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Opioid Use Initiation, Progression, and Motivations Among OEF/OIF/OND-Era Veterans in New York City: An Age-Period-Cohort Analysis

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Abstract

This study examines the temporal relationship between prescription opioid (PO) and heroin use among veterans in New York City. Drawing on survey data from a convenience sample of 214 Operation Enduring Freedom/Operation Iraqi Freedom/Operation New Dawn (OEF/OIF/OND)-era opioid-using military veterans, analyses demonstrate substantial cohort-level variation. Most notably, heroin use prior to PO initiation and prior to military enlistment was reported more frequently among the cohorts born prior to 1970 and after 1984. Across all cohorts, high percentages of participants reported alleviation of emotional/psychological pain as a reason for both PO and heroin use. Cohort-level variation highlights the need for tailored interventions and targeted prevention efforts.

Keywords

Veterans; drugs; illicit drug abuse; prescription drug misuse/abuse; health advocacy

Background

The United States remains in a state of public health crisis related to widespread abuse of prescription opioids (POs) and a related rise in heroin abuse. In the late 1990s when patients' rights to effective pain treatment became a mainstay of medical ideology in the United States (Quinones, 2014), POs began to be prescribed to a widening proportion of the U.S. population, including those in military service (Institute of Medicine, 2012; U.S. Army, 2010), leading to markedly increased rates of both medical and nonmedical use. From 1999 to 2013, the drug poisoning fatality rate more than doubled from 6.1 to 13.8 people per 100,000, and the rate of drug poisoning deaths involving opioid analgesics nearly quadrupled from 1.4 to 5.1 people per 100,000 (Chen, Hedegaard, & Warner, 2015). More recently, as a range of public health interventions including prescription drug monitoring

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programs and legislation curtailing opioid-dispensing pain clinics, rates of overdose related to POs have stabilized whereas heroin-involved overdose rates have escalated.

Both the broader opioid epidemic and the specific relationship between PO and heroin use have had a particular salience within U.S. military and veteran communities. Active-duty military personnel and veterans have experienced high rates of opioid misuse (Seal et al., 2012; U.S. Army, 2012) and are roughly twice as likely as adults in the general population to die of accidental poisoning (Bohnert, Ilgen, Galea, McCarthy, & Blow, 2011). The Army has indicated that, as of 2012, “14 percent of US Soldiers had been prescribed an opioid pain-killer” and “25 percent of wounded Soldiers are addicted to prescription or illegal drugs while they await medical discharge” (U.S. Army, 2012, p. 45). Of more than 440,000 veterans receiving opioid painkillers from the Veterans Administration (VA) in 2012, roughly 34% were chronic users who had been using opioids for more than 90 days, and almost 64% of those chronic users had a dual pain and mental health diagnosis within a year of first being precribed opioids (Department of Veterans Affairs, 2014, p. 17).

Research suggests that in recent decades active duty personnel often develop drug use disorders involving POs while in the military or soon after discharge to cope with injuries sustained during combat and psychological and physical ailments that can be exacerbated during the civilian readjustment process (Bray & Hourani, 2007; Bray et al., 2006; Finley, 2011; Goebel et al., 2011; Heltemes, Dougherty, MacGregor, & Galarneau, 2011). Veterans who may not have had extensive histories of opioid use prior to separation may exhibit heightened risks of opioid dependence when initiating opioid use as a form of self-medication to deal with comorbid physiological and psychological pain (Rigg & DeCamp, 2014) in a civilian environment lacking in formal military controls (including routine drug testing and the threat of demotion or dishonorable discharge), and characterized by ease of access to diverted and illicit opioids (Goebel et al., 2011). These self-medicating and “iatrogenic” pathways in veterans’ opioid use, however, do not account for the full range of opioid use and dependence trajectories experienced by military personnel and veterans (Golub & Bennett, 2013). Recent studies suggest that onset of substance abuse disorders among U.S. Army National Guard personnel generally occurs during a narrow window between late-adolescence and early adulthood (Fink et al., 2016) and that roughly one third of active duty Army personnel experienced symptoms of substance and alcohol use disorders with onset prior to enlistment (Kessler et al., 2014).

