Heidi: Once again, thank you everyone for joining us for today’s spotlight on pain management session. Today’s session is the role of pain in predicting late life suicide. Today’s presenter is Dr. Amy Byers. Dr. Byers is a research career scientist with the San Francisco VA healthcare system. Professor of Psychiatry and Behavioral Sciences at UCSF, and Professor of Medicine Division of Geriatrics at UCSF. Amy can turn things over to you?

Dr. Byers: Yes. Thank you, Heidi. Thank you for inviting me here today. This has interesting putting this talk together. I realize that so much of my work involves pain and I feel fairly enlightened to thinking more about this has got me really thinking hard. I feel passionate about the work I do with late life suicide, and especially older veterans. They’ve become very near and dear to my heart. I also wanted to mention, I’m a non-clinician scientists. I’m an epidemiologist. And I really do see myself as a bridge between methods and clinical substance. And I’ve been pretty much tasked by the Office of Mental Health and Suicide Prevention to really think more how my work can be utilized in terms of clinical practice and relevant to clinical practice. So I think about that constantly now in doing the work I do.   
  
I wanted…let me just move my slide here. Just give some disclosures quickly. I have a Merit award through the Clinical Science Research and Development Service. That’s also where my Research Career Scientist Award has come through. As of October 1, 2021, I am officially a research career scientist which is a wonderful honor. I also have NIH funding…NIMH funding. I am a co-PI with Lisa Barry who is at University of Connecticut. And this is studying reentry veterans who are incarcerated and reentered in terms of suicide risk as well as we’re getting into doing more with neuropsychiatric disorders too. I will talk about that at another time, but right now I just want to talk about late life suicided and the work that my merit is doing.   
  
I also want to mention that any opinions, findings, conclusions, and anything I say today is my opinion and my findings and that it doesn’t necessarily reflect the views of the US government or the US Department of Veterans Affairs. So no official endorsement should be inferred. I want to set the stage about the objectives of my presentation and I’m going to start with giving you just a bit of an overview on death by suicide, suicide attempts in older adults, the general population, and then I move on to show you kind of in comparison older veterans more epidemiological evidence. And then talk about indicators of pain that may be associated with late life suicide. And I talk about indicators, I realize pain is one to those things that can be very hard to study and especially as one ages and the complexity of it all. And I think a lot about the interface of physical and mental health and emotional pain as well as factors and how to measure all of that. And so you’ll see from the work I’m doing how it is interfaced significantly with pain.   
  
And then I want to discuss and hoping to have time of implications and the findings for clinical practice. And any ideas others may have and am I moving in the right direction. To set the stage which I feel like is important just to ground myself at least in my talk as well as just to highlight the importance of empathy and compassion when it comes to those who are struggling with suicide, late life suicide. And I did see recently that Naomi Judd died by suicide I think on Saturday, and she was 76 years old. And the hidden pains and she is an advocate for mental health. So you never know. It’s there and sometimes it’s very far under. But this is called, Pain, by Linda Pastan. She herself is I think in her 80s or more and she writes about some profound life events, and I thought this was a beautiful poem to set the stage.   
  
So let me just begin. More faithful than lover or husband it cleaves to you. Calling itself by your name as if there had been a ceremony. At night, you turn and turn searching for the one bearable position. But though you may finally sleep, it weakens ahead of you. How heavy it is, displacing with its volume your very breath. Before, seemed to weigh nothing. Your arms might have been wings. Now, each finger adds its measure. You were pulled down by the weight of your own hair. And if your life should disappear ahead of you, you would not run after it. So let me begin with some of the epidemiological work of just general national information I should say.   
  
So the US population and suicide by age, it’s interesting when we look at the distribution of the US population. On the left I have the distribution male/female left and right sides. I’m looking at the leftmost quadrant here. The y-axis is age going from zero up to 100 plus and the x-axis is percentage. And you’ll see that really the US population is largely younger for the most part. Approximately 35 percent of US population by 2025 will be 50 and older. And it’s estimated that for 65 and older, they’ll be about 20 percent of the US population by 2025. And when it comes to suicide rates, they are highest in the oldest old age groups in the general population. Now death by suicide, and this is the right-hand quadrant. So suicide rates by age with the rates on the x-axis. Suicide rates per 100,000. Again, set up female age, male age left and right, and you do see that older males are the highest risk of suicide. Have the highest rates. Death by suicide is approximately 40 percent of US suicides are in older adults.   
  
Now let’s look at similar distributions when it comes to the veteran population. And I always think this is really interesting because I always think as an epidemiologists, I think, who’s my denominator? And it’s really important when I’m thinking about rates and I’m thinking about subgroups even when I’m thinking about rates. I’m always asking, who’s my denominator? And here I have four different quadrants. The leftmost upper quadrant is the veteran population. And I want to give credit. The stats for this come from the VA’s National Center for Veterans Analysis of Statistics. And they have great stats and demographics of the entire veteran population. So this isn’t just VA. VA is actually even distributed even older.   
  
