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Molly: Here we are approaching the top of the hour now. So at this time I would like to introduce our speakers in the order of speaking, although they will jump around just a little bit. We are going to start with Dr. Mehdi Kazemi, and he is the Director of the VISN 6 PACT Demo Lab located in Salem, Virginia. Also joining him today is Dr. Joe Gieck, a Principal Investigator for the VISN 6 PACT Demo Laboratory also in Salem. And finally we have Joe Plott. He will be joining. He is a Research Program Analyst also for the VISN 6 PACT Demo Lab located in Salem. So we are very grateful to our presenters for joining today. And at this time I would like to turn it over to you Dr. Kazemi.

Dr. Mehdi Kazemi: Thank you Molly and good day every one. I am Mehdi Kazemi, an Internist by training and Principal Investigator for the VISN 6 PACT Demo Lab and also as the Association Chief of Education here in Salem, Virginia. First I would like to thank the Demo Lab for its support and Dr. Singh for his guidance as we have continued our journey to the care to our patients. And also I want to thank you for taking your time today to join us in this discussion of our preliminary findings. During the past four or five years working with the PACT teams and family care providers, a question of finding more efficient ways to process the CPRS, View Alerts, and Notifications has been rather frequently. Today's presentation offers our preliminary analysis of the PACT CPRS Notifications on PACT workflow and efficiencies. Our project is scoped for multiple phases. Today we find ourselves at the end of phase one. We offer our initial analysis on variability of notification across facilities.

The agenda for today includes a presentation on site variability, data specific to notification and the view alert parameters, an outcome review of a small scale single site pilot project, a review of staff education and training as it relates to notification and view alerts, and having a discussion of the implications of our findings and future directions. Before I turn it over to Dr. Gieck, our Co-PI, we have a poll question. Our question is what is your role in the VA?

Molly: Thank you. So for our audience you can see on your screen you have several options to choose from. Are you a Primary Care PACT Provider? PACT Team Member? Specialty Care Provider? Admin, Researcher, Program Analyst or Electronic Health Record Support? Other? And if you are replying "Other," please note that at the end of the presentation I will put up the feedback survey with more extensive lists of job titles, and you might find yours there. And we do have three quarters of our audience that has responded. So at this time I will close the poll, share the results and I will let you gentlemen talk through them.

Dr. Mehdi Kazemi: Thank you. I am turning it over to Dr. Gieck here.

Dr. Joe Gieck: Thank you all for responding. This is Joe Gieck. I am a Clinical Psychologist just to give you a little bit more background real quick. I have been a part of the mental health integration in primary care prior to my work with the Demo Lab. We appreciate you responding to this, because we wanted to know in part who was attending. What we are hoping to do with the three phases of the overall project as Dr. Kazemi just briefly went over is to be able to find a way to impact frontline staff in their day-to-day activities. So what we have found from that is that a large number of our audience is in fact PACT Team Members and that is really important. We will also have some follow-up questions specific to the use of the CPRS later on in our presentation. We would really encourage those of you who are PACT Team Members, PACT Providers, and clinical folks who utilize CPRS on a frequent basis to respond to those questions as we go through the presentation. So we will talk a little bit about that later on.

So with today's presentation I want to thank everybody for joining us this afternoon or this morning, wherever you are. We believe that today's project is an important one, because it begins to look at what we are intending to do, to look at workflow and workload from a different perspective. And as Dr. Kazemi talked about, one of our overarching goals on that initial slide is to look at workflow and job-related stress and burnout as it applies to CPRS and the use of notifications. We also want to look at quality, patient safety, and PACT outcomes that are monitored and assessed through the use of notification systems in CPRS. For general purposes today we are going to refer to notifications and view alerts as one in the same, because our experience is that those were used interchangeably. Technically they are different, but for the purposes of our conversation today we are going to refer to them as the same, because a lot of times when we are talking to PACT providers they will often say these view alerts that I am receiving in that context.

So what we are going to talk about today has to do with site-to-site variability and we are going to be looking at ways to identify best practices to help operator efficiency. One of the things that we have experienced through the Demo Lab including coordinated site visits with the coordinating center at multiple sites as well as our work with organizations such as the PACT Center of Excellence, we have heard from the front line staff that notifications and alerts are often overwhelming. And so our mission with this project is to be able to find ways to help the field become more efficient in their processing of these alerts and notifications.

To give some back introduction and background, there is a fair amount of literature that looks at notifications, especially within the VA. Most of that I will say focuses primarily on quality and safety and very little of it, if any, focuses on workflow and workload and stress and burnout. And we will talk about that here in a second. So the first point I want to talk about is that the VA operates a fully integrated electronic health record or EHR. This is important for several reasons. First there is a bit of a difference between the EHR and an electronic medical record or an EMR. EHRs are intended to provide multiple functional options. They are designed to integrate data, or at least support this function and its users. The Electronic Medical Records or EMRs tend to have a more limited function or are more about the collection of data. This is also important this fact that we have a fully integrated EHR because when we begin to examine or to discuss the cognitive processing requirements that are required of our medical staff within these records, we will find that it can lead to some negative unintended outcomes. And we will talk about that further as we go along.

