Amanda: … and welcome to & EHR Synergy, the cyberseminar hosted by VIReC, the VA Information Resource Center. And thank you to CIDER for providing technical and promotional support.

Research & EHR Synergy is produced by VIReC in conjunction with the ORD Strategic Initiative for Research & EHR Synergy - OSIRIS - and the VA coordinating hub to promote research optimizing veteran-centric EHR networks proven. And it focuses on helping the VA research community stay informed about the EHR modernization. [Sound out]

Dr. Sarmiento: Amanda, I think you’re muted.

Amanda: Oh, sorry. This series is held on the fourth Wednesday of every month at 12:00 p.m. Eastern. You can find more information about this series and other VIReC cyberseminars on VIReC’s website and you can catch up on previous sessions on HSR&D’s VIReC cyberseminar archive.

A quick reminder for those who are signing on; the slides are available for download. This is a screenshot of the sample email you should’ve received today before the session. In it, you’ll find the link to the downloaded slides.

Today’s presentation is using VA data and information systems, including Cerner data from Spokane, to support the ORH TeleSleep Enterprise-Wide Initiative, presented by Dr. Kathleen Sarmiento and Mary Hooley. Dr. Kathleen Sarmiento is Associate Professor of Medicine, Director of the Sleep Program at the VA San Francisco Healthcare System, VISN 21 Specialty Care Sleep Clinical Resource Hub Director, and National Leader for the VHA TeleSleep.

Dr. Mary Hooley is a primary care physician, implementation scientist, professor of medicine, epidemiology and biostatistics, and Director of the Measurement Science Query at the San Francisco VA and USC - UCSF. Thank you so much for joining us today.

Dr. Sarmiento: Okay, thank you so much for the introduction, Amanda. We’re really excited to be back and presenting again in followup to our initial talk last November. So, I wanted to thank everyone for joining us again for the second presentation.

Today, we’ll be talking a little bit about some of the similar background on the clinical aspect of the TeleSleep Enterprise-Wide Initiative but also, we’ll be including information on today’s talk about use of VA data and information systems that we’re using to support this enterprise-wide initiative.

Okay. So, I’ll be reviewing, again, some of the similar content from our presentation in November highlighting the work that we’ve been doing to improve access to sleep medicine and the role of having a research partner in this process.

But importantly, today’s talk will expand on the use of data from Cerner and this transition that we’re seeing at one of our hubs in the program. We’ll be reviewing access to VA data in Cerner and an approach to working with this data from reviewing it to validating it to recognizing gaps in data input and where our discrete data will come from. And to generally thinking about how to better understand how Cerner works. So, we are learning as we go in real time with our hubs, which has been exciting and challenging at the same time.

Okay. So, I’ll be spending a few slides going over the clinical side to help everyone understand what sleep apnea is, why accessing sleep care is challenging, and discussing how we can fix this problem through greater use of telehealth as one potential solution. And the use of home sleep apnea testing, in particular, which is store and forward telehealth.

We’ll then discuss how we can demonstrate effectiveness of these interventions using defined metrics and the role of an evaluation partner in this process.

Obstructive sleep apnea is the recurrent intermittent closure of the upper airway during sleep, which leads to intermittent hypoxia and sleep disruption. Blockage of the upper airway most commonly occurs at the level of the soft palate or the base of the tongue, which prevents someone who continues to try to breath from getting sufficient airflow. Eventually, the brain tells the muscles of the upper airway to open things back up, which is sometimes associated with an actual awakening from sleep, and then, the process starts all over again. Symptoms in sleep apnea are varied from individual to individual and they range from non-refreshing sleep quality and daytime sleepiness to no symptoms at all.

Untreated sleep apnea affects many different aspects of our physical and mental health, as well as our social wellbeing. Untreated sleep apnea can impair quality of life, daytime functioning, strain on relationships, decreased productivity, and lead to motor vehicle and workplace accidents.

Sleep apnea is diagnosed most commonly using one of two methods; either polysomnography or home sleep apnea testing. Polysomnography is done in a sleep laboratory where a patient spends the night hooked up to multiple leads, belts, and cannulas, and is observed by a sleep pathologist throughout the sleeping period. This has long been considered the gold standard of sleep testing and it can be used to diagnose sleep breathing disorders, movement disorders, and parasomnias, as well as facilitate patient education and acceptance of positive airway pressure therapy in laboratory treatment studies, known as PAP titrations, are performed.

