Robin Masheb: And thank you everybody for joining us for today's cyber seminar. This is Dr. Robin Masheb, Director of Education at the PRIME Center of Innovation at VA Connecticut, and I will be hosting our monthly pain call entitled Spotlight on Pain Management.

Spotlight on Pain Management is Collaboration of the PRIME Center; the VA National Program for Pain Management; the NIH-VA-DoD Pain Management Collaboratory, and the HSR&D Center for Information Dissemination and Education Resources.

Today's session is titled Methodology for Cost-Effectiveness Analysis of a Pain-Focused Brief Intervention. I would like to introduce our three presenters for today. We have with us Christina Lazar who is a Research Associate at the Yale University School of Medicine; Kate Gilstad-Hayden who is a biostatistician at the Yale School of Medicine; and Paul Barnett, who's a health economist health at the Health Economics Resource Center and part of the HSR&D COIN at CA Palo Alto Healthcare System. He's also a Consulting Associate Professor at Stanford University Medical School.

Our presenters will be speaking for approximately 45 minutes and will be taking your questions at the end of the talk. Feel free to send them in using the question panel on your screen; if anyone is interested in downloading the slides from today, you can go to the reminder email you received this morning and you'll be able to find the link to the presentation.

Immediately following today's session, you will receive a very brief feedback form; we appreciate you completing this as it is critically important to help us provide you with great programming.

And now, I'm going to turn this over to our presenters.

Christina Lazar: Hi, everyone. I guess I'll start us out; this is Christina Lazar, I hope everyone can hear me. Thank you for attending our talk today. We're going to present on our methodology for calculating the cost and cost-effectiveness of a brief intervention designed to get veterans access to multimodal pain treatments.

So, here is a brief overview of our talk today. I'll start out by giving you some background about our research trial and study intervention; we'll then move into a discussion of our methods to find costs of VA and VA-sponsored care for musculoskeletal conditions. First, I'll be presenting on outpatient and pharmacy costs, and then I'll hand it over to Kate Gilstad-Hayden who will present on inpatient costs and community care costs; and then finally, Paul Barnett, will our health economist will wrap up and present on our economic hypotheses and analysis.

So, I'll start out by giving a brief to our trial. So, our costing methodology is being developed for a cost analysis of an ongoing randomized clinical trial, the trial is testing whether brief counseling of veterans with musculoskeletal conditions can increase their engagement in non-pharmacological treatments for pain. So, if this intervention is to be widely used, it will be important to understand what effects it will have on VA pain treatment costs and whether it delivers sufficient value to justify the cost of the intervention.

So, the intervention being tested is called Screening, Brief Intervention, and Referral to Treatment for Pain Management, or SBIRT-PM, for short, and our study will be comparing the cost and effectiveness of SBIRT-PM compared to usual care, which is a no-treatment control condition.

So, SBIRT-PM is a motivational, interviewer-based counseling designed to engage veterans in multimodal pain care and address risky substance use. So, under normal conditions when veterans apply for VA disability benefits, they go through the compensation and pension clinic; and as you can see in the diagram, the Comp & Pen clinic is completely separate from VHA care. The SBIRT-PM works to integrate these two by reaching out to veterans at the Comp & Pen clinic and educating them about VHA services, and helping them get connected to VA care for the conditions they are applying for disability for. The study counselors talk with veterans about the pain they've been experiencing and focus on motivating the veteran to engage in multimodal care as a means to reduce their pain symptoms.

If veteran clients are interested in trying different pain services, the study counselors contact the veterans' primary care teams to see if they can put in a referral to get the service at either the VA or through VA's community care program. Study counselors also screen for problematic substance use, and that could be anything from alcohol or drugs, and they address that also as necessary. The counseling is delivered by two part-time counselors over the telephone, and it includes up to four counseling sessions over the first 12 weeks. Due to COVID and pandemic restrictions that shut down many non-emergent services, we added a fifth booster counseling session between Weeks 12 and 32 to help re-engage veterans and update them about service offerings at the VA and in the community.