In the second bullet here it is also important to know that the use of EHRs and EMRs has increased significantly since 2008. And so today's topic applies not only to VA, but it also applies to the private sector of which there is increasing literature as well. But the change in that nationwide increase is a result of what is called the Health Information Technology for Economic and Clinical Health Act. Essentially what this boiled down to is that there is a financial incentive to be able to use more electronic means of data collection and data access for the purposes of patient care integration of information. So sites in clinics and in medical centers are able to obtain some improved financial outcome incentives as a result of moving towards a more integrated system. So with that being said, what we found and this is for those of you who are clinical and know this as well, but integrated health records are integral to making things more efficient as far as synthesization of health factors and elements of patient care.

What we found is that automation is necessary to improve the response to critical patient care needs. It also allows for us to decrease response time to critical results. You do not have to wait on things. Things can be made available to you more quickly. And then finally medical records do help improve coordination of care. Now there are potential drawbacks to the use of increased complexity of information through an EHR. So for example there is a potential for what is called "Information Chaos." Chaos is a result of the complexity of the cognitive requirements that staff has to utilize to synthesize information. Because they are looking at more and more data points within potentially multiple areas of a record and they have to integrate those into some sort of meaningful whole. And so information chaos is actually made up of multiple paths that include things such as information overload, where somebody has too much data that they cannot process it, information underload, where certain information is lacking, or other items or concepts or demands such as information scatter, which often refers to having information located in multiple places. So for those of you who use CPRS, you will know that there are multiple paths of which you have to integrate data. That is an example of information scatter.

Most of the research looking at the use of notifications and alerts at the VA has focused on quality and safety. There is literature including the citation number twelve up there, which is related to a group out of Houston, HSR&D group led by Dr. Singh, who have looked at quality and safety issues specific to missed labs, imaging reports, and things of that nature. What they have found is that there is a potential that information chaos could increase the propensity for those kinds of events to occur within the VA system. There have also been other surveys that have looked at the use of notifications primarily through surveys. For example, there is a survey that was conducted by Wahls and Cram of 106 VA primary care providers. What they found was that at least 37% of that sample reported at least one patient with a missed test result during the previous two weeks. This was an anonymous survey asking people to provide their feedback, but what they are actively seeing in the chart. And interestingly enough on top of that 15% reported having observed at least two events within the same time period. This means that there is the potential for misses within our data review.

There was another study by Meeks et al, which looked at VA EHR-related investigations specifically EHR-related investigations. They found that 94% of the noted safety concerns were related to the elements of the equivalent of information chaos. And then finally there was a review and study provided by Menon et al, who are collaborators with the group out of Houston. They found that VA facilities demonstrating lower risk of missed results use specific strategies to prevent view alerts from being lost to follow-up. This is important in a later discussion that we will have today. So with that being said, one of our primary missions is not necessarily just looking at quality safety as a whole. We want to look at workload and workflow and burden to the frontline staff. The depth of the data in this regard is very limited actually within the VA. So what we have put together here is information that we have been able to pull from the literature. There are two studies that have looked at the number of notifications that providers receive on a daily basis.

On the right hand side of the screen for those of you who may not be as familiar with CPRS, we did put a screen shot up there of that view alert or notification box that people will see when they are using the medical record. These two studies found that anywhere in between 57 and 63 notifications were received per day per provider. Bear in mind that some of the data is six years old at least, and potentially some of it is pre-PACT. So there is not a lot of data that we have access to that talks about how things may or may not have changed as a result of the implementation of PACT nationwide.

Nonetheless, we have also been through some of our other work at sites where providers report up to or maybe in excess of 100 notifications a day. So what we are seeing is that there is some variability and that is a part of what we want to explore through this three-phrase tier project. There was also a 2010 survey and this was a very robust study. This is a national 2009 survey that was published in 2010 that received responses from over 2,500 PCPs in the VA. One of the items that was indicated in that survey was that nearly 50% of notifications were perceived as irrelevant to day-to-day care. This means that there are a lot of administrative tasks that frontline staff is performing that may be a burden to and may be actually increasing information chaos within the system.

There was also another study that we wanted to talk about in which a smaller sample of VA PCPs, about half of those folks reported developing workaround strategies to reduce what they perceive as the burden of CPRS notifications. Workaround strategies are good in the sense that everybody does these in their day-to-day jobs as you adjust to the requirements of what you are expected to do. At the same time workarounds suggest a deviation from the norm, which also increases the potential for misses and things of that nature. Here is the piece was that was somewhat surprising to us. Despite the literature that talks about the volume of notifications, the fact that half of those notifications are perceived as irrelevant, etc., there is only one study that we were able to find that had looked at the impact of EHR utilization on burnout, stress, and job satisfaction. And it was a non-VA study. So this is where our group comes into play. We want to begin looking at these factors within the VA itself.