PAP sleep apnea testing is a much less complicated and involved method of assessing for sleep apnea and can be done in a patient’s home using a simple, portable, small device. Technologies in this realm are rapidly evolving. But the two primary device types used include one that measures respiratory effort, airflow, oxygenation; and one that measures peripheral arterial tonometry or blood vessel tone.

Treatment for sleep apnea depends on the severity of the disease, patient preference and tolerance, and availability of a therapy. Most commonly, patients will be prescribed continuous or auto-adjusting positive airway pressure therapy or CPAP or APAP therapy. This treatment serves as a pneumatic splint of the upper airway, taking run air, compressing it, and delivering this pressurized air to the upper airway via one of several available mask interfaces.

Weight loss is also a standard recommendation for all patients who are overweight or obese and represents one of the few interventions that can lead to cure.

Oral appliances can be effective splints that pull the jaw forward, opening up the space behind the tongue, but are primarily used in patients with mild-to-moderate sleep apnea.

Surgical interventions can be performed to either facilitate the use of PAP therapies, such as those that improve oronasal airflow, or with definitive curative intent such as skeletal surgery, including maxillomandibular advancement.

Here, you see an illustration of how PAP therapy serves as a pneumatic splint, preventing the tongue from collapsing posteriorly and blocking the upper airway.

All of the PAP devices VA uses include a modem, which facilitates our ability to engage in telehealth. These modems transmit data like hours of use, mask leak, and efficacy of the device settings in treating a patient’s apnea. We can log on to view this data and patients can also obtain the same data to monitor themselves. The monitoring of adherence and efficacy provides the objective data we need to support remote visits with patients by telephone and video chat and helps us to identify which patients are struggling with therapy and who may need additional support.

Moving onto challenges in sleep medicine; like many other specialties, we do have access challenges that we’ve been asked to come up with more system-based changes to address.

So, more than 20% of enrolled veterans have been diagnosed already with sleep apnea, though we think the overall prevalence exceeds probably 50% in veterans. In addition, many veterans suffer from other sleep disorders such as insomnia, as well as dream enactment or parasomnias.

Sleep medicine has experienced rapid growth and utilization of our services over the past several years, outpacing even primary care utilization. Increases in the number of consults is not expected to slow anytime soon and will most likely be limited by the number of providers available to deliver this care.

Availability of polysomnography is limited to approximately two-thirds of our facilities. Eight years ago, the availability of home sleep testing was even less but we have appreciated much greater uptake and response to the access crisis and due to efforts to increase use of home sleep apnea testing to provision of devices and targeted efforts at implementation of these programs.

When neither polysomnography nor home sleep apnea testing is available, or when demand exceeds capacity, patients are often sent to the community for testing. This occurs at a higher cost than care providers internally and can lead to fragmented care coordination for many patients.

Outsourced care has increased with the availability of Choice, and now, the Mission Act; particularly at sites with limited to no sleep services. VAs within laboratory facilities that had wait times exceeding six months. The implementation of home sleep testing programs at these sites has reduced wait times and made testing more available. Here, we see growth in the use of home sleep apnea testing within VA programs to the columns on the left, compared to community care - the columns on the right - where polysomnography remains the dominant method of testing.

One thing often forgotten when discussing access to sleep care is that sleep testing is not the only thing sleep programs do. Obtaining a sleep study is analogous to obtaining a stress test or an EEG. It’s a single data point used to inform providers about health risks and to facilitate development of a care plan for that patient. Thus, while it’s a highly visible activity, it’s only a portion of what sleep programs must manage.

Another major challenge for the field has been the lack of consistent data to make programmatic decisions locally, regionally, and nationally. Only six years ago, stop codes for sleep were not being widely used in identifying sleep care, including access to testing and to sleep clinics, was impossible. Every time we asked for data from different offices, we would get a different data set. There was no way to validate that the numbers we were seeing on a national level from these data pools were actually reflective of what was happening in the field, short of calling the facility and verifying numbers and processes. This led to efforts to overhaul the sleep STOP codes and the implementation of these new STOP codes at a national level, beginning in early 2015 and again, in 2019 to ’20. Staffing has also remained invisible, still requiring manual inventories of each VA medical center to obtain the number of physicians, advanced practice providers, respiratory therapists, and sleep technologists engaged in sleep care.

And lastly, as many of you know, care sent out to the community has been extremely difficult to identify. The best data we have is for sleep testing, since we cannot identify CPTs for evaluation and management services or consultations and followup with sleep providers. Thus, understanding cost and volume of outsourced care remains dependent on modeling and not actual care purchase.

