight?

0:38:32.780 --> 0:38:32.960
Moorman, Joseph Randall (rm3h)
Yeah.

0:38:30.990 --> 0:38:41.100
Williams, Andrew E
Mostly so when when a local run has been done of the data quality dashboard and Achilles, we're going to get those in a central location.

0:38:41.200 --> 0:38:51.0
Williams, Andrew E
O what Jared mentioned is that that Aries tool, one of the ways it improves on what data quality dashboard gives is it can look across multiple instances all at once.

0:38:51.210 --> 0:38:56.490
Williams, Andrew E
So you're not only looking at my own sites, iterative attempts to improve the ETL, right?

0:38:56.500 --> 0:38:58.520
Williams, Andrew E
Which it will show you, but you can also see.

0:38:58.590 --> 0:39:5.480
Williams, Andrew E
Here's how my site and this site and that site and all 14 sites contributing look and put it in the context.

0:39:5.490 --> 0:39:10.740
Williams, Andrew E
So if you're the same kind of institution of somebody else's institution, you shouldn't have 110th.

0:39:10.750 --> 0:39:22.270
Williams, Andrew E
The number of the things or the proportion of things should be roughly similar, and the kinds of issues that you learn about might also help them and so forth.

0:39:22.280 --> 0:39:28.610
Williams, Andrew E
So there's a there's a value to having a consolidated view across the network of all of these ETL.

0:39:28.620 --> 0:39:49.670
Williams, Andrew E
So what you said is right, there's just there's an additional step of sending it centrally to us in the standards core where we'll look at it here and provide guidance and say, yes, applause great or here's some areas where probably you know you some of your resources should be spent on trying to improve stuff in order to get there that kind of a thing.

0:39:50.740 --> 0:39:51.50
Moorman, Joseph Randall (rm3h)
Yeah.

0:39:51.100 --> 0:39:55.40
Moorman, Joseph Randall (rm3h)
So let me just see if I can say that back and then I have another question to to follow up.

0:39:59.580 --> 0:39:59.970
Williams, Andrew E
Umm.

0:39:55.50 --> 0:40:4.100
Moorman, Joseph Randall (rm3h)
And so they're locally there is a data quality dashboard and so might and and you work with that until it's as good as you can get it.

0:40:4.310 --> 0:40:8.850
Moorman, Joseph Randall (rm3h)
Then it goes forward to somewhere central and you guys run another odyssey tool, Aries.

0:40:10.610 --> 0:40:10.900
Williams, Andrew E
Umm.

0:40:8.860 --> 0:40:15.100
Moorman, Joseph Randall (rm3h)
If I've got that straight, and then that's that's kind of a more global, then I'm sure they'll be integrations.

0:40:15.110 --> 0:40:20.600
Moorman, Joseph Randall (rm3h)
You'll do the first three senders that come in, and eventually you'll be doing all 14 centers, got got got all that.

0:40:20.860 --> 0:40:21.370
Moorman, Joseph Randall (rm3h)
OK, good.

0:40:21.960 --> 0:40:27.50
Moorman, Joseph Randall (rm3h)
That's very helpful for me now, but and we're here.

0:40:27.60 --> 0:40:28.610
Moorman, Joseph Randall (rm3h)
Here, here's a another idea.

0:40:28.620 --> 0:40:32.720
Moorman, Joseph Randall (rm3h)
Another question on ask about so and in organic evolution.

0:40:32.730 --> 0:40:37.550
Moorman, Joseph Randall (rm3h)
Did this would be that sites do this fix?

0:40:37.560 --> 0:40:45.670
Moorman, Joseph Randall (rm3h)
What's easy to fix and and send it on another another, more systematic way to do it?

0:40:45.680 --> 0:40:46.600
Moorman, Joseph Randall (rm3h)
I'm not saying it's better.

0:40:46.610 --> 0:40:52.480
Moorman, Joseph Randall (rm3h)
I'm just saying it's more systematic is to say, OK, the first thing that we're gonna get right are the chemistries.

0:40:53.400 --> 0:40:57.570
Moorman, Joseph Randall (rm3h)
And the second thing where they were that we're gonna get right are the blood counts.

0:40:58.100 --> 0:41:1.570
Moorman, Joseph Randall (rm3h)
And then after that, we're gonna get micro or whatever, right?

