Wendy Funk: Hi, everybody. My name is Wendy Funk. I work at a company called Kennell and Associates, and I'm here as a contractor supporting the DaVINCI Project. I also work for the Department of Defense for the Military Health System, and one of my jobs at the Military Health System is working with MHS GENESIS. I've been very, very involved with our new electronic health record, and actually very involved with yours as well, as I collaborate with the VA on this work. This is the last of four sessions that we're going to be giving on DaVINCI this year-- on our contract this year. And we've already done an overview. We've done a session on DoD EHR data from the legacy systems. We've done one on TRICARE claims data. All those should be available for you if you'd like to look at them. And so today is the fourth one.

Objectives today are, after attending the webinar, you should be able to describe MHS GENESIS and also understand how that relates to your new Cerner Millennium product that you're implementing, provide an overview of the source data that is available in GENESIS, discuss key fields in GENESIS and differences between CHCS AHLTA and MHS GENESIS. So, CHCS and AHLTA, if you weren't here before, those are our legacy systems. And then known data quality problems, I wanted to bring up to you as well.

So, just very quickly, I know I've talked about this before, and if you've attending my webinars, you've heard me. But I'll just quickly, in case somebody hasn't, Military Health System, we're a network of military hospitals and clinics, and I may use the word "direct care" to refer to that, supplemented by programs to enable beneficiaries to get care in the private sector. We call that private sector care. And then just one thing I thought was important to note to you guys, and why DaVINCI is so important, is that many VA beneficiaries also have DoD eligibility or have previously had it. And one of the things we just did with the DaVINCI data in the Military Health System is we included DaVINCI data in some of our HEDIS performance metrics. And when we looked at the HEDIS diabetes cohort, we found out that 15 percent of our diabetic population is also being treated at the VA, enrolled at the VA, and getting care at the VA. And so, we were really able to increase our scores when we were able to pick up HbA1c tests, for example, being done by VA. So, considerable amount of overlap between the two systems.

Okay. So, 9.4 million eligibles. We've got 50 hospitals, 500 medical clinics, 300 dental clinics. There's a quarter-million admissions in the direct care. We've got well over that in purchased care. 41 million office visits, direct care, 86 million in purchase care, and so on.

Unidentified Male: Next slide.

Wendy Funk: Yeah, I can change it now. I'm good. Oh, she's got control. Okay. This is just a picture of what the MHS looks like. And so, those little blue blobs are where we have markets and those are where we have our military hospitals. And then, on the right-hand side, these are our managed care support contractors. Kind of like you guys have, managing your purchase care programs, we have some that manage ours, too. Next slide. And this is just a transition slide so we'll go right to the next one.

So, now, we transitioned to this new EHR. And so, just like you guys, we bought the Cerner Millennium product. And so, that's what we've been implementing. We started in 2017. The MHS started in 2017. One of the things that is a fundamental principle of this development is that the DoD and the VA are coordinating as much as possible. So there's joint governance so that we try to build out the systems as similarly as possible. All of the data, the DoD and the VA data, are actually being stored in the same data center and in the same database. And so, there are some differences in implementation, but mostly, the data's very, very similar. GENESIS is replacing CHCS and then our old, legacy EHRs AHLTA and Essentris.

We've implemented GENESIS at Puget Sound, Sacramento, Idaho, some parts of California, we've got it in Las Vegas, Alaska, and more and more. We're going to be rolling out more and more of those in the near future.

Unidentified Male: Wendy, I can actually make you the presenter now. And there's a question about the numbers. Somebody asked early on, and that repeated, would you please ask now, are these numbers worldwide or just in the US?

Wendy Funk: They're worldwide. So, yeah, we have people overseas in Korea, in Japan, and Europe, and places like that. And even in remote outposts, we have people, like at embassies and things like that. Those are all included in these numbers.

Unidentified Male: Thank you. I've just made you the presenter so you should be in charge of the slides now.

Wendy Funk: Yes, got it. This is what we call the MHS GENESIS wave chart. So this one's a little out of date, but it's giving you an idea of our implementation schedule. We named the waves after our biggest hospitals. So, like Wave Nellis, Wave Pendleton, that means they're the biggest hospital in the group of hospitals that are getting implemented.

So, Cerner Millennium's database is actually a pretty complex database. It's what they call a third normal database, and so it's a very flexible database, but it's pretty difficult to use. The system is structured entirely within the construct of the encounter. So, when you try to use the data, the encounter is the core and then everyone links to the encounter.