Now this shows you the x-axis is age going from less than 20 to 80 plus. And the y-axis is proportion of veteran population. And I have it laid out here by actually year 2010, actually 2015, and projected year 2025. And you’ll just see the main thing is that the distribution is largely older. In fact, over 70 percent of the veteran population is 50 and older. And it’s estimated by 2025 that it’ll be approximately 50 percent of the veteran population will be 65 and older. Now when it comes to death by suicide, it’s really interesting. If you look to the right, veteran suicide rates per 100,000 there, that comes with 2019 National Veteran Suicide Prevention Annual Report where they laid out age distributions. There’s been more recent reports, but it hasn’t been as focused on the breaking up by age.   
  
But you’ll see that the highest rates on the x-axis it shows 18 to 34 going up to 75 plus with the bars. The highest rates are truly in 18 to 34 rates per 100,000 are on the y-axis. And then if you look at the leftmost lower quadrant veteran suicide counts by age groups, you’ll notice there’s a similar set up with number of suicides on the y-axis. That 55 to 74, 55 and older is actually the highest counts. So this is where it comes into like, rates, and counts, but yet he distribution of the veteran population is much older, so the denominator is much bigger. So as you can see, you slice it and dice it, at the end of the day across the board when it comes to age and aging, suicide is extremely important across the board. This should you ratio just to give you an idea of suicide attempts to death by age. And youth 15 to 24, it’s about 100 to 200 to 1 suicide death. Adults greater than 18 years old, 25 to 40 to 1 suicide death. And as you get into the older age group 65 and older, four to one and then in veterans, it actually looks like in VA veterans about two to three to one.   
  
Okay, so let’s talk about indicators of pain as potential risk factors for suicide among older veterans. And I just want to set the stage that I think it’s been fairly well established that pain is an independent risk factor for suicide. There’s evidence across the lifespan \_\_\_\_\_ [00:09:44]. There’s been systematic reviews done over the past couple years that support that. I will note that the spectrum of pain and the measure of pain I think can be very challenging. And when I say spectrum, there can be mild to severe. How does that interface?   
  
At the end of the day, I do really feel like the reality of pain and late life suicide association is probably pretty complex and complicated. When an individual ages, there are profound events that happen. There are declines in physical as well as cognitive health. There are also losses, significant losses. Those are losses as well, losing one’s physical capacity or mental health. And there’s losses of friendships and family. To there’s profound events that happen with age. And we’re all consistently aging and learning from I think the older individuals and what may be coming upon even us.   
  
So I like to approach my work and I’m going to talk about two separate projects here. The first is really to multi-morbidity and comorbidity. And there really is little known about the spectrum of medical and psychiatric comorbidities and how it all interfaces. And that includes pain and where pain comes in in that in late life suicide risk. And then I will secondly…actually, this should be a two here. Sorry about that. I will secondly talk about psychoactive medication use type and polypharmacy. And they’re most used for pain largely. So let’s talk about comorbidity, multi-morbidity, and pain.   
  
Study objectives here were to identify medical and psychiatric comorbidity profiles of older veterans who were 65 and older last seen in primary care prior to a suicide attempt. We also wanted to describe means and lethality of attempt and utilization factors related to those profiles. This is a published study already It’s in Jags 2019. And I’ve present this before, but I really felt like…I realized as I was looking back at this that it has a lot to do with pain. Especially chronic pain. And let me tell you a little bit more about who we studied. So the data sources were for all veterans 65 and older enrolled in VHA who attempted suicide between 2012 and 2014. And keep in mind that when looking at death by suicide data, there’s always a lag with the…it used to be called SDR, the Suicide Data Repository. Now it’s the MDR/Mortality Data Repository. It’s always a few years legs.   
  
So at the time that I worked on this study, there was a few years lag. And I mean, delay in the availability of the data. We don’t have real-time cause specific mortality data through the MDR. So at this time, I was able to study nonfatal and fatal attempts and of those who were last…their last visit was before their attempt was in primary care. We used the NPCD data they set, the National Patient Care Database, the CMS, Medicare/Medicaid services, the SPAN/Suicide Prevention Applications Network and it used to be called the SDR, the Mortality Data Repository. The records were extracted for all veterans seen in primary care at VA facility between October 1, 2011, and December 31, 2014, and had no suicide attempt in previous fiscal period 2008 to 2011. And we used latent class analysis. And the reason we didn’t want any previous attempt document is because we wanted it new to…often times when there’s attempt, it becomes a strong interface of mental health services. And we really wanted to know what was happening prior to an initial attempt.   
  
Our final sample were 2,100 veterans age 65 and older, mean age about 74. The majority were male, a majority were white, and about 40 percent were college educated, and about 51 percent were married. Here are the medical and psychiatric diagnoses that we included in our analysis for the latent classes. And you’ll notice that chronic pain was included. I highlighted it here. The decision for all these medical and psychiatric were in one way one shape or form had been related to suicide and/or even potentially related, and/or they…. Also I should say, there was enough information that we actually could look at the probability of clusters in distributions. So here are the profiles. The comorbidity profiles that we found and determined. And let me go through this.   
  