0:41:1.580 --> 0:41:9.350
Moorman, Joseph Randall (rm3h)
And we and there are plenty of clinicians in this group and that that, that list will be quickly the pecking order would would be quickly decided.

0:41:9.420 --> 0:41:20.140
Moorman, Joseph Randall (rm3h)
So let me let me just ask for a reaction to that idea that it seems like the plus that on the I the downsides are obvious, right?

0:41:20.150 --> 0:41:20.740
Moorman, Joseph Randall (rm3h)
I mean, you're you.

0:41:20.750 --> 0:41:39.990
Moorman, Joseph Randall (rm3h)
You may immediately run into difficult problems before you ever get in order to get your first batch of data usable, and I I understand that, but at on the other hand, you know if if if everyone has has has got their chemistry straight, then we could start doing projects about chemistries.

0:41:42.610 --> 0:41:43.210
Moorman, Joseph Randall (rm3h)
And so on.

0:41:41.990 --> 0:41:44.320
Williams, Andrew E
Yeah, I see the benefit of that.

0:41:43.220 --> 0:41:46.150
Moorman, Joseph Randall (rm3h)
You know, Netflix comes in and that's player studies.

0:41:44.370 --> 0:41:51.270
Williams, Andrew E
I think there's of a risk for having some sites stay idle.

0:41:51.280 --> 0:42:9.600
Williams, Andrew E
Whose chemistries are already in place when you know if we say we're not even going to touch anything having to do with your, you know, drug exposures until we were all done with chemistries and you know, site A's chemistries are fantastic from the get go.

0:42:9.610 --> 0:42:13.980
Williams, Andrew E
Well, they're twiddling their thumbs while they could be doing productive work.

0:42:13.990 --> 0:42:25.40
Williams, Andrew E
So if we don't, if we have everybody in lockstep, it fails to account for existing differences in what sites, what phase of the overall quality process they are.

0:42:25.50 --> 0:42:30.640
Williams, Andrew E
I think the alternative, as we've seen it is, or at least as I shouldn't say we.

0:42:31.310 --> 0:42:35.240
Williams, Andrew E
This has been the guiding principle in my mind and and it may not be the right one.

0:42:36.220 --> 0:43:28.450
Williams, Andrew E
The that there's going to be enough nuance there and enough opportunity for like not helping each site to take the next step forward that they need to take that it doesn't make sense to try and do it in lockstep, that there's going to be too much variation there, too much, uh, too much need essentially to tailor the overall data quality and and ETL support that we're helping to provide if we if we try and do one section at a time, it's also I guess even more fundamentally a lot of what will happen at sites that haven't done OMOP at all is they won't get to chemistries until they're just like you know our overall performance is OK from a conformance point of view.

0:43:28.560 --> 0:43:38.650
Williams, Andrew E
The that whole class of of data quality checks in that conformance category are just like you know, you don't have unique keys where you need to have them.

0:43:38.660 --> 0:43:48.10
Williams, Andrew E

The overall, you know, relational integrity and every other aspect of your data set is a moot point until that's really solid.

0:43:56.180 --> 0:43:56.320
Moorman, Joseph Randall (rm3h)
And.

0:43:48.340 --> 0:44:9.930
Williams, Andrew E
So it's it doesn't make any sense at all to even think about, you know, the specific domain areas until the overall kind of aspects of things are there and several sites are going to be focused on that for a while, whereas other sites are going to be like ready to go like, OK, you guys got more ambitious aims for helping to develop this, this intensive care related data that's that's you know we can go to town on for right now.

0:44:9.940 --> 0:44:13.610
Williams, Andrew E
And so that's I that make sense to you that we kind of need to take that into account?

0:44:14.80 --> 0:44:27.730
Moorman, Joseph Randall (rm3h)
Let let me play that back because I had I had thought about it that way and and and and and the the impression that I'm getting is is that the whole data set is so intermingled and intertwined that it's you can.

0:44:27.740 --> 0:44:32.410
Moorman, Joseph Randall (rm3h)
It doesn't make good sense to think about it as being a sequence of units of things.

0:44:32.740 --> 0:44:37.570
Moorman, Joseph Randall (rm3h)
Rather, it's it's all one structure and it's it it.

0:44:37.580 --> 0:44:42.920
Moorman, Joseph Randall (rm3h)
It's all emerges as one lump whether you want it to or not.

0:44:54.110 --> 0:44:54.370
Moorman, Joseph Randall (rm3h)
OK.