So, our study procedures. We'll be enrolling eleven hundred veterans into this randomized clinical trial; we recruit veterans out of all eight VA medical centers in VISN 1 and that covers all six New England states. In the trial, we target all veterans who are applying for compensation and pension benefits for a back, neck, knee, or shoulder condition, and our inclusion criteria are presented here on the slide. Because this is a

pragmatic study we kept the inclusion criteria quite broad; we recruit post-9/11 veterans who report a pain severity of at least four on the BPI subscale and have access to a phone for assessments and for counseling. Our exclusion criteria are also presented here. The biggest one is that veterans cannot already be accessing three or more non-pharmacological pain treatments at the VA at the time of their enrollment in the study; and the rationale for that was to minimize a ceiling effect and to only enroll participants that would benefit from referral for further treatment.

Our outcomes are assessed by research assistants who conduct study interviews at baseline Week 12 and Week 36; our primary outcomes are pain scores on the pain severity subscale of the BPI; the number of substances requiring intervention as assessed by the SBIRT.

Our secondary outcomes are a number of modalities of non-pharmacological pain services accessed in the study period, pain interference scores, overall health, and the cost of muscular skeletal care.

So, now that you have a little background about our study, we'll move into our method to cost out care. So, our goals: the challenge for this project was to calculate the total cost of the SBIRT-PM intervention. So, this would include the direct cost of the intervention, that's things like the staff time to counsel veteran, staff time to put in referral notes and communicate with healthcare providers; the cost of cell phones supplies, cell service lines, overhead costs, and other things directly related to the intervention.

Because our intervention aims to engage participants with healthcare services, we also needed to calculate the cost of health care resources used by our study participants. So, the main questions we needed to address are, "Do veterans assigned to SBIRT use more or different pain treatment services than those assigned to the no-treatment control?" So for example, are participants assigned to SBIRT-PM using more multimodal preventative treatment modalities and less surgery emergency care or drugs to treat their pain compared to those in the control group? We also wanted to know veterans assigned to us for healthcare services overall.

To answer these questions, we need to be able to categorize health care as being for pain or not for pain. We're defining pain care as treatment for any musculoskeletal condition; as you'll see in our upcoming discussion, this is not so straightforward but hopefully, our method can be used by others to calculate the cost of pain treatments more generally.

So, the sources of our cost data. So, to calculate the direct cost of our intervention, we'll use a micro costing approach and tabulate the cost of study staff time, study activities, and labor costs. And then to calculate

the cost of health care service without the VA, we'll be collecting a combination of VA Managerial Cost Accounting system data, MCA, and then data from the Program Integrity Tool, PIT. So, MCA data sets are available from VA's Corporate Data Warehouse and provide information about VHA healthcare service costs; they use an activity-based costing system that includes the cost of labor, supplies, and overhead and it's written in a single-line item. And then PIT is also available from CDW and provides information about VHA paid services that are accessed in the community, also known as community care.

So, we're developing our costing methods in a large cohort of veterans who are very similar to our study population. So, this test cohort consists of about 1.4 million veterans with a Comp & Pen exam for a back, neck, knee, or shoulder injury between July 1990 and March 2021. So, of these, 799,836 used VA services in Fiscal Year 2019 and those are the people that are included in the analysis presented today.

So, this table shows the proportion of the cohort receiving each type of care in the 2019 fiscal year. Almost everyone had a VA-provided outpatient encounter and 87 percent use the VA pharmacy; 5 percent had VA hospital stay; and 40 percent used VA-sponsored community care.

Then talking about outpatient service costs. So, to assess outpatient costs, we looked at five overlapping MCA data sets; one contained cost for all outpatient encounters, and then separate data sets for laboratory prosthetics, radiology, and pharmacy. So, we identified all care and then distinguished care for musculoskeletal conditions versus care for anything else, and we assigned all of those things to one of five categories. Four of these categories describe the care for musculoskeletal conditions and include emergency care for musculoskeletal conditions, surgical care for musculoskeletal conditions, imaging of the musculoskeletal system, or other care for musculoskeletal condition. And then the final category describes care that didn't fall into these groups, so they're considered care for other conditions.

So, this slide describes the fields in the MCA data set that we use to make these classifications. So, in order to classify to these five categories, we first used two fields from the MCA data sets. The first was we used a primary diagnosis field that consisted of a single ICD-10 code per outpatient visit; ICD-10codes starting with "M" were considered care for musculoskeletal conditions; we also use the stop code to identify the clinic that the service was performed in to distinguish between emergency surgery or other.

