**Appendix**

**Appendix Table 1.** Cohort flow

|  |  |
| --- | --- |
| **Cohort inclusion/exclusion process:** | **Total No.** |
| 1. Total Veteran cause of death data
 | 1,646,867 |
| 1. X40-X49: unintentional

Y10-Y19: undeterminedX60-X69: intentional1. X85-X90: assault or homicide
 | 17,550 |
| 1. Cause of death contains alcohol (T51 including ethanol, methanol, 2-propanol, fusel oil, other alcohols, alcohol unspecified)
 | 3,020 |
| 1. $\geq $1 outpatient or inpatient visit within 1 year prior to death date
 | 2,496 |
| 1. Veterans age $\geq $18
 | 2,421 |

**Appendix Table 2**. Types of overdose in alcohol-involved overdose

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Alcohol alone****(n= 868)** | **Alcohol + opioids****(n=1269)** | **Alcohol +****other substances****(n=284)** | **All Alcohol-involved overdose****(n=2421)** |
| Unintentional (X40-X44) | 742 | 1119 | 250 | 2111 |
| Undetermined(Y10-Y14) | 36 | 84 | 8 | 128 |
| Intentional(X60-X69) | 90 | 65 | 25 | 180 |
| Assault/homicide (X85-X90) | 0 | 1 | 1 | 2 |

**Appendix Table 3.** Stop codes to determine homelessness

|  |  |
| --- | --- |
| **Stop code** | **Name** |
| 504 | Grant and Per Diem- Group |
| 507 | HUD/VASH- Group |
| 508 | HCHV/HCMI- Group |
| 511 | Grant and Per Diem- Individual |
| 522 | Department of Housing and Urban Development (HUD)-VA Supported Housing (VASH) Individual |
| 528 | Telephone/Homeless Chronically Mentally Ill (HCMI) |
| 529 | HCHV/HCMI- Individual |
| 530 | Telephone/HUD-VASH |
| 555 | Homeless Veteran Community Employment Services- Individual |
| 556 | Homeless Veteran Community Employment Services- Group |
| 590 | Community Outreach to Homeless Veterans by Staff Other than HCHV and RRTP Programs |
| 76 | Homeless Mentally Ill Outreach |
| 453 | Homeless Evaluation |
| 455 | Local Use For Dom/Homeless |
| 458 | Homeless Dual Diagnosis |
| 460 | Homeless Veteran |
| 501 | Homeless Mentally Ill Outreach |
| 555 | Homeless Vt Com Emp Svc Indiv |
| 556 | Homeless Vt Com Emp Svc Grp |

**Appendix Table 4.** ICD9/ICD10 for Key Clinical Characteristics

|  |  |  |
| --- | --- | --- |
| **Clinical characteristics** | **ICD9** | **ICD10** |
| PTSD | 309.81 | F43.1, F43.10, F43.11, F43.12 |
| Depressive disorder | 296.2x, 296.3x, 300.4, 309.0, 309.1, 296.9x, 293.83, 301.12, 311 | F32, F32.0, F32.1, F32.2, F32.3, F32.4, F32.5, F32.9, F33, F33.0, F33.1, F33.2, F33.3, F33.4, F33.40, F33.41, F33.42, F33.8, F33.9, F32.8, F34.1, F34.8, F34.9, F39, F43.21, F43.23 |
| Opioid use disorder | 304.0x,304.7x, 305.5x | F11.1x, F11.2x, F11.3x, F11.4x, F11.5x, F11.6x, F11.7x, F11.8x, F11.9x |
| Alcohol Use Disorder | 303.0x, 303.9x, 305.0x, 291.x | F10.1x, F10.2x, F10.9x |
| Other substance use disorder | 304.1x, 304.5x,304.6x, 304.9x,305.3x, 305.4x, 305.8x, 305.9x, 292.x, 304.2x, 305.6x, 304.4x, 305.7x, 304.3x, 305.2x | F16.x, F18.x, F19.x,F13.x, F12.x, F14.x, F15.x |