So the x-axis here is the actual morbidities and towards the end is the more psychiatric and substance use disorders. Just to give you some orientation, the y-axis is the probability of having diagnosis. So what we found were five different classes or clusters and we named them and based on the prominence of the different morbidities that popped out. And the first is minimal comorbidity which is about 23 percent. That’s the green line. Chronic pain osteoarthritis was about 30 percent. It’s the yellow line. Depression chronic pain, the purple line was about 23 percent. And depression medical comorbidity was approximately 16 percent. And then high comorbidity about seven percent is the blue line. So you see it’s really interesting the distributions. And keep in mind, this everybody who…they attempted fatal or nonfatal lasting in primary care. And I am honing in here for today’s talk on the chronic osteoarthritis and the depression chronic pain.   
  
I put a line here because I also wanted to note that chronic pain is pretty pervasive throughout at least four of the main profiles. And I honestly just as I was preparing this talk, I really notice this. I was like, wow. Chronic pain is really popping out. In the chronic osteoarthritis \_\_\_\_\_ [00:16:18] chronic pain, it’s largely the majority in terms of…in comparison to the other morbidities. But it is it shows up in every single one of these other three. And then there’s the minimal comorbidity. So in this table, I’ve shown you lethality and means by clusters of those last seen in primary care. The first column is a total sample and then there’s the five clusters and I’ve highlighted the chronic pain, osteoarthritis, and depression chronic pain. And you will notice that…so for that prior ideation, the high comorbidity was at 68 percent prior ideation. And I think that’s largely because…keep in mind, this is all VHA data.   
  
These are individuals who interface with mental health services. And I think the more interface you have with mental health services, especially mental health because of this high comorbidity you’ll see later had some significant interface with mental health as well as integrated care. There’s more screen going on and so that’s I think where that 68 percent comes from. In terms of fatal attempts, it really is fascinating to me and scary that the chronic pain osteoarthritis actually had the highest lethality in terms of attempts. And the depression chronic pain where there was actually depression diagnosis, in terms of fatality, it was about 39 percent of the attempts. So it was much lower. And that may very well…and you’ll see as we go along be related to integrated mental health services and the depression diagnosis was noted.   
  
And also scary is the level of firearms in the chronic pain osteoarthritis, it’s nearly 90 percent of the deaths by suicide or by firearms. It’s about 73 percent for the depression chronic pain. And in the high comorbidity, it was nearly 50 percent. For the high comorbidity, overdose was 20 percent. Now you do see here too now with minimal comorbidity, fatality is high. It’s 73 percent and firearm is 82 percent. The highest is the chronic pain osteoarthritis group. And then this shows you type of health services seen in last primary care visit. And this is also from the paper, but I think it’s really interesting when we hone in on chronic pain osteoarthritis and the depression chronic pain.   
  
So the x-axis is just showing you the different…five different clusters. Y-axis percentage. And the four different bars, blue bar is primary care medicine, orange bar primary telephone care, the darker gray bar is primary mental health care, and then the green is most recent primary care visit less than 30 days. And when you look at the chronic pain osteoarthritis, you see that there really wasn’t much of any primary mental health care. Primary integrated mental healthcare. But depression chronic pain there was. There was over 40 percent high. And then you’ll see the high comorbidity just relatively looking at it was well over 50 percent of those who actually had integrated primary care. And I do think it’s interesting too, to see that when you look at primary care medicine and in the chronic pain osteoarthritis, I mean, it was largely primary care medicine was the type of health service without integrated care.   
  
And then also, the green most recent primary care visit less than 30 days in terms of when they attempted looked like it was fairly similar for depression chronic pain, depression medical comorbidity, and high comorbidity. It was less so for chronic osteoarthritis and was a little further out. So just to give some food for thought. And then when thinking about mental services, we’ve been doing more work looking at last visit was in mental health services. And I’ve been doing more work beyond this and almost have a paper ready for submission. But this I think shows you a good comparison of when we looked at last visit with minimal services, so the rightmost shows you what I showed you before the five clusters based on last visit to primary care. And when the last visit with mental services depression was a big factor across all. Even the minimal comorbidity had depression minimal comorbidity.   
  
So depression diagnosis…and I didn’t fully realize, this is highly prevalent in mental health services. And I’ve talked to clinical colleagues since and they’re like, yeah. It looks like the majority of individuals at least have a depression diagnosis if you’re utilizing mental health services. And it was very high across all these clusters and those who last attempted suicide. and I just wanted to show you that in the mental health service one it’s almost like the chronic pain osteoarthritis that we saw with the primary care and the depression chronic pain collapsed into one group, depression chronic pain osteoarthritis one cluster.   
  