What is important from that study is that there were a couple of interesting findings. The first one of which was that physicians who are exposed to a moderately to a high EMR requirements, which is essentially what the VA is, report a significantly more job-related stress and lower job satisfaction. And then when you mix that a factor of time pressure as an increasing function of complexity within the medical record, workload demand was significantly associated with burnout and intent to leave one's current job. So that is where we want to with this project of ours work long-term to help the field in the short-term, but also look at the impact of stress, fatigue and burnout long-term. To just briefly go over our method, I do not want to spend a lot of time on this today. What we are going to talk about today is one of those phases which we provided a survey to program analysts and PACTs through points of contact in VISNs 6, 7, and 8. We had responses from 14 medical centers. So I do want to stress that this is a sub-sample of medical centers. It is not necessarily representative of the entire nation, but this is a sub-sample of centers within the Southeast and Mid-Atlantic region of the country. We based our questionnaire off of the literature which looked at eight key domains.

That was looking at the use of hardware and software, clinical content and data, user interface, people who are a significant resource to our organization, organizational policies, state and federal policies, workflow and communication, and monitoring and measurement. Now we also have been working closely with one site in particular to do more of an in-depth dive and case analysis of what happens when you change certain parameters to notifications as far as workload and workflow. So we are going to present some of that information today as well in which we looked at 26 PACTs or essentially 26 PACT providers. And then our analysis of what we will report on today was fairly simple in the sense that what we are looking at is mostly frequency and qualitative content. Then we did do some simple parametric analysis to look at the change in the workflow and workload related to our site-specific project.

So to begin with, these are some of our additional outcomes looking in the domains of people in hardware. What we found is when we asked sites to report if they have experienced a request for support for missed or lost notifications, the vast majority did. In fact when we upped the anti so to speak to receiving at least two calls, not just one call a week, but two or more calls in a week, over half, almost two-thirds of PACT program analyst who responded to our survey at medical centers reported that they do in fact receive two or more calls in a given week related to missed or lost notifications. That is the people end of things, being able to support the end user. When we look at hardware and software, we found that when we asked specifically about the use of supplemental software to support management of notifications, all but one site reported in the negative. So it means that the majority of sites are using what they have available to them through VISTA, and there is one site that has the ability to do some things that may or may not impact workflow. In fact the qualitative side from that indicated that they use a grandfather's modification software that turns off notifications for procedure orders that are entered into the system. They have the ability to modify that for each consulting service's needs, which is fairly unique.

When we look at monitoring and measurement, we did ask about the use of pre-existing VISTA tools to ensure processing of notifications. Somewhat to our surprise 42% reported they did not use any consistent tool to monitor the processing of notifications. And then when we asked about the use of VISTA notification management tools to notify supervisors or providers about outstanding notifications, we found that the majority of sites do not go that far. But there are a couple of sites that do actually look to VISTA notification tools to notify providers and supervisors about outstanding notifications, not just those that are unassigned or things of that nature. In the qualitative responses what we received was that multiple sites reported the use of what is called the XQAL Backup Reviewers Parameter. This is done to monitor unprocessed notifications and it provides an automatic auto-forward to a backup reviewer within 21 days. That is the existing software that exists within VISTA. What we also found was that there was that one site that assigned administrative staff within each service to receive XQAL Unprocessed Alerts, upon which a supervisor is notified to designate a surrogate. So it means that there is a chain in which those unprocessed alerts follow to get to the end user.

Some additional areas of examination that we are going to report on today is that we ask sites did they use a committee or a quality assurance group to monitor notifications specific to critical and abnormal results? And the vast majority of sites do not. We recognize that all sites have quality and safety committees, but we wanted to know specifically about the use of notifications, because this is a driver of workflow. This is a driver of patient care, and the vast majority does not. So then we also wanted to know are there sites that have methods to monitor notifications specific to workflow and workload. And none of the sites responded in the positive, meaning that nobody is necessarily looking at notifications specific to their impact on workflow and workload within primary care. Of the qualitative responses we did receive, one site reported a use of an oversight committee to review notifications not processed within 13 days. Those findings are forwarded to a designated service chief for resolution. We also found that one site reported that notifications are tracked through the Compliance Committee, which was fairly unique. And then one site reported that a quality assurance person actually within the service monitors those unprocessed notifications. This is similar data to what we just discussed briefly. With that being said, I would like to turn it over to Joe Plott. He is going to talk a little bit more about some of what we have found as far site-to-site variability's and some of the specific parameters.

Joe Plott: Yeah thank you Dr. Gieck. And as Dr. Gieck said I would like to continue our discussion specifically addressing the first two items listed on our agenda. One is preliminary variability data specific to notification and view alert parameters. Two, review parameter modifications and highlight how modifications to notifications and view alert parameters impact workload. So before we proceed, we have a second poll question and we would love to hear from as many of you as possible. The question is for those of you who frequently utilize CPRS, how would you respond to the following statement? The volume of CPRS notifications and view alerts I receive is burdensome to my clinical duties. Do you a) Strongly agree, b) Agree, c) Disagree, or d) Strongly disagree?