0:44:43.800 --> 0:44:56.840
Williams, Andrew E
Yeah, there are certain aspects of how an ETL is done that affect the the basic assumptions of being able to do anything with it, and that includes everything having to do with its conformance.

0:44:57.90 --> 0:45:5.820
Williams, Andrew E

As far as a relational integrity of it of it, relational database, if that stuff isn't right, you can't even understand what a query means, right?

0:45:5.660 --> 0:45:5.860
Moorman, Joseph Randall (rm3h)
OK.

0:45:5.830 --> 0:45:11.780
Williams, Andrew E
And it it either won't run or it'll be nonsense and that will pertain to every domain of the data that's in there.

0:45:11.790 --> 0:45:21.270
Williams, Andrew E
And so until that's right, it doesn't make sense to focus on some of the more that you know the content specific stuff that goes into the different tables in the relational database.

0:45:21.920 --> 0:45:23.950
Moorman, Joseph Randall (rm3h)
Well, then let me see if I have this idea right.

0:45:23.960 --> 0:45:24.810
Moorman, Joseph Randall (rm3h)
It it it?

0:45:40.240 --> 0:45:40.480
Williams, Andrew E
No.

0:45:24.900 --> 0:45:46.960
Moorman, Joseph Randall (rm3h)
Is it generally the situation that after a mapping to OMOP that either that that everything that the results are fairly homogeneous across the data types, that if there's one disaster they're likely to be a lot or the other hand do some things come out shiny bright and the others are a big mess and others individually can be big messes?

0:45:47.220 --> 0:45:53.420
Williams, Andrew E
I would just mean this is there are these categories like conformance this it's a different category than stuff like plausibility.

0:45:53.430 --> 0:46:7.730
Williams, Andrew E
So like you might have a totally conformant database, all of the things that are supposed to be unique are unique, and all of the things that are in the table are garbage, like it's all the lab values are completely out of range, or they're not the right.

0:46:8.430 --> 0:46:10.220
Williams, Andrew E
Uh domain for what?

0:46:10.420 --> 0:46:20.960
Williams, Andrew E
Supposed to be or whatever, but the the data query is going to run, but all the content that's in that data and that properly conformed data is incorrect.

0:46:21.50 --> 0:46:22.920
Williams, Andrew E
So they're just orthogonal things.

0:46:26.20 --> 0:46:26.510
Moorman, Joseph Randall (rm3h)
No, I get it.

0:46:22.930 --> 0:46:29.220
Williams, Andrew E
One has to do with just the structure of it and what has to be unique and how it's related to each other, and so on and so forth.

0:46:29.430 --> 0:46:33.620
Williams, Andrew E
And the other has to do with what's actually in there in various ways.

0:46:33.630 --> 0:46:34.780
Williams, Andrew E
Some of those things are temporal.

0:46:34.790 --> 0:46:36.480
Williams, Andrew E
Some of them are like plausibility, et cetera.

0:46:36.490 --> 0:46:37.620
Williams, Andrew E
All those different categories.

0:46:37.790 --> 0:46:43.420
Williams, Andrew E
So it very well might be an and I'm sure it will be amongst the sites that some of them will have.

0:46:43.430 --> 0:46:44.700
Williams, Andrew E
Oh, I got really great drug data.

0:46:46.30 --> 0:46:46.150
Moorman, Joseph Randall (rm3h)
Yeah.

0:46:44.710 --> 0:46:53.400
Williams, Andrew E
We've had 10 OMOP studies that use drug data before, and we've banged on it all to hell and it's fantastic, and we've never used our measurement data.

0:46:53.590 --> 0:46:55.940
Williams, Andrew E
And so we're just getting started with that or vice versa.

0:46:56.30 --> 0:47:5.760
Williams, Andrew E
And so there's going to be a lot of differences there or just what's easy to get at at your institution like we have, you know, great relations with our pharmacy database.

0:47:5.810 --> 0:47:8.360
Williams, Andrew E
You know data stewards locally and they provide everything.

0:47:8.370 --> 0:47:13.950
Williams, Andrew E
That's high quality and we're at war with our lab Information Services and they won't give us anything.

0:47:13.960 --> 0:47:19.280
Williams, Andrew E
And you know, it's it's hard to get that right or we have to go through some weird process to get it.