Laboratory, radiology, and prosthetic data sets rarely had a diagnosis field. So, in order to determine if that care was for a musculoskeletal condition, we had to use other indicators. So, we used a list of CPT

codes for radiology records, we used a date close to a musculoskeletal care visit for laboratory records; and we used a list of ticket codes for prosthetic record.

So, outpatient care summary results. In the slide, we found that nearly all--98 percent--of cohort members used VA-provided outpatient care in Fiscal Year '19. The total cost of outpatient care was $5,252 million and this reflects the mean cost of $6,567 per capita; and so for the cost presented here for outpatient, inpatient, pharmacy, and community care, we're going to present those as per capita costs which just uses a common denominator of 799,836 which is the cohort population.

So, here, we present the outpatient cost by type of care. We found 18.1 percent of the outpatient care was for a musculoskeletal condition; for all outpatient services, we found that patients had an average of 17 encounters with the mean cost per cohort number of $6,567; for outpatient care for a musculoskeletal condition, patients had an average of three encounters with a mean cost per cohort member of $1,180.

Moving on to pharmacy costs. To identify pharmacy costs related to pain treatment, we performed a literature review to identify drug categories used to treat pain; but each generic name in the MCA prescription file was assigned to a category, and we identified 13 pain medication categories and one residual category of other medications not related to pain. We found 86.7 percent of our cohort received VA-provided medications in Fiscal Year '19; the total medication cost was $741 million, and that comes out to the mean cost of medication was $1,264 per capita.

Medications for pain account for 32 percent of outpatient pharmacy costs when including antidepressants or 27.8 percent of all outpatient pharmacy costs when we exclude antidepressants.

Here, we present the specific costs for each type of medication. Patients received an average of nine prescription bills for pain medication at a mean cost of $436 per cohort member. This was 35 percent of all prescriptions and 32 percent of all medication. And this table describes the distribution of costs, days of supply, and prescriptions among pain medications. Almost 9 percent of prescriptions for pain meds were for gabapentinoids; literature suggests growing use of this class of medication as an alternative for opioids despite potential risk and lack of evidence of effectiveness for musculoskeletal pain. We haven't yet explored medication interactions, but this is an area of interest and given the risk from adverse events, it's something we're interested in doing.

Alright. I'll now turn this over to Kate for a discussion of inpatient costs.

Kate Gilstad-Hayden: Thanks, Christina. Now, we are moving on to inpatient services. For inpatient data, we use MCA discharge and treating specialty files, and we characterize the number of stays, the length of stay, and the cost of the stay; we also categorize by type of setting using a two-digit VA treating specialty code; and with this code, we created six different categories including acute medical, acute surgery, rehabilitation, long-term care, domiciliary, and mental health; and to identify stays related to a musculoskeletal condition, we use the principal diagnosis which is the diagnosis that was the reason for the admission.

So, here is what we have found. About 5 percent of the cohort received inpatient care; the cohort used $1.8 billion in hospital services, which breaks down to $2,300 per cohort member among patients who are hospitalized, so this is the denominator of 44,000 representing the patients who used inpatient services. So, among these patients, there was an average of 1.6 days and $41,800 in costs on average per person; and hospitalizations with a primary diagnosis of a musculoskeletal or principal diagnosis of a musculoskeletal condition accounted for 9 percent of total inpatient costs.

This slide shows VHA-provided hospitalizations by diagnosis. So, at the bottom here, you can see that stays with a principal diagnosis of musculoskeletal condition accounted for 8 percent of all hospitalization stays and 9 percent of all hospitalization costs; and overall, each hospitalization costs an average of $26,000. Hospitalizations with a principal diagnosis of a musculoskeletal condition were about $3500 than stays with other principal diagnoses.

This table breaks down the percentage of total cost for stays with a principal diagnosis for musculoskeletal condition by care setting. So, on the left, you can see the six different care setting categories starting with acute medical stay and ending with mental health. So, the bottom row shows that, overall, 9 percent of inpatient of total costs were accounted for by stays related to a musculoskeletal condition; and if you break this down by care setting, stays for a musculoskeletal condition account for less than 9 percent of total costs for all the care settings, except for surgical stays, in which nearly one-third of total costs were for patients with a primary diagnosis of a musculoskeletal condition.

So, this pie chart shows the VA hospital resources for musculoskeletal conditions. So, among stays for a musculoskeletal condition, nearly two-thirds of costs were occurred in surgical stays, and the other two larger pieces of the pie are acute medical and long-term care, which are about 15 percent each, followed by rehabilitation which is 5 percent of all stays.

