

The Role of Pain in Predicting Late-Life Suicide

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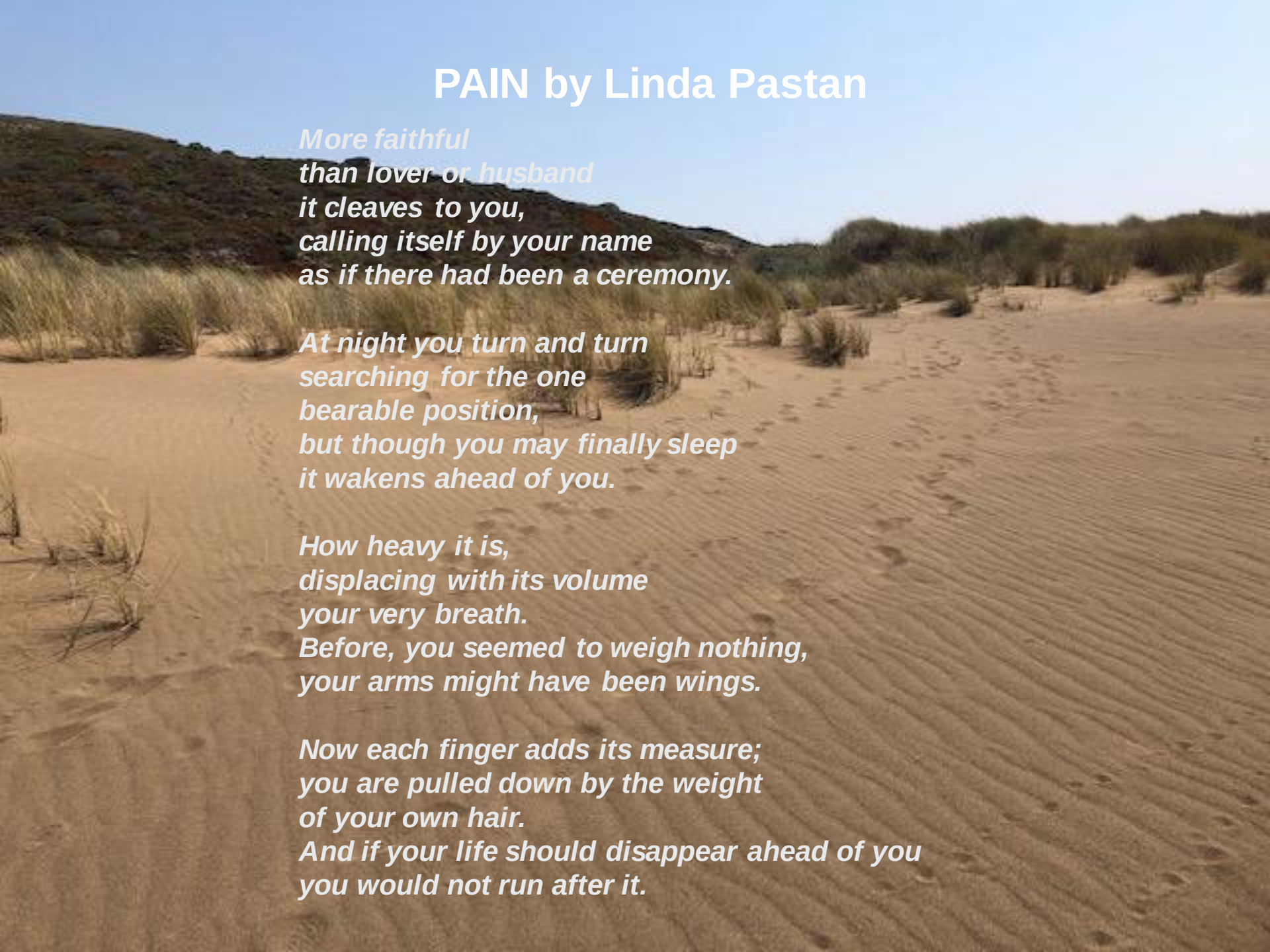
Objectives for Presentation

1. Death by suicide / suicide attempt among older adults/Veterans

2. Indicators of pain that may be associated with late-life suicide

3. Implications of findings for clinical practice



PAIN by Linda Pastan

More faithful
than lover or husband
it cleaves to you,
calling itself by your name
as if there had been a ceremony.

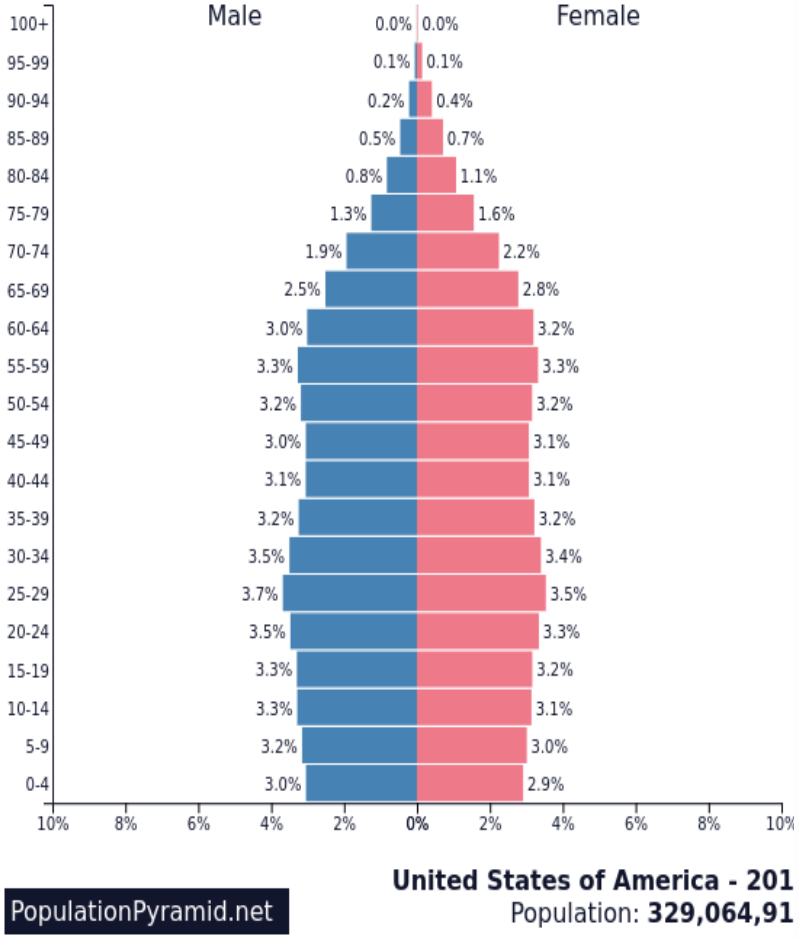
At night you turn and turn
searching for the one
bearable position,
but though you may finally sleep
it wakens ahead of you.