Understanding these etiological differences among military and postmilitary populations is critical both to providing effective screening, prevention, and treatment (Lincoln, Ames, & Moore, 2016) and to understanding the contexts for substance use cessation, maintenance, and escalation after military service, a topic of great importance established by the pioneering work of Lee Robins on Vietnamera opioid abuse and recovery (Robins, 1993; Robins, Davis, & Nurco, 1974; Robins, Helzer, Hesselbrock, & Wish, 2010; Robins & Slobodyan, 2003). This analysis offers an examination of opioid use initiation patterns among an Operation Enduring Freedom/Operation Iraqi Freedom/Operation New Dawn (OEF/OIF/OND)-era cohort of formerly enlisted veterans, providing an epidemiological attention to how opioid use initiation differs by birth cohort (Novak, Bluthenthal, Wenger, Chu, & Kral, 2016) among different military cohorts which came of age during different

national drug epidemics (Golub & Johnson, 2001; Golub, Johnson, & Dunlap, 2005; Musto, 1993) and, accordingly, may have initiated and continued to use opioids in different ways.

Methods

Study sample and data collection

The "Opioid Misuse and Overdose Risk Patterns Among Recent Veterans" study used targeted venue-based sampling and chain referrals to recruit a convenience sample of 214 military veterans between August 2014 and December 2015 from veteran-specific shelters, single-residence occupancies, VA hospitals, and veterans service agencies throughout New York City. At time of enrollment, participants were required to report having used opioids within the past 30 days and were asked a series of detailed questions about their opioid use to confirm eligibility. Veteran status was confirmed either via a DD-214 or VA identification card or through a series of detailed questions about the individual's military occupational specialty (MOS) when formal identification was not readily available. Participants are being followed monthly to observe changes in their overdose risk behaviors. This analysis examines the baseline data, which were collected in face-to-face interviews in a private location, which lasted approximately 2 hr. Participants were compensated $60 for their involvement. Informed consent was established at time of enrollment, and all procedures were approved by the Development and Research Institutes, Inc. Institutional Review Board.

Nearly all of the participants had used POs (92%), many had used heroin (36%), and just under a third (31%) had used both. Most participants were male (84%) and Black (70%); about one-fifth were Hispanic (21%). The average age was 37. Most participants had served in the Army (61%); 40% had a last tour as part of Operation Enduring Freedom (OEF), 24% as part of Operation Iraqi Freedom or Operation New Dawn (OIF/OND). The average time since separation from the military was 7 years. Only half the participants were stably housed in a private or publicly-funded apartment or house (50%); others were homeless and living in a shelter or otherwise unstably housed. Just over one-third were either working or in school (37%). Less than one fifth were cohabiting with a partner or living with a spouse (18%).

To establish the timing of their military service, participants were asked, "When did you first enter the military?" and "What was the date of your last separation from active duty service?" Participants were asked to report their age at first use of POs and heroin and were subsequently asked, "What were your reasons or motivations for using that first time? Check all that apply." The list of motivations ranged from "to relieve physical pain" to "to get high, have fun, party."

Data analysis

A tabular age-period-cohort analysis was used to examine when initiation occurred relative to time spent in the military. Age at initiation was compared to age at the start of military service and age at separation. Sometimes the ages coincided (ties), which introduced some imprecision. Veterans whose age at initiation was less than age at entrance were designated as having clearly initiated prior to military service. Veterans whose age at initiation was

greater than age at separation were designated as having clearly initiated subsequent to separation. All ties were included with those who initiated while in military service. Participants were identified as members of one of four aggregate birth cohorts of roughly comparable size: those born before 1970, 1970–1979, 1980–1984, and those born since 1985.

It was hypothesized that there would be substantial variation in time of heroin initiation across birth cohorts. However, there was also substantial variation within cohorts (see Table 1b). Most notably, some of the 1985+ cohort had initiated heroin use after leaving military service, but even more had initiated prior to entering. Clearly these two groups represent very different heroin experiences that should be studied separately. Because of small subsample sizes, some participants in contiguous birth cohorts were combined into four heroin cohorts differing on both birth cohort and time of heroin initiation: veterans born before 1970 who initiated heroin use prior to military service; veterans born before 1980 (this includes those born before 1970 and those born 1970–1979) who initiated while in the military; veterans born 1970–1984 (including the 1970–1979 and 1980–1984 cohorts) who initiated after military service; and those born since 1985 who initiated prior to entering the military.