Molly: Thank you. We do have our responses coming in. Just a note for our audience that these replies are anonymous. So feel free to answer freely. It looks like we have had about a 50% response rate, which given that not everybody here uses CPRS this might be capping out towards the higher end. That is a good trend so I am going to go ahead and close this out and share the results if you want to talk through them real quick.

Joe Plott: Yes. Thank you Molly and thank you for all who responded. We anticipated the percentages to each of these responses. From literature reviews as Dr. Gieck mentioned earlier, we found some articles that mentioned providers reporting spending a lot of time managing view alerts. Sometimes as much as 30 minutes or more managing view alerts. We listed the articles along with all of the references towards the end of this PowerPoint. So why is that? Why do providers feel so overwhelmed or burdened by the volume of CPRS view alerts? And why is a good chunk of an eight-hour work day dedicated to processing view alerts? We find it difficult answering that question. And understanding the provider workflow process to generate those answers is really a part of the reason we embarked on our project. But before we actually present specifics about our preliminary project work, some notifications and view alert definitions and background is probably prudent here. Dr. Gieck mentioned earlier that we are using the terms interchangeably, notifications and view alerts. As a matter of fact, most of us here are VA colleagues and do the same. So for the purpose of our presentation you will hear us use those terms interchangeably.

The two terms are actually defined differently. Undoubtedly you users of CPRS probably receive both types within your CPRS gooey inbox. You just have not been presented with a clear identifier to delineate the difference. So let me see if I can better define view alerts and notifications just to highlight how they are unique. At the top of the slide that you see are view alerts. View alerts present themselves to you in the form of Text Integrated Utility or TIU Alerts and are generated from documentation within the medical record normally requiring action on the part of the provider such as cosigning a note or acting as an additional signer on the progress note. Vista Notifications are more complex. They present specific information from other packages within the medical record such as laboratory, pharmacy, imaging, including orders, and results of testing performed on patients. These notifications will be presented to providers when orders need some action. For example when an expiring medication needs to be removed or when orders that have been placed need a provider's electronic signature. They also notify the provider when the lab or the radiology department has completed testing and results are available for you to discuss with patients.

Notifications are also more complex because they actually engage Vista parameter settings and step through an algorithm to decide whether to present or not to a provider. And to further complicate the explanation there are a number of notification parameter settings that come into play to determine whether or not a notification will indeed present itself to a provider. To describe the notification algorithm complexity I am going to brief over four parameters from the notification file. But take note, more than four parameters make up the totality of the notification file. There are just simply too many to discuss for the purposes of today's presentation. But it is important to provide you with some notification parameter background in order to give you an idea of the complexity of the notification system, much of which I continue to learn. Again, I am only going to discuss four parameters. The first one is the processing flag parameter. The values that are set to specific notification will determine whether recipients can receive the notification. And you can see an example list of some of those notification types on the left-hand side. The values can be set to mandatory, enabled, or disabled. But take note, this parameter was a major focus of our preliminary analysis. Specifically we gathered qualitative data from three VA visits like Dr. Gieck mentioned earlier to begin to understand site-to-site variability of this particular parameter, as well as the impact that these changes and these values have on provider notification workload. I will discuss some of our findings when we get to the next few slides.

This is the second of the four parameters that I want to show you. The second screenshot highlights the provider recipients parameter. The values in this parameter will determine if ordering providers, attending physicians, primary providers, and/or patient-related things we considered as potential notification recipients. The third screenshot highlights the delete mechanism parameter. This parameter determines how alerts disappear from view when a successful alert follow-up action is taken or when a user views an informational only alert. Values for this parameter can be set to individual recipient, which means that each person who receives the alert must process it themselves before it is removed from CPRS view. Or values from this parameter can be set to all recipients, which means that one recipient can process the alert for all who receive it and it will then disappear from CPRS. The fourth screenshot displays the urgency parameter. This parameter is used in the CPRS gooey display to highlight notification urgency to the provider recipient. Values for this parameter can be set to high, moderate, or low. But again these are just a few of the notification parameters that are programmed within each VA's Vista. These four, along with all of the other notification parameters, contribute to the algorithm which decides providers and staff who were seeing specific notifications. A search for articles and research in this realm yielded some interesting findings.

Menon et al found inconsistencies between VA facilities regarding the rates of abnormal pathology results suggesting significant site -to-site variability and view alerts set up and utilizations of the electronic health record. Despite the use of a common CPRS platform, this further suggests that there could be a lack of consistent best practices for notification parameter setup within the VA, which bodes a question, could consistent standard best practices potentially promote provider and staff efficiencies? For our project we launched an initial review of notification parameter settings across three VA visits as we mentioned before. And responses to our survey query demonstrated significant site-to-site variability. The next two slides will provide a little more detail to that end.

We surveyed PACTs across three VA visits, clinical application coordinators, and specifically asked them to check the boxes of every notification for which their site set a value within the processing flag parameter. Of particular interest were the notifications that their facility had set to mandatory, enabled, and disabled. And if they set any of these flags at the overall system level or more granularly down to the team level. The left side of your screen shows a system level that were set and the percentages reported that they did so for those specific lab result alerts. On the right side are the results of our survey of sites that said they set them at the team level.