Healthy Intent is something that VA will have access to as well as DoD. It's an analytic platform. It contains an operational data store that can be queried from SQL. That system is near real-time and it contains most of the tables from Millennium in the same structure as Millennium. It also has standardized reports. It has the ability to create business objects, universes, and tableau dashboards. And DoD and VA are working together right now to build this application out. In fact, my team is working pretty heavily with the VA on developing an appointment file so that'll be one of the first files that we're able to get out there that's jointly produced by the two organizations. So, that's kind of neat.

So, how does this fit into DaVINCI? So, what we have here is kind of a picture that I've shown people a lot of times before, but now what I want to do is just sort of focus on the MHS GENESIS side. So, if you look at the lower bottom corner, you see MHS GENESIS, our big EHR. To the right, you see PIEDW and you see Healthy Intent. PIEDW is something you guys on the VA side will not see. It's a power insight enterprise data warehouse, and for Cerner, it's a legacy system replaced by Healthy Intent. But PIEDW is actually pretty important to the DaVINCI Project because a subset of MHS GENESIS data was being sent to PIEDW for their what we call sort of a data mark. And what the DoD decided to do is use that exact same data feed to the PIEDW to send data to our corporate warehouse. And so, that's what's happened. So the corporate warehouse is the MHS data repository and it's getting the subset from PIEDW. And what's going to happen when PIEDW sunsets, because it is legacy, is that DoD and VA have decided on a core set of tables that both organizations that are going to get. So the same data that the DoD gets will be the same data that the VA gets. So that's kind of neat is we'll have the same data in our operational systems and also the same data coming out of the systems for us to use for analysis and research.

Once the MHS data repository gets the data, there's a whole lot of processing that is done. I think I'll talk about that briefly. And then, the data gets sent all sorts of places, but eventually, it ends up in DaVINCI after being both in its format directly from the MDR and also modeled into the OMOP format.

These are the major subject areas in MHS GENESIS, and so you can think about these as the major subject areas that'll be in Cerner Millennium as well. And, by the way, I'm really only going to talk about the bolded areas because those are the areas that are built out. And again, why that's important to DaVINCI is that some of this data's in DaVINCI, some of it's not. And I'll be able to tell you what is and what's not. But even if it's not doesn't mean it won't be for-- it may end up there.

We have admissions, a subject area on admissions, where you can look at inpatient care. Anesthesia, very detailed data about anesthesia. Clinical events is one of the most important subject areas in MHS GENESIS. This is where things like lab results are carried. Just about everything that gets captured as part of the workflow is going to show up in these clinical events tables. We see PCL screens, depression screens, we see vital signs, things like that. The encounters file is the big monster, and encounters are very different in MHS GENESIS than they are in either VA systems or DoD systems. I'll talk about that a little bit in a little bit. General laboratory-- the health plan data is where they store if people have other health insurance. For DoD, this is where they're storing also information about their enrollment. There's a microbiology subject area. The orders subject area is another very detailed area. And all this stuff links together, too, by the way. There's a pharmacy area. Procedure and diagnosis, this is one area that's very counterintuitive but it's there. Radiology. There's schedules, and then, the surgery data. We've used all of these files. And where the VA has CDW, the MHS has the MDR. We've taken these files and built them into production products in the MDR already, for users to use in the Military Health System.

Now, the MDR, like I said, it's the primary repository for MHS data. It's the source for DaVINCI, and it's the main way that people are looking at MHS GENESIS data right now as we build out the Healthy Intent application. It's currently providing hundreds of files to the MDR each week, and then those file extracts are processed. The files get combined, flattened so they look more like a record rather than a whole bunch of pieces of records that our users have to put together. The data are cleaned. There are test records in our system, and so we need to take those out. We merge in a bunch of external data sources as well. And all of the processing is described at the URL that I've provided. After the data are processed, cleaned, flattened, et cetera, then the DaVINCI extracts are prepared where we take the DaVINCI cohort, limit these files to only people in the DaVINCI cohort, model that data into OMOP, and then send both the processed and the OMOP data over to DaVINCI.

Now, to make the switch easier, and this really does impact your DaVINCI data, what we like to do is create combined files. So we take the legacy data and the MHS GENESIS data and we put it into one file so that people don't have to write two programs. For some of the variables, though, that was a little bit of a problem because the coding schema in GENESIS is sometimes different than the coding schema in legacy. So, what we decided to do is, we decided to keep the new content because people who are already on the GENESIS product would appreciate that. But for people who aren't on the GENESIS product who want to look at worldwide data or look at data from more than one military hospital, what was really important is for us to have consistent coding schema so if you're trying to use the data, you don't have to say, well, this site's on GENESIS and I'm going to use this variable, and this site's on CHCS, so I'm going to use that one. You just go to one variable, and it's got all the content that you need. So we did that. And those combined content variables are the ones that DaVINCI gets. So, when you're a VA user, you're not having to navigate who's on CHCS and who's on GENESIS. And then, what we do, we just store the data in the same file. So there's just sort of a depiction where we've got two streams of data coming in, getting processed, and then getting pushed out to DaVINCI. The one exception to the combined files-- well, there's a few exceptions to the combined files, but an important one is the immunization file where those are completely separate.