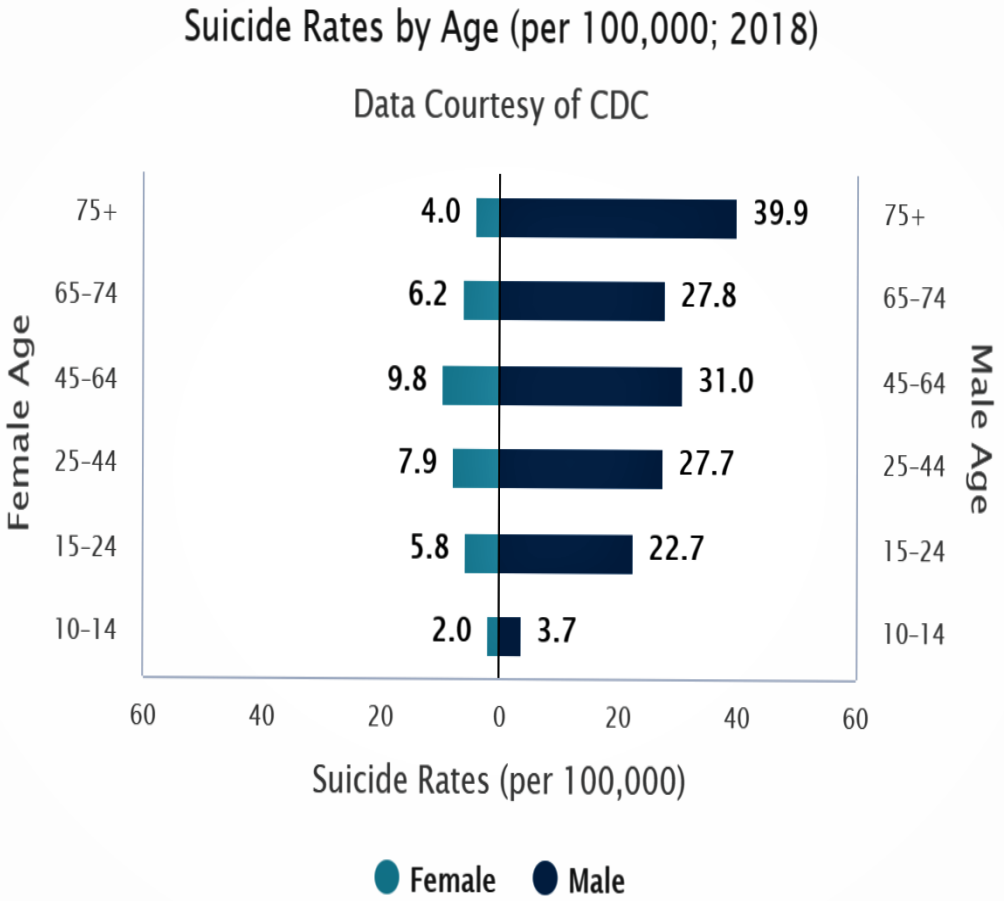
How heavy it is,
displacing with its volume
your very breath.
Before, you seemed to weigh nothing,
your arms might have been wings.

Now each finger adds its measure;
you are pulled down by the weight
of your own hair.
And if your life should disappear ahead of you
you would not run after it.

U.S. Population and Suicide By Age

- ***Older Adults*** (≥50) ~35% of U.S. Population; ≥65 years ~20% by 2025
- ***Suicide Rates*** highest in the oldest old age groups
- ***Death By Suicide****:* ~40% U.S. Suicides are in Older Adults



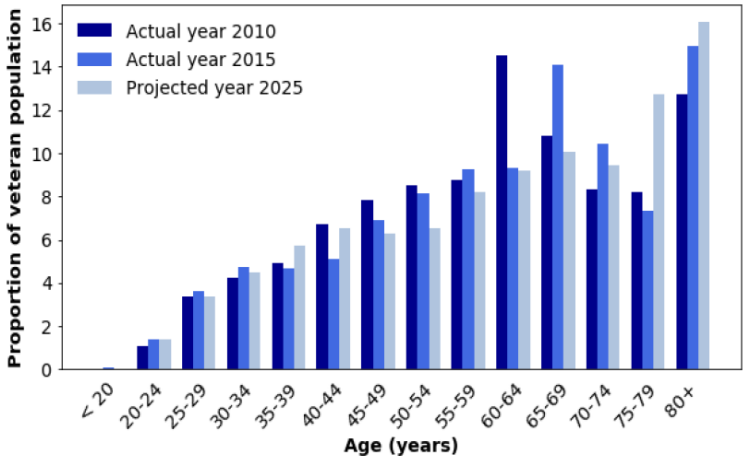


National Institute of Mental Health. https://www.nimh.nih.gov/health/statistics/suicide.shtml

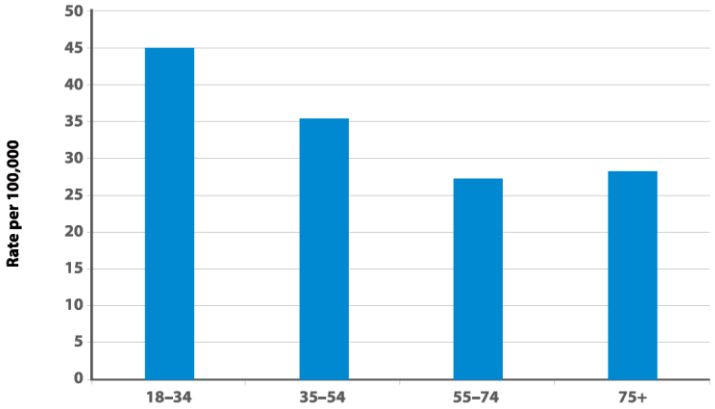
Veteran Population, Rates, and Counts of Suicide By Age

- ***Older Veterans*** (≥50) >70% of Veteran Population; ≥65 years ~50% by 2025
- ***Death By Suicide****:* ~70% Veteran Suicides are in Older Veterans