In our survey query we listed the standard 59 notification types to include things like admissions, abnormal lab results, imaging orders, new service consult requests, and many more. And once we received sites results from our survey, we then placed the 59 notification types into nine Vista notification categories. And those categories were lab orders, lab results, imaging orders, imaging results, medications, consults, orders, patient movements, and one final catchall category of it. The results yielded site parameter variability across all nine of those categories. For this presentation we have limited our findings to two of those nine categories, the lab results and the order notification categories. Why just two of the nine, we actually identified a similar variability trend across all nine of those categories and decided to eliminate report redundancy.

This slide highlights the lab result notification variability. The two boxes that you see on your screen are the lab result notifications that are set to mandatory at both the system level as well as down to the team level. Results of our survey yielded some variation. Of the 14 respondents only two of the listed items were set to mandatory at the majority of the sites. The abnormal pathology result items were set at 64.29% of the sites. The critical lab result action items were set at 71.43% of the sites, and only in one of the two sites identified other lab result items set to mandatory as you can see from these percentages. At the team level on the right side, we found only one or two of the 14 respondents set specific lab result notifications to mandatory. The next two boxes that popped up are sites that set the enabled flag at both the system and the team level. The enabled flag yielded similar results, although fewer sites have decided to set lab result notifications to enable at the system level as you can see from the percentage numbers. The disabled flag is where we found the most extreme site variability. Across the nine lab result notifications, there were disparities of the number of sites that had decided to disable those specific notifications. And then on the right side of all of the respondents, zero decided to set lab results to disabled at the granular team level.

The survey query of the order type notification yielded even more variation than we saw with the lab result type notifications. Of the 14 respondents you can see from the percentages an increase in the number of sites that reported mandatory flag settings on a variety of order type notifications. Interestingly and again at the team level on the right side, we found only one or two of the 14 respondents set specific order type notifications to mandatory. The enable flag yielded similar results, although fewer sites had decided to set order type notifications at enable at the system level. Once again, the disable flag is where we found the most extreme site variability. Across the 17 order type notifications, there were disparities of the number of sites that had decided to disable those specific notifications. Also once again as you can see on the right, zero of the sites had decided to set order notifications to disable at the granular team level. As mentioned earlier we also have results from the other seven notification categories, but the result in trend is similar and therefore redundant for us to report and to discuss with additional slides.

What are some implications? We could extend our query nationally to determine if site-to-site variation we found within three visits trends across the country. The provider and CPRS user implication of these parameter variations is also of interest and requires a deeper dive and a more comprehensive analysis and evaluation. So the question is, where did that lead us at least with our project in the initial phase? For the first phase of our project we evaluated and analyzed changes to the processing flag parameter at one sample site. This facility provided us with the details of two changes, time one and time two that were made to their processing flag notification parameter. And then we performed a pre and post analysis of the PACT provider notifications to determine impact to workload. Essentially, we generated reports from the sample site VISTA database to determine pre and post changes in the number of notifications pending. And any changes in the ratio with pending notifications and encounters for the providers. The screen shots above highlight the pre and post changes our sample site made to their processing flag parameters. A committee of providers and administrative staff met recurrently to evaluate the baseline and to confer on decisions to alter the baseline. When changes were made in April and November of this year they ultimately decided to modify values on nine different notifications in the processing flag parameters highlighted in green on the right side. Those were the nine changes made.

The results were that we received the data, pulled the data from all of those timeline changes, and we ran a paired sample T test to look at changes pre and post intervention, in other words the implementation of changes. We actually ensured that there was equivalent sampling for time, context, and other factors pre and post intervention. We ensured that outliers, those with inconsistent panels, extending circumstances, etc., did not bias the data. This left us with as mentioned before 26 PACTs or providers. We assessed the impact of total notifications within each individual's alert box in CPRS in 28-day cycles during each timeframe, as well as the ratio of notifications to encounters looking to see what the change was in volume, but also begin to examine the impact on workflow for veteran patient encounter. We felt significant changes resulted. Total notifications within each individual's CPRS alert box were reduced by over 1,500 per provider. And the ratio of notifications was reduced by almost two per encounter. Those were significant in the magnitude of findings was really robust as indicated by the Eta Square. So with that information I would like to shift the conversation back to Dr. Gieck.

Dr. Joe Gieck: Thank you Joe. One of the things that we do want to talk a little bit about is the education and training because there is a significant component to this, which is when our folks encounter literature, we know that there is a general lack of knowledge about how to maximize the notification tool. One of the things that we would also like is for those of you who utilize CPRS on a regular or on a frequent basis, please site the primary method by which you were trained or educated to manage notifications specifically? We recognize that sites have CPRS training, but specific to notifications. We have the option of video training, assigned personal mentor/trainer, simulation-based scenarios, instructor-based courses, or self-taught where you learned it on your own.