Okay. So, subject areas then that are in DaVINCI. Admissions, encounters. From the clinical events file, we've extracted four different files; the vital signs, immunizations, laboratory, and radiology. We have additional files in MDR but not in DaVINCI that could be added, and they're listed to the right.

Okay. So, key concepts. Just to introduce you to a couple of key concepts that, when you use the data, are probably going to be important for you. So, like the VA has station codes, the DoD has what we call DMIS ID codes, defense medical information system identifier codes. And those represent our facilities or DoD's facilities. Like the VA has stop codes and treating specialties, the MHS uses what's called a MEPRS code. And those identify care locations in treating specialties. These two code sets are the linchpin that tie together data from throughout the DoD. These code sets are used in our clinical systems, financial systems, human resources systems, accounting, everything. So, these fields are unique to DoD, and so they were not part of the commercial, off-the-shelf software. And so, that was-- we still needed these concepts so the data could be combined, but it wasn't native to the system.

So, this is what the data looks like when it's captured. This is what's called the nurse unit location code. And so, the nurse unit location code, the first four characters are the DMIS ID, representing the facility. That fifth character, right there, that A is acute, the C means clinic, and case management you can see there as well. So, that's just a prefix. And then after that, they're sort of describing what the clinic is or what the care location is. So, you can see an emergency medicine. You can see behavioral health, internal medicine, case management, family medicine, the hearing clinic, et cetera. So, a couple of parts to these codes; they're pretty helpful. The VA uses these codes in Cerner Millennium, as well. We have not provided this nurse unit location code to DaVINCI yet, but what we do with this nurse unit location code is we map the MEPRS code to it. And so, what DaVINCI does get is the MEPRS code. So this BIAA that's in the first row right there, you can see a DMIS ID 125 is Madigan, our big hospital, our first big hospital that got MHS GENESIS. And then, BIAA says emergency medicine. So you can see how that's derived from this nurse unit location code. So that's an important concept.

The second really important concept I wanted to teach you about-- and I don't think you can teach much about using this data without talking about encounters and kind of what they mean. And so, the patient doesn't have to be present at an encounter in MHS GENESIS. And there's encounters for things that, at least at DoD, they don't normally expect. Like, instead of-- at DoD, typically, there would be an admission record. But we would not call that an encounter. But in Cerner Millennium, they do. And Cerner Millennium, inpatient stays and office visits, well, I guess, yeah, okay, you can expect those. But what's unexpected, the way they built the software, encounters have to exist for providers to order events. They can't write an order if they can't open an encounter. And so, what they've done is they've created these encounter types, the pre-- like a pre-inpatient or a pre-recurring. And then they also have what are called between visit encounters. I think it's five to ten days before the encounter starts, the pre-encounter is opened up so that the provider can start doing their work. And then, those between encounters are for things like telephone consults or things like that. Patient's not present at those encounters.

There's also encounters for laboratory services, so their encounter file lab and rad, they would consider an encounter. And they even have encounters for referral tracking. So some of it's administrative, some of it's there just because they need to order, and then some of it's normal. Not all encounter types get sent to DaVINCI. So we didn't want to make this hard for the VA because some of this stuff is just not what people would think of as an encounter. We also haven't sent the encounter type to DaVINCI because it doesn't quite fit within the OMOP model easily. That doesn't mean we won't send it, and especially as more sites move onto GENESIS, we probably will end up sending it, but for now, that data is not sent to DaVINCI.

But just to show you what's included, what's not included, and give you an idea of what this looks like, the table on the right, I'm going to focus on. So, first row, these are clinic visits. So your regular office visit, you go to family medicine or something like that, and this is our most common type of clinic visit that we're seeing in the DoD data. What's interesting about this, though, is the VA did not choose the same implementation strategy. If you look below, there's also an encounter type called outpatient. The VA is using outpatient for regular clinics. So there's a fundamental difference between the two. You see the between visit encounters I talked about. Recurring encounters are for a course of treatment, so physical therapy, chemotherapy, things like that. When they're using encounter type emergency, they mean emergency plus urgent care. In the DoD, encounter type outpatient is what we use for lab, rad, not like VA who uses it for clinic visits. There's pre-reg, pre-admit, pre-recurring. There's inpatient, so those are used for both inpatient professional services and inpatient admissions. There's outpatient day surgery and there's mass vaccine. So these are the ones that we do send to DaVINCI. And if you look on the left, there's lifetime pharmacy, there's history, dental, and referral tracking. And those don't get sent to DaVINCI right now.