Further analysis examined order of initiation among the subsample of veterans who reported having used both POs and heroin as it varied across the heroin cohorts defined above. Lastly, the analysis examined motivations for PO use as they varied with time of PO initiation (premilitary, in military, and postmilitary service) and for heroin use as they varied across the four heroin cohorts.

Results

Tables 1a and 1b indicate how PO and heroin initiation times varied across birth cohorts. Table 1a shows that the oldest birth cohort (born before 1970) was the least likely to have ever used POs (83%), indicating the relatively high prevalence of heroin-only opioid use among the oldest group of veterans in our sample. Of note, more than a quarter of participants (27%) reported initiating PO use prior to having entered the military. The variation across birth cohorts with regard to time of PO initiation was not statistically significant.

The age-period-cohort analysis of heroin initiation found substantial and significant variation across birth cohorts (Table 1b). Premilitary initiation dropped after the pre-1970 cohort (from 26% to 6%) but a new cohort of pre-military initiators emerged with the cohort born since 1985 (13%). In military heroin initiation was highest among the pre-1970 cohort (23%), declined to about half among the 1970–79 cohort (13%) and to even lower levels among later cohorts (2%-5%). Postmilitary heroin initiation was less common among those born before 1970 (8%); nearly half of this cohort had already initiated use. Postmilitary initiation was highest among the 1970–1979 (23%) and 1980–1984 (16%) cohorts and was lower among those born since 1985 (8%).

Table 2 examines the order of initiation for PO and heroin use across heroin cohorts. Overall, veterans who had ever used both were more than twice as likely to start with POs (49%) than with heroin (20%). This calculation disregards those who initiated both in the same year. A standard *z*-test confirmed that this difference was statistically significant. A χ^2 test of the substantial variation across birth cohorts was not significant—almost certainly a product of the lack of power resulting from small subsample sizes.

Tables 3a presents the motivations for initiating PO use as it varies with time of initiation. Table 3b presents the motivations for initiating heroin use as it varies across heroin cohorts. The last column in each table presents the percent of all lifetime users that endorsed each motivation. Overall, users endorsed substantially different reasons for each drug. Irrespective of the time of initiation, the most commonly endorsed reason for initiating PO use was to relieve physical pain (77%). The most common reasons for initiating heroin use were to get high, have fun or party (68%) and to relieve emotional/psychological pain (56%).

Several reasons for initiating PO use varied significantly with time of initiation. To relieve pain was very widely endorsed by in military or postmilitary initiators (84%-86%) and less commonly by premilitary initiators (59%). Conversely, premilitary initiators were much more likely than others to report being motivated to get high, have fun or party (59% vs. 24–35%) and peer/partner pressure or to be cool (26% versus 6%-7%).

Several variations in motivations for initial heroin use were identified even with the small number of participants in each heroin cohort. Those premilitary initiators born since 1985 endorsed the most reasons. Their responses can be compared to premilitary initiators born before 1970. These two cohorts provided information about heroin initiation at similar ages, but during very different periods. Premilitary heroin initiators born since 1985 compared to their counterparts born before 1970 were much more likely to report using heroin to relieve emotional/psychological pain (88% vs. 36%), to relieve physical pain (50% vs. 7%) and to manage negative effects of other drugs (50% vs. 0%).

Several reasons for initiating heroin use varied substantially across the first three heroin cohorts. These cohorts differed primarily according to time of initiation. Relief from physical pain increased from 7% for the premilitary cohort to 32% (in military) and 47% (postmilitary). Relief from emotional/psychological pain was also higher among postmilitary initiators (47%) than pre- and in military initiators (32–36%). Reports of managing negative effects of other drugs were also higher among post-military initiators (11%) than among pre- and in military initiators (0–5%), but was still not widely endorsed. Similarly, to substitute for or help quit another drug was rarely endorsed (0%–16%). For all three groups, however, the motivation of enjoying the experience was central; the majority of respondents in each cohort indicated that to get high, have fun, or party was a motivation for heroin initiation (50%–74%).