Molly: Thank you very much. Our CPRS users are a little bit slower to respond this time around, but we are approaching a 50% response rate so that should be good. I do again see some clear trends so I will go ahead and close that poll out now and share those results with you.

Dr. Joe Gieck: And again this is largely consistent with what we have seen in the literature and what we have seen in practice, which is that the majority of folks have learned how to manage notifications on their own, which does not surprise us. This is also consistent with what we saw earlier in the previous poll question where we found that 80% of folks find it burdensome. So when we look at the value of education and training to our staff, we see that as an invaluable kind of thing. In fact when we look back in the literature very quickly what we found is that your responses are very similar to what was shown in the literature, including that national survey we had mentioned earlier where 66% of primary care providers found education in CPRS to be inadequate. And in fact only 35% were able to identify the site contact for any kind of technical assistance.

And then the majority of folks looked to a colleague as opposed to a subject-matter expert per se to receive assistance in the setup of notifications and the use of CPRS. What we have also found is that a smaller sample of a few VA facilities is that nearly 50% of primary care providers were completely unaware of what is called the user notification menu options that are available to folks, which we will talk a little bit about here later. This means there are actually settings within CPRS that users can modify for their own personal use. They show that if you are able to adjust those settings accordingly for yourself, not only were providers more likely to have more time in the completion of notifications, but they received almost 30% fewer notifications just by being able to set up the user specific menu. We will talk about that as we go forth.

Very quickly we wanted to look at sites specific from the programming analyst or PACT perspective about who they are training and who is receiving training specific to notifications. What we found is that just over a third of sites reported providing specific training to primary care or PACT providers. What we found is that on the whole that RN care coordinators within PACT or the nursing staff did not really receive much training at all, neither did administrative personnel including clerks and NMSA's. And then finally we also wanted to look at training as a part of this equation. What we found was that the vast majority of sites did not invest a lot in training in our experience. There are medical residents who often do not know about notifications for some period of time as they are entering the system. With that being said we also wanted to look at with those sites that actually provided the training specific to notifications, how much time was devoted to notifications? There was a mean of about 15 minutes. What we also found was that program analysts that received responses still reported receiving a mean of 8.45 requests per week from PACT providers specific to management of notifications. I guess what this slide portrays to us is that there is a demand and a need yet we are not necessarily filling that demand and need.

So very quickly we want to talk about some of the implications and limitations and future directions. The first thing that we want to talk about as far as implications is operator development. We see the need for additional training in this area or education at the very least of PACT staff because in large part this does drive some of the patient care. What we are also finding is that some of the other analyses that we are running in the background is that some of this is self-inflicted through the communication mechanisms and the utilization of CPRS within the teams themselves. But at a minimum what we would advocate for is the use of those user control management tools and we will talk about that in the tool section here at a minimum, because that per the information that we have seen in the literature can reduce the amount of workload. There is also a general need to begin to understand why this variability exists to such an extreme across sites. If I wanted to decrease variability, not necessarily take anything away from science, but to identify what are some better consistent user menus that we can set up and to identify best practices to optimize workflow and decrease the administrative burden on our PACT staff, because we know that burnout and whatnot is an issue here right now.

And then finally workflow quality and safety, really looking at workload and the burden that it places on staff and having a better understanding of system versus team parameters, which I have talked a lot about. What are the implications of turning on or off a switch at the system or at the team level? And then having an improved design of monitors and tools to be able to monitor workflow, and limit the information chaos. Finally, there are tools that are out there such as what is called AWARE, which comes from our group in Houston. AWARE stands for the Alert Watch And Response Engine, which is a software that they have been developing that they talked a little bit to us briefly to look at misses and so forth. We do know that there are updates coming to CPRS under the eHMP. One of the things that we do know is that in future designs being able to monitor workflow as a part of that we would suggest as a fourth piece.

Due to the timeframe we are going to pass this slide. We are going to talk a little bit just briefly about tools, because we did not want to provide this information and then not provide anything to our audience, and for that I will turn it over to Joe.

Joe Plott: Yeah, just one more minute to highlight three tools that we know that most of you are probably familiar with. To those of you who are not, there are three things that we wanted to mention that you can go to or look at or review specific to alerts and notifications. The very first one again comes from our good folks in Houston, which is a document that outlines ten strategies for managing notifications. If you downloaded this PowerPoint, the PDF on the right-hand side is actually an embedded object that you can double click and open. Otherwise, you can search for this document on the VA Internet and find it readily. It is a very good, well thought out and well outlined document, and those are the ten strategies that they highlight. The second tool that we want to mention is in regards to is some on demand courses that you can take in VeHU. Again these links are live on this slide. So if you downloaded this presentation you can click on these links and it will take you to the VeHU login screen. There are multiple courses available specific to alerts and notifications. These are just three of the suggested ones that you can click on right away and look at. They are on demand and you can watch and they provide good details and information.

Then of course last but not least as Dr. Gieck mentioned we as CPRS users have the ability to turn on and off some notifications. This variable is by site as we have already mentioned from our review with our survey. You do have some control over some options that you can turn on and off within your system, but it is all based on the policies and procedures identified at your facility.

