



YOR CALIFORNIA
California Youth Opioid Response

YOR California Annotated Bibliography

Youth Substance Use & Treatment

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Introduction and Methodology

This bibliography provides YOR California stakeholders with research articles that may be helpful as you expand access to services for youth who are misusing opioids or stimulants. It is our intent that anyone with an interest in current research on adolescent treatment for substance use disorders will find relevant articles in this bibliography.

This annotated resource includes studies and articles published in peer-reviewed journals from 2015 through present (June 2021), but it should not be considered exhaustive.

The search terms included the following: adolescent, amphetamine, assessment, cocaine, cognitive behavioral therapy, co-occurring disorders, early intervention, evidence-based practices, heroin, intervention, methamphetamine, opioids, opiates, opioid use disorder, opioid use, screening, medication assisted treatment (MAT), medications for opioid use disorder (MOUD), recovery (recovery supports; recovery high schools; collegiate recovery), stimulants, teen, transition age youth (TAY), treatment, withdrawal, young adults, youth, and youth development.

The search focused on adolescent and young adult substance use and substance use treatment approaches, with a primary focus on opioid or stimulant use treatments. While some articles pertaining to prevalence and risk factors for use are included, these were not sought out specifically. Additionally, articles with multiple age groups are included if findings were in a delineated cohort ranging from 12-24 years old.

Regardless of the location of publication, articles are included if the study population is within the United States. The bibliography includes articles with different study designs including quantitative and qualitative studies, case reports, meta-analyses, and literature reviews.

How to Use the Tags to Find Articles of Interest

Articles are arranged in alphabetical order of the first author's last name. Tags (formatted keywords) of the primary topics of an article are listed above each article's abstract and on pages 3-4. Using the document's **find** or **search** function on the home screen toolbar, type or copy/paste the tag exactly as it appears into the **navigation** field. (Be sure not to add a space at the end or the articles may not appear.) All the articles within the document with the same tags will display. Only one tag can be entered into the **navigation** field at a time.

All of the abstracts are complete versions of those published in the cited journal and require attribution to the article authors if utilized. No original writing or commentary from the bibliography author(s) is included.

Tag List

#access	#codeine	#HighSchoolStudents
#ACRA	#CollegeHealth	#HIV
#addiction	#comorbidity	#HomeDelivery
#admissions	#completion	#hydrocodone
#ADHD	#CoOccurring	#hypomania
#adolescent	#ConcurrentSubstanceUse	#IllicitDrugUse
#adolescents	#COVID19	#implementation
#agonist	#depression	#incidence
#alcohol	#DepressiveEpisodes	#initiation
#AlcoholAbuse	#DepressiveSymptoms	#injection
#AlcoholUseDisorder	#DecisionMaking	#InjectionDrugUse
#AmericanIndians	#disaster	#inpatient
#anxiety	#DiversionofStimulants	#intervention
#anxiolytics	#dose	#longitudinal
#AsianAmerican	#EarlyDetection	#MachineLearning
#AssertiveTreatment	#EarlyTreatment	#management
#assessment	#education	#MAT
#benefits	#EducationalAttainment	#Medicaid
#benzodiazepine	#emergency	#medication
#brain	#EmergencyDepartment	#MedicationTreatment
#buprenorphine	#EmergingAdult	#MentalHealth
#cannabis	#engagement	#MetaAnalysis
#CannabisUse	#ExtendedRelease	#methadone
#CareContinuum	#family	#methamphetamine
#CaseReport	#FamilyStructure	#MexicanAmerican
#CBT	#families	#MicroInduction
#childhood	#feasibility	#mindful
#ChildhoodBehavior	#framework	#mindfulness
#children	#gender	#misuse
#ChronicPain	#GenderMinorities	#mortality
#cocaine	#GroupTreatment	#MotivationalInterviewing
	#heroin	#MOUD
	#HighSchool	#naloxone

#naltrexone	#prescription	#socioeconomic
#nonmedical	#PrescriptionMisuse	#stimulant
#NonMedicalUse	#PrescriptionOpioids	#StimilantUse
#NMOU	#PrescriptionOpioidUse	#StreetInvolvedYouth
#NMPO	#PrescriptionUse	#students
#OBOT	#prevention	#SubstanceUseDisorders
#opiates	#ProblemSolving	#SubstanceUse
#opioid	#ProtectiveFactors	#SUD
#OpioidAgonist	#PTSD	#taper
#OpioidCrisis	#qualitative	#telehealth
#OpioidUse	#QualityImprovement	#tobacco
#OpioidMisuse	#RandomizedControlTrial	#transition
#OpioidNaive	#recovery	#trauma
#OpioidOverdose	#RecoveryHighSchools	#treatment
#OpioidUseDisorder	#residential	#TreatmentAdherence
#OUD	#ResidentialTreatment	#TreatmentServices
#outpatient	#resilience	#utilization
#overdose	#retention	#urban
#oxycodone	#review	#women
#pain	#risk	#XRMOUD
#PolysubstanceUse	#RiskBehavior	#XRNnaltrexone
#PostTraumaticStress	#RiskFactors	#XRNTX
#peer	#rural	#YoungAdult
#pharmacology	#sedatives	#YoungAdulthood
#predictors	#ServiceDelivery	#youth
#pregnant	#sex	
#PrescribingPatterns	#SexualMinorities	

Articles

Alinsky, R.H., Hadland, S.E., Matson, P.A., Cerda, M., & Saloner, B. (2020). Adolescent-Serving Addiction Treatment Facilities in the United States and the Availability of Medications for Opioid Use Disorder. *Journal of Adolescent Health, 67*(4), 542-549.

Tags: #adolescent; #OpioidUseDisorder; #treatment; #MOUD

Abstract: Purpose: Adolescents with opioid use disorder are less likely than adults to receive medications for opioid use disorder (MOUD), yet we know little about facilities that provide addiction treatment for adolescents. We sought to describe adolescent-serving addiction treatment facilities in the U.S. and examine associations between facility characteristics and offering MOUD, leading to informed recommendations to improve treatment access.

Methods: This cross-sectional study used the 2017 National Survey of Substance Abuse Treatment Services. Facilities were classified by whether they offered a specialized adolescent program. Covariates included facility ownership, hospital affiliation, insurance/payments, government grants, accreditation/licensure, location, levels of care, and provision of MOUD. Descriptive statistics and logistic regression compared adolescent-serving versus adult-focused facilities and identified characteristics associated with offering maintenance MOUD.

Results: Among 13,585 addiction treatment facilities in the U.S., 3,537 (26.0%) offered adolescent programs. Adolescent-serving facilities were half as likely to offer maintenance MOUD as adult-focused facilities (odds ratio, .53; 95% confidence interval, .49–.58), which was offered at 23.1% (816) of adolescent-serving versus 35.9% (3,612) of adult-focused facilities. Among adolescent-serving facilities, characteristics associated with increased unadjusted odds of offering maintenance MOUD were nonprofit status, hospital affiliation, accepting insurance (particularly, private insurance), accreditation, Northeastern location, or offering inpatient services.

Conclusions: The one-quarter of U.S. addiction treatment facilities that serve adolescents are half as likely to provide MOUD as adult-focused facilities, which may explain why adolescents are less likely than adults to receive MOUD. Strategies to increase adolescent access to MOUD may consider insurance reforms/incentives, facility accreditation, and geographically targeted funding.

Alinsky, R.H., Zima, B.T., Rodean, J., Matson, P.A., Larochelle, M.R., Adger, H., Bagley, S.M., & Hadland, S.E. (2020). Receipt of addiction treatment after opioid overdose among Medicaid-enrolled adolescents and young adults. *JAMA Pediatrics, 174*(3): e195183.

Tags: #adolescent; #YoungAdults; #OpioidOverdose; #Medicaid; #treatment

Abstract: Importance: Nonfatal opioid overdose may be a critical touch point when youths who have never received a diagnosis of opioid use disorder can be engaged in treatment. However, the extent to which youths (adolescents and young adults) receive timely evidence-based treatment following opioid overdose is unknown.

Objective: To identify characteristics of youths who experience nonfatal overdose with heroin or other opioids and to assess the percentage of youths receiving timely evidence-based treatment.

Design, Setting, and Participants: This retrospective cohort study used the 2009-2015 Truven–IBM Watson Health MarketScan Medicaid claims database from 16 deidentified states representing all US census regions. Data from 4 039 216 Medicaid-enrolled youths aged 13 to 22 years were included and were analyzed from April 20, 2018, to March 21, 2019.

Exposures: Nonfatal incident and recurrent opioid overdoses involving heroin or other opioids.

Main Outcomes and Measures: Receipt of timely addiction treatment (defined as a claim for behavioral health services, for buprenorphine, methadone, or naltrexone prescription or administration, or for both behavioral health services and pharmacotherapy within 30 days of incident overdose).

Sociodemographic and clinical characteristics associated with receipt of timely treatment as well as with incident and recurrent overdoses were also identified.

Results: Among 3791 youths with nonfatal opioid overdose, 2234 (58.9%) were female, and 2491 (65.7%) were non-Hispanic white. The median age was 18 years (interquartile range, 16-20 years). The crude incident opioid overdose rate was 44.1 per 100 000 person-years. Of these 3791 youths, 1001 (26.4%) experienced a heroin overdose; the 2790 (73.6%) remaining youths experienced an overdose involving other opioids. The risk of recurrent overdose among youths with incident heroin involvement was significantly higher than that among youths with other opioid overdose (adjusted hazard ratio, 2.62; 95% CI, 2.14-3.22), and youths with incident heroin overdose experienced recurrent overdose at a crude rate of 20 700 per 100 000 person-years. Of 3606 youths with opioid-related overdose and continuous enrollment for at least 30 days after overdose, 2483 (68.9%) received no addiction treatment within 30 days after incident opioid overdose, whereas only 1056 youths (29.3%) received behavioral health services alone, and 67 youths (1.9%) received pharmacotherapy. Youths with heroin overdose were significantly less likely than youths with other opioid overdose to receive any treatment after their overdose (adjusted odds ratio, 0.64; 95% CI, 0.49-0.83).

Conclusions and Relevance: After opioid overdose, less than one-third of youths received timely addiction treatment, and only 1 in 54 youths received recommended evidence-based pharmacotherapy. Interventions are urgently needed to link youths to treatment after overdose, with priority placed on improving access to pharmacotherapy.

Al-Tayyib, A., Riggs, P., Mikulich-Gilbertson, S., & Hopfer, C. (2018). Prevalence of nonmedical use of prescription opioids and association with co-occurring substance use disorders among adolescents in substance use treatment. *Journal of Adolescent Health, 62*(2).

Tags: #adolescents; #PrescriptionOpioids; #CoOccurring; #SubstanceUseDisorders; #NonMedicalUse; #treatment

Abstract: Purpose: We sought to describe the prevalence of the nonmedical use of prescription opioids (NMUPO) and its association with co-occurring substance use disorders in a sample of adolescents in substance treatment.

Methods: Adolescents in two substance treatment programs were recruited for participation between 2009 and 2013. The Composite International Diagnostic Interview—Substance Abuse Module (CIDI-SAM) was administered to assess substance use patterns and lifetime abuse or dependence.

Results: A total of 378 adolescents completed the CIDI-SAM (mean age 16.1 [standard deviation = 1.1], 78% male, 50% white, non-Hispanic). Of the 378 adolescents, 62 (16.4%) reported NMUPO and 59 (15.6%) were diagnosed with opioid/heroin abuse or dependence. The mean age at first NMUPO was 14.3 (standard deviation = 1.4). NMUPO was associated with a 3.31-fold (95% confidence interval: 2.83–3.79) increase in having three or more co-occurring substance use diagnoses.

Conclusions: NMUPO is quite prevalent among adolescents in substance use treatment. Intervention to interrupt NMUPO from progressing to heroin use or developing into a disorder is critical.

Azar, P., et al. (2020). A case report: Rapid micro-induction of buprenorphine/naloxone to administer buprenorphine extended-release in an adolescent with severe opioid use disorder. *The American Journal on Addictions, 29(6)*, 531-535.

Tags: #adolescent; #OUD; #buprenorphine; #naloxone; #MicroInduction; #CaseReport

Abstract: Background and Objectives: Buprenorphine extended-release (BUP-XR) is a monthly injectable form of opioid agonist therapy. Before its administration, a minimum 7-day induction period with a transmucosal buprenorphine-containing product is recommended.

Methods: Case report (n = 1).