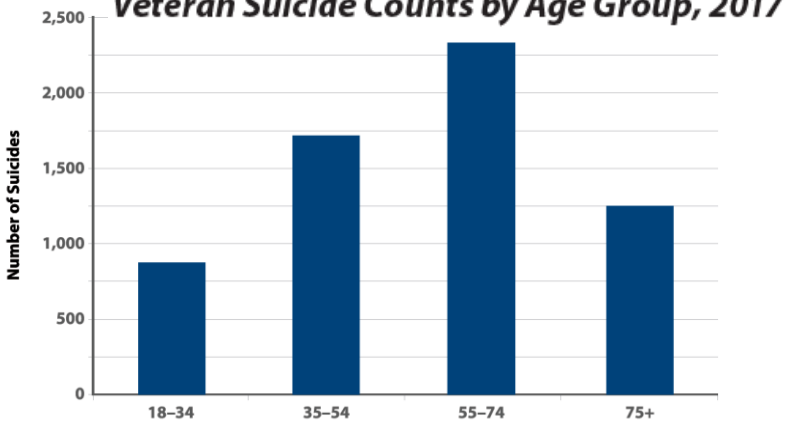
Veteran Population (All Veterans)



Veteran Suicide Rates per 100,000, by Age Group, 2017



Veteran Suicide Counts by Age Group, 2017



- Rates highest: 18-34 years
- Counts remain highest: ≥ 55 years
- Important:
  - Increase denominator with time/age
  - Veterans aging into over 55 group
  - Due to this, rates may "decline" but counts staying same or increasing

VA's National Center for Veterans Analysis and Statistics - Lai AX, Byers AL created Veteran Population Figure; Others: *OMHSP, 2019 National Veteran Suicide Prevention Annual Report.*

Ratio of Suicide Attempts to Suicide Death

Youth (15-24 years): 100-200 to 1

Adults (≥ 18 years): 25-40 to 1

Older Adults (≥ 65 years): 4 to 1

Older Veterans (VHA): 2-3 to 1

15-24 years: https://youth.gov/youth-topics/youth-suicide-prevention; ≥ 18 years and ≥ 65 years: https://suicidology.org/wp-content/uploads/2019/04/2017datapgsv1-FINAL.pdf; CDC and SAMHSA; Conwell Y, Thompson C. Suicidal behavior in elders. *Psychiatr Clin North Am.* 2008;31(2):333-356.

Indicators of Pain As Potential Risk Factors for Suicide Among Older Veterans

- Pain known individual risk factor for suicide
  - Evidence across lifespan and late-life
  - Spectrum of pain measured
- ***Reality of Pain and Late-Life Suicide Association:*** **Complicated/Complex**
  - (1) Multimorbidity/Comorbidity: Little known about spectrum of medical and psychiatric comorbidities, including pain, and late-life suicide risk
  - (3) Psychoactive Medication use (type, polypharmacy, patterns) – most used for pain

Comorbidity/Multimorbidity and Pain

Study* Objectives

- Identify medical and psychiatric comorbidity profiles of older Veterans ≥ 65 last seen in primary care prior to a suicide attempt
- Describe means and lethality of attempt and utilization factors related to those profiles

*from Morin, Li, Whooley, Mackin, Conwell & Byers (2019) *Journal of the American Geriatrics Society*

Methods

- Data sources for all Veterans ≥ 65 enrolled in VHA who attempted suicide between 2012-2014 and whose last visit before that attempt was in primary care, from these databases:

VA's National Patient Care Database

Centers for Medicare and Medicaid Services (CMS)

VA Suicide Prevention Applications Network (SPAN)

VA's National Suicide Data Repository (SDR; aka MDR)

- Records were extracted for all Veterans seen in primary care at a VA facility between October 1, 2011 and December 31, 2014 and had no suicide attempt in the previous fiscal period (2008-2011)

- Latent Class Analysis

Methods – Participants

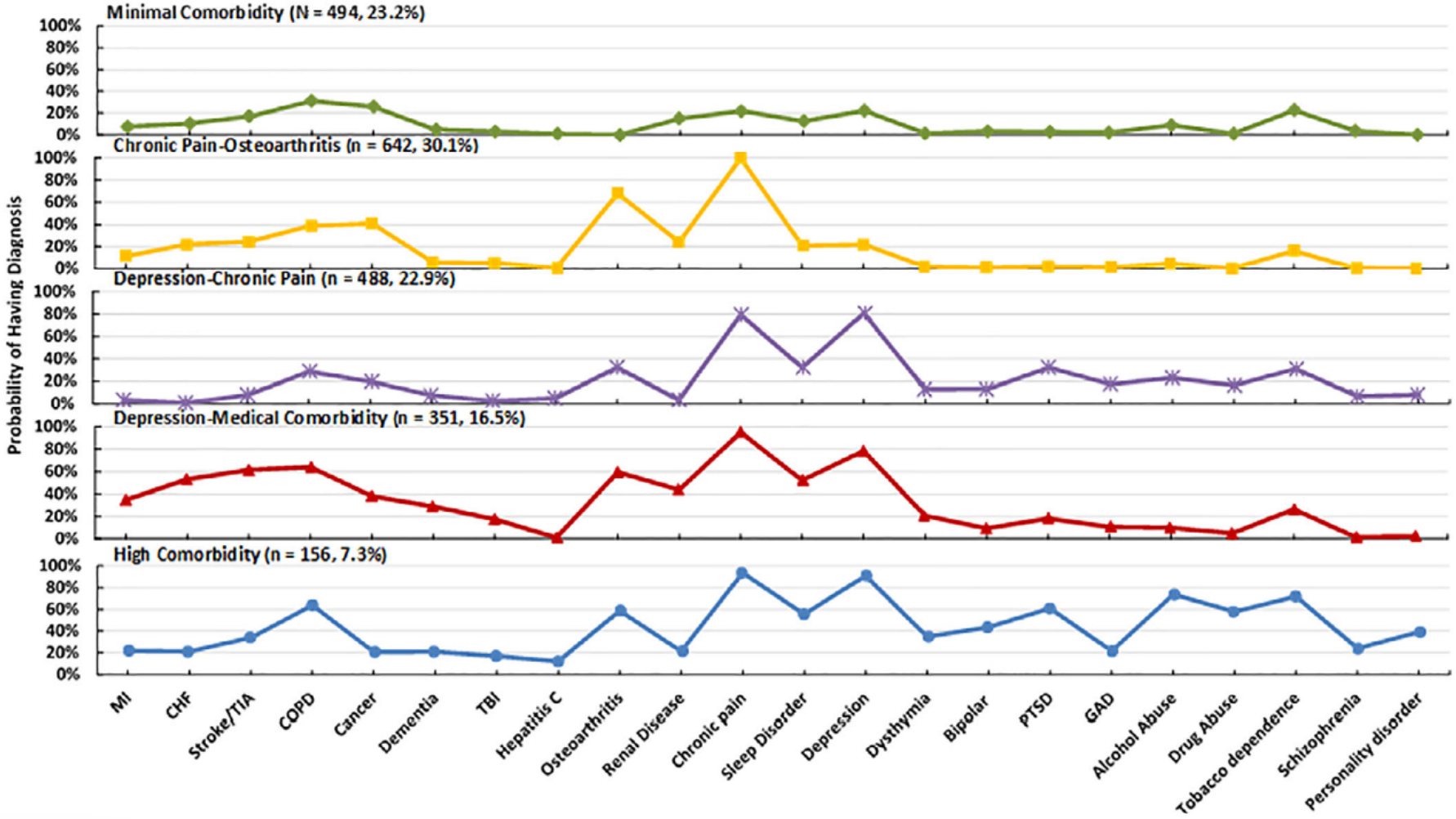
- Final sample last seen in PC = 2,131 Veterans age ≥ 65