Identifying MHS GENESIS records, what's a CHCS record and what's a GENESIS record, in DaVINCI is not exactly as straightforward as I would like it to be. But what I'm showing you is kind of a-- I mean, it's not rocket science. The record ID. There's a field, it's the ax\_source\_ID\_primary. If you look at the bottom bullet, see that, that's the name of the field. That field contains what we call the record identifier for each record. And it's a sequential number that goes up one. And you can see there's going to be a point of discontinuity when the sites go on MHS GENESIS. So what I'm showing you on the right here is the Bremerton data, 0126, that's their DMIS ID, and they transitioned. You can see 9/22/2017 was their last day on CHCS. The reason I know that is because the record IDs keep going up and up and up, right, because they're just assigning a new one as new patients show up, but all of a sudden, there's a point of discontinuity. And that's when they started MHS GENESIS. So not exactly as straightforward as I'd like it to be, but you can certainly see when the sites convert using this method.

Okay. So just a little bit about the data. For GENESIS inpatient care-- so, the legacy data starts in 1989. The GENESIS data starts in fiscal year 2017 for the sites that have implemented GENESIS. Their record definition for the inpatient care that's provided is it's the most recent version of a record from a patient disposition from an MTF. Remember that all MTFs are acute care facilities so that's a little different from the VA. There's a GENESIS encounter team, there's admission and discharge dates, length of stay. Actually, the nursing unit location codes-- there's MEPRS codes, not nursing unit location codes. I apologize for that.

Provider information is actually a little bit suspect in MHS GENESIS. What happens is whenever somebody looks at the record, they get tagged to be part of the encounter. So we were just looking at a record the other day where the MTF was telling us that this provider is not the one who provided care for a case we were looking at. And the investigation made it clear that the provider got attached to the encounter simply because the provider looked at it. So one of that doctor's patients was in the ER and they went back to look at the record after the patient was discharged from the ER. The doctor looked at the record, and lo and behold, all of a sudden we have a primary care doctor looking like he's delivering care in the ER. So this is something that is suspect. The provider data is suspect. We still haven't cracked the nut to really properly get that data onto the records. This is going to apply to almost everything except for surgery data. And the same issues are occurring with the VA. We're working together to try to understand this.

There's 20 diagnosis codes and procedure codes. We have a TRICARE DRG, patient identifiers, the beneficiary category, enrollment status, admission discharge source, et cetera. So the kinds of data that you're expecting to see, you would see in legacy, you're going to see coming out of MHS GENESIS.

Here are the patients' dispositions from MHS GENESIS hospitals pulled from the DaVINCI data that you guys get. And so these are the MTFs that are on MHS GENESIS. It's fiscal years going across. And you can just see it roll out and get larger and larger, right? In 2017 there was hardly anything, 2018, that's when Madigan got on there. And now, in 2021, as we really start to roll out, you can see the numbers are growing. So this is just the GENESIS data. I didn't look at any of the other data.

Just to give you a heads up about DRGs. We don't use the same DRGs as the VA does. The DaVINCI data-- there'll be a discontinuity. The DRGs could mean different things. And so you want to be careful with that and make sure you understand. There are two reasons that they're different. One of them is that we have a much younger population, and so some of the DRGs get split out into children versus adults. The other difference is neonates. Everybody else uses Medicare DRGs, but Medicare doesn't have a very robust product line in terms of neonates, and it is the number one product line for TRICARE. And so TRICARE has far more neonate DRGs than the other systems would, typically.

One thing I wanted to talk to you about MEPRS codes is if you're trying to kind of look at sort of legacy versus GENESIS, things are a lot different. So looking at 2016 data, this is the top dispositioning MEPRS codes at Madigan. So they were not on MHS GENESIS on the left-hand side. And see how I can look at each line and I can tell what kind of care is being provided, right? I can see internal medicine, I can see moms, babies, surgery, family medicine, cardiology, et cetera. So that's kind of like the treating specialty concept that you're used to. On the right-hand side, Madigan has fully transitioned over the MHS GENESIS, and notice the MEPRS codes look a lot different. Now I'm seeing wards. So I see a surgical ward. I see a OB. I see a medical ward, a psych ward, a pediatric ward, a NICU, et cetera. These are not the same at all. These are actually physical locations. They're not really interested in the specialty of the provider. Where you could see that before in the MEPRS codes, now it's all location-based. So DoD is struggling hard with how to kind of reconstruct what used to be available for when they want to understand what the specialty was. So that's going to be a difference, and you're going to see that point of discontinuity. So if you're trying to use MEPRS code AAA and all of a sudden it goes blank, that's why that happens.