Results: A 16-year-old female with active, severe opioid use disorder (OUD) and stimulant use disorder, hepatitis C virus, co-occurring mental health disorders, and complex social stressors had five recent overdoses requiring naloxone. She had previously been treated with methadone and several trials of sublingual buprenorphine/naloxone, but would quickly discontinue the treatment. Using a rapid micro-induction protocol, buprenorphine/naloxone was administered for 3 days. On day 4, 300 mg BUP-XR was administered subcutaneously. Minimal withdrawal symptoms occurred, despite recent fentanyl use.

Discussion and Conclusions: A rapid sublingual buprenorphine/naloxone micro-induction was successfully used to initiate BUP-XR, thereby eliminating the abstinence period prior to buprenorphine/naloxone administration, shortening the induction period, and minimizing withdrawal.

Scientific Significance: This is the first reported case of using rapid micro-induction as a bridge to initiate BUP-XR. By reducing the length of induction to 4 days and minimizing withdrawal, this induction method can make BUP-XR more accessible to patients who would otherwise refuse the medication due to concerns of enduring withdrawal.

Bagley, S.M., Gai, M.J., Earlywine, J.J., Schoenberger, S.F., Hadland, S.E., & Barocas, J.A. (2020). Incidence and characteristics of nonfatal opioid overdose among youths aged 11 to 24 years by sex. *JAMA Netw Open, 3(12)*, e2030201.

Tags: #opioid; #youth; #overdose; #incidence; #sex

Abstract: Importance: Opioid-related overdose has substantially increased among adolescents and young adults in recent years. How overdose differs by age and sex among youths and the factors associated with overdose by sex remain poorly described.

Objective: To compare the sociodemographic and clinical characteristics of female and male youths who have experienced a nonfatal opioid overdose (NFOD) and compare the incidence of NFOD by sex.

Design, Setting, and Participants: This retrospective cohort study used data on US individuals aged 11 to 24 years with a diagnosis of NFOD from the IBM MarketScan Commercial Database from January 1, 2006, through December 31, 2017.

Exposure: Sex.

Main Outcomes and Measures: The primary outcome was NFOD stratified by sex; covariates included sociodemographic and clinical characteristics.

Results: Among 20 312 youths aged 11 to 24 years who had a history of NFOD and met study eligibility criteria, the median age was 20 years (interquartile range, 18-22 years; mean [SD] age, 20.0 [2.9] years) and 56.7% were male. Compared with male youths, female youths had a higher baseline prevalence of mood or anxiety disorder (65.5% vs 51.9%, $P < .001$), trauma and stress-related disorders (16.4% vs 10.1%, $P < .001$), and history of suicide attempt or self-harm (14.6% vs 9.9%, $P < .001$). Male youths had a higher prevalence of opioid use disorder (44.7% vs 29.2%, $P < .001$), cannabis use disorder (18.3% vs 11.3%, $P < .001$), and alcohol use disorder (20.3% vs 14.4%, $P < .001$). The incidence rate ratio of NFODs in females vs males was greater than 1 for ages 11 to 16 years and was less than or equal to 1 after age 17 years.

Conclusions and Relevance: This cohort study found differences between female and male youths in sociodemographic and clinical characteristics and incidence of NFOD. Although female and male youths who experience overdose appear to have different risk factors, many of these risk factors may be amenable to early detection through screening and intervention.

Barbosa-Leiker, C., et al. (2020). Substance use and mental health in emerging adult vs older adult men and women with opioid use disorder. *The American Journal on Addictions*, 29(6), 536-542.

Tags: #EmergingAdult; #OUD; #MentalHealth; #SubstanceUse; #buprenorphine; #XRNnaltrexone; #MAT

Abstract: Background and Objectives: We examined age differences across genders in clinical characteristics in emerging adult (≤ 25 years) vs older adult patients (26+ years) with opioid use disorder (OUD).

Methods: Participants (N = 570; 30% female) entering a comparative effectiveness medication trial of buprenorphine vs extended-release naltrexone.

Results: Differences in clinical characteristics in emerging adult vs older participants were similar across genders. However, women 26+ years reported more mental health problems compared with women ≤25, while men ≤25 years reported more mental health problems compared with men 26+ years.

Discussion and Conclusion: Different strategies for emerging adult and older patients seeking OUD treatment may be necessary to address psychiatric comorbidities that differ across genders in this population.

Scientific Significance: Comprehensive psychiatric assessment should be systematically included in OUD treatment for all genders. Treatment should focus on the emerging adult developmental phase when appropriate, with psychiatric treatment tailored for women and men, separately, across the lifespan.

Barton, A.W., Reinhart, C.A., Campbell, C.C., Smith, D.C. & Albarracin, D. (2021). Opioid use at the transition to emerging adulthood: A latent class analysis of non-medical use of prescription opioids and heroin use. *Addictive Behaviors, 114*.

Tags: #OpioidsUseDisorder; #NonMedicalUse; #PrescriptionOpioids; #heroin; #EmergingAdult

Abstract: Background: Although rates of nonmedical opioid use are highest in late adolescence and emerging adulthood, efforts to understand the extent of the heterogeneity in opioid misuse during this time have been limited. The current study aimed to derive and define typologies of opioid use in high school students at the onset of emerging adulthood.

Methods: Survey responses from a statewide sample of high school students aged 18 and 19 (N = 26,223) were analyzed. Group-based comparisons between participants reporting opioid use and those not reporting opioid use were conducted. Among those reporting opioid use (n = 1,636), we conducted a latent class analysis (LCA) to identify heterogeneous subgroups of opioid users on the basis of non-medical use of prescription opioids (NMUPO) and heroin use. The resulting classes were then compared across various risk and protective factors using multinomial logistic regression.

Results: Consistent differences were observed between participants using opioids and participants not using opioids, with moderate to large effect sizes. Results from LCA revealed three subclasses: NMUPO-Any Use, NMUPO To Get High, and Heroin Use. Subclass differences were observed for non-opioid substance use, mental health, and demographics.

Conclusions: Findings from this study underscore the variability of youth who engage in opioid use in late adolescence. Results also indicate that opioid use during adolescence is likely indicative of a broader set of substance use and mental health issues.

Bell, T.M., Raymond, J.L., Mongalo, A.C., Adams, Z.W., Rouse, T.M., Hatcher, L., Russell, K., & Carroll, A.E. (2021). Outpatient opioid prescriptions are associated with future substance use disorders and overdose following adolescent trauma. *Annals of Surgery* [published ahead of print]

Tags: #PrescriptionOpioids; #adolescent; #SubstanceUseDisorders; #overdose; #trauma

Abstract: Objective: This study aims to determine if outpatient opioid prescriptions are associated with future substance use disorder (SUD) diagnoses and overdose in injured adolescents five years following hospital discharge.

Summary Background Data: Approximately, 1 in 8 adolescents are diagnosed with an SUD and 1 in 10 experience an overdose in the five years following injury. State laws have become more restrictive on opioid prescribing by acute care providers for treating pain, however, prescriptions from other outpatient providers are still often obtained.

Methods: This was a retrospective cohort study of patients ages 12–18 admitted to two level I trauma centers. Demographic and clinical data contained in trauma registries were linked to a regional database containing five years of electronic health records and prescription data. Regression models assessed whether number of outpatient opioid prescription fills after discharge at different time points in recovery were associated with a new SUD diagnosis or overdose, while controlling for demographic and injury characteristics, as well as depression and PTSD diagnoses.

Results: We linked 669 patients (90.9%) from trauma registries to a regional health information exchange database. Each prescription opioid refill in the first 3 months after discharge increased the likelihood of new SUD diagnoses by 55% (OR:1.55, CI:1.04–2.32). Odds of overdose increased with ongoing opioid use over 2–4 years post-discharge ($p = 0.016–0.025$).

Conclusions: Short-term outpatient opioid prescribing over the first few months of recovery had the largest effect on developing an SUD, while long-term prescription use over multiple years was associated with a future overdose.

Berger, M., Fernando, S., Churchill, A., Cornish, P., Henderson, J., Shah, J., Tee, K., & Salmon, A. (2021). Scoping review of stepped care interventions for mental health and substance use service delivery to youth and young adults. *Early Intervention in Psychiatry*, Online Version of Record before inclusion in an issue.

Tags: #youth; #YoungAdults; #MentalHealth; #SubstanceUse; #ServiceDelivery; #intervention; #MetaAnalysis

Abstract: Aims: Many young people with mental health and/or substance use concerns do not have access to timely, appropriate, and effective services. Within this context, stepped care models (SCMs) have emerged as a guiding framework for care delivery, inspiring service innovations across the globe. However, substantial gaps remain in the evidence for SCMs as a strategy to address the current systemic challenges in delivering services for young people. This scoping review aims to identify where these gaps in evidence exist, and the next steps for addressing them.

Methods: A scoping review was conducted involving both peer-reviewed and grey literature. Eligible studies explored SCMs implemented in the various health care settings accessed by young people aged 12–24 seeking treatment for mental health and substance use challenges. After screening titles and abstracts, two reviewers examined full-text articles and extracted data to create a descriptive summary of the models.

Results: Of the 656 studies that were retrieved, 51 studies were included and grouped by study team for a final yield of 43 studies. Almost half of the studies were focused on the adult population (i.e., 18 and over), and most did not specify interventions for young people. Among the SCMs, substantial variability was found in almost every aspect of the models.

Conclusions: Considering the current body of evidence, there is an urgent need for a consensus position on the definition, implementation, and outcome measures required for rigorously assessing the utility of SCMs for young people.

Bohm, M.K. & Clayton, H.B. (2020). Nonmedical use of prescription opioids, heroin use, injection drug use, and overdose mortality in U.S. adolescents. *Journal of Studies on Alcohol and Drugs*, 81(4), 484 – 488.

Tags: #adolescents; #overdose; #mortality; #NonmedicalUse; #heroin; #InjectionDrugUse

Abstract: Objective: We assessed overdose mortality by opioid types involved as well as interrelationships between nonmedical use of prescription opioids (NUPO) and heroin and injection drug use (IDU) among adolescents.

Method: We examined 2010 and 2016 overdose data by drug type for decedents in the United States ages 15-19 years from the Multiple Cause of Death Files. We also analyzed data from the 2017 National Youth Risk Behavior Survey, a nationally representative survey of high school students. We assessed lifetime NUPO and calculated heroin use and IDU by frequency of lifetime NUPO. Adjusted prevalence ratios (aPRs) were generated, and linear contrast analysis determined dose-response relationships between frequency of lifetime NUPO and the two outcomes.

Results: The percentage of deaths involving prescription opioids that also involved illicit opioids such as heroin or fentanyl was 5.5% in 2010 and 25.0% in 2016. We observed a positive dose-response relationship with frequency of lifetime NUPO; aPRs were highest for 20 or more times of NUPO and heroin use (aPR = 49.49, 95% CI [33.39, 73.34]) and IDU (aPR = 44.37, 95% CI [23.16, 84.99]). However, aPRs for heroin and IDU were high even among those reporting just one or two occasions of NUPO (aPRs = 9.25, 95% CI [5.90, 14.49] and 6.63, 95% CI [3.99, 11.02], respectively).

Conclusions: Adolescent prescription opioid overdose deaths now frequently involve illicit opioids. Heroin use and IDU are higher among students reporting even a few instances of NUPO, indicating that students with any NUPO are an important risk group. Clinical, community, and school-based efforts can address NUPO, noting these associations.

Bonar, E.E., et al. (2020). Prescription opioid misuse among adolescents and emerging adults in the United States: A scoping review. *Preventive Medicine*, 132, 105972.

Tags: #adolescents; #EmergingAdults; #PrescriptionOpioids; #misuse; #review

Abstract: The U.S. opioid epidemic is a critical public health problem. As substance use and misuse typically begin in adolescence and emerging adulthood, there is a critical need for prevention efforts for

this key developmental period to disrupt opioid misuse trajectories, reducing morbidity and mortality [e.g., overdose, development of opioid use disorders (OUD)]. This article describes the current state of research focusing on prescription opioid misuse (POM) among adolescents and emerging adults (A/EAs) in the U.S. Given the rapidly changing nature of the opioid epidemic, we applied PRISMA Scoping Review (PRISMA-ScR) guidelines to identify empirical articles published in the past 5 years (January 2013–September 2018) from nine databases examining POM among A/EAs (ages 10–25) in the U.S. Seventy-six articles met our inclusion criteria focusing on POM in the following areas: cross-sectional surveys (n = 60), longitudinal cohort studies (n = 5), objective, non-self-reported data sources (n = 9), and interventions (n = 2). Final charted data elements were organized by methodology and sample, with results tables describing design, sample, interventions (where applicable), outcomes, and limitations. Most studies focused on the epidemiology of POM and risk/protective factors, including demographic (e.g., sex, race), individual (e.g., substance use, mental health), and social (e.g., peer substance use) factors. Despite annual national surveys conducted, longitudinal studies examining markers of initiation and escalation of prescription opioid misuse (e.g., repeated overdoses, time to misuse) are lacking. Importantly, few evidence-based prevention or early intervention programs were identified. Future research should examine longitudinal trajectories of POM, as well as adaptation and implementation of promising prevention approaches.