Discussion

Findings from these analyses demonstrate the variability in veterans' historical experiences of opioids in relation to their military service as prevailing patterns for substance use change

over time. The relatively high proportion of veterans in the sample reporting premilitary initiation of prescription opioids (27%) adds to other recent findings challenging the assumption that opioid use in veteran populations can be understood primarily as the product of iatrogenic initiation followed by a progression to PO abuse and, for some at least, a subsequent transition to heroin. Significant variation across birth cohorts was identified for initiation of heroin and for the motivations underlying both POs heroin initiation. For those veterans born prior to 1970, heroin initiation prior to use of POs was far more common than among later cohorts who came of age during periods when PO use was far more common in the United States. Perhaps the most concerning finding in this analysis was the significant trend back toward heroin use and, in particular, premilitary heroin initiation among those born after 1985. This birth cohort, often referred to as *millennials*, were adolescents when PO "pill mills" were at their peak (Okie, 2010; Quinones, 2014; Rutkow et al., 2015), contributing to epidemic levels of opioid dependence in states like Ohio, West Virginia, Maine, and Florida (Okie, 2010; Quinones, 2014; Rutkow et al., 2015). Although our sample of New York City resident veterans includes relatively few participants who were born outside of New York, the trend identified is likely indicative of rising rates of premilitary nonmedical opioid initiation among Millennials enlisting in the U.S. armed forces (Banerjee et al., 2016; Kessler et al., 2014).

This article is responsive to a call to "elucidate the motivations for non-medical use of prescription opioids among veterans" (Kessler et al., 2014, p. 9), and the analysis has produced a strong preliminary finding about the relative complexity of veterans' motivations for initiating opioid use. The high rates of self-medicating use to alleviate both psychological and physiological pain (Edlund, Steffick, Hudson, Harris, & Sullivan, 2007; Rigg & DeCamp, 2014), as well as the frequent endorsement of both these and recreational motivations (involving pleasure and intentions to "get high"), suggest that current prevention efforts involving prescription monitoring and more carefully managed use of longer-term opioid treatments (Wiedemer, Harden, Arndt, & Gallagher, 2007) outside of cancer and palliative care might be coupled with "wrap-around" interventions (O'Toole, Conde-Martel, Gibbon, Hanusa, & Fine, 2003; Pringle et al., 2002; Rivers, 1998) which seek coordination of different healthcare and social service modalities to achieve a holistic regard for individual health. More recently this approach has been reinvigorated through advances in the patient-centered medical home model (Jackson et al., 2013) which has been advanced, in part, by recent Veterans Health Administration initiatives (Perlin, Kolodner, & Roswell, 2004; Rosland et al., 2013) and is well situated to address opioid and other substance abuse with a recognition that precipitants of opioid abuse, dependence, and overdose risk are myriad and often overlapping.

Limitations

This study is limited by the nature of self-reported data, which may understate the extent of socially undesirable behavior or suffer from issues related to recall. The relatively small, and regionally defined sample is noteworthy for its disproportion-ate number of disadvantaged and unstably housed veterans and prevents generalizing beyond low-income and predominantly minority urban veteran populations to the broader population of veterans in the United States.

The study's comparability to other recent research is also limited by the lack of explicit questions about the contexts for participant's first PO use and whether they initiated use under the direction of a medical professional. Participants were asked whether they had used POs "to relieve physical pain," but affirmative responses to this question characterize both those given a prescription and those who self-medicated. Knowing the proportion that had first used in a medical context would have more clearly identified those who experienced iatrogenic initiation and contributed further to the growing literature on the nonmedical use of prescription opioids and its contribution to heroin initiation.

Despite these limitations, the range of opioid use histories reported and the significant differences by birth cohort among a single, local veteran population strongly suggests that cohort differences will exist at the national level and that further research of this nature should be conducted.

Conclusions

Even veterans serving within the same conflict era (here, OEF/OIF/OND) exhibit great demographic and socio-cultural diversity, and this analysis demonstrates the importance of birth cohort differences when considering the health of active-duty personnel and veterans. The epidemic rates of dependence and overdose morbidity and mortality among active duty and veteran populations makes understanding how different opioid use histories may be informed by the historical period in which individuals' first initiate opioid use an important research agenda. The findings from this study demonstrate the considerable variability in opioid use initiation patterns and motivations for use by birth cohort and suggest the value of prevention and treatment efforts sensitive to sociohistorical period as well as individual motivations for use.