- Mean age = 74.38 (*SD* = 7.81)
- 98% male
- 93% White, 4% Black, 3% Hispanic/Other
- 39% college educated
- 51% married, 27% divorced/separated/widowed, 10% never married

Medical Diagnoses	Psychiatric Diagnoses
Myocardial Infarction (MI)	Depression
Congestive heart failure (CHF)	Dysthymia
Stroke/TIA	Bipolar disorder
Chronic obstructive pulmonary disease (COPD)	Post-traumatic stress disorder (PTSD)
Cancer	Generalized anxiety disorder (GAD)
Dementia	Alcohol abuse
Traumatic brain injury (TBI)	Drug abuse
Hepatitis C	Tobacco dependence
Osteoarthritis	Schizophrenia
Renal disease	Personality disorder
Chronic pain	
Sleep disorder	

Comorbidity Profiles in Late-Life Suicide

Distribution of Comorbidity Type in 2,131 Veterans ≥ 65 Who Attempted Suicide 2012-2014 + Last Visit Primary Care



Ref: Morin….. Byers. Comorbidity profiles identified in older primary care patients who attempt suicide. *JAGS*. 2019;67(12):2553-2559.

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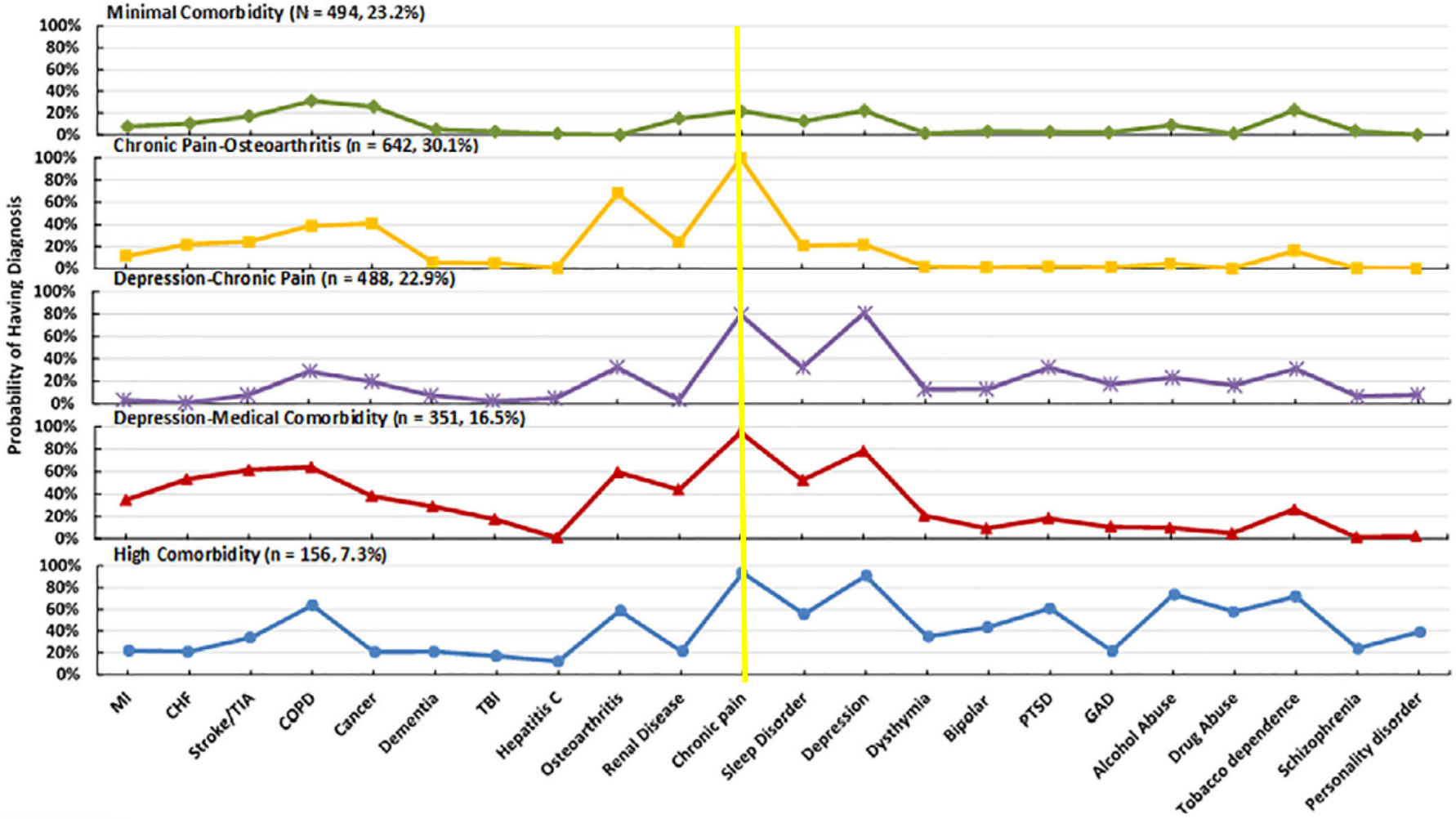