Dr. Joe Gieck: If you use this tool we would suggest that you work with your local analyst to set that up.

Joe Plott: Absolutely. That is correct; anything non-mandatory is up for grabs in terms of turning on and off. These are the references that we talked about. Feel free to look those up. Contact us if you need help finding anything.

Dr. Mehdi Kazemi: Thank you very much Joe. I want to now see if we can answer any questions. I think we have about six or seven minutes here.

Molly: Excellent. Thank you all very much. We do have a couple of pending questions. For those of you who joined us after the top of the hour, to submit your question or comment just use the question section of the Go To Webinar Dashboard on the right-hand side of your screen. The first question we have is, please define information chaos again? Thank you.

Unidentified Male: Sure. Information chaos essentially means that there is erroneous or missing or overwhelming information. It typically means that there is a cognitive processing limitation on some account based off of what is available or not available to the user. There are five domains within that information chaos that are talked about in the literature. One of which is called information overload. This means that there is too much data. It means that there is too much to process in too short of a time. We all have cognitive shortcuts by which we use and we need those to be able to function in our day-to-day jobs. If you add a time factor on top of that people have developed an algorithm by which they pre-select some information. They may bias it over others and that information overload may actually foster that to some extent.

There is a term of what is called information underload, which means that the data is just completely whacky. So what you are looking for may or may not be there, and the user may spend undue amounts of time trying to find information that they cannot get their hands on. Information scatter is another domain. That refers to having information in too many places, having to go back across multiple paths or paper records versus electronic records and so forth that requires a new cognitive processing. There are some others, but I hope that answers that question. One of our references does talk about information chaos more specifically.

Molly: Thank you for that reply. We did get several more pending questions. How was the survey distributed on-calls, link meetings, etc.?

Unidentified Male: The survey was distributed through points of contact in VISN 6, 7, 8. Essentially we were looking for program analysts or PACT leads, somebody who serves potentially in that kind of capability for work groups and so forth and allowing them to distribute it to the analysts in their network. It was anonymous, so we were unable to identify which site responded in which capacity, because we wanted as honest information as possible.

Molly: Thank you. The next question is, did you look at the AWARE system which was piloted to approve alert management in Houston and Cleveland?

Unidentified Male: So we have not actually been able to observe that program. We have talked to the AWARE team on several occasions to understand what it is that they are doing. As we understand it is that that program focuses primarily on quality and safety issues and things of that nature. But we do know that it is out there and it is something that we have reached out to them to try and figure out how we can better collaborate in the future.

Molly: Thank you. The example you used in your presentation were related to lab results. My research is around suicide prevention and it has included provider perspective of the category one slide when veterans are at high risk for suicide in which flag fatigue was identified, same as the researchers. I am wondering if the researchers came across specific information on this high-risk flag.

Joe Plott: This is Joe Plott. No not specifically for that slide. We tended to lend more towards generalities of notifications. There is one notification that is specific for suicide and it fell into one of our other categories where we did not present directly on the slide. But no we did not dive too deep into that specific notification. As we move into our future directions and deeper dives of information, that is definitely going to be a realm that we tap.

Dr. Joe Gieck: We recognize flag fatigue as a part of that process of cognitive processing process.

Joe Plott: Yeah that is very good question. Thank you for that.

Molly: Thank you for your responses. Has there been a specific team or facility with the best management of notifications? And if so can you share their practices?

Unidentified Male: As of right now that is a part of our three-tier project. As we move forward one of our goals is to begin to identify best practices and to see what is out there. A part of that is not just identifying the best practice. It is identifying what that best practice or how that best practice actually alters the workflow. It is not just identifying best practice, but figuring out how that best practice actually impacts patient care and workflow. But we have not come across a set of best practices at one facility.

Dr. Mehdi Kazemi: Maybe the final recommendation on best practices would be a combination of good practices at different sites that can be put together as the best practices.

Unidentified Male: Yeah and at the same time we do know and a large part of our audience is clinical, we are driven to trying to help make a difference in the frontline. So that is a part of our near future emphasis is to begin looking at those best practices because we would like to coalesce something to be able to provide to the field in the near future.

Molly: Thank you for those replies. The next question is, how are you collaborating with the teams you mentioned in your later slides working on EMR?

Unidentified Male: We are referring to eHMP. We reached out to the eHMP folks per the suggestion of the Demo Lab to look at how we can possibly collaborate and redesign all of this in the system. We did not talk a lot about this, but there are some things happening within eHMP where they are looking to add an additional window let's say so that alerts, maybe some of you know about this, there are some alerts that if accidently close out the patient without having done anything to address the alert it disappears. And you have to go back and find it. There is some tool and mechanisms that are coming up which will allow all alerts to be stored for a short period of duration so that the user can go back in and adjust as necessary. So what we are looking at is that we want to find a way to collaborate with these folks to be able to help measure the impacts on that workflow. That is our goal.

Molly: Thank you. We are at the top of the hour, but we have three pending questions. Are you gentlemen able to stay on so that we can capture the answers in the recording?