So, just to summarize why access to sleep care has been challenging, we have had limited humans to provide this care in light of ever-increasing demand for sleep services. Sleep care follows chronic disease management pathways where we evaluate, initiate therapy, and follow a patient sometimes for life. And the data that we use, while much improved now compared to six years ago, remains largely inaccessible to clinical leads and decisionmakers at the individual facilities.

So, how do we address our access challenges? TeleSleep is one solution that has been very successful. So, for those of you who are not familiar with Enterprise-Wide Initiatives and the Office of Rural Health, these are enterprise-wise programs that are meant to support programs that will target various interventions in partnership with a program office. Back in 2015, we used to fly to DC almost quarterly to door-knock, get to know people, wave the sleep flag, and promote the importance of sleep; highlighting the under-resourcing that has plagued our programs and then, to ask for support to improve access to care.

So, in 2017, we learned about these new enterprise-wide initiatives and were referred to the Office of Rural Health to establish a partnership. We submitted our application midyear and were accepted for funding for the last half of fiscal year ’17.

In our enterprise-wide initiative, we proposed a model of hub-spoke care that leverage the very resources at VA medical centers and included hubs that embraced telehealth that were willing to try new ways of doing business in sleep. There were initially seven hubs and 35 spokes. And the three components of the TeleSleep program included expansion or initiation of telemedicine services largely using video chat and electronic triage or consultations with patients; expansion or initiation of home sleep apnea testing; and the use of a virtual care platform called REVAMP - the Remote Veteran Apnea Management Platform.

The goals of TeleSleep are to improve diagnosis and treatment of sleep apnea, enhance patient experience, reduce wait times, and improve staff satisfaction and efficiency.

Before we dive into talking about home sleep apnea testing in more detail, I just wanted to show the expansion of our services over the last four fiscal years. So, in fiscal year ’17 - ’18, we have seven hubs and 35 spokes. We expanded to include an additional eight spokes in the second fiscal year. In fiscal year ’20, we added four new hubs and increased the spokes to 61. And recently, in this renewed three-year funding period, we now have 16 hubs and 68 spokes. We’ve tried to locate our hubs and spokes in a wide variety of locations across the country to achieve both complexity of facility - diversity and complexity of facility - as well as geographic diversity.

Just as a future reference, if anyone wanted to look at these slides after the talk, this does outline where our hubs and spokes are currently, as well as sites participating in REVAMP and who have received support from us through the home sleep apnea testing device distribution.

I also wanted to highlight some of the ideal positioning of sleep in the use of telehealth and the impact of promoting telehealth within the VA as a strategy for improved access to care. This slide is based on data through fiscal year ’18 but was of significant interest to us as we looked at the status of our programs, not just within the Office of Rural Health but also, the impact of expansion of support for sleep telehealth at non-rural health sites.

So, here, we display the total number of face-to-face visits, the traditional method of providing care; a contrast done with all telehealth including store and forward home sleep apnea testing, and synchronous video chat visits. And the number of visits are reflected in the size or the color of the orange dot representing individual facilities.

When we looked at sleep medicine compared to other specialty care services, we were really excited to see how much progress we’ve made in the last five years in growing the use of telehealth to reach our patients at the national level, both within and outside of the ORH program.

Okay. So, we’ve used a number of strategies to increase the adoption and expansion of home sleep apnea testing, which is really one of the core components of TeleSleep that we’re focusing on today. We’re focusing on this because we can easily identify these procedure codes for home sleep apnea testing and have focused significant efforts on improving access to our testing component of sleep medicine; in part, because we can also track the data for community care and the impact of expansion of home sleep testing in VA community care utilization.

So, some of these strategies to increase adoption of home sleep apnea testing include centrally-funded device distribution funded by ORH, contracted in partnership with the SAC, and then, coordinated distribution of the devices from two VISNs - Dallas and San Francisco, initially, and then, subsequently, through the direct contracting process - reaching a total of 54 facilities. We’ve just repeated a third expansion and distribution of home sleep apnea devices to an additional two dozen facilities at the end of this last fiscal year.

We’ve developed toolkits to support the implementation and renew our expanding programs, including understanding the changes to the sleep STOP codes related to testing, providing process maps that have been vetted at the Central Office level, and providing standard operating procedures, documentation, and encounter closure guidance.

We have strengthened partnerships with our stakeholder offices in telehealth and MCAO to ensure correct processes and standardization. We wanted to ensure that business rules aligned in our program with the accepted business rules that VA follows, as well as aligning our processes with those of other areas of telehealth store and forward programs; specifically, telehealth in dermatology and retina that are heavily store and forward-based.