**Appendix Table 5.** VHA Stop Codes to Define Treatment Utilization

|  |  |  |
| --- | --- | --- |
| **Treatment utilization** | **Clinic stop code** | **Stop code name** |
| PTSD Clinic | 516 | PTSD - Group |
| 519 | Substance Use Disorder/PTSD Teams |
| 525 | Women's Stress Disorder Treatment Teams |
| 540 | PTSD Clinical Team (PCT) Post-Traumatic Stress Ind |
| 561 | PCT-Post Traumatic Stress- Group |
| 562 | PTSD- Individual |
| 580 | PTSD Day Hospital |
| SUD Clinic | 513 | Substance Use Disorder Individual |
| 514 | Substance Use Disorder - Home Visit |
| 523 | Opioid Substitution |
| 547 | Intensive Substance Use Disorder - Group |
| 548 | Intensive Substance Use Disorder - Individual |
| 560 | Substance Use Disorder- Group |
| General Mental Health Clinic | 502 | Mental Health Clinic Individual |
| 509 | Psychiatry |
| 510 | Psychology - Individual |
| 524 | Active Duty Sexual Trauma |
| 529 | HCHV/HCMI- Individual |
| 533 | Mental Health Intervention Biomedical Care- Individual |
| 538 | Psychological Testing |
| 550 | Mental Health Clinic (Group) |
| 552 | Mental Health Intensive Case Management (MHICM)- Individual |
| 564 | Mental Health Team Case Management |
| 565 | MH Intervention Biomedical Care- Group |
| 566 | Mental Health Risk-Factor Reduction Educational- Group |
| 571 | SeRV-MH (Services for Returning Veterans-Mental Health)- Individual |
| 572 | SeRV-MH (Services for Returning Veterans-Mental Health)- Group |
| 576 | Psycho-Geriatric Clinic- Individual |
| 577 | Psycho-Geriatric Clinic- Group |
| 582 | Psychosocial Rehabilitation Recovery Center (PRRC)- Individual |
| 583 | Psychosocial Rehabilitation Recovery Center (PRRC)- Group |
| Primary Care | 322 | Comprehensive Women's Primary Care Clinic |
| 323 | Primary Care Medicine |
| 348 | Primary Care Shared Appointment |
| 350 | GeriPACT |
| PCMHI | 534 | Mental Health Integrated Care - Individual |
| 539 | MH Integrated Care Group |

**Appendix Table 6.** Definitions for AUD medication and AUD Psychotherapy treatment

|  |  |
| --- | --- |
| AUD Medications | Naltrexone, Disulfiram, Acamprosate |
| Individual psychotherapy\* | CPT code: 90804, 90805, 90806, 9080, 90808, 90809, 90810, 90811, 90812, 90813, 90814, 90815, 90832, 90833, 90834, 90837, 90838, 90839, 90840, 90846 ,90847, 90875, 90876 |
| Group psychotherapy\* | CPT code: 90849, 90853, 90857, 96153  |

\*With primary diagnosis of AUD

**Appendix Table 7.** Changes in alcohol overdose rates in US Veterans (2012-2018)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **All alcohol-involved overdose** | **Alcohol- only** | **Alcohol + opioids** | **Alcohol +****other substances** |
| Rate Ratio from 2012 to 2018 | 1.57 (1.33, 1.84) \* | 1.02 (0.78, 1.30) | 2.13 (1.68, 2.69) \* | 1.94 (1.53, 2.46) \* |
| Adjusted Rate Ratio1 from 2012 to 2018 | 1.66(1.42, 1.94) \* | 1.12(0.87, 1.45) | 2.21 (1.74, 2.80) \* | 1.76 (1.06, 2.92) \* |

1 Adjusted for demographic changes (age, gender, race/ethnicity) from 2012 to 2018 in the overall VHA patient populations

**Appendix Table 8.** Substances involved and prevalence in alcohol overdose deaths

|  |  |  |
| --- | --- | --- |
| **Type** | **Frequency** | **Percent** |
| Stimulants (e.g., cocaine and methamphetamine) | 505 | 20.9% |
| Heroin | 503 | 20.8% |
| Prescription opioids | 480 | 19.8% |
| Synthetic opioids | 473 | 19.5% |
| Sedatives (e.g. benzodiazepines) | 318 | 13.1% |
| Unspecified narcotics | 90 | 3.7% |
| Methadone | 67 | 2.8% |
| Cannabis | 16 | 0.7% |