There are a couple data quality problems. And actually, let me go back to the last slide, because you can see it right here. If I look at this row, BIA, it's like the third from the bottom on 2019, I can see emergency medical clinic. Well, an emergency medical clinic is not really inpatient, and in legacy data you would never see an emergency department MEPRS code in inpatient care. But you do see that in GENESIS. And really, the reason for that is that GENESIS-- if an outpatient becomes an inpatient, GENESIS treats that as one encounter. And so DoD is working to try to separate those into two encounters. The reason that that's wanting to be done is because of things like space planning or staffing or ordering supplies or something like that. We need to have visibility of the fact that the patient was in the emergency department or was a same-day surgery patient that went to inpatient. There is a nursing unit location code history file. You don't get it in DaVINCI, but you can see all of the location histories. So I think we're going to use that. So sort of expect that to be a change, because we are trying to fix that. Also, admission source is not being properly coded for newborns, so I wouldn't use admission source to identify babies.

Professional services data. So, legacy data started in '98, begins in '17 again, just like the inpatient data. And each record represents an encounter. So visits, ER, same-day surgery, inpatient professional services, things like that. Key fields, we have the encounter key, the encounter date. Again, it's the MEPRS code not the nursing unit. I got a little ahead of myself. We don't have those added yet. Provider information, again, it's suspect. It's the same issue I was just talking about earlier. Diagnosis and procedure codes, patient, beneficiary category, enrollment status. Right now we don't have any cost or relative value units for MHS GENESIS sites. Those are things that we're working on still.

This is the encounter type field again. I showed it to you earlier from just a general perspective, but I wanted to show you this because we do have a little bit of problems with the diagnosis codes in the GENESIS data. So what this chart does, it looks at the encounter type, it looks at, all time, the number of encounters, and then how many don't have a diagnosis. And then I just looked at FY 2020 and how many didn't have a diagnosis. And we were a little concerned. This was actually really very bad at first. This is much better. Used to be about 40 percent of encounters didn't have the right diagnoses in clinics, and we were able to figure out those mapping issues and get most of this issue resolved. But you can see, like if I look at clinic, over all time, 16 percent of office visits didn't have diagnosis codes. We still have 13 percent of office visits without office codes. That never happened in the legacy data. And some of this might be mapping issues, but a lot of it, we think, is related to providers learning how to use the system. And they get in and they create an encounter and then they get lost and so they get frustrated and create another encounter. And so I think some of it is that you have pieces of encounters. MHS GENESIS actually automatically closes out encounters after three days. So if they create that encounter and then never finish it, it still gets closed out. And so you have two encounters for the same event, one of them with documentation and diagnoses and the other without. So I think it's partially both problems. And the mapping problems we can fix, but the other problems, maybe not necessarily.

One thing that I think is really interesting in this chart is if you look at inpatient and emergency. Inpatient and emergency are 100 percent coded by coders. And so you can see zero percent of diagnoses are missing because of that. The other encounter types-- well, same-day surgery as well. The other encounter types, it's not done that way. They're not done by coders. They're done by the providers themselves as they document care, and it's that workflow where we're losing diagnoses. So complex issue. Don't be alarmed that some of these encounter types have no diagnoses, generally. Like mass vaccine. You're not diagnosing a patient when you're giving them a vaccine. Outpatient. Remember I told you that's where we do a lot of lab and rad, and so at lab and rad they don't always make diagnoses. So anyway, that's one of the data quality issues that I like to bring up. And we're continuing to work on. The data's continuing to get better and better.

I noted there's no direct tie between the providers and the procedures, and I actually already told you about the providers getting added to the encounter when they just look at a record. So that's a little bit of a problem. So unraveling this provider thing is a work in progress. When we resolve problems with GENESIS data, we re-extract it and re-provide it, and we'll do that. The inability to link providers and procedures is actually consistent with the legacy feed to DaVINCI, but we are hoping to be able to add that linkage to both legacy data and hopefully GENESIS data, moving forward.

MEPRS codes, again, are different. If you look at legacy MEPRS codes, here's one MTF, and where they're primarily different is same-day surgery. And I think this is consistent with what I told you earlier. On the left-hand side, we have the legacy MTF, and I can tell what kind of provider is doing the same-day surgery. So is it gastro, orthopedic, general surgery, and ophthalmology, et cetera. But if I look on the right-hand side, one year later, on MHS GENESIS, almost everybody is showing up in either the PACU or the ambulatory nursing services. A couple of them in the surgical suite. But you know what? If you think about it, remember how I told you that the inpatient data was really location-based? It was based on a ward. Well, the outpatient data is also really location-based. And so, basically, patients move through different locations throughout the course of their treatment. And what we're tagging the system with is the most recent location. And so, here, you can see PACU, which is going to make sense. You have surgery, the last place a lot of patients go is PACU. Some of them might be endoscopies or something like that and might not go to a PACU, but you can sort of make sense of that. So again, it's a big kind of discontinuity in the data.