Boyd, C.J., Meier, E.A., Veliz, P.T., Epstein-Ngo, Q., & McCabe, S.E. (2015). A prospective study of youth's nonmedical use of opioids, anxiolytics and sedatives. *Drug and Alcohol Dependence, 146*(1).

Tags: #youth; #opioids; #NonmedicalUse; #anxiolytics; #sedatives

Abstract: Aims: To determine whether adolescents' recent medical use of opioid analgesics, anxiolytics or sleeping medications is associated with an increased incidence of nonmedical use one year later. Compared to Group A, Group B respondents will demonstrate a higher incidence of nonmedical use opioids, anxiolytics and sedatives at Time 2, and will endorse both sensation-seeking and self-treating motivations.

Methods: A longitudinal study using annual web-based surveys was conducted in five secondary schools between 2009 and 2012. At Time 1 respondents self-selected into mutually exclusive groups: Group A was the no exposure group (n = 1287), never having used opioid analgesics, anxiolytics or sedatives. Group B (n = 314) was exposed medically to opioids, anxiolytics or sedatives within the past 12 months, and had possessed their own legal prescriptions for the medications. The sample was comprised of 1601 adolescents with an average age of 14.8 years (SD = 1.9). Sixty-five percent (65.4%) were White/Caucasian, 28% were African American, and the rest were from other ethnic groups (Asian, Hispanic, and American Indian/Alaskan Native). The sample was evenly distributed by sex and grade.

Results: At Time 1, most in Group B had been given a prescription for opioid analgesics (89.9% received opioids, 12.5% anxiolytics and 10.3% sedatives). At Time 2, Group B had a significantly increased incidence of nonmedical use of opioids, anxiolytics or sedatives when compared to Group A (AOR, 3.32 [95% CI 2.04–5.38] p < 0.001), with increased odds of engaging in sensation seeking (AOR, 5.62 [1.94–16.23] p < 0.001) as well as self-treatment motivations (AOR, 2.96 [1.77–4.93] p < 0.001) with the nonmedical use.

Conclusions: A legal prescription for a controlled medication at Time 1 increases an adolescent's risk of nonmedical use one year later, both for sensation-seeking and self-treating motivations.

Buck, J.M. & Siegel, J.A. (2015). The effects of adolescent methamphetamine exposure. *Frontiers in Neuroscience, 9*.

Tags: #adolescent; #methamphetamine

Abstract: Methamphetamine use among adolescents is a significant social and public health concern. Despite increased awareness of methamphetamine use among younger people, relatively little research has examined the effects of adolescent methamphetamine use compared to adult use. Thus much remains to be learned about how methamphetamine alters adolescent brain function and behavior. In this article we review recent trends in adolescent methamphetamine use and data examining the effects of adolescent methamphetamine use on the dopaminergic system and behavior in humans and animal models. Future research is warranted to expand our understanding of the effects of adolescent methamphetamine exposure and how those effects differ from those seen in adults.

Camenga, D.R., Colon-Rivera, H.A., & Muvvala, S.B. (2019). Medications for maintenance treatment of opioid use disorder in adolescents: A narrative review and assessment of clinical benefits and potential risks. *Journal of Studies on Alcohol and Drugs, 80*(4), 393–402.

Tags: #adolescent; #OUD; #MAT; #review; #benefits; #risks

Abstract: Objective: Methadone, buprenorphine, and naltrexone are evidence-based treatments for opioid use disorder (OUD). A large body of evidence supports their effectiveness in adults with OUD. However, few studies have tested their efficacy in adolescents. This study summarizes the clinical benefits and risks of three medications for the treatment of OUD in adolescents.

Method: We review and synthesize the published evidence about the efficacy and potential risks (including safety concerns) associated with methadone, buprenorphine, or naltrexone for the treatment of OUD in adolescents and compare their benefits and risks with that of no treatment or treatment without medications. We also discuss adolescent-specific treatment needs and strategies to overcome potential challenges in prescribing medications for adolescents with OUD.

Results: Methadone appears to be effective in promoting treatment retention among adolescents with heroin use disorder. Data from three randomized controlled trials suggest that buprenorphine treatment improves the likelihood of opioid abstinence and treatment retention. Although these medications have a potential risk of overdose when misused or used illegally, evidence suggests this risk is much lower for buprenorphine than methadone. Emerging data also suggest that naltrexone is a safe and feasible option for adolescents. Vast evidence demonstrates that the risks of untreated OUD far outweigh the risks of any of the previously discussed medications.

Conclusions: Little published evidence specifically examines the efficacy and safety of using medications for OUD in adolescents, and more research is needed. It is essential for healthcare professionals to determine whether their adolescent patients may benefit from medications for the treatment of OUD.

Carmona, J., Maxwell, J.C., Park, J., & Wu, T. (2020). Prevalence and health characteristics of prescription opioid use, misuse, and use disorders among U.S. adolescents. *Journal of Adolescent Health, 66*(5), 536-544.

Tags: #PrescriptionOpioidUse; #NonmedicalPrescriptionOpioidUse; #hydrocodone; #codeine; #oxycodone; #CannabisUseDisorder; #AlcoholUseDisorder; #adolescents

Abstract: Purpose: The prevalence of past-year prescription opioid use (POU), nonmedical POU (NMPOU), and POU disorder (POUD) and their correlates were examined in a national sample of American adolescents (N = 41,579).

Methods: This study used data from the public-use files of the 2015, 2016, and 2017 National Surveys on Drug Use and Health, which captured substance use and mental health problems among noninstitutionalized individuals. Prevalence and specific types of prescription opioids and other substances used and misused in the past year were examined among adolescents. Logistic regression analyses were conducted to determine correlates (demographics, other substances used, past-year major depressive episode, school enrollment, two-parent household, number of lifetime medical conditions, and survey year) of POU, NMPOU, and POUD.

Results: Multiple substance use was common within the past year. The most frequently used prescription opioids were hydrocodone, codeine, oxycodone, and other opioids among adolescents. Cannabis use disorder and alcohol use disorder were comparatively prevalent among opioid misusers. Several correlates (demographics, other substances used, lifetime medical conditions, major depressive episode, and survey year) of POU, NMPOU, and POUD were found.

Conclusions: In this national sample, multiple substance use was common among adolescents with past-year POU and NMPOU. Clinical screening for opioid use problems, assessment, and treatment expansion for POUD can focus on persons with substance use, mental health, and/or behavioral problems. Longitudinal studies are needed to better elucidate temporal associations between POU and NMPOU/POUD among adolescents, and more prevention and treatment research on rural residents and minority groups is needed.

Carney, B. L., Hadland, S. E., & Bagley, S. M. (2018). Medication Treatment of Adolescent Opioid Use Disorder in Primary Care. *Pediatrics in review, 39*(1), 43–45.

Tags: #OUD; #buprenorphine; #naltrexone; #methadone

Abstract: Since 2000, a three-fold increase in unintentional opioid poisonings among adolescents has followed a dramatic increase in adult opioid-related deaths. In 2016, 1 in 13 high school seniors reported

past year non-prescription use of opioids. Despite these increases, only 8.5% of adolescents received addiction treatment.

In September 2016, the American Academy of Pediatrics (AAP) released a policy statement recommending that pediatricians offer medication for treatment of severe opioid use disorder (OUD). There are three medications approved for OUD treatment: buprenorphine, naltrexone and methadone. Buprenorphine and methadone are opioid agonists that decrease cravings for opioids and treat withdrawal symptoms. Additionally, both provide “opioid blockade”, which means if an individual uses another opioid after taking their medication, euphoric effects are blocked. Naltrexone, an opioid antagonist, blocks the opioid receptor preventing the effects of opioid use. It may also reduce cravings for opioids. Head-to-head clinical trials of these medications in adolescents are lacking; observational data among adults suggest that among these medications, methadone may be the most effective for retention in treatment.

Cerdá, M., Santaella, J., Marshall, B.D.L., Kim, J.H., & Martins, S.S. (2015). Nonmedical prescription opioid use in childhood and early adolescence predicts transitions to heroin use in young adulthood: A national study. *The Journal of Pediatrics*, 167(3), 605-612.

Tags: #OpioidUse; #nonmedical; #PrescriptionUse; #heroin; #childhood; #transition; #YoungAdulthood

Abstract: Objectives: To examine the relationship between nonmedical use of prescription opioids and heroin initiation from childhood to young adulthood, and to test whether certain ages, racial/ethnic, and income groups were at higher risk for this transition.

Study design: Among a nationally representative sample of US adolescents assessed in the 2004-2011 National Surveys on Drug Use and Health cross-sectional surveys (n = 223 534 respondents aged 12-21 years), discrete-time hazard models were used to estimate the age-specific hazards of heroin initiation associated with prior history of nonmedical use of prescription opioids. Interactions were estimated between prior history of nonmedical use of prescription opioids and age of nonmedical use of prescription opioid initiation, race/ethnicity, and income.

Results: A prior history of nonmedical use of prescription opioids was strongly associated with heroin initiation (hazard ratio 13.12, 95% CI 10.73, 16.04). Those initiating nonmedical use of prescription opioids at ages 10-12 years had the highest risk of transitioning to heroin use; the association did not vary by race/ethnicity or income group.

Conclusions: Prior use of nonmedical use of prescription opioids is a strong predictor of heroin use onset in adolescence and young adulthood, regardless of the user's race/ethnicity or income group. Primary prevention of nonmedical use of prescription opioids in late childhood may prevent the onset of more severe types of drug use such as heroin at later ages. Moreover, because the peak period of heroin initiation occurs at ages 17-18 years, secondary efforts to prevent heroin use may be most effective if they focus on young adolescents who already initiated nonmedical use of prescription opioids.

Chan, K.T. & Marsack-Topolewski, C. (2019). Gender differences in adolescent opioid misuse and major depressive episodes. *Child and Adolescent Social Work Journal, 37*, 397-409

Tag: #adolescent; #OpioidMisuse; #gender; #DepressiveEpisodes

Abstract: The opioid crisis is a public health emergency in the United States, with staggering financial and social costs to society. Nonmedical prescription opioid use (NMPOU) disproportionately impacts adolescents, with opioid-related mortality rates increasing for female adolescents. Past research has linked opioid misuse to mental health problems, and adolescents have the highest prevalence of substance use and mental health disorders compared with other age cohorts. This study examined the relationship of adolescent NMPOU with having a major depressive episode (MDE), stratified by gender. This study used data from the 2016 National Survey on Drug Use and Health (NSDUH), and included 11,489 respondents aged 12 to 17. Multivariate logistic regression analyses using survey design weights were used to examine the effect of past-year NMPOU with the odds of having a past-year major depressive episode. Results indicated a higher prevalence of past-year MDE among adolescents who used NMPOU (34.0%), compared to those who did not (12.7%). Adolescent opioid misuse was associated with increased 60% higher odds for having a past-year MDE (OR = 1.60, 95% CI [1.11, 2.32], $p < 0.05$). Subgroup analysis found that NMPOU was associated with increased odds for having a past-year MDE for adolescent females (OR = 1.99, 95% CI [1.24, 3.17], $p < 0.01$), while the association of NMPOU with past-year MDE was not statistically observed for adolescent males. Results indicated that opioid misuse is a leading factor associated with having a major depressive episode among adolescent females. Adolescent females were at a higher risk for poor mental health outcomes compared to adolescent males. Social workers in collaboration with other professionals can play a central role by coordinating substance use and mental health prevention and recovery services.

Chang, D.C., Klimas, J., Wood, E. & Fairbairn, N. (2017). Medication-assisted treatment for youth with opioid use disorder: Current dilemmas and remaining questions. *The American Journal of Drug and Alcohol Abuse, 44*(2), 143-146.