So, we are also looking at community care costs since the VA purchases substantial care from community providers. Our data source for this is the Program Integrity Tool, or PIT, pitch and it includes both institutional and professional claims. So, this is still a work on progress; we have overall totals, but we haven't yet broken down costs by categories of care like we did for the VHA-provided services, but we can share what we have done so far.

So, first, with institutional claims. These are bills from hospitals, ambulatory surgery centers, and other institutional providers. So, our aim is to break down these claims into different care categories analogous to what we did for VHA services. So, the fields we are using to determine whether or not a claim is for an inpatient or outpatient service, and then to identify the care setting, our revenue code, place of service, bill type and the diagnosis-related group. We're using the DRG procedure code and diagnosis code to determine whether or not a claim is related to a musculoskeletal condition or not.

So, for professional claims, these are bills from providers and they include outpatient care as well as services to inpatients; and that last part, the inpatient services from doctors, is going to be hard to categorize because we have to match up the dates of the service in the professional claim with dates of service and institutional claim in order to see if the patient was hospitalized when they were receiving these services and their professional claims. So, we haven't done that yet, but that is part of our next step.

So, here is what we have found so far for community care. About 40 percent of the cohort received community care in Fiscal Year 2019, the cohort used $900 million in community care which breaks down to $1,100 per cohort member and represents about 10 percent of all VHA-sponsored care. Among those using community care, that's the 40 percent of the cohort, there was a mean of 11.2 claims per person and an average cost of $2800 per person.

So, this table shows VA-sponsored community care costs. Overall, each cohort member had an average of 4.5 claims for an average cost of $1,126 in Fiscal Year 2019. And we have classified institutional care by setting and most of the costs were for outpatient care.

So, this table shows the annual cost of VHA-sponsored services including community care and VA-provided care. And so, the numbers represent cost per cohort member. So, the average cost per cohort member was highest for outpatient services and community care had the lowest average cost, and community care represents 10 percent of the total cost of VHA-sponsored healthcare.

This table shows--it's a two-by-two table showing community care by VHA care; and community care was received by 40 percent of the cohort; most who received sponsored community care also received VA-provided services; only 1.2 percent of the cohort received community care exclusively, and that less than 1 percent who didn't receive any care, that was most likely pharmacy data, they were pharmacy services.

So, now, I'm going to turn this over to Paul.

Paul Barnett: Thank you. So, I'm just going to briefly summarize what we found out from this test of the methods on this cohort of 1.4 million of whom 800,000 use services. We found musculoskeletal conditions accounted for 18 percent of the cost of outpatient care and 9 percent of the cost of inpatient care, and that pain medications accounted for 32 percent of the cost of the outpatient pharmacy, that including antidepressants which are often included in many studies of pain.

Overall, the musculoskeletal conditions and pain medications accounted for $1828 per capita or eight roughly 18 percent of the cost of VA services provided to the cohort; and this is another way of saying this or the specific information, which is that outpatient services were 18 of the of the care was for musculoskeletal conditions, outpatient, pharmacy, 32 percent was pain medications; inpatient care, 9 percent; 18 percent overall

So, this pie chart shows the distribution of expenditures of care for musculoskeletal conditions, so this is the whole pie is that $1828 that was spent on musculoskeletal care and pain medications. As you can see, surgery is an important source of costs as our pain medications and the imaging that's done in the radiology service; other outpatient service account for a little less than one-third of care, and this is where the primary care visits where pain medications are prescribed would occur and specialized services like physical therapy, or the pain medicine clinic, or acupuncture, or chiropractic, all those fit in that one part of the pie, that 31 percent.

I just want to go through some of the limitations of our analysis; we acknowledge the results are preliminary; we're refining the classification methods. We did rely on a simplified definition of musculoskeletal condition, which is simply the ICD-10 codes that began with the letter "M"; there are some additional codes that have to do with the actual musculoskeletal injury which we did not clued because we were thinking, "Well, we're interested in the follow-up care for their service-connected injury," so there's arguments you met either way.

The database that we relied on to identify our cohort only includes information on the VA-provided Comp & Pen exams; and in recent years

increasing share--now most exams--are conducted by contract examiners, and those are not in this CDW database. So, the most recent veterans applying for Comp & Pen benefits would be underrepresented in this cohort, which makes it a little less like the people that are being recruited for the SBIRT trial.