Alright. Let me move on and show you here too just for getting some reference to what we looked at before with lethality and means by clusters, this is last seen in mental health based on those four clusters I just showed you. And that lethality went down to 21 percent for the depression chronic pain osteoarthritis group here. Ten perfect for high comorbidity. Minimal was 32 percent. And firearms were much less as well going down to 61 percent for the depression chronic pain group and it was highest actually here, 81 percent for depression medical comorbidity. Overdose was similar here with high comorbidity being the highest at 22 percent. So it’s just interesting to think about the interface of services, those who did attempt suicide and the service they were last seen in in their profiles and how this may inform clinical care.   
  
And this is just another comparison of those last visit in primary care and last visit in mental health to really highlight for you where chronic pain is coming in here. And when we looked at last visit primary care, 86 percent fatal in chronic pain osteoarthritis. Of course depression was in every single cluster for those last visit mental health. And the last row here firearms use in 83 percent of fatal attempts. That was the highest was in chronic pain osteoarthritis class. And firearms use was 65 percent of fatal attempts with highest in depression medical comorbidity. So there’s significant differences in those who were last seen in these different types of services and with the interface of chronic pain.   
  
So just some reflections on these findings and potential implications for clinical care. I do think chronic pain with and especially without co-occurring depression is a strong indicator of suicide risk. I also wonder how often suicide risk assessment when working with older patients if they do not have a medical diagnosis. And how often are firearm access safety and access to other lethal means discussed with older patients who experience chronic pain. And also, what happens in a clinical interview that makes a provider want to probe further about suicide risk. I would think that if a patient denies depression or suicide, maybe there seems to be no reason to probe further. And I just wonder too, how much providers rely on their internal clinical compass, their internal instincts when it comes to asking the questions to patients if they don’t seem to have any obvious signs of suicidal thoughts. If you know that they have a firearm in the house and they’re experiencing significant pain, are gun locks often provided or suggested?   
  
And future directions of this work, I really want to investigate more closely the chronic pain comorbidity profiles and look to see mechanistically what might be going on as longitudinal predictors over time for late life fatal and non-fatal suicide attempts. Now I wanted to access psychoactive pain medications and work I’ve been doing and more focused on recently as well as the profiles too. But this is work that is almost ready for submission. And it’s the potential role of psychoactive pain medications and how to think about this. A little is known about other unique factors such as psychoactive pain medications and predicting late life suicide related outcomes. And I say other as in other than depression or anxiety disorders or sleep disorders. And often the focus is on the diagnoses opposed to what else might be going on. And I think medications can be a really…potentially a really good indicator of severity of disease or hard to treat underlying distress of disorders.   
  
And older veterans are highly likely to experience conditions such as chronic pain associated with these commonly prescribed medications such as benzodiazepines and opioids and as well as anti-epileptics and antipsychotics even. Psychoactive pain medications may serve as valuable markers. So I’m thinking of them as markers and stepping away from that they are absolutely causal factors or what not. And they may uniquely characterize those who may attempt in ways that a diagnosis alone such as depression would be unable to capture. And keep in mind, the work I do is large-scale VHA data, Medicare data. So it’s at the point of time of the diagnosis and so it’s really hard to get at level of symptoms.   
  
I won’t spend much time on this table so we can move along with my talk. But this just shows you there are six main categories I’m interested in looking at. I realized I initially in my grant I had talked about five, which was benzos, sedative-hypnotics, opioids, antidepressants, antiepileptics, and also realizing antipsychotics are important ones well. All of these in one way shape or form in this table I show that the drug categories and a description of common treatments, indications in older adults, veterans, and all of them in one way shape or form interface with treatment for the pain and different levels of pain.   
  
So I’m going to move on and talk about how to think about this. So I can set the stage because I often think we think in…when you think of associations, we often think, how do you get a causation? And I want to step away from causation and think of this much more as indicators, markers, and thinking about what is this… If you can see the association, what potentially could be telling you? Because a lot of the issues around studying medications becomes confounding by indication when you’re looking at observational studies. So how do different medications are associated with risk of suicide is likely complex in older individuals, especially veterans. There are likely multiple potential pathways where medications may be strongly associated with suicide risk that do not fully capture by other predictors as I was mentioning like just a depression diagnosis. Especially when we use this kind of data.   
  
So here’s some pathways to think about one through four. Simply access to highest medications. It’s similar to access to firearms. If there’s access. So capacity is important. Desire is important. But capacity is hugely important. The ability to actually fulfill one’s desire to die by suicide. Secondly. Medications may be causally linked. They truly may be where central nervous acting medications increase vulnerability to risk of attempting suicide. And often times we’ll think about antidepressants at least in the first few weeks of starting the antidepressant may put a person at particular vulnerability of attempting suicide.   
  