Tags: #youth; #OUD; #MAT

Abstract: The prevalence of risky opioid use, opioid use disorder, and related harms continue to rise among youth (adolescents and young adults age 15–25) in North America. With an increasing number of opioid overdoses, there remain significant barriers to care for youth with opioid use disorder, and there is an urgent need to expand evidence-based care for treatment of opioid use disorder among this population. Based on the extensive literature on treatment of opioid use disorder among adults, medication-assisted treatment is likely to be an important or even essential component of treatment of opioid use disorder for most youth. In this article, we outline the current dilemmas and questions regarding the use of medication-assisted treatment among youth with opioid use disorder and propose some potential solutions based on the current evidence.

Chavez, L.J., Bonny, A.E., Bradley, K.A., Lapham, G.T., Cooper, J., Miller, W., & Chisolm, D.J. (2021). Medication treatment and health care use among youth with opioid use disorder in Ohio. *Journal of Adolescent Health, 67*(1), 33-39.

Tags: #adolescent; #OpioidUseDisorder; #MAT; #access

Abstract: The opioid epidemic impacts both adolescents and adults, and overdose deaths continue to rise. Two medication treatments (buprenorphine and naltrexone) are effective for treating opioid use disorder (OUD) in office-based settings but are seldom prescribed to adolescents. The present study describes medication treatment for OUD and other care received by adolescents with OUD in a state at the center of the opioid epidemic. This retrospective cohort study included adolescents (aged 12–18 years) enrolled in Ohio Medicaid with an index OUD diagnosis (August 1, 2012, to May 31, 2016). Analyses describe the proportion of adolescents who received medication for OUD, health care (general medical outpatient, behavioral health, hospitalization, and emergency department), and other medications (attention deficit/hyperactivity disorder, antidepressants, antipsychotics, benzodiazepines, and opioid analgesics) within 3 months after OUD diagnosis. The results are compared by age group (12–15 and 16–18 years). Among 626,508 adolescents enrolled in Medicaid, 2,097 met inclusion criteria. Overall, 4.6% received medication for OUD, whereas 9.8% received an opioid analgesic, within 3 months after OUD diagnosis. The proportion of older adolescents receiving medication for OUD was significantly higher than younger adolescents (5.9% vs. 1.2%; $p < .001$), whereas a higher proportion of younger adolescents received attention deficit/hyperactivity disorder medications, antidepressants, and antipsychotics. Low proportions of adolescents in both age groups received benzodiazepines (2.4% and 3.6%). During the 3 months after OUD diagnosis, 48.5% of adolescents had general medical outpatient visits, and 29% received outpatient behavioral health services. Although a large proportion of adolescents with OUD have subsequent visits in outpatient settings, few receive medications to treat OUD.

Chen, L., Crum, R.M., Strain, E.C., Martin, S.S., & Mojtabai, R. (2015). Patterns of concurrent substance use among adolescent nonmedical ADHD stimulant users. *Addictive Behaviors, 49*, 1-6.

Tags: #adolescent; #ADHD; #stimulant; #nonmedical; #ConcurrentSubstanceUse

Abstract: Objectives: There are growing concerns about nonmedical use of ADHD stimulants among adolescents; yet little is known whether there exist heterogeneous subgroups among adolescents with nonmedical ADHD stimulant use according to their concurrent substance use.

Methods: We used latent class analysis (LCA) to examine patterns of past-year problematic substance use (meeting any criteria for abuse or dependence) in a sample of 2203 adolescent participants from the National Surveys on Drug Use and Health 2006–2011 who reported past-year nonmedical use of ADHD stimulants. Multivariable latent regression was used to assess the association of socio-demographic characteristics, mental health and behavioral problems with the latent classes.

Results: The model fit indices favored a four-class model, including a large class with frequent concurrent use of alcohol and marijuana (Alcohol/marijuana class; 41.2%), a second large class with infrequent use of other substances (Low substance class, 36.3%), a third class characterized by more

frequent misuse of prescription drugs as well as other substances (Prescription drug + class; 14.8%), and finally a class characterized by problematic use of multiple substances (Multiple substance class; 7.7%). Compared with individuals in Low substance class, those in the other three classes were all more likely to report mental health problems, deviant behaviors and substance abuse service use.

Conclusions: Adolescent nonmedical ADHD stimulants users are a heterogeneous group with distinct classes with regard to concurrent substance use, mental health and behavioral problems. The findings have implications for planning of tailored prevention and treatment programs to curb stimulant use for this age group.

Compton, W.M., Jones, G.M., Baldwin, G.T., Harding, F.M., Blanco, C., & Wargo, E.M. (2019). Targeting youth to prevent later substance use disorder: An underutilized response to the US Opioid Crisis. *American Journal of Public Health, 109*(S3), S185-S189.

Tags: #youth; #prevention; #SUD; #OpioidCrisis

Abstract: The evolving US opioid crisis is complex and requires myriad different interventions. These include reducing opioid overprescribing and curtailing the supply of illicit opioids, overdose rescue interventions, and treatment and recovery support services for those with opioid use disorders.

To date, more distal primary prevention strategies that have an evidence base are underutilized. Yet, the impact of early environments on later substance use disorder risk is increasingly well understood, including knowledge of the mechanistic linkages between brain development and subsequent risk behaviors. Applying this developmental framework to prevention shows promise, and some middle-school interventions have demonstrated significant reductions in prescription opioid misuse.

Reducing these risks of initial misuse of opioids may be the “ounce of prevention” that makes a substantial difference in a society now reeling from the worst drug crisis our country has seen. The challenge is to continue to develop and test promising distal interventions and to support implementation fidelity through frameworks that ensure their cultural appropriateness and sustainability. In addition, research is needed to develop new prevention strategies for adults, including patients with pain at risk for transitioning from prescription to illicit opioids.

Cottrill, C.B., Lemle, S., Matson, S.C., Bonny, A.E., & McKnight, E.R. (2019). Multifaceted Quality Improvement Initiative Improves Retention in Treatment for Youth with Opioid Use Disorder. *Pediatric Quality & Safety, 4*(3), e174.

Tags: #youth; #OUD; #QualityImprovement; #treatment; #retention

Abstract: Introduction: There is a critical need to develop interventions that help adolescents and young adults with opioid use disorders (OUDs) connect with, engage in, and remain consistent with the treatment given that patients who develop long-term OUDs experience long-term medical and mental health sequelae.

Methods: We implemented quality improvement (QI) processes to increase early engagement and 6-month retention within a medication-assisted treatment clinic for youth with OUDs. QI interventions included motivational interviewing (MI) staff training, implementation of reduced initial treatment requirements, reduction of access barriers to treatment, and enhancement of patient treatment motivation. We monitored the impact of the interventions via a p-chart.

Results: A statistically significant shift was seen in the 6-month retention rate following both MI staff training and the use of reduced initial treatment requirements. Second visit return rate also experienced a statistically significant shift following transportation support and an incentive program.

Discussion: Our data demonstrate that following MI staff training, reduced initial clinic requirements, transportation support, and utilization of an incentive program, the second visit return rate, and 6-month retention rate improved within an outpatient medication-assisted treatment clinic for youth with OUDs.

Davis, J.P., Prindle, J.J., Eddie, D., Pedersen, E.R., Dumas, T.M., & Christie, N.C. (2019). Addressing the opioid epidemic with behavioral interventions for adolescents and young adults: A quasi-experimental design. *Journal of Consulting and Clinical Psychology, 87*(10), Special Issue: Responding to the Opioid Crisis: Perspectives, Challenges, and Directions, 941-951

Tags: #adolescent; #YoungAdult; #OpioidTreatment; #interventions; #ACRA; #CBT; #MET

Abstract: Objective: While several behavioral interventions have shown efficacy in opioid use disorder treatment, little is known regarding which behavioral interventions work best for youth, and if treatment responses vary by developmental age or sex. We explored latency to first episode of opioid use among adolescents and young adults following opioid use disorder treatment initiation with: (a) adolescent community reinforcement approach (A-CRA), (b) motivational enhancement therapy (MET) combined with cognitive-behavioral therapy (CBT) or CBT alone (MET/CBT or CBT alone), or (c) treatment as usual (TAU; 12-step facilitation, supportive therapy). Method: Adolescents and young adults (N = 785) entering treatment for opioid use disorder were followed for 1 year. Survival analysis was used to assess variation in latency to first episode of opioid use by treatment received, as well as moderation by age group and sex. Results: Those receiving MET/CBT or CBT alone, and TAU fared better than those receiving A-CRA. For adolescent males, those receiving TAU or A-CRA had poorer outcomes compared with those receiving MET/CBT or CBT alone, while no differences were found between treatments for female adolescents. Female young adults receiving TAU had lower hazard of opioid use compared with those receiving A-CRA, and MET/CBT or CBT alone, and male young adults receiving A-CRA had higher hazard than those receiving TAU, and MET/CBT or CBT alone. Conclusions: Findings highlight different treatments may be more efficacious for youth based on developmental age and sex. Clinicians working with young people with opioid use disorder should consider patients' developmental stage and sex when considering treatment approaches.

DeBeck, K., Wood, E., Dong, H., Dobrer, S., Hayashi, K., Montaner, J., & Kerr, T. (2016). Non-medical prescription opioid use predicts injection initiation among street-involved youth. *International Journal of Drug Policy, 34*, 96-100.

Tags: #youth; #NonmedicalUse; #PrescriptionOpioids; #injection; #StreetInvolvedYouth

Abstract: None. [Short Report]

Deputy, N.P., Lowry, R., Clayton, H.B., Demissie, Z., Bohm, M.K., & Conklin, S. (2021). Initiation of nonmedical use of prescription opioids among high school students. *Substance Abuse*, 1-6.

Tags: #PrescriptionOpioids; #NonmedicalUse; #HighSchoolStudents

Abstract: Nonmedical use of prescription opioids (NUPO) is associated with heroin use and other adverse outcomes among adolescents. To inform the timing of substance use prevention activities and which substances to target, we examined age at NUPO initiation, associations between substance use initiation and current (past 30-day) NUPO, and order of NUPO initiation relative to other substances. Data from 2,834 students aged 15 or older participating in the 2017 Virginia Youth Survey, the first Youth Risk Behavior Surveillance System survey to assess age at NUPO initiation and current NUPO, were analyzed in 2019. Students reported current NUPO and ages at initiation for cigarettes, alcohol, marijuana, and NUPO (categorized as 12 or younger, 13 or 14, 15 or older, or never). Associations between age at substance use initiation and current NUPO were examined using adjusted prevalence ratios (aPRs) and 95% confidence intervals (CIs). Overall, 12% of students reported lifetime NUPO, with 2.4%, 4.0%, and 5.6% initiating at 12 or younger, 13 or 14, and 15 or older, respectively; 5.3% reported current NUPO. Initiating cigarettes, alcohol, and marijuana at each age category (compared with never) was associated with an increased prevalence of current NUPO after adjusting for demographics and initiation of other substances. Among students initiating NUPO, initiating NUPO at 12 or younger (compared with 15 or older) was associated with an increased prevalence of current NUPO after adjusting for demographics (aPR = 1.54, 95% CI: 1.10-2.16), but not after further adjustment for initiation of other substances (aPR = 1.38, 95% CI = 0.97-1.97). Among students initiating NUPO, 45.4% initiated NUPO before or during the same age as other substances. More than 6% of students initiated NUPO at 14 or younger. Younger substance use initiation was associated with current NUPO, suggesting that some students may benefit from prevention activities during early adolescence that address multiple substances.

Dyar, C., Bradley, H., Morgan, E., Sullivan, P.S. & Mustanski, B. (2020). Reduction and cessation of alcohol, cannabis, and stimulant use: Prospective associations with changes in depressive symptoms across two cohort studies of sexual and gender minorities. *Journal of Studies on Alcohol and Drugs, 81*(6), 790–797 (2020).

Tags: #AlcoholUse; #CannabisUse; #StimulantUse; #DepressiveSymptoms; #SexualMinorities; #GenderMinorities

Abstract: Objective: Sexual and gender minorities (SGM) are at increased risk for substance use and depression. However, little research has examined the directionality of associations between substance use and depression in this high-risk population, and we are not aware of any to parse associations between depression and changes in the frequency of substance use versus substance use cessation. Such research can help to inform the development of future interventions to address health disparities affecting SGM.

Method: We used data from two longitudinal cohorts of SGM assigned male at birth (SGM-AMAB; N = 1,418) to examine associations between changes in frequency of alcohol, cannabis, and stimulant use and depressive symptoms. Multilevel models tested whether changes in substance use predicted changes in depressive symptoms and vice versa.