As any analysis, we had to make assumptions and there are some limitations from the assumptions: one is that we attribute to care based on primary diagnosis--and that word, I've been founded primary in principle in here on the slides that I created; for "inpatient", we mean principal diagnosis, so diagnosis on basis of the DRG. But in any case, when we come to outpatient visits, a given visit may address more than one condition, and so we may include care that was for other conditions by assuming that all the care that has a primary diagnosis of musculoskeletal care is for musculoskeletal conditions. And we've not included care that may have been part of a different visit that didn't have that primary diagnosis.

Lab costs, the best we could do is based on temporal proximity. We looked at the lab tests that were indicated for musculoskeletal conditions and there's just too much overlap with other conditions to make any other assignment.

Radiology, we based on the procedure codes that are related with a musculoskeletal system, but there may be conditions that aren't musculoskeletal involved; for instance, it could be a follow-up for cancer that is looking at that part of the body. So, that's also a little bit of a blunt tool. And in terms of the medications, some medications used for pain are also used for conditions other than musculoskeletal diagnosis, so we have those. Antidepressants, we have sedative hypnotics other categories of medications that have other applications other than pain--and there's no real way to tell why they were prescribed.

So, our community care analysis is especially preliminary because we haven't yet attributed the care to musculoskeletal conditions. I should also point out that we only use the PIT data system, there are other data systems that have community care data, but they have been phased out as of beginning of 2020, which is three months after our end of our study period. And we also did not look at the cost of community care pharmacy; in previous work with a fee basis system, we found that the VA provided the vast majority of the medications received even by patients who are using fee-basis care, they still got their medications from VA from the mail-out pharmacy.

So, I want to pivot here a little bit to talk about the economic hypotheses that we'll be testing, and this is partly just to make it clear that cost-effectiveness analysis and economic study analysis is not just about

measuring costs. And so, first, just to get some idea of people's experience and interest, we'll do this poll. If you could help us out with running this poll, Whitney, that'd be great. And the question is how do you use cost-effectiveness analysis in your work? And these are the alternates.

Whitney: Yes, that poll is now open and it should be on the right-hand side of everyone's screen.

Paul Barnett: And this is a check-all-that-apply poll, so you can do more than one; although I guess the last item, D, is kind of mutually exclusive from the rest.

Whitney: Alright. So, the poll is open and our answers are coming in; so, I'm just going to leave it up for another ten, 15 seconds or so. So, again, this is a check-all-that-apply question, so please check all that apply. Alright, so seems like things have slowed down a lot, so I'm just going to go ahead and close that poll and share the results. So, we have 20 percent that said, A, planned or implement a study with cost-effective analysis; 18 percent said B, "Make clinical or administrative decisions while considering cost-effectiveness."; 24 percent said, C, "Read literature on cost-effectiveness," and 18 percent said, D, "Do not use cost effectiveness in my work."

Paul Barnett: Well, I'm glad to see we have so many people that are interested in this topic on the call and bear with me if you're well familiar with some of these questions. So, our hypothesis first is just to ask the cost-effectiveness question: is the SBIRT-PM intervention a good use of healthcare resources; and also, a budget impact analysis which is to ask what the impact of the intervention is on the budget from the perspective of the decision-maker in the Veterans Health Administration, who's challenged with finding the money to to implement it.

So, I'm mainly just going to talk about cost-effectiveness analysis in the in the next few slides. So, it really should say "recommendations" not "guidelines" for cost-effectiveness analysis, recommend that we measure all costs and express outcomes and quality-adjusted life years, and these revised guidelines have some new practices we've thought about how to implement. And I see that one of the members of the panel is Dr. Russell, is on the call, so I need to be careful what I say in quoting him.

Healthcare costs, we've covered that about--we're trying to be comprehensive in measuring the cost of the intervention and the cost of identifying that which is for musculoskeletal care and pain medications; but we also want to be sure to include all other health care costs, and not only the VA-provided and VA-sponsored, but those incurred outside the VA system. So, we are asking the participants about care that they get

outside the VA system; but we're focusing on the musculoskeletal conditions because that's what we think our priors are, that that's what the intervention is really going to impact.