From a clinical data perspective, we have legacy data from fiscal year 2009 forward, GENESIS, again, in 2017. We have lab files, radiology files, vital sign files, and immunization files, made available from that clinical events. Lab and rad, '05 forward. Record definition is either a lab or a rad component. The labs, they're usually one record, coded with a CPT, and the radiology is usually two records, one for the technician and one for the radiologist reading the results. You can tell which is which, using a CPT code modifier.

Key fields; there's record IDs, patient enrollment, date of care, order date, ordering provider and location. CPT codes; there's a test name, free text name. It's standardized. Well, we try to keep it standardized, put it that way. And then for result data, we actually do have all of the result data showing up in the MDR. But only chemistry results are being provided to DaVINCI right now, and only if it's a singular test. If there's more than one result out of a test, it's not being provided. That's just a limitation of the data that we're getting, and hopefully that will get rectified.

If you look at the order type, you can kind of see the breadth of what kinds of labs and rads are going to be available. So chemistry, hematology, immunology, micro analysis, that kind of thing. And then on the radiology type; diagnostic, mammography, nuclear med, that kind of thing.

So data quality; I have to talk to you about the lab data, because there's a pretty substantial data quality problem with the lab data that we've been trying to deal with. And that is that the mapping-- the way that Cerner works, they don't collect CPT codes directly. They don't correct ICD-10 codes directly. What they have is these orderables where a doctor picks from a drop-down list what they want to order. And then behind the scenes there's a mapping table where they'll take that orderable and say this orderable equals this CPT code. That's not working very well in GENESIS. About 40 percent of the time, in the early years, the CPT code wasn't getting mapped. That's huge. We went through a big scrub and they cleaned up the mappings, and that number is probably down to 20 percent now but it's still way too large. And so my recommendation, you do get the lab test name. And unfortunately, using lab test name is going to be probably the only way to go until this CPT code issue is resolved. We need to have it resolved. We can't bill if we don't have a CPT, and our financial cost accounting systems need it. So it will be resolved. Also, LOINCs. These are the standard nomenclature used for laboratory resulting. They are collected in MHS GENESIS but they're 100 percent blank in the feed data coming to the MDR. We know that will be fixed when we move to the new solution. Remember I told you that the PIEDW was a legacy system and that the VA and the DoD will be using the same things, going forward. When that happens, the LOINCs will be populated and then we'll be able to clean up all of that data because then all the records will have LOINCs.

Immunization; it's one record per immunization that a patient got that GENESIS knows about. So we did load legacy immunization data in to MHS GENESIS, so hopefully the history is there. There are immunizations that are administered during an encounter charted in GENESIS. There's historical immunizations that are reported by the patient. So they can bring in shot records and those get scanned in and then added to the health record. But not all immunizations are going to be captured. We know that. They were giving away COVID vaccines here, everywhere, and you didn't have to show your insurance card, for example. So we know, when we're tracking COVID immunizations that we're probably understating the number of beneficiaries who've had them. Hopefully over time enough beneficiaries will bring their shot records in and we'll be able to complete that picture, but immunization data, it's just not complete, is the point I'm making. It has the CDX codes, which are CDC codes for immunizations; name of an immunization; lot number; the route; the site; encounter IDs; date given; date charted; person; enrollment; those types of things.

For vital signs; each record represents a vital sign but there's also some other documented information in there. There's the appointment date, there's a-- I don't know why that legacy CAPER Record ID is on there. That's copy/paste error. There's appointment date, there's height and weight, body mass, blood pressure, heart rate; a lot of the kinds of things that you would think of for vital sign data.

And then just data quality. You sometimes see weird stuff come up that's out of range and so we tell our users-- we don't apply any edits to that, we just tell the users-- provide them with this chart and if they'd like to edit the data that they can.

So far I've covered the data flow, key fields, some differences, and some data quality issues. I just have a couple more slides and then I'll just open it up to questions.

So current status. So these are VA systems, and so if I look on the left, the Microsoft SQL Server, okay, and then on the right in SQL Server. I've highlighted the path name. And then here, I'm showing you the DoD OMOP, right there alongside the CDW and CMS OMOPs, so they're all in the same area. And then the other thing to show you is on the right-hand side, these are all the raw-- the feeds that you've got from the DaVINCI Project. So if you're very comfortable, you're working on a project where you want to use OMOP, especially if you're going to be combining data from various settings, then the OMOP's going to be helpful because the variables'll all be standardized. But if you want to look on the right, if you're more comfortable with flattened-out records that are kind of similar to what has historically been available in VA systems before OMOP, then the tables on the right are going to look a lot more like what you'd be used to seeing. So both of those are available for you to use when you want to.