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References

Banerjee G, Edelman EJ, Barry DT, Becker WC, Cerdá M, Crystal S, … Kerns RD. Non-medical use of prescription opioids is associated with heroin initiation among US veterans: A prospective cohort study. Addiction. 2016; 111(11):2021–2031. [PubMed: 27552496]

Bohnert AS, Ilgen MA, Galea S, McCarthy JF, Blow FC. Accidental poisoning mortality among patients in the Department of Veterans Affairs Health System. Medical Care. 2011; 49(4):393–396. [PubMed: 21407033]

Bray RM, Hourani LL. Substance use trends among active duty military personnel: Findings from the United States Department of Defense Health Related Behavior Surveys, 1980–2005. Addiction. 2007; 102(7):1092–1101. [PubMed: 17567397]

Bray, RM., Hourani, LL., Rae Olmsted, KL., Witt, M., Brown, JM., Pemberton, MR., … Hayden, D. 2005 Department of Defense Survey of Health Related Behaviors among Active Duty Military Personnel. Research Triangle Park, NC: RTI International; 2006.

Chen L, Hedegaard H, Warner M. QuickStats: Rates of deaths from drug poisoning and drug poisoning involving opioid analgesics—United States, 1999–2013. MMWR. 2015; 64(1):32.

Department of Veterans Affairs. Healthcare inspection: VA patterns of dispensing take-home opioids and monitoring patients on opioid therapy, Report No. 14-00895-163. Washington, DC: Office of Inspector General; 2014.

Edlund MJ, Steffick D, Hudson T, Harris KM, Sullivan M. Risk factors for clinically recognized opioid abuse and dependence among veterans using opioids for chronic non-cancer pain. Pain. 2007; 129(3):355–362. [PubMed: 17449178]

Fink DS, Calabrese JR, Liberzon I, Tamburrino MB, Chan P, Cohen GH, … Goto T. Retrospective age-of-onset and projected lifetime prevalence of psychiatric disorders among US Army National Guard soldiers. Journal of Affective Disorders. 2016; 202:171–177. [PubMed: 27262639]

Finley, EP. Fields of combat: Understanding PTSD among veterans of Iraq and Afghanistan. Ithaca, NY: Cornell University Press; 2011.

Goebel JR, Compton P, Zubkoff L, Lanto A, Asch SM, Sherbourne CD, … Lorenz KA. Prescription sharing, alcohol use, and street drug use to manage pain among veterans. Journal of Pain and Symptom Management. 2011; 41(5):848–858. [PubMed: 21256706]

Golub A, Bennett AS. Prescription opioidinitiation, correlates, and consequences among a sample of OEF/OIF military personnel. Substance Use & Misuse. 2013; 48(10):811–820. [PubMed: 23869455]

Golub A, Johnson BD. Variation in youthful risks of progression from alcohol and tobacco to marijuana and to hard drugs across generations. American Journal of Public Health. 2001; 91(2): 225–232. [PubMed: 11211630]

Golub A, Johnson BD, Dunlap E. Subcultural evolution and illicit drug use. Addiction Research & Theory. 2005; 13(3):217–229. [PubMed: 23805068]

Heltemes KJ, Dougherty AL, MacGregor AJ, Galarneau MR. Alcohol abuse disorders among U.S. service members with mild traumatic brain injury. Military Medicine. 2011; 176(2):147–150. [PubMed: 21366075]

Institute of Medicine. Treatment for posttraumatic stress disorder in military and veteran populations: Initial assessment. Washington, DC: The National Academies Press; 2012.