Results: Results indicate that when SGM-AMAB decreased their alcohol use or ceased alcohol, cannabis, or stimulant use, they experienced concurrent decreases in depressive symptoms. Only reducing stimulant use (not alcohol or cannabis use) was associated with decreases in depressive symptoms over the subsequent 6 months. Depressive symptoms did not prospectively predict cessation or reduction in the use of any substance.

Conclusions: These findings suggest that clinical interventions targeting substance use may simultaneously reduce depressive symptoms and that reductions in alcohol use (even in the absence of cessation) may simultaneously benefit mental health among SGM-AMAB. The limited evidence of prospective effects over 6 months suggests that studies with shorter lags may be better equipped to examine the directionality of the association between depressive symptoms and substance use/reduction.

Eisdorfer, S. & Galinkin, J. (2019). Opioid use disorder in children and adolescents: Risk factors, detection, and treatment. *The Clinical Journal of Pain, 35*(6), 521-524.

Tags: #children; #adolescents; #pain; #OUD; #RiskFactors; #EarlyDetection; #treatment

Abstract: Opioid medications are an important tool in the management of pain and have been used in clinical practice for centuries. However, due to the highly addictive nature of this class of medications coupled with the life-threatening side effect of respiratory depression, opioid misuse has become a significant public health crisis worldwide. Children and adolescents are at risk for opioid misuse, and early detection is imperative to facilitate treatment and improve outcomes. This review will address the current state of opioid misuse and treatment in children and adolescents in the United States.

Ellis, M.S., Kasper, Z.A. & Cicero, T.J. (2020). The impact of opioid use disorder on levels of educational attainment: Perceived benefits and consequences. *Drug and Alcohol Dependence, 206*.

Tags: #adolescents; #YoungAdults; #OUD; #education; #EducationalAttainment

Abstract: Background/Aims: Adolescents and young adults have the highest rates of opioid use, and despite shared risk factors such as mental health and social pressures, there is little information on the

relationship between education and opioid use disorder. In this study, we sought to assess differences in educational attainment between opioid users and the general population, and the impact of opioid use on one's education. Methods: Patients (N = 14,349) entering opioid treatment programs across the United States were surveyed on educational attainment from 2010 to 2018. Data were compared to estimates from an annual survey administered by the US Census. A follow-up sub-set of opioid users (N = 240) was interviewed to add context and expand on the structured survey. Results: Nearly one-third (32.2%) of the US population is estimated to have earned a bachelor's/advanced degree, compared to just 7.8% of treatment-seeking opioid users. Over half of follow-up respondents (57.5%) reported initiating regular opioid use while attending an educational institution. The majority (68.0%) also indicated opioids negatively impacted their education, with drug-seeking behavior prioritized over attendance and academic performance. Perceived benefits included cognitive enhancement and therapeutic value for anxiety/depression. Conclusions: Our data suggest that opioid users achieve lower levels of education, which may result in both individual and economic costs. Prevention programs need to not only include education-specific risk factors (e.g., social norms), but underlying precipitators such as mental health, stigma, and the myth of risk-free cognitive enhancement. Opioid specific services should be available and disseminated to student populations, including certification of campus physicians to provide buprenorphine maintenance.

Faraone, S.V., Rostain, A.L., C. Montano, C.B., Mason, O., Antshel, K.M., & Newcorn, J.H. (). Systematic review: Nonmedical use of prescription stimulants: risk factors, outcomes, and risk reduction strategies. *Journal of the American Academy of Child & Adolescent Psychiatry*, 59(1), 100-112.

Tags: #NonmedicalUse; #DiversionOfStimulants

Abstract: Objective: To review all literature on the nonmedical use (NMU) and diversion of prescription stimulants to better understand the characteristics, risk factors, and outcomes of NMU and to review risk-reduction strategies.

Method: We systematically searched PubMed, PsycINFO, and SCOPUS from inception to May 2018 for studies containing empirical data about NMU and diversion of prescription stimulants. Additional references identified by the authors were also assessed for inclusion.

Results: A total of 111 studies met inclusion criteria. NMU and diversion of stimulants are highly prevalent; self-reported rates among population samples range from 2.1% to 58.7% and from 0.7% to 80.0%, respectively. A variety of terms are used to describe NMU, and most studies have examined college students. Although most NMU is oral, non-oral NMU also occurs. The majority of NMU is associated with no, or minor, medical effects; however, adverse medical outcomes, including death, occur in some individuals, particularly when administered by non-oral routes. Although academic and occupational performance enhancement are the most commonly cited motivations, there is little evidence that academic performance is improved by NMU in individuals without attention-deficit/hyperactivity disorder.

Conclusion: NMU of stimulants is a significant public health problem, especially in college students, but variations in the terms used to describe NMU and inconsistencies in the available data limit a better understanding of this problem. Further research is needed to develop methods to detect NMU, identify

individuals at greatest risk, study routes of administration, and devise educational and other interventions to help reduce occurrence of NMU. Colleges should consider including NMU in academic integrity policies.

Fatkin, T., Moore, S.K., Okst, K., Creedon, T.B., Samawi, F., Fredericksen, A.K., Roll, D., Oxnard, A., Cook, B.L., & Schuman-Olivier, Z. (2021). Feasibility and acceptability of mindful recovery opioid use care continuum (M-ROCC): A concurrent mixed methods study. *Journal of Substance Abuse Treatment, 130*.

Tags: #OpioidUse; #mindful; #recovery; #CareContinuum; #feasibility

Abstract: As opioid overdose deaths increase, buprenorphine/naloxone (B/N) treatment is expanding, yet almost half of patients are not retained in B/N treatment. Mindfulness-based interventions (MBIs) designed to promote non-judgmental awareness of present moment experience may be complementary to B/N treatment and offer the potential to enhance retention by reducing substance use and addressing comorbid symptoms. In this pilot study, we examined the feasibility and acceptability of the Mindful Recovery OUD Care Continuum (M-ROCC), a trauma-informed, motivationally sensitive, 24-week MBI. Participants (N = 18) were adults with Opioid Use Disorder prescribed B/N. The study team conducted assessments of satisfaction, mindfulness levels, and home practice, as well as qualitative interviews at 4 and 24-weeks. M-ROCC was feasible in a sample with high rates of childhood trauma and comorbid psychiatric diagnoses with 89% of participants retained at 4-weeks and 72% at 24-weeks. Positive qualitative interview responses and a high rate of participants willing to refer a friend (100%) demonstrates program acceptability. Participant mindfulness increased from baseline to 24-weeks ($\beta = 0.24$, $p = 0.001$, $d = 0.51$), and increases were correlated with informal mindfulness practice frequency ($r = 0.7$, $p < 0.01$). Although limited by small sample size, this pilot study highlights the feasibility and acceptability of integrating MBIs into standard primary care Office-Based Opioid Treatment (OBOT) among a population with substantial trauma history.

Feder, K.A., Krawczyk, N., & Saloner, D. (2017). Medication-assisted treatment for adolescents in specialty treatment for opioid use disorder. *Journal of Adolescent Health, 60*(6), 747-750.

Tags: #adolescents; #OpioidUseDisorder; #MAT; #treatment

Abstract: Purpose: The American Academy of Pediatrics recently recommended that pediatricians consider medication-assisted treatment (MAT) for adolescents with severe opioid use disorders. Little is known about adolescents' current use of MAT. Methods: We use data on episodes of specialty treatment for heroin or opioid use (n = 139,092) from a database of publicly funded treatment programs in the U.S. We compare the proportions of adolescents and adults who received MAT, first using unadjusted comparison of proportions, then using logistic regression to adjust for potential confounders. Results: Only 2.4% (95% confidence interval [CI], 1.4%–3.7%) of adolescents in treatment for heroin received MAT, as compared to 26.3% (95% CI, 26.0%–26.6%) of adults. Only .4% (95% CI, .2%–.7%) of adolescents in treatment for prescription opioids received MAT, as compared to 12.0% (95% CI,

11.7%–12.2%) of adults. Regression-adjusted results were qualitatively similar. Conclusions: Regulatory changes and expansions of Medicaid/CHIP coverage for MAT may be needed to improve MAT access.

Fishman, M., Wenzel, K., Vo, H., Wildberger, J., & Burgower, R. (2020). A pilot randomized controlled trial of assertive treatment including family involvement and home delivery of medication for young adults with opioid use disorder. *Addiction, 116*(3)

Tags: #YoungAdults; #MOUD; #OpioidUseDisorder; #family; #AssertiveTreatment; #HomeDelivery

Abstract: Background and Aims: Although medications for opioid use disorder (OUD), including extended-release naltrexone (XR-NTX), have demonstrated effectiveness, adherence is often low. We tested the preliminary efficacy of youth opioid recovery support (YORS), a multi-component intervention designed to improve engagement and medication adherence for young adults with OUD.

Design: Single-site randomized controlled trial with 24-week follow-up.

Setting: Community substance use disorder treatment program in Baltimore, MD, USA.

Participants: Young adults aged 18–26 years enrolled in inpatient/residential OUD treatment intending to pursue outpatient OUD treatment with XR-NTX. Twenty-one participants were randomized to YORS and 20 to treatment as usual (TAU). The analyzed sample was 65.8% male.

Intervention and comparator: Components of YORS include: (1) home delivery of XR-NTX; (2) family engagement; (3) assertive outreach; and (4) contingency management for receipt of XR-NTX doses. The comparator was TAU, which consisted of a standard referral to outpatient care following an inpatient stay.

Measurements: Primary outcomes were number of XR-NTX doses received over 24 weeks and relapse to opioid use (defined as ≥ 10 days of use within 28 days) at 24 weeks.

Findings: Participants in the YORS condition received more XR-NTX doses [mean = 4.28; standard deviation (SD) = 2.3] compared with those in TAU (mean = 0.70; SD = 1.2), $P < 0.01$. Participants in the YORS group compared with TAU had lower rates of relapse (61 versus 95%; $P < 0.01$). Survival analyses revealed group differences on time to relapse with participants in TAU being more likely to relapse sooner compared with participants in the YORS condition [hazard ratio (HR) = 2.72, 95% confidence interval (CI) = 1.26–5.88, $P < 0.01$].

Conclusions: The youth opioid recovery support intervention for extended-release naltrexone adherence and opioid relapse prevention among young adults with opioid use disorder appeared to improve treatment and relapse outcomes compared with standard treatment.

Fuchs, R., Glaude, M., Hansel, T., Osofsky, J., & Osofsky, H. (2020). Adolescent risk substance use behavior, posttraumatic stress, depression, and resilience: Innovative considerations for disaster recovery. *Substance Abuse*.

Tags: #adolescent; #SubstanceUse; #RiskBehavior; #depression; #resilience; #PostTraumaticStress; #disaster

Abstract: Natural and technological disasters cause long-term psychological trauma and increase substance use in adults. It is unclear whether these problems also occur in children and whether trauma influences long-term psychological outcomes due to developmental stages at the time of trauma. One community of interest is located in southeastern Louisiana, where, as children, many locals were exposed to Hurricane Katrina in 2005 and the Deepwater Horizon Oil Spill in 2010. We hypothesized individuals exposed to these disasters in early childhood would exhibit higher rates of anxiety, depression, and alcohol use as adolescents than the general population. To test this, we developed a questionnaire with a focus on severity of disaster exposure, indicators of psychological resilience, and current levels of anxiety, depression, and alcohol use. This survey was administered to over 1000 adolescents in local high schools throughout southeastern Louisiana. Structural equation modeling was performed to test correlations and moderation effects. We found disaster exposure was positively associated with trauma-like symptoms and substance use and psychological resilience was negatively related to these outcomes. These findings demonstrate childhood disaster exposure has the potential to cause chronic psychological distress and predispose individuals to substance use later in life. They also suggest resilience may be protective for disaster survivors. Future studies should expand these concepts to other age groups and types of disasters. Whether resilience-focused psychotherapy may be beneficial in these populations is also a relevant topic for exploration.

Godley, M.D., Passetti, L.L., Subramaniam, G.A., Funk, R.R., Smith, J.E., & Meyers, R.J. (2017). Adolescent Community Reinforcement Approach implementation and treatment outcomes for youth with opioid problem use. *Drug and Alcohol Dependence, 174*, 9-16.

Tags: #adolescent; #treatment; #opioids; #ACRA; #implementation; #treatment

Abstract: Background: This paper compares adolescents with primary opioid problem use (OPU) to those with primary marijuana or alcohol problem use (MAPU) who received up to six months of Adolescent Community Reinforcement Approach (A-CRA), an empirically supported treatment.