And then here's just some useful links for you. So there's a data dictionary, there's a mapping design document, there's an OMOP ETL document, which you can look how we modeled this. There's also the DaVINCI Data Academy, where you can find training materials and things like that, and then there's just pictures of that on the right. And then that really was the last slide that I had for you. I'm surprised that I got through it quickly enough, because of my debacle, but I did. And I just will open this up for if you have any questions that you'd like to ask me. I'd be very happy to answer them for you.

Unidentified Male: Thanks, Wendy. We do have a few questions queued up. But let me just remind people, if you have questions for Wendy, please submit them to the Q&A panel. If you don't see the Q&A panel, click on the three dots in the lower right-hand corner and then click on Q&A to turn it blue and then that panel will pop up to the right of the slide. So first up, Fearson asks, will audiograms and hearing testing be a part of this?

Wendy Funk: Oh, so Hearing Center of Excellence-type work. We haven't begun that process yet. So I would say, not yet. That would be something that we'd have to build out. Yeah.

Yes, DEERS data is part of DaVINCI, absolutely. We provide a monthly DEERS data file at person-level that tracks status of patients over time. You can see their beneficiary category, you can see where they live, what enrollment programs they're in, the relationships between the patients. You can see lots and lots-- occupation. Lots and lots of stuff is in there.

Yes, telehealth does fall into these encounters. They're typically captured under the clinic visit encounters with GT and GQ modifiers.

Let's see. In the VA's implementation of Cerner, the charge-- yes. So Craig is talking about the charge data. So charges is a very useful area in MHS GENESIS to get information, although charges doesn't contain everything. Charges, for example, that's where you're going to find CPT codes are definitely in charges. You can find diagnoses that are linked to CPT codes in charges as well. ICD-10 procedure codes, in our implementation of MHS GENESIS, are not in the charges data. But to your point, Craig, we merge the charges data into the encounter data as well as the diagnoses and procedure tables into the encounter data, and then we use those to append that information to the files that you're talking about. So I don't think you guys are going to have the same problems as DoD has with diagnoses and procedures because one of the things DoD did is they inserted a third-party coding software in the middle of the process. And a lot of the problems have been related to that third party trying to implement software that was not native to MHS GENESIS into MHS GENESIS.

Craig also mentions that they're mapping VA stop codes. DoD is not using-- the MEPRS codes are not in MHS GENESIS. The whole thing is based on nursing unit location. But like I said, absolutely we're using the charges data, and it's embedded in the lab file, the rad file, all the other files that have coded data. Charges is one of the sources it comes from.

I think that, Patricia, that's very interesting. Is it no DX because of the encounter issue or because they couldn't locate the appropriate DX? Probably both. I'm not there to know exactly what the issues are, but I know there are issues with both things. So we talked about the encounter issue with those sort of orphan encounters being created. For DoD-- well, this would be the same for your organization as well. The providers have always been used to choosing ICD-10 codes. That's what they've done. A lot of them didn't like doing that, but that's what they've done. When we moved to this new system, they're not choosing ICD-10 codes. They're choosing natural language. This was a live birth. And it's not always obvious what's the right diagnosis code. So there could be some-- it's not always obviously how the orderable maps to a diagnosis code. And for DoD, that's a big lesson learned, is that that mapping is very critical. And it's critical for people to understand it when they're collecting data. I'll give you an example that might not be a huge example for VA but I thought it was really illuminating. When patients have babies, there's a live birth diagnosis code. And there's codes that belong on the mom's record and there's codes that belong on the baby's record. And they're different codes. But in the orderable display name-- I was talking to a pediatrician the other day, and he's like, I wasn't sure which one to use. Because they couldn't see the actual diagnosis code, they just didn't know which one. And so I think there's some of that training in things like that too. But hopefully we'll be able to unravel and peel this onion back and figure out what's going on. It's been sort of a tough slog, trying to understand the diagnosis data, especially with a third-party software being part of the process at DoD.

Okay, fiscal data is not currently being tracked. So John, this data does not get sent to HCUP or NIS. We're not sending any of this data, legacy or GENESIS here.

Radiology does not include images. And the narrative text reports, I have actually some bad news for you guys. In the DoD, they've been using narrative text reports for a lot of natural language processing. And I'm very involved in some projects where we're trying to teach machines how to read radiology results, actually, and we're using the notes as this is the source of truth and trying to get closer and closer to the truth with the software. It's an important project, but unfortunately, Cerner stores this data in an area they call BLOB, B-L-O-B. And at this point, the decision Cerner has made, and this applies to both DoD and VA, is that data's not going out of the system. That doesn't mean that all decisions are final, but what we're being told is the data's too large. So I'm actually trying to work with that right now because it impacts work that I'm doing.