0:47:19.290 --> 0:47:23.730
Williams, Andrew E
And so there's idiosyncrasies that are this is 1,000,000 idiosyncrasies for how these things come in.

0:47:24.470 --> 0:47:29.80
Moorman, Joseph Randall (rm3h)
From whom have we heard with Omar data sets?

0:47:29.150 --> 0:47:35.780
Moorman, Joseph Randall (rm3h)
I mean, we're in communication down here in Charlottesville, but we don't have one to put up to start testing.

0:47:36.700 --> 0:47:37.310
Moorman, Joseph Randall (rm3h)
Are there other?

0:47:40.680 --> 0:47:40.830
Williams, Andrew E
Yeah.

0:47:37.320 --> 0:47:43.580
Moorman, Joseph Randall (rm3h)

Are there other Canaries in coal mines around where we can start to get a the size and shape of this for chorus?

0:47:45.840 --> 0:47:48.70
Williams, Andrew E
I'm going to make sure I understand that.

0:47:48.80 --> 0:47:49.990
Williams, Andrew E
How many sites already having them up data set?

0:47:50.60 --> 0:47:51.90
Williams, Andrew E
Is that saying?

0:47:50.280 --> 0:47:54.410
Moorman, Joseph Randall (rm3h)
That we the the where you've gotten quality dashboard results are.

0:47:54.180 --> 0:47:56.920
Williams, Andrew E
We haven't started asking for people to get this to us yet.

0:47:57.40 --> 0:47:58.560
Williams, Andrew E
We're just, we're just rolling this out now.

0:47:59.210 --> 0:47:59.670
Moorman, Joseph Randall (rm3h)
OK.

0:48:0.350 --> 0:48:0.660
Moorman, Joseph Randall (rm3h)
Geo.

0:48:0.670 --> 0:48:2.820
Moorman, Joseph Randall (rm3h)
What your what is your thinking?

0:48:4.200 --> 0:48:9.590
Clermont, Gilles
Oh, I need to rival with you in terms of a a dumb questions.

0:48:9.600 --> 0:48:13.950
Clermont, Gilles
So I do have a very naive question as well and it has to do with.

0:48:14.280 --> 0:48:31.660
Clermont, Gilles

This looks like a very comprehensive tool and as a site, uh, is there anything I should prioritize or do I just run it all and and so what's the expectation as to what I should be doing with the output?

0:48:37.530 --> 0:48:37.750
Clermont, Gilles
Yeah.

0:48:33.630 --> 0:48:39.150
Williams, Andrew E
I here's I'll give you if you're starting writing your ETL from scratch, there's a couple of different general patterns.

0:48:40.40 --> 0:48:49.900
Williams, Andrew E
One is you get a sample of the data and it'll depend on how easy it is for you to get the data from its original source in ECHO, which people are often sensitive about.

0:48:49.910 --> 0:48:52.500
Williams, Andrew E
Anybody touching who isn't involved in operations or care, right?

0:48:52.550 --> 0:49:15.10
Williams, Andrew E
So sometimes you get need to get a mirror set of those core data tables like from in your case from Cerner into an environment where it's OK for your ETL team to work with them, and then the typical patterns are you're either gonna start with some of the fundamental tables that all the other tables are built off of, like the person table and the visit table, right?

0:49:15.20 --> 0:49:22.490
Williams, Andrew E
Everything else is kind of attached to visits that happen to people, so you would like populate those first and then maybe go through.

0:49:22.500 --> 0:49:40.710
Williams, Andrew E
OK, now we're going to add the conditions that we see or so on the other, the other tables in sequence after those another strategy is to bring everything together in a way that doesn't cause you to currently create copies of the segments of those that are needed for that table.

0:49:40.720 --> 0:49:56.720
Williams, Andrew E
So you do what's called a stem table or a mashu table, where you put everything together and you've kind of gotten rid of the normalized relational data form, and you've put everything in one very why not normalized table and you can just draw all of your stuff from that.

0:49:56.780 --> 0:50:3.350
Williams, Andrew E

There are efficiencies from that second approach and then there are, you know, people who don't prefer that.

0:50:3.360 --> 0:50:7.570
Williams, Andrew E
But those are broadly the kinds of both logistical steps, making sure you have a copy.

0:50:7.580 --> 0:50:8.180
Williams, Andrew E
That's OK.

0:50:8.190 --> 0:50:14.510
Williams, Andrew E
That has enough representative data from the source that you're bringing in to get you.