Thirdly. Type and amount of medication used can serve as valuable markers of presence and severity of pain and/or psychiatric symptoms and socioemotional mental distress. And I think number four is a big one. Polypharmacy. I’m finding the work I’m doing; polypharmacy is I think a pretty huge indicator. And of the complexity of the comorbidities, especially involving pain that increase risk of suicide. I think polypharmacy can often be an indicator of not just underlying distress but maybe difficulty in treatment. And a person’s distress may be based on the fact that they can’t quite figure out a way to resolve their underlying pain and mental and physical and emotional health conditions.   
  
So the study objective for this study was to look at high-risk and low-risk medications. And when I say high-risk, I’m talking about those six psychoactive pain medications I mentioned. And to first examine the relationship of high/low-risk medication use to suicide attempt among older veterans. When I’m talking about look at a high and low-risk medication, part of the idea we had with bringing the low-risk was, it was a type of falsification analysis. So it’s like, yeah, yeah, yeah, yeah. Yu see more medication used polypharmacy what not \_\_\_\_\_ [00:30:36]. Could that just be kind of type of \_\_\_\_\_ [00:30:39] that just they’re using more services, having more issues.   
  
So then then looking at more low-risk medications would help to alleviate that and help provide some confidence that maybe it really is the psychoactive medications themselves are actually providing a pretty good indicator and that we need to think more about what’s going with the patients. So with the low-risk medications, we defined it as…we did cardiovascular types of medications and that really don’t have much of an established association with suicide risk to help control the noise. And then finally, we want to investigate risk associated polypharmacy for both high and low-risk medications.   
  
Here’s our methods. With my Merit Award, I have actually created what I call a national representative sample of five million veterans. This comes from the VHA data, but the samples convened. It’s all veterans 50 and older convened in fiscal year 2012, 2013. And I set it up like a longitudinal study where every year we update the data of those individuals convened in 2012, 2013 who are 50 and older. And for this study, it was through December 31, 2018. Now we have the more recent date of December 31, 2019, and that gives you perspective on the most recent MDR data available for cause specific mortality to get at suicide death is December 31, 2019.   
  
And so there is this delay we can’t white study real-time when it death by suicide on a large-scale level. And so this sample is those who attempted. This is a case-control type of study. Nested case-control. It’s those who attempted suicide between 2012 and 2018 who were then age matched 1 to 3 with veteran seen in VHA during that same period from the following databases. The NPCD again, and the pharmacy data as well we linked in CMS data, SPAN data for nonfatal attempts which has event dates, which is important for the work we’re doing. And the National Mortality Data Repository which gets at the fatal attempts and means.   
  
So final was over 31,000 veterans. Think about that who attempted suicide, 50 and older from 2012 through the end of 2018. Their age matched to a sample of over 93,000 veterans same time period who did not attempt. Exposures to high-risk medications within six months prior to the attempt visit date and it includes the benzodiazepines, sedative-hypnotic, opioids, antidepressants, antipsychotics, and antiepileptics. We also looked at low-risk medications within six months prior to attempt. And we use logistic regression. This is the way by doing the nested case-control was a way we could really capture the timing within the six months. We could’ve also look at this prospectively, but I really wanted to capture within the six months from the attempt what medications were they taking.   
  
Keep in mind that, more of the work I’m doing, I realize how complicated to look at medications. There’s intermittent use, there’s new uses, there’s high-risk use. This is just really yes/no within those six months. This table shows you the non-attempters and attempters and the medications. And I list it up by any high-risk medication within six months before attempt visit. The benzo, sedative-hypnotics, opioids, antidepressants, antipsychotics, and antiepileptics, number of high-risk medication use. So we consider polypharmacy greater than or equal to three. And here’s 012. And then any low-risk medications. There’s a number of low-risk medications as well. So you’ll see that among attempters, they are taking more of the psychoactive medications in general, especially the antidepressants when you compare them to non-attempters, antiepileptics.   
  
And then also you can see that when you look at the polypharmacy, it’s pretty high in terms of greater than equal to 3, 23 percent of the attempters were taking 3 or more of any of those 6 psychoactive medications where it was about 3 percent for the non-attempters. You’ll also notice any low-risk medications which interestingly attempters are taking more as well. If over 50 percent compared to 35 percent approximately for the non-attempters. And then the distribution of the low-risk medications…actually, that distribution is fairly similar to the distribution that we were seeing with the high-risk medication. So I think this is a pretty good…it’s pretty good to say, assessment of…let’s look to see how these associations go with high and low-risk medications when we’re talking about suicide attempts.   
  
And here’s a table looking at are odds ratios where high-risk medication use and risk of suicide attempt. Benzos, sedative-hypnotics, opioids, antipsychotics, antidepressants, antipsychotics, antiepileptics and the models are…the first models unadjusted. So you see these high odds ratios. Very, very high especially for the antipsychotics and antidepressants. And then model two is adjusted for demographics. Model three is adjusted for demographics and psychiatric comorbidities. So mood disorders, PTSD, other anxiety disorders, substance use disorders, and psychosis, also personality disorders, as well suicide ideation. And model four is adjusted for all what I just said as well as number of visits.   
  