We also instituted monitoring of compliance with changes to stop codes and store and forward visits and support to make changes when problems arose, identifying coding errors or selection of incorrect encounter locations that led to orphans in CDW.

We also established a single email for sites to seek assistance from when they were facing challenges with standing up or standing home sleep apnea testing. We offered one-to-one meetings with sites, when needed, to offer more in-depth support, and then, we disseminated many - much of our information through many webinars and newsletters.

This is just a map showing device distribution from the first two distributions in fiscal year ’18, and the reach of the program by centrally resourcing the equipment.

So, moving onto my last section would be Evaluating Effectiveness. So, I’m an operations person that’s really trained to problem-solve, identify gaps in care and processes, and define solutions that meet the needs of clinical programs. Critical supervision of care under rapidly changing circumstances such as new laws so, Choice and Mission Act, or pandemics, with the ability to adapt quickly to how we reach our patients. So, our focus is on the actual care delivery and ensuring primarily that what we do doesn’t cause harm.

While evaluating what we do is always a good idea, there’s sometimes not enough time to set up a formal evaluation process to measure this. Fortunately for us, the Office of Rural Health required a query evaluation partner as part of the EWI program and that the partnership between the measurement science query, led by Dr. Mary Hooley and the TeleSleep program, was born.

There are thirteen queries across the country and the mission of these queries is to improve the quality of healthcare for veterans by using research evidence to improve clinical practice. This is exactly the partnership we needed to better understand sleep care in VA but hadn’t really had the support until the ORH program was started.

So, before we continue, we’d like to just ask you all to participate in two poll questions to understand who’s attending these webinars today. So, the first question is; what is your role in Research and/or Quality Improvement projects?

Amanda: Alright, that poll is now open. So, again, the question is; what is your role in Research and/or Quality Improvement projects? A, investigator, PI/CO-I; B, statistician/data manager, analyst or programmer; C, project coordinator; D, other. Please describe via the chat function.

So, the answers are coming in. It seems that things have started to slow down so, I’m going to go ahead and close the poll and we’ll - sorry about that. [Mumbling] Sorry, if you could just give me a moment. My screen is not cooperating right now. Alright, sorry about that. Alright, so, go ahead and close that poll and our results - I seem to - I can’t find the results here at the moment. So, if we can move on to the next poll, I will share the results [interruption]…

Rob: I can probably read them for you if you like.

Amanda: Alright, thank you, Rob.

Rob: Sure. 50% answered A; 22% chose Answer B; 10% chose Answer C; 12% chose Answer D, and that’s it.

Amanda: Great, thank you. So, back to you, Katie.

Dr. Sarmiento: Okay, thanks for that. Let me advance here. We have our second poll question here; how much experience do you have working with VA, OE, HRM, or Cerner data? And check all that apply.

Amanda: Alright, that poll is now open. Again, the question is; how much experience do you have working with VA, OE, HRM, Cerner data? None, I’m brand new to this; B, I’ve attended a few webinars; C, I have served on an OE/HRM council; D, I’ve taken the Millennium Fundamentals Training; E, I’ve done SQL queries and CDW Work 3; and lastly, I’ve done F2L series in CDW Work 2.

So, again, seems like things have slowed down so, I’m going to go ahead and close the poll and share the results. Rob, I might need your help again.

Rob: Sure.

Amanda: Thank you.

Rob: 32% of respondents show Answer A; none, I’m brand new to this. 16% shows Answer B; I’ve attended a few webinars. 3% only chose C; I have served on the OE/HRM council. 4% chose D; I have taken Millennium Fundamental Trainings. Only 2% chose; I have done SQL Queries and CDW Works 3. And 7% answered; I have done SQL Queries in CDW Work 2. Thank you.

Dr. Sarmiento: Okay, great. Thank you, everyone, for answering that. It really helps us to understand the breadth of experience of the audience today. I personally am not ashamed to say that I’m brand new to this and basically, entirely reliant on Dr. Hooley’s expertise in navigating the transition at our Spokane TeleSleep hub and going through the process of understanding what this data is. So, it sounds like many of you are in a similar position. So, I’m glad that you’re joining us today.

So, this is one of my favorite slides from the last talk. Again, it’s one of my favorite slides from this talk because it really epitomizes the relationship between Research and operational partners. Again, we started out the development of this table with three columns and as they went something like - in air quotes - “Katie says she wants to know…” Then, Mary says, “You can find that here.” And then, Katie says, “Let’s try acting on this data in this way,” and Mary says, “Let’s evaluate the effectiveness of these actions by re-assessing this data.”