0:50:14.520 --> 0:50:15.570
Williams, Andrew E
See you have coverage of.

0:50:15.580 --> 0:50:19.10
Williams, Andrew E
If you only bring in 100 or something rows, it's not going to tell you very much.

0:50:19.990 --> 0:50:20.300
Clermont, Gilles
Umm.

0:50:19.20 --> 0:50:23.150
Williams, Andrew E
You need several 1000 records at least.

0:50:23.360 --> 0:50:45.260
Williams, Andrew E
Probably more than several thousand from the main sources that you're coming in in order to make sure stuff looks OK typically, and you know it doesn't have to be everything like your query runs as you try and test the ETL as you run it shouldn't run on the full data set because then it just adds hours of time to get everything and you've you've already got complete enough information.

0:50:58.290 --> 0:50:58.530
Clermont, Gilles
Umm.

0:50:45.270 --> 0:51:4.220
Williams, Andrew E
If you only have several thousand, that kind of a thing, so you generally want to work with, you know, a representative large enough but not complete sample in either that like 1 table at a time form or all coming from a A, you know, a mash-up table or a stem table form and then use this.

0:51:4.280 --> 0:51:14.490
Williams, Andrew E
You know the sample ETL's from Cerner or from Epic or wherever you're coming from, if if that's an easy first step, you know, go with those and and then start.

0:51:15.440 --> 0:51:18.460
Williams, Andrew E
You know, I would say people differ.

0:51:18.470 --> 0:51:31.460
Williams, Andrew E
Reasonable people differ about whether it makes sense to try and do everything with something like a sample ETL and then just look at what you've got across the board versus doing a much more careful table by table job that scrutinizes things.

0:51:31.470 --> 0:51:32.800
Williams, Andrew E
I tend to prefer.

0:51:34.380 --> 0:51:46.930
Williams, Andrew E
I think there's value in running everything at once and just seeing what you get because some of the data quality issues only show up when it at least some of everything is populated.

0:51:46.940 --> 0:51:54.760
Williams, Andrew E
You're you risk focusing a lot of data quality or ETL improvement effort on on things that aren't as important.

0:51:54.770 --> 0:51:59.60
Williams, Andrew E
If you don't get that global view first, that's my philosophy about it.

0:51:59.70 --> 0:52:2.910
Williams, Andrew E
But I think you know different people approach it in different ways for good reasons.

0:52:6.370 --> 0:52:6.590
Clermont, Gilles
Yep.

0:52:3.980 --> 0:52:6.870
Williams, Andrew E
Does that give you some values that helpful?

0:52:20.110 --> 0:52:24.590
Williams, Andrew E
Jared or Polina or Kyle?

0:52:24.510 --> 0:52:24.750
Moorman, Joseph Randall (rm3h)
OK.

0:52:24.600 --> 0:52:29.600
Williams, Andrew E
You all have anything to add manlik to what I've blathered on about them.

0:52:32.580 --> 0:52:52.30
Houghtaling, Jared
I mean, I think there's there's an important concepts that we've also kind of glossed over in this process, which I think when you're when you're developing the ETL, you have, I see it kind of as as as two parallel tracks, you have the structural logic which is which fields from which tables need to actually fill my measurements table.

0:52:52.40 --> 0:53:11.420
Houghtaling, Jared
For instance, how do I need to join my different source tables to get to what I need for my measurement, and then you have the conceptual or semantic logic which is the actual concept that's in my source table is not a standard concept and OMOP how can I represent that in OMOP as a standard concept right?

0:53:11.430 --> 0:53:23.620
Houghtaling, Jared
And I think the data quality dashboard does have checks that look at both of those things, but there will be elements of updating mappings and also elements of of actually updating.

0:53:23.630 --> 0:53:25.950
Houghtaling, Jared
The logic itself, depending on what the checks are.

0:53:26.0 --> 0:53:33.240
Houghtaling, Jared
So just as a hopefully that's clear in terms of what's practically looks like, it's not just you see the checks, you see the issue.

0:53:33.290 --> 0:53:35.860
Houghtaling, Jared
Let me go rewrite the code it sometimes it's.

0:53:35.910 --> 0:53:43.940
Houghtaling, Jared
Let's actually go and evaluate how we should actually map our our different stuff semantically for it to either fit or to make sense with what we expect.