So we can kind of say with health services what might be happening is there any sort of confounding going on. And model five is the last model which then further adjust for medical comorbidities including hypertension, such things as a COPD, cancer, dementia, TBI, sleep disorders, osteoarthritis, epilepsy. Just to see what independently was going on with the medications. And see across the board, these medications are associated with suicide attempts. We even did a model where we readjusted for each of the individual medication and still saw a signal for each of medications. And this to me is…I feel like this is pretty profound at lease for what we’re doing in terms of looking at low-risk medication, high-risk medications, and polypharmacy and the potential dose effect going on.   
  
So this graph figure shows you on the y-axis the odds ratio. And the x-axis is the number of medications going from zero, one, two and great than or equal to three. So pretty much be the referenced. And you’ll see the blue is low-risk medications which are just below that odds ratio one line. And then you can see the orange is the high-risk medications and how it increases with more psychoactive medications utilization within the six months from the attempt visit date. And just some reflections on this and implications for clinical care potentially. I keep it in mind I am and a non-clinician scientists and so I really like to think through this with my clinical colleagues. First off, given lethality of attempt in late life, the potential association of number of high-risk medications with risk of attempt is vital information I think to really think about and how to utilize this information across stakeholders.   
  
For providers, possibly maybe what would the awareness of number of high-risk medications, how does that imply pharmacy in the context of other risk factors there or not there? How might that influence going forward the lethal means safety counseling? And importance for patients education about risk factors even medications, the availability of medications, what might be happening with medications. And thinking through safety planning that more of a…maybe more of a universal level. And I really like to think about empowering ourselves and everybody in terms what they do.   
  
I mean, I know I’m an epidemiologist and I don’t see patients, and I actually consider that…I have the benefit of running these numbers and then try to think through, how can we resolve this? But I also don’t have the benefit of being able to sit there with the patient and actually talk to them and the challenges and the amount of time available to do anything. I do think that clinicians internal instincts and heuristics are a powerful suicide prevention tool. I see that with my geriatrician colleagues. They’re amazing how they think about quality of life and balancing things and even deprescribing and monitoring these different types of benzos and opioids and all these different types of medications and what does pain mean and how to manage pain.   
  
Also, what could be added to one’s internal checklist when working with an older veteran particularly where there is polypharmacy of high-risk and psychoactive pain medications. Education for family members about the intersection of polypharmacy with other potential effects. Cognitive sequelae of sedative-hypnotics that may lower inhibition if there is a firearm in the house and some is under significant distress. I have a clinical colleague of mine who actually, she’s a nurse psychologist and she hands out gun locks she says like they’re candy. If I find out someone has a gun in the house, I give them a gun lock whether they show symptoms of suicidal thoughts or not. She said, I also give them a gun lock because there’s other people in the house who could be at risk. So we know our older veterans different from their younger counterparts in many ways, and how can we use knowledge of indicators such as these medications related to chronic pain to help keep them safe?   
  
So future research as I’ve been thinking about it for me, and the next steps is capturing and assessing the impact of changing. How the changing and prescribing mandates over time. It does really seem to be impacting the work I’m doing thus far with the way I’ve been looking at the data and investigating it. I do think I would like to do further investigation of trends in polypharmacy and looking at…it’s hard because you’re looking at intermittent use or new use or co-occurring use and the timing of it all can be very challenging. I feel up for the challenge and I think it can be very informative because every time a new prescription happens or there’s a new interface or there’s a new transition, it’s an opportunity for a point of intervention or prevention.   
  
And other unique and novel indicators of pain that may be associated with late life suicide, I’m thinking more in terms of also protective factors or resiliency related to social factors or support services that come in or help to manage care that may help to…or palliative services that may help to mitigate pain and thus suicide risk. I do wonder about that minimal comorbidity group and who are those individuals. But yet, they’re at high-risk also of suicide risk and they don’t seem to show up on having the chronic pain issues or the depression diagnoses and who are those individuals and how could we get at more information on them? And I do think it’s a real must that I engage more collaboratively with my clinical colleagues, and I do. I work my geriatrician colleagues, my psychiatrist colleagues, I’m doing more and more of internal medicine colleagues. I think it’s imperative, especially for late life suicide work to talk to primary care.   
  
So is some in terms of thinking this through, I really do believe suicide prevention is everyone’s business. I believe growing old is everyone’s business too. I got into the work of studying late life as a epidemiology of aging because I was so fascinated by the stories of older adults, but also just by the fact that I feel like I’m studying myself. I’m studying where I’m going, and I feel so much empathy and compassion and I want to maintain that in the work I do even though I don’t see patients. And how best to manage pain and the complexity of comorbidities. I think the importance of clinical compass is imperative. Internal clinical instincts and heuristics are a powerful, powerful suicide prevention tool. How best to translate these findings to clinical practice, which I think I need to think more about.   
  