Methods: Intake clinical characteristics, treatment implementation measures, and clinical outcomes of two substance problem groups (OPU and MAPU) were compared using data from 1712 adolescents receiving A-CRA treatment. Data were collected at intake and 3, 6, and 12 months post-intake.

Results: At intake, adolescents in the OPU group were more likely than those in the MAPU group to be Caucasian, older, female, and not attending school; report greater substance and mental health problems; and engage in social and health risk behaviors. There was statistical equivalence between groups in rates of A-CRA treatment initiation, engagement, retention, and satisfaction. Both groups decreased significantly on most substance use outcomes, with the OPU group showing greater improvement; however, the OPU group had more severe problems at intake and continued to report higher frequency of opioid use and more days of emotional problems and residential treatment over 12 months.

Conclusions: The feasibility and acceptability of A-CRA for OPU was demonstrated. Despite significantly greater improvement by the OPU group, they did not improve to the level of the MAPU group over 12 months, suggesting that they may benefit from A-CRA continuing care up to 12 months, medication to address opioid withdrawal and craving, and the inclusion of opioid-focused A-CRA procedures.

Goldstick, J., Bonar, E., Myers, M., Bohnert, A., Walton, M., & Cunningham, R. (2021). Within-person predictors of same day alcohol and prescription opioid use among youth presenting to an urban emergency department. *Injury Prevention, 27*.

Tags: #youth; #PrescriptionOpioidUse; #AlcoholUse; #EmergencyDepartment; #predictors; #urban

Abstract: Statement of purpose: To use longitudinal data collected from youth presenting to an urban emergency department to determine predictors of within-person changes in alcohol and prescription opioid same day use frequency.

Methods/Approach: Research assistants recruited youth age 14–24 reporting past-six-month substance use into the Flint Youth Injury study from 11/2009–9/2011 (n=599; 349 violently-injured at baseline). Participants self-administered validated measures of alcohol use severity, cannabis use severity, mental health symptoms, social support/influences, and violent injury at baseline and four biannual follow-ups. In addition, participants completed Time Line Follow Back calendars (baseline: 30-days; follow-ups: 90-days) which allowed ascertainment of same day use of alcohol and prescription opioids. We calculated the prevalence of same day alcohol and prescription opioid at each follow-up, and used negative binomial regression with person-level fixed effects to isolate within-person predictor effects on same-day use frequency.

Results: Between 2.0% (baseline) and 5.7% (18-month follow-up) of youth reported same-day use of alcohol and prescription opioids across follow-ups, with 19.9% reporting same-day use in at least one follow-up. Within-person increases in alcohol use severity, cannabis use severity, and depression and anxiety symptoms all corresponded to increases in same day alcohol and prescription opioid use frequency. Increased exposure to positive peer influences, and decreased exposure to delinquent peers, both coincided with lower same day alcohol and prescription opioid use frequency.

Conclusions: Same day use of alcohol and prescription opioids is common in this population, and within-person changes are predictable. Interrupting worsening trajectories of substance use severity and mental health symptoms, and enhancing social support and reducing delinquent peer exposures, may reduce same day use frequency.

Goodhines, P.A., Taylor, L.E., Zaso, M.J., Antshel, K.M., & Park, A. (2020). Prescription stimulant misuse and risk correlates among racially-diverse urban adolescents. *Substance Use & Misuse, 14*, 2258-2267.

Tags: #adolescents; #PrescriptionMisuse; #stimulant; #risk; #urban

Abstract: Background: Most research on prescription stimulant misuse has focused on college students, and research on high school-aged adolescents is limited.

Objectives: This study aimed to characterize risk correlates of prescription stimulant misuse among a racially-diverse and socioeconomically-disadvantaged sample of urban adolescents.

Method: Cross-sectional data were drawn from an ongoing study of adolescent health behaviors, Project Teen. Participants were 414 9th to 11th graders (Mage=16.00 [SD = 1.08]; 57% female; 41% Black or African American, 22% White, 18% Asian, 17% Multiracial, 2% Pacific Islander, and 1% Native American; 12% Hispanic/Latinx). Participants completed a web-based survey assessing prescription stimulant misuse, demographics, mental health and personality, social environment, and substance use.

Results: Eight percent of participants endorsed past-year prescription stimulant misuse. Compared to non-misusing peers, participants endorsing past-year prescription stimulant misuse reported greater depression/anxiety symptoms, sensation seeking, perceived peer risk behavior, and alcohol and cigarette use, as well as a lower level of parental monitoring; null group differences were observed for academic goal orientation, perceived peer approval of risk behavior, and cannabis use. Binary logistic regression demonstrated that binge drinking and cigarette use were significantly associated with prescription stimulant misuse over and above all other identified risk variables.

Conclusions: Adolescent prescription stimulant misuse appears to overlap with general adolescent substance use, sharing several known risk correlates. Results highlight potential targets for identification of emerging prescription stimulant misuse risk profiles at earlier stages of development. Longitudinal replication is needed to examine directional associations and risk mechanisms underlying adolescent prescription stimulant misuse.

Groenewald, C.B., Patel, K.V., Rabbitts, J.A., & Palermo, T.M. (2020). Correlates and motivations of prescription opioid use among adolescents 12 to 17 years of age in the United States, *Pain*, 16(4).

Tags: #adolescent; #OpioidUse; #pain

Abstract: Despite significant efforts, the opioid crisis remains a pressing health concern affecting adolescents. The primary aim of this study was to describe recent sociodemographic shifts in the opioid epidemic. We examined whether rates of opioid use, including opioid misuse and opioid use disorder among 12 to 17 year olds in the United States, differ according to sociodemographic factors, physical and mental health, and substance use characteristics using data from the 2015 and 2016 National Survey on Drug Use and Health. We also examined motivations for opioid misuse. The study included 27,857 participants. Black, non-Hispanic adolescents were more likely to both use and misuse opioids as compared to white, non-Hispanic adolescents, a clear difference from previous studies. The main motivation for misuse by adolescents was relief of physical pain (50%, 95% confidence interval 46%-54%). Adolescents who reported pain relief as the major reason for misuse had increased odds of substance use as compared to adolescents who did not report any opioid misuse. However, odds for substance use was greatest among adolescents who reported reasons other than pain relief for opioid misuse. National Survey on Drug Use and Health self-report data suggest recent shifts in opioid misuse

with minority adolescents appearing to be at increased risk of opioid misuse compared with white adolescents. Relief of physical pain is the most common motivation for opioid misuse.

Grubb, L.K. (2019). Personal and socioeconomic determinants in medication-assisted treatment of opioid use disorder in adolescents and young adults. *Clinical Therapeutics*, 41(9), 1669-1680.

Tags: #adolescents; #YoungAdults; #MAT; #OUD; #socioeconomic

Abstract: Opioid use disorder (OUD) is a pediatric and adolescent problem as most young adults (aged <25 years) in treatment programs report initiating use before 25 years of age, and there are lifelong impacts from early substance use necessitating early screening for opioid use and subsequent treatment. Medication-assisted treatment (MAT) is a highly effective intervention for OUD, and there is strong evidence for its use with adolescents; however, most adolescents with OUD are unable to access MAT or remain in MAT long term to achieve substantial recovery. Using case examples drawn from a pediatric and adolescent physician's experiences proving MAT to adolescents and young adults (ages 16–24 years), this article explores the personal and socioeconomic determinants in MAT of OUD in adolescents and young adults and provides suggestions for advocacy areas and resources to improve MAT with this population.

Guarino, H., Mateu-Gelabert, P., Teubl, J., & Goodbody, E. (2018). Young adults' opioid use trajectories: From nonmedical prescription opioid use to heroin, drug injection, drug treatment and overdose. *Addictive Behaviors*, 86, 118-123.

Tags: #YoungAdult; #opioid; #nonmedical; #PrescriptionUse; #heroin; #injection; #treatment; #overdose

Abstract: Introduction: Recent research has begun to explore the transition from nonmedical use of prescription opioids (POs) to heroin and injection drug use, adding to earlier literature identifying factors that influence the transition from intranasal to injection use of heroin. However, little research has explored how these transitions are embedded within young people's broader opioid use trajectories – individual pathways that may also include experiences of nonfatal overdose and drug treatment.

Methods: Data are from a study of 539 18–29 year-old New York City residents, recruited via Respondent-Driven Sampling, who reported past-month nonmedical use of POs and/or heroin use. Participants completed structured, computer-assisted interviews that included assessment of their ages at a series of “benchmark” events and experiences, including first use of a drug or route of administration, the onset of “regular” use of a drug (i.e., 1 or more times a week for at least 1 month), first overdose and first drug treatment.

Results: Results suggest a predictable, ordered pathway by which opioid use tends to progress in this cohort of young adults. Participants initiated nonmedical PO use at age 16.8, on average, and most transitioned to heroin use (83%) and heroin injection (64%), generally within 4 years of first PO misuse. Drug treatment was not typically accessed until after participants had progressed to heroin use. First overdose occurred <1 year after first heroin use, on average.

Conclusions: Findings may help inform the optimal timing for delivery of primary, secondary and tertiary prevention efforts targeting young opioid users.

Hadland, S.E., Bagley, S.M., Gai, M.J., Earlywine, J.J., Schoenberger, S.F., Morgan, J.R., & Barocas, J.A. (2021). Opioid use disorder and overdose among youth following an initial opioid prescription. *Addiction*. Online Version of Record before inclusion in an issue.

Tags: #OUD; #youth; #overdose; #prescription

Abstract: Background and Aims: Some adolescents and young adults (termed “youth”) prescribed an opioid will develop opioid use disorder or experience overdose. This study aimed to identify patient and prescription characteristics associated with subsequent risk of opioid use disorder or overdose during the year after an opioid is first dispensed.

Design: Retrospective cohort study.

Setting: Commercial health insurance claims in a large United States (US) database from 2006 to 2016.

Participants: Youth age 11 to 25 years filling an initial opioid prescription (n = 3 278 990).

Measurements: The primary outcome was development of an ‘opioid-related complication’ (a diagnosis of opioid use disorder or opioid-related overdose) during the subsequent 12 months. Exposures of interest were patient (sociodemographic information, and physical and mental health diagnoses) and prescription characteristics (opioid formulation, dose, and duration).

Findings: Among youth filling an initial opioid prescription, median age was 18 years (interquartile range [IQR] = 16–21) and 56.1% were female. During the subsequent 12 months, 10 405 (0.3%) youth experienced an opioid-related complication. Conditions associated with increased risk included mood/anxiety disorders (adjusted relative risk [aRR] = 4.45; 95% CI = 4.25–4.66) and substance use (aRR = 20.77; 95% CI = 19.74–21.84). Comorbid substance use disorders were present among 72.8% of youth experiencing an opioid-related complication and included alcohol (33.4%), cannabis (33.0%), nicotine (43.2%), and other substance use disorders (75.5%). Long-acting opioids (aRR = 2.59; 95% CI = 2.18–3.09) and longer durations were associated with increased risk (7–14 days: aRR = 1.15; 95% CI = 1.08–1.22; ≥15 days: aRR = 1.96; 95% CI = 1.80–2.12) compared with short-acting formulations and durations ≤3 days, respectively.

Conclusions: Among United States youth, complications after an initial opioid prescription appear to be relatively rare and appear to be associated with mood/anxiety disorders, substance use, comorbid substance use disorders, and prescriptions involving long-acting opioids or long durations.

Hadland, S.E., Bagley, S.M., & Rodean, J. (2018). Receipt of timely addiction treatment and association of early medication treatment with retention in care among youths with Opioid Use Disorder. *JAMA Pediatrics*, 172(11), 1029-1037.

Tags: #youth; #OUD; #treatment; #MedicationTreatment; #EarlyTreatment; #retention

Abstract: Importance: Retention in addiction treatment is associated with reduced mortality for individuals with opioid use disorder (OUD). Although clinical trials support use of OUD medications among youths (adolescents and young adults), data on timely receipt of buprenorphine hydrochloride, naltrexone hydrochloride, and methadone hydrochloride and its association with retention in care in real-world treatment settings are lacking.

Objectives: To identify the proportion of youths who received treatment for addiction after diagnosis and to determine whether timely receipt of OUD medications is associated with retention in care.

Design, Setting, and Participants: This retrospective cohort study used enrollment data and complete health insurance claims of 2.4 million youths aged 13 to 22 years from 11 states enrolled in Medicaid from January 1, 2014, to December 31, 2015. Data analysis was performed from August 1, 2017, to March 15, 2018.

Exposures: Receipt of OUD medication (buprenorphine, naltrexone, or methadone) within 3 months of diagnosis of OUD compared with receipt of behavioral health services alone.