0:53:45.720 --> 0:53:46.700
Houghtaling, Jared
Yeah, I hadn't mentioned that.

0:53:46.710 --> 0:53:48.50
Houghtaling, Jared
So I just wanted to make sure that that was clear.

0:53:51.90 --> 0:54:3.180
Williams, Andrew E
And in this you know, because we want this to be a a unique and shiny example of data that's useful for critical care research, there's gonna be an unusual amount of semantic mapping.

0:54:3.190 --> 0:54:10.710
Williams, Andrew E
So just to reiterate a little bit of what Jesus said, it's like you can think of two broad categories of things that need to be done right.

0:54:10.720 --> 0:54:14.490
Williams, Andrew E
You need to identify the right sources and put things from those sources in the right places.

0:54:14.500 --> 0:54:15.100
Williams, Andrew E
That's one.

0:54:15.380 --> 0:54:23.640
Williams, Andrew E
The other is you need to make sure what's there is represented appropriately and correctly in the semantic mapping and there.

0:54:23.680 --> 0:54:30.690
Williams, Andrew E
So there's a as a separate considerations to you know, are you getting getting things from the right place?

0:54:31.280 --> 0:54:39.810
Williams, Andrew E
Is it represented the right way once you put it there and the latter part of that is almost always a lot harder.

0:54:39.960 --> 0:55:7.500
Williams, Andrew E
Manual effort and expert input is required and so a lot of the work Polina has been helping to lead and all of the work on flowsheets and so on are really to make sure that the richness of the E EHR data the potentially pertains to being able to really specify populations and exposures and outcomes and all those things in as much detail as EHR's can is going to be represented.

0:55:7.510 --> 0:55:22.650
Williams, Andrew E
It's it's too large a thing to do everything, and so a lot of getting back to that prioritization task is that

because that part is manually intensive and we will be looking at some of these concept definitions like a phenotype definitions for things that require that.

0:55:22.660 --> 0:55:34.480
Williams, Andrew E
It really puts pressure on like here's the these are the ones that you don't have up to snuff yet and it's going to take more manual effort from your slim informatics budget to go after those.

0:55:40.350 --> 0:55:41.200
Regina Williams
I have a question.

0:55:42.870 --> 0:55:46.540
Regina Williams
Umm, I know you said that you're just not rolling it out, but when?

0:55:46.770 --> 0:55:50.300
Regina Williams
When is it gonna be available and where can we find it?

0:55:51.850 --> 0:56:2.500
Williams, Andrew E
I when and when I met roll out, I meant the communications with the it's already available data quality dashboard is available.

0:56:2.830 --> 0:56:11.80
Williams, Andrew E
We will follow up with you with the links to where to get it and how to install it and run it.

0:56:12.390 --> 0:56:12.630
Regina Williams
OK.

0:56:12.280 --> 0:56:13.670
Williams, Andrew E
Uh, but it's already available.

0:56:13.680 --> 0:56:20.820
Williams, Andrew E
What we mean rolling out is just this communication about what the expectations are and the tools used to meet them, et cetera.

0:56:21.860 --> 0:56:22.130
Regina Williams
OK.

0:56:23.440 --> 0:56:23.820
Regina Williams
Thank you.

0:56:35.840 --> 0:56:40.130
Williams, Andrew E
Man like I saw you had appeared in, looked like you might be willing about to say something.

0:56:40.860 --> 0:56:41.780
Williams, Andrew E
It's mailing still on.

0:56:43.450 --> 0:56:45.830
Williams, Andrew E
Oh no, must be like.

0:56:54.830 --> 0:57:12.250
Alvarez, Marta
OK, so I will follow up with you, Regina and everybody on the call will send that information, including the normal recording and slides to our Google Drive as usual.

0:57:12.710 --> 0:57:15.730
Alvarez, Marta
So thank you everyone for joining today.

0:57:17.740 --> 0:57:18.30
Moorman, Joseph Randall (rm3h)
Thanks.

0:57:19.150 --> 0:57:19.410
Williams, Andrew E
Thanks.

0:57:18.900 --> 0:57:20.50
Alvarez, Marta
Alright, take care.

0:57:18.830 --> 0:57:20.520
Houghtaling, Jared
Think so honestly.

0:57:18.40 --> 0:57:20.780
Moorman, Joseph Randall (rm3h)
So thank you.

0:57:20.710 --> 0:57:21.210
Regina Williams
Thank you.