Ultimately, it’s much more complicated and this is a much more professional table to display for the purposes of this talk. But the table here does reflect examples of some of the discussions that we’ve had and we’re highlighting them here.

So, for example, we wanted to know what the prevalence of sleep disorders was and beyond just pulling ICD-9 and ICD-10 codes, we actually asked programs for feedback based on their local databases, which were not \_\_\_\_\_ [00:28:36] CDW to help validate these volumes and identify coding errors in ICD-10s and 9s.

We also wanted to know the demand for sleep services. And the evaluation team did a deep dive into consult data into how these consults are tagged as being sleep-related. We found out a single consult can have numerous stop codes associated with it and that the primary stop code isn’t always sleep and is, therefore, not visible.

We worked with \_\_\_\_\_ [00:29:04] sites to correct these stop code associations and provided guidance to sites when they were creating these consults to ensure that these would be visible.

We wanted to monitor the use of polysomnography and home sleep apnea testing and in the process, discovered how an erroneous coding process and workflow could significantly skew the data and developed SOPs for encounter closure and educated providers on how to use CPTs properly for testing both within VA and when reviewing community care records.

We wanted to track the use of sleep telehealth services not just at ORH-funded sites but nationally, since we provide the same toolkits and guidance to all programs who are interested. We spent significant time assisting programs with getting stop codes set up correctly and figuring out payer telehealth codes to comply with the business rules and quality measures from telehealth services.

We wanted to understand outsourcing of sleep care and how to begin to measure the impact of a national hub-spoke program on volume of care going out of participating sites. We wanted to know if resourcing programs of home sleep testing devices helped to reduce studies sent to the community. We learned an amazing amount about where the data comes from just in time for the process to change again and for this to become, once again, a mystery.

We’ve learned about working with HCPCS for prosthetics so, our CPAP devices and supplies could be identified in the databases, and how to measure provision of these items to patients at different points in time, identifying gaps in care and potential opportunities for interventions.

And now, we’re learning about the transition to Cerner and how to map sleep care across those systems since Spokane is one of our ORH hubs. And this will better position us to monitor sleep services as implementation of Cerner occurs nationally.

We really did run out of space on this slide and probably could’ve kept going but felt that these were good examples of accessing different types of data in support of the program.

This is a great shot of how Mary’s team helps to educate not just me as the Program Lead but educate all of our site leads in the national network. So, every week, there’s a meeting with the ORH network and we have a standing evaluation agenda section. So, we go through data to verify processes, identify missing data, identify erroneous data. And then, Mary’s team works with each site to understand why the data pools are off, uncovering errors in clinic setup or in the way the data is being identified in CDW. So, this vetting of the data with numerous sleep programs helps us to trust the data more and to extrapolate the codes used to pull the data to other non-ORH sites. The data thus becomes a bit more reliable.

And providing just a couple of examples, we go through this every quarter and then, at year end for reporting purposes. This is an example of quarterly data on the number of veterans receiving virtual care at each site. So, Mary will send the spreadsheets out to our site leads, we’ll review these numbers on the call. And we spent the last three weeks reviewing spreadsheets similar to this and data from each location, vetting it during the month of January reflecting Quarter 1 of this new fiscal year. And so, we go through each location and verify telehealth visits, store and forward visits, e-consults, secure messaging, and overall volumes of patients. And we do this for both rural and urban veterans located at our sites.

Here, we’ve seen a demonstration of what we’d look for for, specifically, expansion of the home sleep apnea testing programs and the use of polysomnography at sites that are either starting up home sleep testing or expanding access to increasing the number of devices or imbedding these devices at community-based outpatient clinics and initiating store and forward. Or most recently, through COVID-initiating mail-out programs.

I really like this slide, which is a graphic from our year-end report submitted to the Office of Rural Health. It demonstrated the impact of this strategy to purchase recorders in a centralized fashion and then, distribute them to the field based on understanding who was performing home sleep apnea testing services versus polysomnography, their positioning and likelihood of success in standing up store and forward, telehealth with home sleep apnea testing, and where to target our efforts.

So, here, you can see the \_\_\_\_\_ [00:33:57] reflect the number of veterans who underwent sleep testing with home sleep apnea testing devices versus polysomnography. And this shows for sites that receive home sleep testing recorders, do our centralized resourcing, that we have an increase over the four and a half, five fiscal years at sites that receive home sleep apnea testing devices; particularly, in our reach to rural veterans. Definitely reflective in a consistent pattern to all veterans.