Provider’s ability to track and see and sense the signs that, even if you don’t see depression diagnoses, is there something going on? Psychoactive pain medications are modifiable factors. And how to integrate that into more monitoring. I know there are mandates, but how to integrate that more into just individual practice? And I just want to say thank you and of course open things up for questions. I’m glad there’s time for it. I want to thank though my funders, especially CSR&D has been so supportive of my work that I just want to continue doing. I want to thank the VA. San Francisco VA, UCSF, my co-authors, and clinical colleagues, and in particular I always like to give a shout out to my gratitude to the men and women veterans who entrust their care to the VA and make my work possible. So thank you. Heidi, should I just leave things up?

Heidi: Yeah, I would just leave it up. You never know if you want to refer back to something depending on the….

Dr. Byers: I think I can see the chat. I have it open here.

Heidi: Okay, so with the questions, I’m just going to start at the top. I know Bob responded to a couple, but let’s just see what we can get through here. The first question here. Thank you for sharing this work. Question related to study design with greater than 55 greater than 65 years. How might your results be similar or divergent from veterans 55 to 64 years old? Thank you.

Dr. Byers: So with the latent class analysis…that’s a good question. Part of the reason we did the 65 and older is because the Medicare data. So we just don’t have the complete information. It feel much more complete to do 65 and older. Although, that said, I do think the 55 to 64 is an important group to study as well. I think that we would likely see potentially more mental health probably less medical. And I do wonder how much more chronic pain we would see as highly prevalent already. It probably would be a very high factor. But we did target the 65 and older largely because we wanted to bring in Medicare data. And it does create a challenge when bringing in Medicare data to be complete when we also include the 50 to 64.

Heidi: Great. Thank you. The next question. Question regarding type of healthcare visit and clusters. If chronic pain osteo having many veterans dying by suicide without interaction with mental health, could proactive intervention be done with predictive analytics with cold call outreach rather than awaiting referral to mental health?

Dr. Byers: So Heidi, is that a question?

Heidi: Yeah, it was a question. There’s a question mark at the end. Could proactive intervention be done with predictive analytics?

Dr. Byers: Yes, I think so. I do think the issue is…so this is interesting. If Bob, I don’t know clinically speaking and what not. This is where I think yes. I think it totally can be done. Predictive analytics. Now how the end of flagging those individuals and then calling them and then getting them into…there’s this interface right, getting into mental health services I actually think is potentially the bigger challenge. And I know…and I don’t know…I know providers who feel like they have to…they’re not as comfortable doing that, and yet they have to do it. And then I also know on the veteran end, they feel like…so I guess the question is how to approach it from a feasibility perspective as well as, there’s a backlog when it comes to mental health services.   
  
And I often think when an individual is in distress…and I think the predictive modeling can pick up on it. It updates every night or something like that. It can flag someone, but when someone is in distress, I really think it can be acute distress. And it can be that moment of acute distress that they’re going to contemplate, or they have the most capacity and desire to do something. And if there’s a gun sitting in the house, there’s medications; it can take a moment of impulse to do it. And so I do wonder…that doesn’t say that that goes away. I think it’s clear from the mental health service work that I’ve done with the clusters that there is something still there. I think mental health services does help to mitigate those moments of high hits of crises over the longer-term, but there is still something underlying there. so I think mental services is important, but I don’t necessarily think that that resolves that immediate acute moment where someone may take their life. And I don’t know the answer of what to do about that.

Heidi: Great. Thank you. The next question that I have here. And if you’re following along Amy, I jumped down a little bit here.

Dr. Byers: Okay. I haven’t read it all.

Heidi: Yeah, Bob answered a few so I’m jumping down below there. As an epidemiologist, can you speak to possible population level disparities between age, life satisfaction, and suicide rate with life satisfaction possibly having a U-shaped relationship with age while suicide rate increases with age?

Dr. Byers: Yeah, I think it could be. I think there’s multiple explanations. One could very well be a resiliency issue. I think that if a younger individual attempts suicide especially…if it was firearms, I think it’s pretty clear-cut. When you look at the death data, most the firearm deaths are not by homicide or unintentional. It’s intentional. And so I think the access to firearms is a huge one. And I think when it comes to overdose, it’s a resiliency issue. I think that younger individuals are probably more resilient to overdose than older individuals. Can you repeat that question too Heidi? I’m sorry I just want to make sure I’m capturing everything there they’re talking about.

Heidi: As an epidemiologist, can you speak to possible population level disparities between age, life satisfaction, and suicide rate with life satisfaction possibly having a U-shaped relationship with age while suicide rate increases with age?

Dr. Byers: Yeah. I think it’s really complex and there’s different ways to think about this and at a population level, I think what I was talking about with the firearms is a really interesting and capacity to have firearms as you get older. Now life satisfaction when thinking about disparities with that, I do think that becomes a quality of life issue. And there has been some work as well done with that. With age, there’s been studies and related to suicide as well where your quality of relationships increase with age and actually individuals can do better. But there’s also with age relationships…there’s more death.   
  