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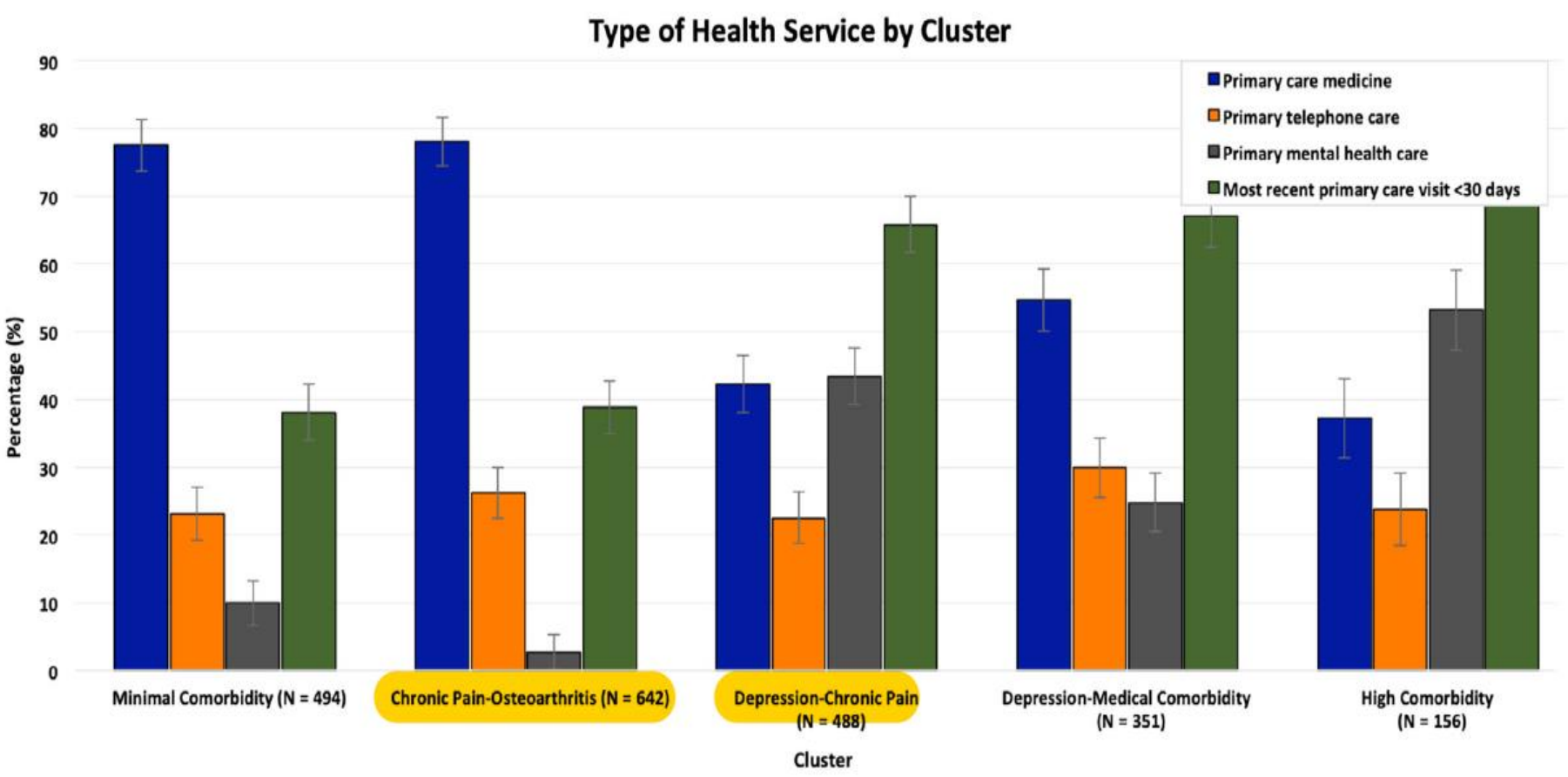
Lethality and Means by Cluster (Last Seen PC)

	Total Sample (N=2,131)	Minimal Comorbidity N=494 (23.18%)	Chronic Pain	Chronic Pain N=488	Depression-Medical Comorbidity N=351 (16.47%)	High Comorbidity N=156 (7.32%)	
Prior Ideation	14	3	2	20	21	68	<.001
Fatal Attempt	61	73	86	39	52	10	<.001
Fatal Method							
	83	82	87	73	82	47	<.001
	8	8	5	12	11	13	.016
	4	3	3	7	3	20	<.001
	2	2	2	2	1	7	.654
	1	1	1	3	0	0	.006
	3	4	2	3	3	13	.056