And on the right, we reflect the other sites that did not receive home sleep apnea testing recorders through a centralized distribution.

Phase II saw an increase in the number of home sleep apnea testing in rural veterans but not for the same degree. And saw persistent use of polysomnography in that population.

Overall, for all veterans, at sites that did not receive home sleep apnea testing recorders, we saw a similar pattern of increase in home sleep apnea testing and again, a real lack of reduction in polysomnography compared to sites that were resourced.

So, we’re very excited to see the impact of being able to reduce the in-lab burden of sleep testing at sites when they do have access to devices and the impact that this strategy of supporting our programs has had. Most recently, this has also been reflective in the call for requests for equipment from sites supported by the Office of Connected Care, adopting a similar process to purchase devices centrally and distribute them to the field in an effort to encourage use of store and forward telehealth for sites.

And then, this is the last slide that I’m reviewing in this section before I turn it over to Dr. Hooley. And this was another way to look at the data or the impact of expansion of home sleep testing through the Office of Rural Health EWI but also, in parallel, impacting the National Network at the non-ORH-funded sites. And we can see here that we’ve increased the number of rural veterans who have been tested for sleep apnea via home sleep testing, which is the red line, and have seen a reduction in patients in rural areas in the use of polysomnography at sites that received the recorders. And the middle graph here shows sites that did not receive recorders; again, an increase overall in the use of home sleep apnea testing paralleling mostly the same increase in uptake of home sleep apnea testing in the ORH network, reflecting the national effort to disseminate toolkits and support for sites, both inside and outside of our network, and the success of the strategy as opposed to really targeting reduction in polysomnography, which we didn’t see at the national level in sites that didn’t get the additional recorders.

And then, the final graph on the right shows the overall trends in sleep testing since 2012 with pretty rapid growth in home sleep apnea testing due to the ongoing efforts and a real kind of plateau in the use of polysomnography. So, we do like to follow this data and it does help us to know whether or not, in general, our efforts and strategies to improve access to care; particularly, in the diagnostic realm, have been effective.

And with that, I’m going to hand over the ball to Dr. Hooley to guide us through the second half of this presentation.

Dr. Hooley: Thank you, Katie, and hello to everyone. Thank you for joining us today. It’s been an absolute pleasure working with Dr. Sarmiento and her team. We’ve learned so much about how the healthcare system works and that helps us as researchers better understand how we can improve care for our patients.

As everyone knows, we are transitioning to a new electronic health record and Spokane went live on October 24, 2020. And Spokane is one of the sites in this ORH-funded TeleSleep program. And so, for the Quarter 1 fiscal year ’21 data, October through December, we needed to figure out how to get the numbers of veterans served and the numbers of procedures done at Spokane.

So, the Cerner electronic health record has three kind of main components. One is Millennium, which is the electronic health record itself. The second is HealtheIntent, which is a population health management platform that is populated by data from Millennium, as well as data from other sources. And then, CareAware, which is a device connectivity functionality where the electronic health record connects with digital devices like blood pressure monitors to upload those data.

HealtheIntent is a cloud-based program, a population health management platform, that is vendor-agnostic. It can receive data from any EHR such as - and from any HIT system such as pharmacy benefits, management, and insurance claims. It has a lot of parts. “Healthe” is the terminology that Cerner uses to describe these parts and it includes HealtheCare, HealtheRecords, HealtheRegistries - which is really exciting for us because it has registries of certain patient populations - HealtheAnalytics, HealtheCDW, and HealtheDataLabs.

Unfortunately, these data are not currently available to the VA. This is the HealtheIntent Person model, which has persons, encounters, orders, and care plan. There are also HealtheIntent revenue cycle models to look at accounts and financial parts of Cerner.

CareAware; also, data not currently available to VA. Enables the connection between medical devices such as ventilators, vital sign monitors, etc., and transmits data to Millennium.

And then, finally, Millennium is the major EHR, which supports enterprise-wide view of clinical information to coordinate patient care and document the point at which it was delivered. So, this is the interface that everybody in Spokane is using to take care of patients. And the Millennium data is stored in an Oracle database they call - their language - Cerner Command Language, which is very similar to SQL. And they have - Discern Analytics is their brand name for the tools that they’ve built.