Jackson GL, Powers BJ, Chatterjee R, Bettger JP, Kemper AR, Hasselblad V, … Kendrick AS. The patient-centered medical home: A systematic review. Annals of Internal Medicine. 2013; 158(3): 169–178. [PubMed: 24779044]

Kessler RC, Heeringa SG, Stein MB, Colpe LJ, Fullerton CS, Hwang I, … Sampson NA. Thirty-day prevalence of DSM-IV mental disorders among nondeployed soldiers in the US Army: Results from the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS). JAMA Psychiatry. 2014; 71(5):504–513. [PubMed: 24590120]

Lincoln ML, Ames GM, Moore RS. Conducting qualitative research on stigmatizing conditions with military populations. Military Behavioral Health. 2016; 4(4):307–315. [PubMed: 27722033]

Musto, D. The rise and fall of epidemics: Learning from history. In: Edwards, G.Strang, J., Jaffe, JH., editors. Drugs, alcohol, and tobacco: Making the science and policy connections. New York, NY: Oxford University Press; 1993. p. 278-284.

Novak SP, Bluthenthal R, Wenger L, Chu D, Kral AH. Initiation of heroin and prescription opioid pain relievers by birth cohort. American Journal of Public Health. 2016; 106(2):298–300. [PubMed: 26691120]

O'Toole TP, Conde-Martel A, Gibbon JL, Hanusa BH, Fine MJ. Health care of homeless veterans. Journal of General Internal Medicine. 2003; 18(11):929–933. [PubMed: 14687279]

Okie S. A flood of opioids, a rising tide of deaths. New England Journal of Medicine. 2010; 363(21): 1981–1985. [PubMed: 21083382]

Perlin JB, Kolodner RM, Roswell RH. The Veterans Health Administration: Quality, value, accountability, and information as transforming strategies for patient-centered care. The American Journal of Managed Care. 2004; 10(11 Pt 2):828–836. [PubMed: 15609736]

Pringle JL, Edmondston LA, Holland CL, Kirisci L, Emptage NP, Balavage VK, … Jungblut E. The role of wrap around services in retention and outcome in substance abuse treatment: Findings from the Wrap Around Services Impact Study. Addictive Disorders & Their Treatment. 2002; 1(4):109–118.

Quinones, S. Dreamland: The story of America's new opiate epidemic. New York, NY: Bloomsbury Press; 2014.

Rigg KK, DeCamp W. Explaining prescription opioid misuse among veterans: A theory-based analysis using structural equation modeling. Military Behavioral Health. 2014; 2(2):210–216.

Rivers JE. Services for substance abusers in a changing health care system. American Behavioral Scientist. 1998; 41(8):1136–1156.

Robins LN. Vietnam veterans' rapid recovery from heroin addiction: A fluke or normal expectation? Addiction. 1993; 88(8):1041–1054. [PubMed: 8401158]

Robins LN, Davis DH, Nurco DN. How permanent was Vietnam drug addiction? American Journal of Public Health. 1974; 64(12 Suppl):38–43. [PubMed: 4429174]

Robins LN, Helzer JE, Hesselbrock M, Wish E. Vietnam veterans three years after Vietnam: How our study changed our view of heroin. The American Journal on Addictions. 2010; 19(3):203–211. [PubMed: 20525024]

Robins LN, Slobodyan S. Post-Vietnam heroin use and injection by returning US veterans: Clues to preventing injection today. Addiction. 2003; 98(8):1053–1060. [PubMed: 12873239]

Rosland AM, Nelson K, Sun H, Dolan ED, Maynard C, Bryson C, … Fihn SD. The patient-centered medical home in the Veterans Health Administration. The American Journal of Managed Care. 2013; 19(7):e263–e272. [PubMed: 23919446]

Rutkow L, Chang HY, Daubresse M, Webster DW, Stuart EA, Alexander GC. Effect of Florida's prescription drug monitoring program and pill mill laws on opioid prescribing and use. JAMA Internal Medicine. 2015; 175(10):1642–1649. [PubMed: 26280092]

Seal KH, Shi Y, Cohen G, Cohen BE, Maguen S, Krebs EE, Neylan TC. Association of mental health disorders with prescription opioids and high-risk opioid use in US veterans of Iraq and Afghanistan. JAMA: Journal of the American Medical Association. 2012; 307(9):940–947. [PubMed: 22396516]

U.S. Army. Army health promotion, risk reduction and suicide prevention report. Washington, DC: Author; 2010.