Then the other thing that we want to be sure to--and this is something that's novel about the newest recommendations--is to consider costs that are incurred outside of healthcare. And to do that, we are looking at lost wages from pain-related illness and looked at the various survey instruments that are used, and decided that we are implementing this work productivity and activity impairment questionnaire, and there are some worked out methods that we have for assigning a value to those lost wages from pain-related illness. So, we want to think about that and also about patient time in engaging in getting care, so that we consider not just the health care costs, but the entire societal costs.

The economic outcomes--Christina briefly mentioned this--that we are wanting to use a quality adjust instrument that can be used to measure quality-adjusted life years; and so, the quality is based on evaluation of preference-based quality of life; and this concept, scored on a scale of 0 to 1 allows a trade-off between the quality of life and the length of life. So, illustrated by saying, well, a QALY is a year in perfect health or it represents two years with a 0.5 preference-based quality of life score. And so, this allows us some advantages about comparing interventions.

So, with the QALY and the cost information, we can figure out the incremental cost-effectiveness ratio, which is the difference between the intervention and standard care in terms of the cost in dollar per QALY gain. So, it's a measure of efficiency; once we have that measure, that ice or that ratio, we can compare our intervention to other interventions across the healthcare continuum, and assuming that we're using common methodology, and that's the point of using the recommended methods. And that we can also compare our intervention to a threshold value of what the decision-maker is willing to pay to gain an additional quality-adjusted life here. One threshold that seems to be used in the US evaluations is somewhere around $100,000 per QALY; but there is no absolute threshold, it's up to the decision-maker what they want to fund, but it does seem that experience in the US healthcare system is that interventions that are at least that efficient don't cost more than a $100,000 per QALY are being adopted.

In the SBIRT trial, we're using the EQ-5D is our quality-of-life instruments, so participants are taking that at their periodic assessments.

So, at that point, I think we're ready to look forward to your questions.

Robin Masheb: Thank you so much to our presenters for such a great presentation. So, we do have some questions that are coming in the chat. First, have you

published any of these results to date? And kind of where are you with this data?

Paul Barnett: Not yet. This is the departmental seminar where we're testing out; till we're still working on it, and we're thinking about hypotheses that we might test with this data set that we've built.

Robin Masheb: And can you talk a little bit more about the limitations that you seem to be running into because of the fragmented nature of the billing and how you understand that, what you think could be done in the future to improve that?

Paul Barnett: Yes. So, I think that the MCA costing system, we're in a very lucky position in the VA to have that sort of cost accounting system that is activity-based cost allocations, and based on pretty detailed information about utilization. So, there's cost assigned based on every lab test and every encounter, and you think about hospital-based systems often have a lack the outpatient data that is outside hospital, but we have comprehensive data. So, in terms of VA-provided services, I think we're in a very good situation.

The community care database is new and this is really--I have worked with the VA data for more than 25 years now--but this claims data that we have in the PIT system is the first time I've worked with that, and it has been somewhat challenging, in part, because it's not real well-documented yet. But without getting too much into the weeds, there's a lot of work, but in analyzing it, Kate put up--and Kate has the scars to show for it--she put up this... this is a list of codes that we found in... so, for the institutional codes--and we used every one of these--so revenue code, place of service, bill type, the DRG procedure codes--these are sometimes conflicting information, sometimes in agreement; we had to kind of validate it by saying, "Gee, did it make sense that even if it suggested that it's inpatient care? If it's actually too-low cost to be an inpatient stay, it must really be an outpatient service, so there's still a little bit of art to interpreting these data. If you think about it, there's a large number of of providers.

"PIT" stands for Program Integrity Tool, it's a way for VA to--it's a commercial software that VA uses to validate claims, and so we're sort of itching our... this is what researchers have about the community care program. And of course, it's 10 percent of the VA budget or more than that now. I hope that answers your question.

Robin Masheb: Yes, thank you. That's super helpful. We also have on the call today, Dr. Robert Kearns who is a Professor in the Department of Psychiatry at the Yale School of Medicine and also the Director of the Pain Management Collaboratory, and he had a question or two for our presenters.