There are two phrases that Cerner uses a lot - Power is something to document tools like PowerChart, PowerForms, PowerTrials. And Net is how they document connected applications like PharmNet, FirstNet, RadNet, SurgeonNet, and PathNet.

So, we decided to try and dive into Millennium to get the information on sleep and this is an important slide for everyone to understand, and I’ll go through it carefully. So, the Cerner Millennium EHR has about 6,000 data tables. And Cerner generates extract from the Millennium database on a daily basis and then, exports a subset of the files to the VA. And they execute a step-wise process that integrates this Millennium data into the CDW computational environment. They have a staging database, which is called CDW Work 2, and those are SQL tables that are similar to the tables in Millennium. And then, there’s a lot of effort being invested in converging the CDW with the Millennium data and trying to map data from Millennium to the fields that we are familiar with in the CDW.

So, the operational data store imports - I think it’s about 950 tables now with maybe 30,000 columns. But that’s only a sixth of all of the data that’s collected in Millennium. And they transform it from Oracle to SQL and then, make those tables and columns available to us in CDW Work 2.

The Managerial Cost Accounting Office was very interested in trying to identify workload from Cerner. And so, because Cerner doesn’t have stop codes, they needed to figure out a way to generate the stop codes that they could then use for budgeting purposes and VIReC calculations.

And in Cerner, appointment scheduled resources, unlike clinics at the VA where our clinics are associated with stop codes; in Cerner, the appointment’s scheduled with provider, location, equipment, and patient. And then, dropped charges are - which is kind of what they use to monitor workload - are linked with clinical events or encounters.

So, Cerner assigns stop codes after charges have been dropped and they have created about 180 stop codes from the Millennium data elements that are available in CDW Work 2 and are being used by Managerial Cost Accounting for their workload tracking and budgeting purposes.

These are all the stop codes that have been matched from Cerner. And we were very excited to find that the two key sleep stop codes - 143 for sleep studies and 349 for sleep visits - were both on the list. So, we dove right in and this is just a very simple query and it’s selecting the data fields from this table in CDW Work 2 and finding general ledger community, company, unit, alias number, which you guessed it; is a stop code like 349 or 143.

And then, we were a little bit confused. Because when we pulled out the sleep visit stop codes, we found much fewer encounters per month than we had expected based on historical data. And the same with sleep study where we found much higher numbers of procedures than we had expected based on previous data.

So, we then thought; okay, well, maybe the stop codes weren’t mapped exactly correctly. And it turns out that lots of other things ended up being matched to stop code 143 like sleep supplies and other aspects of sleep care that weren’t necessarily sleep studies.

To further explore, we tried to identify CPT codes, which looked at sleep study. And we did search CDW Work 2 for CPT codes but we were only able to find six. And I wish that I had an explanation for this but I think, as Katie was encouraging me, the main thing is for us to describe the process of data and how we need to validate the data that’s coming from Millennium. So, you know, there’s a lot of steps between entering blood pressure and actually seeing it in a table and there are a lot of things that can go wrong. People may not enter the correct data or they might enter it in the wrong field, the data might not be coded correctly, the data might not be organized in the way that we need. So, perhaps not all of the data that has been indicated in these 950 tables is comprehensive enough for the kinds of things that we are looking for. Data harmonization where you want to try to get not the same data fields to get the same information that we’ve been obtaining from the CDW is challenging and the mapping may be incorrect. And then, the data analysis, the queries could be wrong so, it may be that I’m, for example, not doing the correct SQL queries to get out the data that we need.

So, I still don’t have answers but I can tell you where to look, which is with this data migration and management knowledge database. And they have put fantastic resources here at this website and especially these data syndication training presentations, which are listed here from starting with number 1 and going all the way down. I would strongly encourage people to review those and try to learn as much as you can about Cerner data.

These are many great VA resources that I won’t go through in the interest of time. But if you click on each of them, you will discover all sorts of treasures.

Similarly, Cerner has a bunch of resources and we, as VA employees, can obtain Cerner Care accounts. And then, we are able to log onto the Cerner Wiki and try to find information that can help us better understand the data model and how we might obtain the information that we need.

So, in summary, how to learn more about Cerner data; I would first suggest that you bookmark the Data Migration Management and Syndication SharePoint. Then, I would review the previous syndicated slides and recordings that I just showed you here.

Then, attending these future syndicated database sessions where these three brilliant people - David Fackler, Beth Gibson, and Margaret Gonsoulin - go through Cerner data issues and teach everybody about how to troubleshoot. Consider joining their D&M Knowledge Team. I put a little screenshot of what it looks like on Teams.