U.S. Army. Army 2020: Generating health & discipline in the force ahead of the strategic reset. 2012. Retrieved from http://usarmy.vo.llnwd.net/e2/c/downloads/232541.pdf

Wiedemer NL, Harden PS, Arndt IO, Gallagher RM. The opioid renewal clinic: A primary care, managed approach to opioid therapy in chronic pain patients at risk for substance abuse. Pain Medicine. 2007; 8(7):573–584. [PubMed: 17883742]

Table 1a

Age-period-cohort analysis of prescription opioid (PO) initiation.

			% of birth cohort initiating PO use in each time period		
Birth year	**Subsample size**	**POs ever***	**Premilitary (n.s.)**	**In military (n.s.)**	**Postmilitary (n.s.)**
<1970	53	82.7	22.6	32.1	26.4
1970–1979	53	96.2	28.3	32.1	35.8
1980–1984	45	95.6	24.4	40.0	28.9
1985+	63	93.7	31.7	42.9	19.0
Overall	214	92.0	27.1	36.9	27.1

* Difference across birth cohorts significant at the α = .05 level.

n.s.: Differences across birth cohorts not significant at even the α = .10 level.

Table 1b

Age-period-cohort analysis of heroin initiation.

			% of birth cohort initiating heroin use in each time period		
Birth year	**Subsample size**	**Heroin ever****	**Premilitary****	**In military****	**Postmilitary**†**
<1970	53	56.6	26.4[a]	22.6[b]	7.5
1970–1979	53	41.5	5.7	13.2[b]	22.6[c]
1980–1984	45	22.2	4.4	2.2	15.6[c]
1985+	63	25.4	12.7[d]	4.8	7.9
Overall	214	36.4	12.6	10.7	13.1

†Difference across birth cohorts significant at the α = .10 level.

*Difference across birth cohorts significant at the α = .05 level.

**Difference across birth cohorts significant at the α = .01 level.

*a,b,c,d*identify the four heroin cohorts analyzed further and presented in Tables 2 and 3b.

Table 2

Variation in order of heroin and prescription opioid (PO) initiation across heroin cohorts.

		% initiating POs and heroin in specified order		
Heroin cohort	**Subsample size**	**POs then heroin**	**Heroin then POs**	**Same year**
Born <1970, premilitary heroin initiation	10	40	20	40
Born <1980, in military heroin initiation	15	33	40	27
Born 1970–84, postmilitary heroin initiation	17	65	6	29
Born 1985+, premilitary heroin initiation	7	57	14	29
Overall	49	49**	20**	31

** Difference in order of initiation was significant at the $\alpha = .01$ level.

Table 3a

Motivations for initial prescription opioid (PO) use by time of initiation.

	% endorsing by time of PO initiation			
Motivation	**Premilitary**	**In military**	**Postmilitary**	**Total**
Subsample size	58	79	58	195
Relieve physical pain **	59	86	84	77
Relieve emotional/psychological pain	45	30	40	37
Substitute for or help quit another drugs	9	7	7	8
Manage negative effects of other drugs	9	8	10	9
Alleviate boredom	26	19	16	20
Peer/partner pressure or to be cool **	26	6	7	12
Get high, have fun, party **	59	35	24	39

** Differences across time periods significant at the α = .01 level.

Table 3b

Motivations for initial heroin use by heroin cohort.

Motivation	% endorsing by heroin cohort				
	Born <1970, premilitary heroin initiation	Born <1980, in military heroin initiation	Born 1970–1984, postmilitary heroin initiation	Born 1985+, premilitary heroin initiation	Total
Subsample size	14	19	19	8	78[a]
Relieve physical pain[†]	7	32	47	50	41
Relieve emotional/psychological pain[**]	36	32	79	88	56
Substitute for or help quit another drugs	0	11	16	25	14
Manage negative effects of other drugs[**]	0	5	11	50	13
Alleviate boredom	29	26	37	63	38
Peer/partner pressure or to be cool	36	16	37	63	33
Get high, have fun, party	50	74	63	88	68

[a] Includes all lifetime heroin users including those not in the four major heroin cohorts identified.

[†] Differences across heroin cohorts statistically significant at the $\alpha = .10$ level.

[*] Difference across heroin cohorts statistically significant at the $\alpha = .05$ level.

[**] Difference across heroin cohorts statistically significant at the at the $\alpha = .01$ level.