Robert Kearns: Thanks, Robin. That was a terrific presentation, and so important, not only in the context of this project, but potentially many other projects, and it'd be interesting to follow up with this within our collaboratory but also I think within the pain opioid core. So, a couple questions: one is I'm sure I just missed it--and there are probably people on the call that can speak to this better than I can--but imagine that one of the--besides the issues that you've mentioned--interventional pain medicine approaches can be administered in multiple different settings, some potentially in a surgical suite, some in an ambulatory surgical setting, maybe even in outpatient clinic settings, or ultrasound suite it is; and I'm guessing that can account for a bunch of costs. So, how were they actually coded and sorted. Is there a standard approach to doing that? So, that's one question.

The other question I have is more generally about the methodology employed here. I think many of us rely--have relied on 10-year-old data from the, at that time, Institute of Medicine report, from a committee in the Institute of Medicine, which I serve, that commissioned a cost estimate of care for pain in the United States. Wondering if you have any appreciation for the methodology used there and whether this methodology is similar or how it's different from that previous methodology and estimated costs.

Paul Barnett: If I may. Well, for the second question, I don't know how we compare to that Institute of Medicine report; we did look at a number of other studies in thinking about how to do this. And getting back to the first question about how do you identify specific pain services, there are a number of folks who have done this, and in the context of VA, trying to identify the specific pain services that are provided; and it's not an easy prospect for a couple of reasons--and for that reason, we just decided to say if it was--we didn't actually address what is pain or not pain care, we said, it's the diagnosis that we're after, the musculoskeletal diagnosis. And there have been people who have looked at broader categories of pain, and I know there's some VA papers on this where they've looked at all causes, but by disease, looking at treatment for conditions that are associated with pain.

So, we sort of looked at our list of pain modalities; we actually have a survey that we're fielding with SBIRT asking people, "Which modality did you receive? Did you get acupuncture? Did you go to pain clinic? Did you go to a chiropractor? Did you get physical therapy?" It's each specific modality, and we said, "Well, let's see if we can replicate that." And soon as we looked at the various codes, we said, "Gee, that's almost an impossible task." So, to give you one example, we sort of said, "Okay, ed we'd like to figure out what procedure codes we should use," and so we said, "Well, let's look at visits to pain clinics and see which has a specific code within the VA system stop code for pain clinic, and

let's see what procedure codes they use." And say, "Oh, here's somebody who got a flu shot in the pain clinic." Well, that's not pain care. So, it becomes, "Well, what does the pain clinic code mean?" Well, it's a setting, but it's not necessarily treatment for musculoskeletal pain, could be for another kind of pain, could be the flu shot.

And then the other way, there are especially for cognitive-behavioral type care, the codes are just not specific to what we're interested in. And so that's why we took this other approach, which we said we're going to count it if it's the primary diagnosis or for inpatient care principal diagnosis, is for a musculoskeletal diagnosis, and we're going to say, "Yeah, that's the care we're interested in and we'll try to classify it based on these other codes." But in terms of trying to drill down and say what specific services can be used, that's a pretty hard road to hoe, and was really not essential for our purposes of just trying to get what was spent on treatment of musculoskeletal conditions.

Robert Kearns: And Paul, I think I understand exactly what you're saying and I think the approach that you're employing right upfront is very similar to work, for example, out of the Denver, Joe Frank, and Evan Carey, and others [Crosstalking] limitations.

Paul Barnett: Right. That's exactly the group that I was talking about who've done that... try to catalog each condition.

Robert Kearns: And I think, actually, the other comparison just trying to understand any data that you have in comparison to other efforts to try to examine costs of care, even back to the VA. I think it's quite a while ago, but your colleagues at HERC published a couple of papers that were heavily cited for a long time about low-back pain costs. So, think it would be helpful for many of us who don't know... get into the weeds as you are, to know a little bit about similarities or differences of methodology, and capturing costs, in this case, compared to those that are otherwise published in literature.

One last point because I'm here, can't really represent VA, now the Pain Management, PMOP, the Pain Management, Opioid Safety and Prescription Drug Monitoring Program, PDMP, Program Office, I'm guessing in the context of their efforts to try to--emerging efforts to try to evaluate integrated pain teams, that they would likely be highly interested in knowing more about this methodology. Unfortunately, [Freedom Sandbrick] is away now, but I think there is an opportunity to brief them and I'd be happy to try to broker or facilitate that when the time is right.