Main Outcomes and Measures: Retention in care, with attrition defined as 60 days or more without any treatment-related claims.

Results: Among 4837 youths diagnosed with OUD, 2752 (56.9%) were female and 3677 (76.0%) were non-Hispanic white. Median age was 20 years (interquartile range [IQR], 19-21 years). Overall, 3654 youths (75.5%) received any treatment within 3 months of diagnosis of OUD. Most youths received only behavioral health services (2515 [52.0%]), with fewer receiving OUD medications (1139 [23.5%]). Only 34 of 728 adolescents younger than 18 years (4.7%; 95% CI, 3.1%-6.2%) and 1105 of 4109 young adults age 18 years or older (26.9%; 95% CI, 25.5%-28.2%) received timely OUD medications. Median retention in care among youths who received timely buprenorphine was 123 days (IQR, 33-434 days); naltrexone, 150 days (IQR, 50-670 days); and methadone, 324 days (IQR, 115-670 days) compared with 67 days (IQR, 14-206 days) among youths who received only behavioral health services. Timely receipt of buprenorphine (adjusted hazard ratio, 0.58; 95% CI, 0.52-0.64), naltrexone (adjusted hazard ratio, 0.54; 95% CI, 0.43-0.69), and methadone (adjusted hazard ratio, 0.32; 95% CI, 0.22-0.47) were each independently associated with lower attrition from treatment compared with receipt of behavioral health services alone.

Conclusions and Relevance: Timely receipt of buprenorphine, naltrexone, or methadone was associated with greater retention in care among youths with OUD compared with behavioral treatment only. Strategies to address the underuse of evidence-based medications for youths with OUD are urgently needed.

Hadland, S.E., Bagley, S.M., Rodean, J., Levy, S., & Zima, B.T. (2018). Use of evidence-based medication treatment among Medicaid-enrolled youth with Opioid Use Disorder, 2014–2015. *Journal of Adolescent Health, 62*(2)

Tags: #youth; #Medicaid; #OUD; #MAT

Abstract: Purpose: Opioid use disorder (OUD) most commonly begins in adolescence and young adulthood, and medication treatment with buprenorphine, methadone, or naltrexone is recommended by major professional organizations including the American Academy of Pediatrics. Yet, no prior studies have examined the extent to which publicly insured adolescents and young adults (collectively, “youth”) receive recommended medications for OUD. We sought to determine the percentage of Medicaid-enrolled youth with OUD who receive recommended pharmacotherapy, and identify disparities according to age, sex, race/ethnicity, and psychiatric comorbidity.

Methods: Using the Truven MarketScan data, we analyzed all inpatient, emergency department, outpatient, and pharmacy claims of 2,490,114 Medicaid-enrolled youth from 11 states between January 2014 and December 2015. Inclusion criteria were (a) age 13–22 years, (b) ≥ 11 months of continuous enrollment, (c) a diagnosis of opioid use disorder (OUD; based on International Classification of Diseases, Ninth Revision, Clinical Modification [ICD-9-CM] codes 304.0x and 304.7x) in ≥ 1 inpatient or emergency department claim or in ≥ 2 outpatient claims, and (d) preceding 1-month window without a prior OUD diagnosis or receipt of OUD medication. We determined the proportion of youth dispensed buprenorphine, methadone, or naltrexone within 3 months of their first OUD diagnosis. We then identified differences in receipt of medication according to age, sex, race/ethnicity, and psychiatric comorbidity using multivariable logistic regression. The study was approved by the Boston University Institutional Review Board.

Results: Among 6,864 youth diagnosed with OUD, 59.4% ($n = 4,074$) were female and 78.4% ($n = 5,380$) were non-Hispanic white. Median age (interquartile range) was 20 (19–22) years at diagnosis. Overall, 21.6% ($n = 1,483$) youth were dispensed any recommended medication within 3 months of diagnosis and of these, 84.0% ($n = 1,245$) received buprenorphine, 5.5% ($n = 81$) received methadone, and 10.5% ($n = 157$) received naltrexone. Adolescents < 18 years were more likely than young adults ≥ 18 to receive naltrexone, and young adults ≥ 18 were more likely to receive buprenorphine or methadone ($p < .001$). Younger individuals were less likely to receive medications (age 13–15: adjusted odds ratio [AOR], .09; 95% confidence interval [CI], .04–.21; age 16–17: AOR, .17; 95% CI, .12–.24; age 18–20: AOR, .76; 95% CI, .67–.87) compared to adults ≥ 21 years, as were males compared to females (AOR, .75; 95% CI, .67–.86) and black youth compared to non-Hispanic white youth (AOR, .39; 95% CI, .28–.55). Receipt of medication was less likely among youth with depression (AOR, .79; 95% CI, .66–.96), comorbid alcohol use disorder (AOR, .70; 95% CI, .51–.97), or another comorbid substance use disorder (AOR, .83; 95% CI, .70–.98).

Conclusions: In this first multi-state study of Medicaid-enrolled youth with OUD, only 1 in 5 received evidence-based medication treatment. Pharmacotherapy may be particularly underutilized among adolescents. As clinicians and policymakers work to confront this treatment gap, efforts should be made to address the disparities we observed for males and black youth, and to maximize treatment for youth with depression and polysubstance use.

Hammond, C.J., Kady, A., Park, G., Vidal, C., Wenzel, K., & Fishman, M. (2021). Therapy dose mediates the relationship between buprenorphine/naloxone and opioid treatment outcomes in youth receiving medication for Opioid Use Disorder treatment. *Journal of Addiction Medicine*. Published ahead of print.

Tags: #youth; #MOUD; #dose; #buprenorphine; #naloxone; #treatment

Abstract: Background: Evidence-based interventions for treating opioid use disorder (OUD) in youth are limited and little is known about specific and general mechanisms of OUD treatments and how they promote abstinence.

Methods: The present study used data from the NIDA-CTN-0010 trial to evaluate the mediating effects of psychosocial treatment-related variables (therapy dose and therapeutic alliance) on end-of-treatment opioid abstinence in a sample of youth with OUD (n = 152, 40% female, mean age = 19.7 years) randomized to receive either 12-weeks of treatment with Bup/Nal (“Bup-Nal”) or up to 2 weeks of Bup/Nal detoxification (“Detox”) with both treatment arms receiving weekly individual and group drug counseling ± family therapy.

Results: Participants in the Bup-Nal group attended more therapy sessions (16 vs 6 sessions), had increased therapeutic alliance at week-4, and had less opioid use by week-12 compared to those in the Detox group. In both treatment arms, youth who attended more therapy sessions were less likely to have a week-12 opioid positive urine. In a multiple mediator model, therapy dose mediated the association between treatment arm and opioid abstinence.

Conclusions: These findings provide preliminary support for a “dose-response” effect of addiction-focused therapy on abstinence in youth OUD. Further, the results identified a mediating effect of therapy dose on the relationship between treatment assignment and opioid treatment outcomes, suggesting that extended Bup-Nal treatment may enhance abstinence, in part, through a mechanism of therapy facilitation, by increasing therapy dose during treatment.

Hill, L.G., Holleran Steiker, L.K., Mazin, L., & Kinzly, M.L. (2020). Implementation of a collaborative model for opioid overdose prevention on campus. *Journal of American College Health, 68*(3).

Tags: #opioid; #overdose; #prevention; #CollegeHealth; #naloxone

Abstract: Drug overdose is the leading cause of death for Americans under the age of 50, a crisis that is driven by an increasingly potent supply of illicit opioids. College-aged adults are more likely than any other age group to engage in opioid misuse. Naloxone, the antidote for an opioid overdose, can save the life of an opioid overdose victim if it is readily available and administered quickly. The University of Texas at Austin implemented a collaborative model for proactive opioid overdose prevention in 2016. This model includes stocking naloxone in residence halls and providing it to police officers, training resident advisors and police officers to respond to suspected overdoses, and engaging student pharmacists in a service learning program to increase naloxone access and awareness among university students. Programmatic experiences and key recommendations for U.S. campuses are shared by faculty, student, and community leaders.

Hogue, A., Becker, S.J., Fishman, M., Henderson, C.E., & Levy, S. (2021). Youth OUD treatment during and after COVID: Increasing family involvement across the services continuum. *Journal of Substance Abuse Treatment, 120*

Tags: #telehealth; #SubstanceUse; #treatment; #MOUD; #youth; #families; #engagement; #retention; #COVID19

Abstract: Telehealth innovations in substance use treatment necessitated by the COVID-19 pandemic present a generational opportunity to increase family involvement in medication for opioid use disorders (MOUD) among youth. This commentary describes a conceptual framework for engaging and retaining youth and families across four stages of MOUD services: Preparation, Initiation, Stabilization, Remission & Recovery. Case vignettes illustrate provider-delivered and direct-to-family tele-interventions for augmenting family involvement in each MOUD stage: Family Outreach, Family Engagement, Family Training, Family Recovery Maintenance.

Hogue, A., Bobek, M., Levy, S., Henderson, C.E., Fishman, M., Becker, S.J., Dauber, S., Porter, N., & Wenzel, K. (2021). Conceptual framework for telehealth strategies to increase family involvement in treatment and recovery for youth opioid use disorder. *Journal of Marital and Family Therapy, 47*(2), 501-514

Tags: #youth; #OUD; #framework; #telehealth; #family; #treatment; #recovery

Abstract: With opioid use at crisis levels, it is imperative to support youth ages with opioid use disorders (OUD) in taking medication and accessing behavioral services over long periods. This article presents a conceptual framework for telehealth strategies that can be adopted to increase family involvement across a four-stage continuum of youth OUD treatment and recovery: Treatment Preparation, Treatment Initiation, Treatment Stabilization, OUD Recovery. It first identifies provider-delivered tele-interventions that can enhance OUD services in each of the four stages, including family outreach, family engagement, family-focused intervention, and family-focused recovery maintenance. It then introduces several types of direct-to-family tele-supports that can be used to supplement provider-delivered interventions. These include both synchronous tele-supports (remote interactions that occur in real time) such as helplines, peer-to-peer coaching, and online support groups; and asynchronous tele-supports (communications that occur without participants being simultaneously present) such as automated text messaging, self-directed internet-based courses, and digital web support.

Hogue, A., Henderson, C.E., Ozechowski, T.J., Becker, S.J., & Coatsworth, J.D. (2019). Can the group harm the individual? Reviewing potential iatrogenic effects of group treatment for adolescent substance use. *Clinical Psychology Science and Practice, 00*:e12307.

Tags: #adolescent; #SubstanceUse; #GroupTreatment; #review

Abstract: This article provides a narrative review of potential harmful effects of group-based treatment for adolescent substance use. We first describe potential harms thought to be induced by peer deviancy training and discuss how deviancy training concerns have widely impacted youth intervention science and policy. We next review evidence supporting various group treatment models for adolescent substance use and delineate how providers might inoculate group treatment against deviancy training processes. We then underscore limitations in statistical validity that characterize many deviancy training

studies and offer methodological guidelines to advance assessment of harmful effects. We conclude that group-based intervention is an effective treatment modality for adolescent substance use posing no exceptional risk of iatrogenic effects and suggest innovations to increase its delivery.

Hudgins, J.D., Porter, J.J., Monuteaux, M.C., & Bourgeois, F.T. (2019). Prescription opioid use and misuse among adolescents and young adults in the United States: A national survey study. *PLoS Med*, 16(11).

Tags: #adolescent; #YoungAdult; #PrescriptionOpioids; #PrescriptionMisuse

Abstract: *Background:* Prescription opioid misuse has become a leading cause of unintentional injury and death among adolescents and young adults in the United States. However, there is limited information on how adolescents and young adults obtain prescription opioids. There are also inadequate recent data on the prevalence of additional drug abuse among those misusing prescription opioids. In this study, we evaluated past-year prevalence of prescription opioid use and misuse, sources of prescription opioids, and additional substance use among adolescents and young adults.