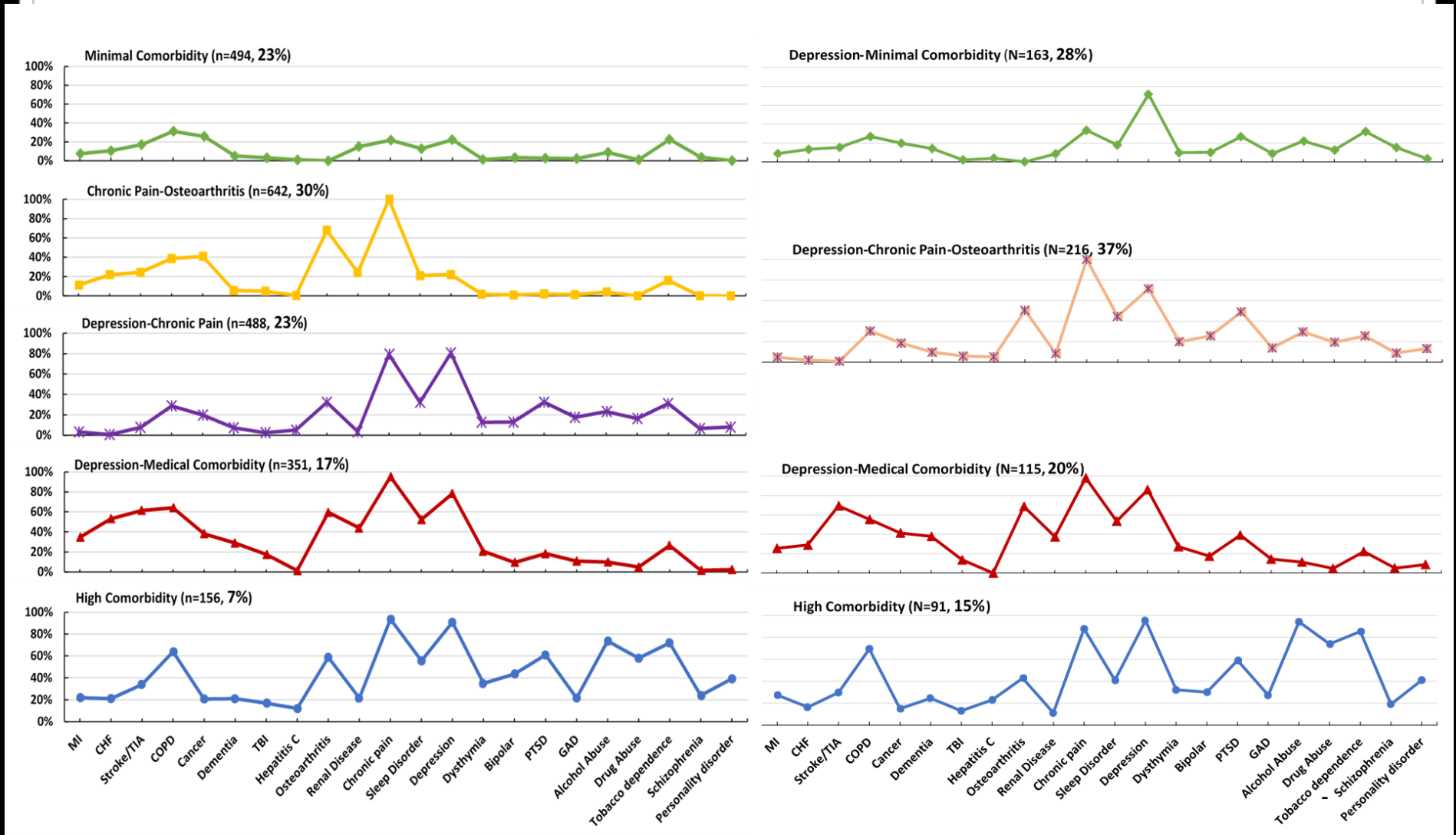
- 20% of all fatal attempts (N=1,300) occurred within 7 days of primary care visit
- 42% of all non-fatal attempts (N=831) occurred within 7 days of primary care visit

Ref: Morin….. Byers. Comorbidity profiles identified in older primary care patients who attempt suicide. *JAGS*. 2019;67(12):2553-2559.

Type of Health Service Seen in Last PC Visit by Cluster



Distribution of Comorbidity Type – Late-Life Suicide Attempters Last Seen in *Primary Care* (N=2,131) *vs.* *Mental Health* (N=585)



Lethality and Means by Cluster (Last Seen MH)

%	Total Sample (N=585)	Depression Minimal Comorbidity N=163 (28%)	Depression Chronic Pain Osteoarthritis N=216 (37%)	Depression Medical Comorbidity N=115 (20%)	High Comorbidity N=91 (15%)	P
Prior Ideation	6	1	7	6	14	<.001
Fatal Attempt	23	32	21	23	10	<.001
Fatal Method						
Firearms	65	60	61	81	67	.237
Hanging	13	15	15	4	11	.458
Overdose	10	6	15	4	22	.155
Poisoning	1	2	0	0	0	.662
Jumping	5	8	4	4	0	.721
Others	7	10	4	7	0	.620

Last Visit PC and MH Before Suicide Attempt: Similar Comorbidity Profiles, *BUT*… Means/Fatality

Last Visit *Primary Care* (N = 2,131)	Last Visit *Mental Health* (N = 585)
• Minimal Comorbidity (23%) • Chronic Pain-Osteoarthritis (30%) • Depression-Chronic Pain (23%) • Depression-Medical Comorbidity (17%) • High Comorbidity (7%)	• Depression-Minimal Comorbidity (28%) • Depression-Chronic Pain-Osteoarthritis (37%) • Depression-Medical Comorbidity (20%) • High Comorbidity (15%)
61% fatal overall	23% fatal overall
73% fatal in Minimal Comorbidity class 86% fatal in Chronic Pain-O 39% fatal Depression-Chronic Pain	32% fatal in Minimal Comorbidity class 21% fatal Depression-Chronic Pain-O
Classes differed in method of attempt by firearm and drug overdose	No difference in fatal method among classes
Firearms used in 83% of fatal attempts (highest in Chronic Pain-Osteoarthritis class)	Firearms used in 65% of fatal attempts (highest in Depression-Medical Comorbidity class)

Reflections on Findings and Implications for Clinical Care

- Chronic Pain with and especially without co-occurring depression may be a very strong indicator of suicide risk
- How often is suicide risk assessed when working with older patients if they do not have an MH diagnosis?
- How often are firearm access/safety, and access to other lethal means discussed with older patients experiencing chronic pain?
- What happens in a clinical interview that makes a provider want to probe further about suicide risk, even if a patient denies depression or suicidal ideation (e.g., things patients say or behaviors they exhibit related to pain, internal clinical compass)?
- *Future directions*: Investigate more closely chronic pain-comorbidity profiles of late-life suicide risk in primary care patients (e.g., mechanisms of risk, profiles as longitudinal predictors of late-life fatal and non-fatal suicide attempts)

Psychoactive/Pain Medications

Potential Role of Psychoactive/Pain Medications

- Little known about other unique factors such as psychoactive/pain medications in predicting late-life suicide-related outcomes
- Older Veterans are highly likely to experience conditions such as chronic pain associated with commonly prescribed medications[1] that are potential markers for suicide risk (e.g., benzodiazepines, opioids)
- Psychoactive/pain medications may serve as valuable markers, uniquely characterizing those who may attempt in ways that a diagnosis alone (e.g., depression) is unable to capture

[1]Reid MC, Eccleston C, Pillemer K. Management of chronic pain in older adults. *BMJ*. 2015;350:h532.