Yeah. So that's all the questions that I have. If there's anything else? Oh, yeah?

Unidentified Male: I'm not sure, did you answer this one? Does the DaVINCI data only contain data for care that is only provided in MHS or is there a community care or purchase care concept in MHS?

Wendy Funk: Oh, great, yeah, I missed that one. Thank you for pointing it out to me. It's both. It's both. So DoD is really different in terms of community care than the VA. I've worked with both systems for a very long time, and DoD began their big purchase care warehouse back in the late-90s. Purchase care is a much bigger component of DoD care than it is of private sector care, right? I mean, than VA. Because right now, about 55 percent of the care is purchase in the DoD system, and I don't think that number's anywhere near that in the VA system. So we've been doing this purchase care data capture for decades, and it's very reliable data. And it's all in there. You can see the community care files, and you can see-- they've put the data together and you can tell by the locations whether they're MTS or private sector care.

Unidentified Male: This one came in as you were answering the last one. Did you consider using activity type from [billingmill].[chargeitem] table in place of stop code?

Wendy Funk: Well, we don't-- no. We do see-- so activity type and also another field, medical service, those are two really helpful fields. And those are ways that we can combine the nursing unit location code with some of the values from those fields and derive something more consistent with legacy. I worked on a project where we were trying to do that. I think DoD, for a while, was thinking that, for their financial accounting systems, they were really going to try to map things back to the way it used to look. That project went on for a little while, and we were preparing those mappings, but then they sort of changed their mind and decided they were going to do their financial accounting based on the new nursing units. So we never really finished the project, but I think combining variables, like you're suggesting, can be very helpful.

Unidentified Male: This one came in through the chat, and then she indicated that maybe more of a clinical procedures, but I'll ask it anyway. Will VA physicians access DoD data for patient care through Cerner as we can for CPRS and other VA?

Wendy Funk: Physicians? That's a good question. So where I specialize is secondary use. I hope the answer is yes to your question. I think it is, yes, for registries, but I'm not positive. What I do know from a data querying perspective, if they get you in Healthy Intent you will not be able to see data delivered at DoD. And DoD people will not be able to see care delivered in VA. That is the segregation rule right now. They're using the location of care to segregate access. So it's all in one database, but the way that they enforce the concepts of who gets what, who gets to see what, is based on the location of care delivery. So there is a use case, important use case, for the sharing of the data for analytic purposes. But right now, DaVINCI is so valuable because that's not being allowed.

Radiology data does not include images or-- oh, I already answered that one. Sorry, I just thought it popped up.

Unidentified Male: Have you seen the one that just came in? When applying to use DoD data, is it the same procedure as using VHA data?

Wendy Funk: It is. It's one governance process. That's what's wonderful, is we were able to negotiate a memorandum of understanding between the two agencies. And for DaVINCI data, if you, at VA, want to use DoD data, you just go through your whole normal VA governance process. You don't have to ask DoD. And for me, just the other day we were looking at the VA data, and in the MHS system too, we don't have to ask you guys for permission. That's the beauty of DaVINCI.

Unidentified Male: Thank you. This last one came in via the chat, and we'll ask this and that'll be the end. For GENESIS records that go to DaVINCI, is the population restricted to active duty, guard, et cetera, or does it include dependents?

Wendy Funk: It does not include dependents unless they're being treated at the VA already. So the way it works is you take the-- yeah. Basically, dependents, yeah. We have a DaVINCI finder file that the agencies maintain together. And so if a dependent is treated, then we'll see that because they'll be able to capture their person identifiers in encounter data, and we'll say, oh, that's a dependent you guys are treating, you can have that record. But in general, the answer is no. Very, very small number of dependents in the system.

Unidentified Male: Well, thank you for staying late and thank you for being a trooper with your technical problems. Do you have any closing comments?

Wendy Funk: Well, my biggest closing comment is to really apologize to the group for the delay. It was certainly unexpected. I was sitting at my computer all day \_\_\_\_\_ [00:56:01] wasn't working. So I do apologize and I thank you for sticking with me and feel free to ask any questions if you need to. We're out here. Thank you very much for your attention and again, I apologize.

Unidentified Male: Thanks again, Wendy. Attendees, when I close the webinar momentarily, a webpage with a few questions will pop up. Please take a few moments to answer those questions. We do count on them to continue to bring you high-quality cyber seminars such as this one. And with that, I'll just wish everyone a good day. Bye now.