Paul Barnett: Yeah, Freedom was on our advisory committee for the low back pain study. I should also mention that the group out of Los Angeles--VA

group out of Los Angeles--that has been looking at alternative and complementary therapies--has also done some good work trying to use these codes to identify specific services. And so, we looked at what they did and said, "Gee, that's a good thing to do, but it would get us some subtotals that we don't have, but it doesn't help us get the total of what the care for the musculoskeletal conditions were. So, we really focused on that bigger picture. Because, in the end, that's what we think our intervention is going to, hopefully. So, it has the purpose of getting people more engaged in pain care, so we want to see whether it actually succeeds and doing that.

And we thought that, somehow, those surgery and emergency care were somehow different--and I'll go on a limb here and say maybe what we're interested in is the non-surgical non-emergency care is what we'd like to see more of, and probably not more surgeries and not more emergency care, not more pain medication. So, that's sort of why we sliced it the way we did.

Robert Kearns: I think that's a great point because there's a lot of old literature now really outdated, about the benefits of behavioral medicine or the psychological treatment approaches, or multidisciplinary pain care, and cost offset effects downstream cost savings, which of course, is valuable and important in the VA as an integrated health healthcare system with a captured population.

So, I think this project and these results have a great opportunity to contribute to the business case for these kinds of interventions.

Paul Barnett: This pie chart here showing, this is the budget for care for musculoskeletal conditions in this very large cohort. I was actually quite surprised how important surgery was in that budget; but you think about it, they're rare but very expensive.

Robert Kearns: And I guess that was part of my point, Paul, is that I'm guessing that included there are some things that many people wouldn't necessarily think about as surgeries, but that are procedures, invasive interventions that are actually done in some facilities in the surgical suite, because there isn't somewhere else to do them; whereas some of those same procedures potentially are done in other... captured in outpatient.

Paul Barnett: Well, we did not use the code for the procedure suite, it had to be a surgical clinic or inpatient service; and we also relied on CPT codes for their surgical CPT codes. We didn't require the surgical CPT code, but we required either a surgical location with a musculoskeletal diagnosis or the CPT code for a surgical procedure on the musculoskeletal system.

Robin Masheb: I also thought that this pie chart was fascinating because if you compare other outpatient surgery, pain medications, it's all in the 24 to 31 percent range in terms of treatment; but that's not all equal because the surgery is much more expensive. And so are you getting a smaller number of patients, but just with procedures that are very expensive. It's hard to interpret and evaluate this without having another layer of what's going on here--and I know that's way beyond the scope of what you were doing, but just seems like it would be an important direction.

Paul Barnett: Well, once we built this data set, it occurs to us that there are some publications or some further analysis, and one of the issues is exactly how this is distributed among people, because I think the vast majority of people are not getting surgery, so, obviously, that's a small number of people. So, means hide a lot of information.

Robin Masheb: Kind of a related question we had about other analyses are can you repeat this analysis with subgroups of musculoskeletal pain condition, so can you repeat it just for, say, low back pain patients.

Paul Barnett: So, we did do a study on low back pain and costs of low back pain, and so that would be possible, and I could imagine that someone could also go to the trouble to say they were interested in knees, or hips, or shoulders or whatever they could limit the diagnosis to the care they got for those things. I mean this is a pretty a blunt instrument because some of the musculoskeletal conditions are not what we think about military-induced trauma, somebody who's an older veteran that's got arthritis or an autoimmune condition of the musculoskeletal system, it's going to be swept in here too.

That's why what we really want to do is we refine this is look at the newly-returned veterans which is what our cohorts address, and we're trying to get access to the VHA data that includes the contract exam so that we can actually look at that cohort which is, in a sense, a little more pure because they don't have these other kinds of more medical musculoskeletal illnesses involved.

Robin Masheb: Thank you so much. Thank you for an incredible presentation and some incredible work for the VA. Thank you also to Bob Kearns for being on the call with us today; thanks to our audience for participating in writing in with some great questions.

Just one more reminder to hold on for another minute or two for the feedback form. If you're interested in downloading the PowerPoint slides from today or any of the other sessions that we've had, if you can search on VA cyber seminars archive, there's a pull-down menu where you can find the Spotlight on Pain Management past sessions.

Our next cyber seminar will take place on Tuesday, November 2nd and we will be sending registration information out around the 15th of the month. I want to thank everyone for attending this HSR&D cyber seminar and we hope that you'll join us again.

Thanks, everybody. Have a great afternoon.