Potential Role of Psychoactive/Pain Medications….. Continued…

Table 1. Prescription Medications Commonly Prescribed in Later Life and Potential Markers for Suicide Risk	
Drug Category	**Description of Common Treatment Indications in Older Adults / Veterans**
Benzodiazepines	Treatment of anxiety, insomnia, seizures, and **neuropathic pain**. This is a large category, where treatment indications overlap with other categories, e.g., Sedative-Hypnotics and Antiepileptics.
Sedative Hypnotics	Treatment of anxiety, insomnia, and other sleep-related disorders. For purposes of this proposal, medications for this category include barbiturates and nonbenzodiazepine prescription sleep medications.
Opioids	Treatment of **acute and chronic physical pain**, includes opiates (e.g., opium, codeine, morphine) and opioids (e.g., methadone, oxycodone, hydrocodone, fentanyl).
Antidepressants	Treatment of depression, insomnia, and **neuropathic pain**. These are nonbenzodiazepine derivatives, including selective serotonin reuptake inhibitors, tricyclic antidepressants, and other antidepressants.
Antiepileptics	Treatment of seizures, tremors, and **neuropathic pain**. For purposes of this proposal, medications for this category include nonbenzodiazepine derivatives, e.g., gabapentin, commonly prescribed for **nerve pain**.

Potential Role of Psychoactive/Pain Medications….. Continued…

- How different medications will be associated with risk of suicide attempts and death by suicide in older Veterans is likely complex

- Multiple potential pathways where medications may be strongly associated with suicide risk not fully captured by other predictors

    1. Simply access to "high-risk" medications, similar to access to firearms, may increase risk
    2. Medications may be causally linked where central nervous system-acting medications increase vulnerability to risk of attempting suicide
    3. Type and amount of medication use can serve as valuable marker of presence and severity of pain and/or psychiatric symptoms and associated emotional and mental distress
    4. Polypharmacy is likely important indicator of complexity of comorbidities, especially involving pain, that increase risk of suicide

High-Risk and Low-Risk Medications

- Examine relationship of high- and low-risk medication use to suicide attempt among older Veterans (type of falsification analysis)
  - High-risk defined as medications prescribed for psychiatric/pain diagnoses more commonly associated with suicide risk
  - Low-risk medications defined relative to treatment of illnesses without established specific suicide risk (e.g., cardiovascular disease)
- Investigate risk associated with polypharmacy for both high- and low-risk medications

Methods – Participants

- Nationally representative sample of 5 million Veterans ≥ 50 enrolled in VHA with baseline visit between FY 2012-2013 and followed through December 31, 2018. Sample is those who attempted suicide between 2012-2018, who were then age-matched 1:3 with Veterans seen in VHA during that same period from these databases who did not attempt suicide:

  VA's National Patient Care Database* & VA Pharmacy Data

  Centers for Medicare and Medicaid Services* (CMS) & Medicare Pharmacy Data

  VA Suicide Prevention Applications Network (SPAN) – non-fatal attempts and event date

  VA's National Mortality Data Repository (aka SDR) – fatal attempt and means

- Records were extracted between October 1, 2011 and December 31, 2018 for those with no suicide attempt in the previous fiscal period (2008-2011)

*Inpatient and outpatient services and diagnoses

Methods: Nested Case-Control Study

- Final N = **31,079** aged ≥ 50 who attempted suicide and an age-matched sample of **93,237** Veterans same time period who did not

- Exposure: **High-risk medications** (6 months prior to attempt/visit)
  - Benzodiazepines, sedative-hypnotics, opioids, antidepressants, antipsychotics, antiepileptics
- Exposure: **Low-risk medications** (6 months prior to attempt/visit)
  - Digitalis glycosides, beta blockers/related, alpha blockers/related, calcium channel blockers, antianginals, antiarrhythmics, antilipemic agents, antihypertensive combinations, other antihypertensives, peripheral vasodilators, sclerosing agents, diuretics, thiazides/related diuretics, loop diuretics, carbonic anhydrase inhibitor diuretics, potassium sparing/combination diuretics, other diuretics, ace inhibitors, angiotensin inhibitors, direct renin inhibitors, other cardiovascular agents

- Statistical Analysis: **Logistic Regression**

Medications

N (%)	Non attempters (N=**93,237**)	Attempters (N=**31,079**)
Any *high risk* medications 6 months before attempt/visit	15,844 (17.0)	16,527 (53.2)
Benzodiazepines	2,533 (2.7)	5,037 (16.2)
Sedative Hypnotics	1,566 (1.7)	2,950 (9.5)
Opioids	5,885 (6.3)	6,992 (22.5)
Antidepressants	8,597 (9.2)	12,342 (39.7)
Antipsychotics	1,599 (1.7)	4,750 (15.3)
Antiepileptics	5,628 (6.0)	7,471 (24.0)
Number of *high risk* medication use		
0	77,393 (83.0)	14,552 (46.8)
1	9,254 (9.9)	4,608 (14.8)
2	3,974 (4.3)	4,659 (15.0)
>=3	2,616 (2.8)	7,260 (23.4)
Any *low risk* medications 6 months before attempt/visit	32,426 (34.8)	16,250 (52.3)
Number of *low risk* medication use		
0	60,811 (65.2)	14,829 (47.7)
1	10,451 (11.2)	4,426 (14.2)
2	9,290 (10.0)	4,326 (13.9)
>=3	12,685 (13.6)	7,498 (24.1)

High-Risk Medication Use and Risk of Suicide Attempt

OR (95%CI)	Benzos	Sedative Hypnotics	Opioids	Anti depressants	Anti psychotics	Antiepileptics
Model 1 (unadj)	6.92 (6.59-7.28)	6.14 (5.77-6.54)	4.31 (4.15-4.47)	6.49 (6.28-6.69)	10.34 (9.75-10.96)	4.93 (4.75-5.11)
Model 2	6.51 (6.19-6.85)	5.88 (5.52-6.27)	4.08 (3.93-4.24)	6.21 (6.01-6.42)	9.87 (9.30-10.48)	4.69 (4.52-4.88)
Model 3	2.52 (2.36-2.69)	2.59 (2.39-2.81)	2.49 (2.37-2.61)	2.21 (2.11-2.30)	2.18 (2.01-2.36)	1.98 (1.89-2.08)
Model 4	2.52 (2.36-2.68)	2.58 (2.38-2.79)	2.48 (2.36-2.60)	2.20 (2.11-2.29)	2.17 (2.01-2.35)	1.97 (1.87-2.07)
Model 5	2.31 (2.17-2.46)	2.40 (2.21-2.60)	2.20 (2.10-2.31)	2.12 (2.03-2.21)	2.24 (2.07-2.43)	1.83 (1.74-1.92)