There’s more complications with relationship. It’s so complicated on both a resiliency factor and then also on a life satisfaction factor. And as we age and quality of life as well as there’s been work done on negative stereotypes with age very strong by Becca Levy. Very strong risk factor for later life suicide and in veterans as well, especially in America. So it’s so complex that there’s so much to study when it comes to this that I always feel like yeah, there’s so many questions. So I don’t know if I’ve fully answered that, but it gets me thinking more and more about all the different directions.

Heidi: Sometimes that’s a good part with these cyber seminars. They send in questions that you never thought of and it kind of takes you in a new direction.

Dr. Byers: I’ve been thinking a lot more about protective factors and what that means.

Heidi: Okay, we’ve got a few more questions here. Let’s see what we can get through. Interesting to look at medication and suicide attempts including thinking of medication as marker. What about lumping medications into sedating or not? Sedatives could be hybridized to be coping strategy for avoiding unpleasant flashbacks, et cetera. And sedatives are lethal means for suicide.

Dr. Byers: Yeah. Sedatives, there’s been enough and there’s been some work and I think there needs to be more work in this area when it comes to sedative-hypnotics. And I’ve actually become more interested in thinking more about sedative-hypnotics for sleep disorders and what not. There’s a number of at least anecdotally that I actually know friends of mine who had experiences with this of people they knew. Individuals who sleepwalk or sleepwalking issues and they’re taking meds. And get in the middle of night and actually have a firearm and kill themselves and had no signs of suicidal thoughts or whatnot. And what’s going on there?   
  
Yet on the other hand, sleep meds can be incredibly helpful for coping. So it’s, how do you manage that in terms of monitoring medications, risks if someone…I would say you’re giving someone sedative-hypnotics and they have a firearm in the house, you give them a gun lock. You figure out ways to talk to them about it. And I think providers are often afraid to talk...primary care providers are afraid to talk to the patient because they don’t think they should, or they’re supposed to. That isn’t true. There’s multiple articles in the annals of internal medicine that talk about this. It’s fine to talk about suicide and firearms to your patients if you have concerns.

Heidi: If everyone could look at your chat. Bob Kearns had a few references I just sent out to everyone.

Dr. Byers: Can I just copy that?

Heidi: No, I just sent it out to everyone so everyone should have the in their chat now. And then I just got a question in about the slides. The link to the slides was included in the reminder that was sent out this morning. So if you refer back to that reminder it’s there. You’ll also receive an archive notice in a couple days, and you’ll be able to get to the slides from that archive notice. Let’s see if we can try to slip one more question in here. Curious about the specific medication cyclobenzaprine/Flexeril, which is usually categorized as a skeletal muscle relaxant used for acute or chronic low back pain but has chemical similarities as TCAs. Is this medication accounted for high-risk or low-risk medication?

Dr. Byers: I would need to look to see…what’s the generic name?

Heidi: Flexeril.

Dr. Byers: Flexeril? Okay. I would need to check to see our list because we have a multiple list of domains and I’d have to see Flexeril. I don’t I know. I don’t know right now. I need to check with my statistician to make sure that it would be included.

Heidi: Okay, so if you don’t have an answer for that, let me try to slip in one more here. Do you consider social psycho factors like the role of life losses, job status, marriage, health?

Dr. Byers: I’m unlimited by what the EHR data has. And we haven’t tapped into doing anything in terms of…so we can include marital status. So whatever the…but when it comes to life satisfaction or social support, the data isn’t very good for that. Actual social support relationships, we probably have to do something like natural language processing or something more in depth or interviews. The thing with suicide, it has a very low base rate and so studying it with this large population of over five million, we’re able to do a lot with it, but were limited by the data available. So if it’s not in the EHR or available through health factors or some of the other, it’s very difficult for us to study.

Heidi: Got it. And we are right at the top of the hours so it’s time to wrap things up. Amy, do you have any closing remarks or Bob?

Dr. Byers: I just want to say thank you very much. And if anybody wants to reach out to me to discuss anything or whatnot, I really love the questions. They’re very thought provoking. And I think that’s what…really think it through. And to e supportive in a very real way. Thank you.

Heidi: Thank you. And Bob Kearns, while I have you on the line just wanted to check to see if you have anything you wanted to….

Bob Kearns: This was terrific. I have a lot of thoughts about it. We’ll have to follow-up. But really, the bottom line is this focus on suicide and late life in the context of this cyber seminar series and our research portfolio and the VA is important. So thank you for your work and for speaking today.

Dr. Byers: Thank you too.

Heidi: Yes, thank you so much. For the audience, when I close the meeting out here, you will be prompted with a feedback form. We would appreciate if you took a few moments to fill that out. Thank you everyone for joining us for today’s HSR&D cyber seminar and we look forward to seeing you at a future session. Thank you everyone.

Dr. Byers: Thank you Heidi.

Heidi: Thank you.