Unidentified Male: Yes ma'am.

Molly: Excellent. Thank you. If any of our attendees need to drop off when you exit out of the meeting please wait just a second while a feedback survey populates on your screen. It is just a few questions, but we look very closely at your answers and it helps us to improve presentations we have already given, as well as provides us ideas for different sessions to facilitate. For the next question, once the alert has been optimized by the users there still will be a lot of alerts and notifications that take from several minutes to more to deal with every day. Is there any movement from administration to account for this time and reduce clinical workload to accommodate?

Dr. Mehdi Kazemi: One approach is the PACT teams. Right now I do not believe that there is room for all PACT members to function on top of their capacity. So I think PACT teams could identify what type of alerts would go to what team member. That is an easy approach to this. We could also set up a system where all the alerts would go to that location and then the PACT team members would go and attend to those alerts for that PACT team. That may help with the volume of alerts that goes to a PACT team instead of everybody potentially receiving all of the alerts. They could be designated to specific team members.

Unidentified Male: But the question is a very good one and as a part of the challenge that we are looking at and wanting to address is looking at workload as a part of this process. What we have found is that there is a general lack of looking at the volume of workload related to the administrative side of things. Our mission is to be able to begin to document that and understand it more clearly so that there can be recommendations potentially in the future.

Molly: Thank you for those replies. Are there any suggestions when one feels that they have maximized the notification options they can block out, but yet remain overwhelmed with the amount of CPRS notifications?

Joe Plott: This is Joe Plott. I could recommend that someone similar to a clinical application coordinator, maybe someone at PACT. Someone who can look at a group of your notifications and determine where they are coming from and possibly are you receiving duplicate notifications when you do not need to, or are you receiving notification types that you do not need to. Maybe you are receiving consult alerts for which you do not need to receive, specifically administrative alerts. And if it is possible to do a thorough evaluation of what you are receiving and identifying are there things that can be eliminated from your view of what you receive. That would be one recommendation I would make to have somebody do a review of your settings.

Molly: Thank you for that reply. Have lean sigma colleagues been involved in the notification improvement program?

Dr. Mehdi Kazemi: I think two of us have had training in lean six sigma. But to answer the question are there other people that just do the lean six sigma, I think that is a good idea, but we have learned and we have folks even on our team that have an equivalent of a black belt in lean six sigma.

Unidentified Male: It is a good question overall. I do not necessarily have the answer to that question.

Molly: Thank you for that reply. There are just two questions left. I am sorry, more did come in. It looks like this is a comment. An important aspect of workflow to decrease the number of alerts to providers should include a robust nursing protocol allowing nurses to work at their highest competency. This decreases the number of alerts the nurse has to send to the provider because he or she can enter certain orders and can fill requests.

Dr. Mehdi Kazemi: I could not agree more than with what was stated here.

Unidentified Male: Absolutely. We agree and concur wholeheartedly and recognize that there is also a site variability in nurse protocol across sites as well. And again one of the goals is to elevate the people's ability to work with them with their scope and abilities, but we do recognize that there is variability in that as well, but we wholeheartedly agree.

Molly: Thank you. That is the final pending question, but we still have a large portion of our audience left, so I would like to give you gentlemen the opportunity to make any concluding comments if you would like.

Unidentified Male: First of all we would like to thank folks for participating today. And again we see this as something that is really valuable to the field and being able to move in a direction that is more efficient in effective care. We also recognize that there is a lot of concern around the issue of burnout and fatigue, not only in primary care, but in the VA as a whole. And I think that does not just extend to just providers, it also includes other health care professionals including those on the PACT team, the RN's and so forth. And so again this is a first step towards being able to identify and establish a baseline moving forward. If there are folks that would like to work with us in this capacity, we would encourage you to contact us. We are more than open to find a way to work with sites and look at how we can not only work with other groups that are out there like quality and safety and so forth, but are they finding those best practices. If people have access to those best practices and has an identifiable way of how they've been measured, we would be more than happy to work with those folks because the field needs those soon like now, yesterday. Do you have anything?

Unidentified Male: Nothing more, but I just want to highlight the special thanks that we have on our screen. To the Demo Lab Coordinating Center we really thank them for their guidance and support and to VISN 6, 7, 8 CAC, Clinical Application Coordinators, and those individual staff members you see. Dr. Singh especially from the Demo Lab we really appreciate his support as well.

Molly: Well that was a great segway to a point that I would like to make. We do hold these PACT Cyberseminars every month and they are on the third Wednesday of the month at noon Eastern. And we actually have Dr. Singh presenting next month. He will be joining the tomorrow box on the 20th of January. So please keep an eye peeled on your emails and you should see an advertisement for that. Also, thank you very much as well to Ida May and to Cynthia for helping to organize this series. This does conclude today's Cyberseminar presentation. Once again I am going to close out the meeting, so please take a moment to fill out the feedback survey. Thank you once again gentlemen and thank you to our attendees for joining us. This does conclude today's HSR&D Cyberseminar presentation. Thank you.