Table 3. High-risk medication use and risk of suicide attempt

*all p-values were <.001

Model 1: unadjusted model

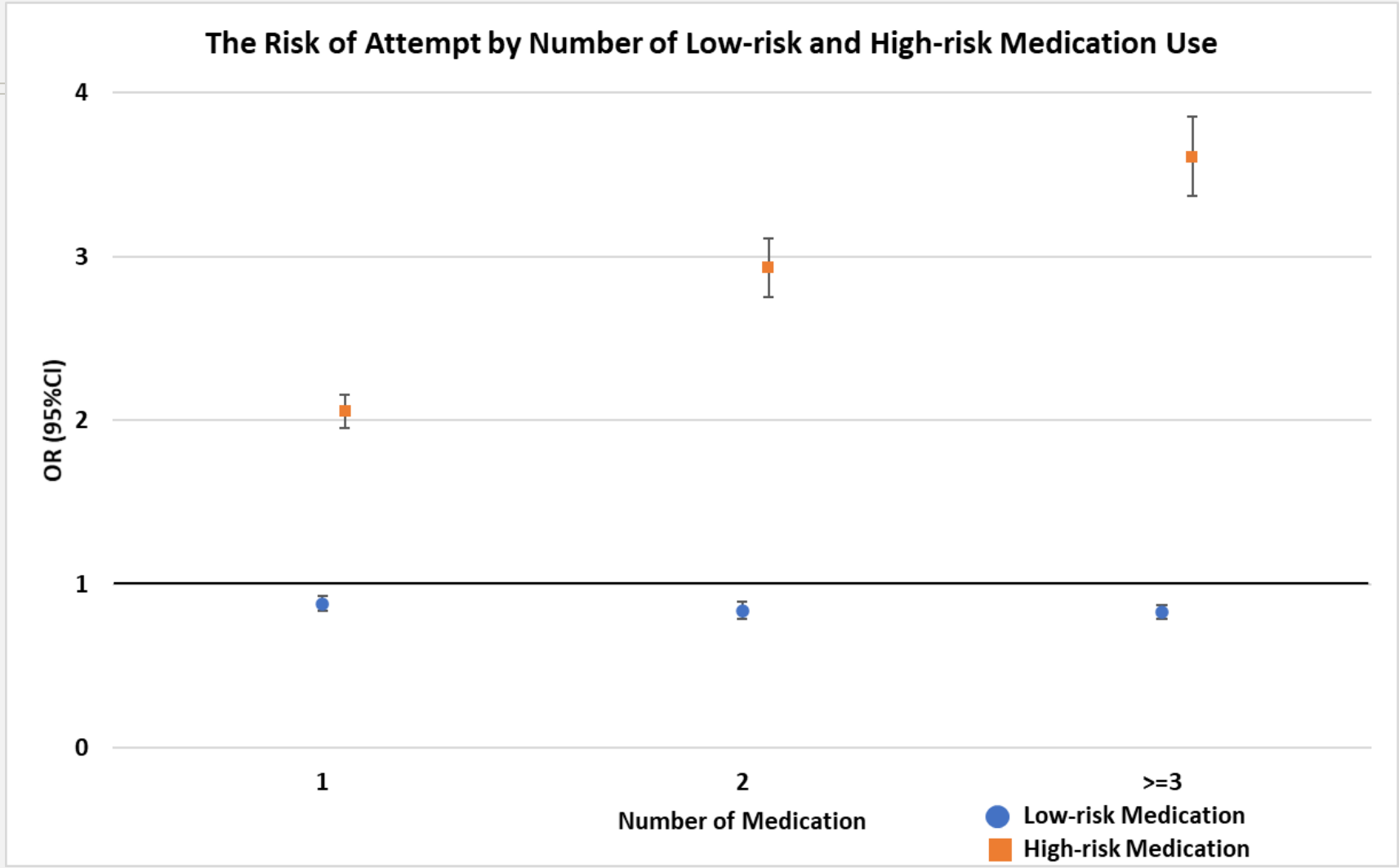
Model 2: adjusted for demographics (gender, race, income, education)

Model 3: adjusted for demographics and psychiatric comorbidities (mood disorder, PTSD, other anxiety disorder, substance use disorder, schizophrenia, psychosis, personality disorder, suicide ideation).

Model 4: adjusted for demographics, psychiatric comorbidities, and number of visits.

Model 5: adjusted for demographics, psychiatric comorbidities, number of visits, and medical comorbidities (Hypertension, MI, CHF, CVD, COPD, cancer, dementia, TBI, hepatitis C, osteoarthritis, renal disease, sleep disorder, epilepsy, chronic pain).

Results: Dose Effect



Fully-adjusted for demographics, utilization (number of visits), medical and psychiatric comorbidities, and # of medications for each.

Reflections on Findings and Implications for Clinical Care

- Given lethality of attempt in late life, potential association of number of high-risk medications (i.e., psychoactive/pain) with risk of attempt is vital information to disseminate across stakeholders
- Providers: Awareness of number of high-risk medications and polypharmacy in context of or in addition to other risk factors
  - Lethal means safety counseling
- Patients: Education about risk factors (i.e., psychoactive/pain meds) included in other counseling on lethal means and safety planning

Clinical Compass

- Our internal clinical instincts and heuristics are a powerful suicide prevention tool
  - What could be added to “internal checklist” when working with an older Veteran, particularly when there is polypharmacy of high-risk (psychoactive/pain) medications?
    - Education for family members about the interaction of polypharmacy with other potential effects (e.g., cognitive sequelae of sedatives, which might lower inhibition if there are firearms in the house, etc.)
- We know our older Veterans differ from their younger counterparts in many ways – how can we use knowledge of indicators (such as medications) of chronic pain to help keep them safe?

Future Research… *Next Steps*

- Capturing and assessing the impact of…
  - Change in prescribing mandates over time
  - Further investigation of trends in polypharmacy, given recent deprescribing of opiates and benzodiazepines
  - Other unique and novel indicators of pain associated with late-life suicide (e.g., protective factors or resiliency related to social factors or supportive services that help to mitigate pain and, thus, suicide risk)
- *A Must*: More engagement/collaboration with clinical colleagues to inform research

In sum, Indicators of Pain For Late-life Suicide Risk Are Important For Prevention/Intervention

- Suicide prevention is *everyone's* business (everyone has a unique perspective and awareness), and so is growing old and managing pain and complexity of comorbidities
- Importance of Clinical Compass: Internal clinical instincts and heuristics are a powerful suicide prevention tool
- How best to translate findings to clinical practice?
  - Providers ability to track and see and sense the signs
  - Psychoactive/pain medications are modifiable factors

Thank You! Questions?

- VA CSR&D and NIH
- SFVAMC / UCSF
- Co-Authors
- Clinical Colleagues

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