And then, you could request data, provision \_\_\_\_\_ [00:51:33] CDW Work 2 to your VINCI folder. Finding a collaborator in VISN 20 is really critical because it’s absolutely necessary to figure out what’s happening on the ground so that you can verify the quality.

And if you’re an active SQL user with operational data access, consider joining the CDW Work 2 Report Developer Team meetings, which are every other Tuesday from 12:30 to 2:30 ET.

So, I will now pass back to Katie.

Dr. Sarmiento: Okay. Thank you so much, Mary, for that really great overview. And I want to highlight just how much I’m learning from working with Mary on this very specific, but absolutely critical, aspect of evaluation, which is working to identify sleep services in Cerner. It’s incredibly complex and complicated but because of Dr. Hooley’s feedback on her data polls and what she’s finding at Spokane, we’ve already identified challenges and stop code mapping and process maps set up in Cerner for sleep testing workflows and encountering and in the documentation and templates for sleep, and are now having an opportunity to make adjustments to those processes on the operational side so that the data is more meaningful and reflects what’s actually being done in the data warehouse.

So, had Dr. Hooley’s team not been looking for sleep services from Month 1 for Spokane, these things would not have become so apparent so early in the implementation of Cerner in VISN 20. I just want to really thank Mary’s team for doing a deep dive into our data to support this program and to help us really have valuable data at the end of this fiscal year.

So, again, I just want to close things out by highlighting the value of research and operational partnership. When we are required to work together, we get better communication on our operational priorities and how to ensure effectiveness of an intervention or clinical programs such as a rollout of home sleep apnea testing. We get immediate feedback and data is available to facilitate decision-making about continuing, modifying, or shifting the direction of the intervention or program. We are lucky enough to have development of data dashboards that are usable by clinical sites and created by professionals that are non-clinicians who know what they’re doing with the data. But this enables us all to look at the same data for decision-making, understand how to interpret the data, and can use them locally in advocating for resourcing or to determine the effectiveness of each of our programs.

We get synergy together in asking new questions relevant to learning healthcare systems; something that’s so very important and valuable in VA as we’ve undergone major changes in priorities and strategies for care delivery over the last few years.

And then, we also see improved dissemination of work performed other than just sending out memos or providing talks to operational stakeholders and other pipelines other than newsletters, for example, to the field, that does promote not just sleep medicine efforts but promotes what VA is doing to implement programs. And we get the data that we can rely on to then promote the work of what we’re doing for VA programs externally, as well.

As part of the success of the partnership between Mary’s query, the TeleSleep EWI, we did receive renewed funding for an additional three-year period, which began this fiscal year. We have an annual budget now in Connected Care to support sleep equipment for all of our programs. We have established a model for research and operational partnerships in new specialty care clinical resource hubs. Dr. Hooley’s team remains the evaluation partner for our clinical resource hub in VISN 21 where we are starting to tackle different issues that we’re not seeing in the Office of Rural Health, Enterprise-Wide Initiatives, that relate to funds flow and mapping of services across different sites. And we’ll be soon looking at different ways that we deliver care, leveraging other telehealth interventions within the VISN. So, we’re excited to start looking at other aspects of care delivery and cost of care delivery in VISN 21.

And then, lastly, we’re just putting up our contact information here and we would love to meet with anyone or share more in depth the experience that we’ve had with the EWI or the evaluation of the EWI for those who are interested. So, you can reach us at our VA email addresses posted here.

And for online reference when accessing this talk later, we’re also sharing some of these publications that have come out from the program from the last - primarily the last year and a half. We’ve been evaluating a number of different aspects of sleep care from community care to cost of care, access to care, being able to describe the state of sleep medicine at the national level. And then, also have included qualitative evaluation for feedback from veterans about this program.

And lastly, it looks like the next session is February 24 at 12:00 p.m. Amanda, are you going to provide additional information on this?

Amanda: Yes, thank you so much, Katie. And so, given the time, we will answer questions that we received during the presentation offline. But thank you so much to our presenters for taking time to present today’s session. To the audience, if you have any other questions for the presenters, you can contact them directly. And please stay tuned for our next Research and EHR Synergy session; Configuring Cerner Millennium for VA: Informative Evaluation of the EHRM Councils.

And thank you once again for attending. We’ll be posting the evaluations shortly. Please take a minute to answer those questions and let us know if you have any other data topics you’re interested in and we’ll do our best to include those in the future sessions.

Thank you again to our presenters and our audience for joining us.