Methods and findings: This was a retrospective analysis of the National Survey on Drug Use and Health (NSDUH) for the years 2015 and 2016. Prevalence of opioid use, misuse, use disorder, and additional substance use were calculated with 95% confidence intervals (CIs), stratified by age group and other demographic variables. Sources of prescription opioids were determined for respondents reporting opioid misuse. We calculated past-year prevalence of opioid use and misuse with or without use disorder, sources of prescription opioids, and prevalence of additional substance use. We included 27,857 adolescents (12–17 years of age) and 28,213 young adults (18–25 years of age) in our analyses, corresponding to 119.3 million individuals in the extrapolated national population. There were 15,143 respondents (27.5% [95% CI 27.0–28.0], corresponding to 32.8 million individuals) who used prescription opioids in the previous year, including 21.0% (95% CI 20.4–21.6) of adolescents and 32.2% (95% CI 31.4–33.0) of young adults. Significantly more females than males reported using any prescription opioid (30.3% versus 24.8%, $P < 0.001$), and non-Hispanic whites and blacks were more likely to have had any opioid use compared to Hispanics (28.9%, 28.1%, and 25.8%, respectively; $P < 0.001$). Opioid misuse was reported by 1,050 adolescents (3.8%; 95% CI 3.5–4.0) and 2,207 young adults (7.8%; 95% CI 7.3–8.2; $P < 0.001$). Male respondents using opioids were more likely to have opioid misuse without use disorder compared with females (23.2% versus 15.8%, respectively; $P < 0.001$), with similar prevalence by race/ethnicity. Among those misusing opioids, 55.7% obtained them from friends or relatives, 25.4% from the healthcare system, and 18.9% through other means. Obtaining opioids free from friends or relatives was the most common source for both adolescents (33.5%) and young adults (41.4%). Those with opioid misuse reported high prevalence of prior cocaine (35.5%), hallucinogen (49.4%), heroin (8.7%), and inhalant (30.4%) use. In addition, at least half had used tobacco (55.5%), alcohol (66.9%), or cannabis (49.9%) in the past month. Potential limitations of the study are that we cannot exclude selection bias in the study design or socially desirable reporting among participants, and that longitudinal data are not available for long-term follow-up of individuals.

Conclusions: Results from this study suggest that the prevalence of prescription opioid use among adolescents and young adults in the US is high despite known risks for future opioid and other drug use

disorders. Reported prescription opioid misuse is common among adolescents and young adults and often associated with additional substance abuse, underscoring the importance of drug and alcohol screening programs in this population. Prevention and treatment efforts should take into account that greater than half of youths misusing prescription opioids obtain these medications through friends and relatives.

Jones, C.M., et al. (2020). Prescription opioid misuse and use of alcohol and other substances among high school students — Youth Risk Behavior Survey, United States, 2019. *MMWR Suppl*, 69(1), 38–46.

Tags: #HighSchool; #opioid; #PrescriptionOpioid; #alcohol; #SubstanceUse; #risk

Abstract: Adolescence is an important period of risk for substance use initiation and substance use–related adverse outcomes. To examine youth substance use trends and patterns, CDC analyzed data from the 2009–2019 Youth Risk Behavior Survey. This report presents estimated prevalence of current (i.e., previous 30-days) marijuana use, prescription opioid misuse, alcohol use, and binge drinking and lifetime prevalence of marijuana, synthetic marijuana, cocaine, methamphetamine, heroin, injection drug use, and prescription opioid misuse among U.S. high school students. Logistic regression and Joinpoint analyses were used to assess 2009–2019 trends. Prevalence of current and lifetime substance use by demographics, frequency of use, and prevalence of co-occurrence of selected substances among students reporting current prescription opioid misuse are estimated using 2019 data. Multivariable logistic regression analysis was used to determine demographic and substance use correlates of current prescription opioid misuse. Current alcohol, lifetime cocaine, methamphetamine, heroin, and injection drug use decreased during 2009–2019. Lifetime use of synthetic marijuana (also called synthetic cannabinoids) decreased during 2015–2019. Lifetime marijuana use increased during 2009–2013 and then decreased during 2013–2019. In 2019, 29.2% reported current alcohol use, 21.7% current marijuana use, 13.7% current binge drinking, and 7.2% current prescription opioid misuse. Substance use varied by sex, race/ethnicity, grade, and sexual minority status (lesbian, gay, or bisexual). Use of other substances, particularly current use of alcohol (59.4%) and marijuana (43.5%), was common among students currently misusing prescription opioids. Findings highlight opportunities for expanding evidence-based prevention policies, programs, and practices that aim to reduce risk factors and strengthen protective factors related to youth substance use, in conjunction with ongoing initiatives for combating the opioid crisis.

Jones, C.M., Underwood, N., & Compton, W.M. (2020). Increases in methamphetamine use among heroin treatment admissions in the United States, 2008–17. *Addiction*, 115(2), 347–353.

Tags: #methamphetamine; #heroin; #treatment; #admissions

Abstract: Background and Aims: Due to their small sample sizes, geographic specificity and limited examination of socio-demographic characteristics, recent studies of methamphetamine use among people using heroin in the United States are limited in their ability to identify national and regional trends and to characterize populations at risk for using heroin and methamphetamine. This study aimed

to examine trends and correlates of methamphetamine use among heroin treatment admissions in the United States.

Design: Longitudinal analysis of data from the 2008 to 2017 Treatment Episode Data Set. Descriptive statistics, trend analyses and multivariable logistic regression were used to examine characteristics associated with methamphetamine use among heroin treatment admissions.

Setting: United States.

Participants: Treatment admissions of people aged ≥ 12 years whose primary substance of use is heroin.

Measurements: Primary measurement was heroin treatment admissions involving methamphetamine. Secondary measurements were demographics of sex, age, race/ethnicity, US census region, living arrangement and employment status.

Findings: The percentage of primary heroin treatment admissions reporting methamphetamine use increased each year from 2.1% in 2008 to 12.4% in 2017, a relative percentage increase of 490% and an annual percentage change (APC) of 23.4% ($P < 0.001$). During the study period, increases were seen among males and females and among all demographic and geographic groups examined. Among primary heroin treatment admissions reporting methamphetamine use in 2017, 47.1% reported injecting, 46.0% reported smoking, 5.1% reporting snorting and 1.8% reported oral/other as their usual route of methamphetamine use.

Conclusions: Methamphetamine use among heroin treatment admissions in the United States increased from one in 50 primary heroin treatment admissions in 2008 to one in 8 admissions in 2017.

Krawczyk, N., Mojtabai, R., Stuart, E.A., Fingerhood, M., Agus, D., Lyons, B.C., Weiner, J.P., & Saloner, B. (2020). Opioid agonist treatment and fatal overdose risk in a state-wide US population receiving opioid use disorder services, *Addiction*, 115(9)

Tags: #opioid; #agonist; #treatment; #overdose; #OpioidUseDisorder

Abstract: Background and aims: Evidence from randomized controlled trials establishes that medication treatment with methadone and buprenorphine reduces opioid use and improves treatment retention. However, little is known about the role of such medications compared with non-medication treatments in mitigating overdose risk among US patient populations receiving treatment in usual care settings. This study compared overdose mortality among those in medication versus non-medication treatments in specialty care settings.

Design: Retrospective cohort study using state-wide treatment data linked to death records. Survival analysis was used to analyze data in a time-to-event framework.

Setting: Services delivered by 757 providers in publicly funded out-patient specialty treatment programs in Maryland, USA between 1 January 2015 and 31 December 2016.

Participants: A total of 48 274 adults admitted to out-patient specialty treatment programs in 2015–16 for primary diagnosis of opioid use disorder.

Measurements: Main exposure was time in medication treatment (methadone/buprenorphine), time following medication treatment, time exposed to non-medication treatments and time following non-medication treatment. Main outcome was opioid overdose death during and after treatment. Hazard ratios were calculated using Cox proportional hazard regression. Propensity score weights were adjusted for patient information on sex, age, race, region of residence, marital and veteran status, employment, homelessness, primary opioid, mental health treatment, arrests and criminal justice referral.

Findings: The study population experienced 371 opioid overdose deaths. Periods in medication treatment were associated with substantially reduced hazard of opioid overdose death compared with periods in non-medication treatment [adjusted hazard ratio (aHR) = 0.18, 95% confidence interval (CI) = 0.08–0.40]. Periods after discharge from non-medication treatment (aHR = 5.45, 95% CI = 2.80–9.53) and medication treatment (aHR = 5.85, 95% CI = 3.10–11.02) had similar and substantially elevated risks compared with periods in non-medication treatments.

Conclusions: Among Maryland patients in specialty opioid treatment, periods in treatment are protective against overdose compared with periods out of care. Methadone and buprenorphine are associated with significantly lower overdose death compared with non-medication treatments during care but not after treatment is discontinued.

Krawczyk, N., Williams, A.R., Saloner, B., & Cerdá, M. (2021). Who stays in medication treatment for opioid use disorder? A national study of outpatient specialty treatment settings. *Journal of Substance Abuse Treatment, 126*

Tags: #MOUD; #treatment; #retention; #outpatient

Abstract: Background: Maintenance treatments with medications for opioid use disorder (MOUD) are highly effective at reducing overdose risk while patients remain in care. However, few patients initiate medication and retention remains a critical challenge across settings. Much remains to be learned about individual and structural factors that influence successful retention, especially among populations dispensed MOUD in outpatient settings.

Methods: We examined individual and structural characteristics associated with MOUD treatment retention among a national sample of adults seeking MOUD treatment in outpatient substance use treatment settings using the 2017 Treatment Episode Dataset-Discharges (TEDS-D). The study assessed predictors of retention in MOUD using multivariate logistic regression and accelerated time failure models.

Results: Of 130,300 episodes of MOUD treatment in outpatient settings, 36% involved a duration of care greater than six months. The strongest risk factors for treatment discontinuation by six months included being of younger age, ages 18–29 ((OR):0.52 [95%CI:0.50–0.54]) or 30–39 (OR:0.57 [95%CI:0.55–0.59]); experiencing homelessness (OR: 0.70 [95%CI:0.66–0.73]); co-using methamphetamine (OR:0.48 [95%CI:0.45–0.51]); and being referred to treatment by a criminal justice source (OR:0.55 [95%CI:0.52–0.59) or by a school, employer, or community source (OR:0.71 [95%CI:0.66–0.76).

Conclusions: Improving retention in treatment is a pivotal stage in the OUD cascade of care and is critical to reducing overdose deaths. Efforts should prioritize interventions to improve retention among patients who are both prescribed and dispensed MOUD, especially youth, people experiencing homelessness, polysubstance users, and people referred to care by the justice system who have especially short stays in care.

Kuitunen-Paul, S., Roessner, V., Basedow, L.A., & Golub, Y. (2021). Beyond the tip of the iceberg: A narrative review to identify research gaps on comorbid psychiatric disorders in adolescents with methamphetamine use disorder or chronic methamphetamine use. *Subst Abus, 42*(1):13-32.

Tags: #adolescent; #methamphetamine; #comorbidity; #MentalHealth; #ADHD; #depression; #PTSD; #anxiety; #review

Abstract: Methamphetamine use disorder (MUD) frequently begins in adolescence, often accompanied by other psychiatric or mental disorders. Up to now, no comprehensive review about MUD and comorbid disorders in adolescents is available. We thus aimed to review the literature on comorbid mental disorders and MUD in adolescents in order to identify future research topics.

Method: A PubMed search was conducted in July 2019. Relevant comorbidities were defined as attention-deficit disorder with/without hyperactivity, anxiety disorders, depression, eating disorders, post-traumatic stress disorder, psychosis, borderline personality disorder, conduct disorder and antisocial personality disorder, as well as other substance use disorders. For each comorbidity, we summarized prevalence rates, findings on comorbidity mechanisms, and recommended treatment options, if applicable.

Results: Few articles focused on MUD in adolescents. Prevalence rates differed largely between comorbid disorders, with tobacco use disorder, conduct disorder, post-traumatic stress disorder, anxiety disorders, and attention-deficit disorders being the most prevalent comorbidities while eating disorders were rare. Examined onset patterns and comorbidity mechanisms indicated three groups of comorbidities: preexisting disorders self-medicated with methamphetamine, disorders induced by chronic methamphetamine use, and disorders arising due to risk factors shared with MUD. Reviewed comorbidities were frequently associated with worse treatment outcomes.

Conclusions: The limited evidence is in stark contrast to the presumably high prevalence and relevance of comorbid mental disorders in adolescents with MUD. Suggestions for future research topics, informed by adult findings, include genetic vulnerabilities, biological changes, and consequences of different use patterns. Surprisingly few MUD treatment programs explicitly integrate comorbid mental disorder modules.

Kulak, J.A. & Griswold, K.S. (2019). Adolescent substance use and misuse: Recognition and management. *American Family Physician, 99*(11), 689-696.

Tags: #adolescent; #SubstanceUse; #management

Abstract: Adolescent use of illicit substances imposes an enormous burden on individuals, families, and communities. The types of illicit substances adolescents are using have changed drastically over the past decade with decreases in alcohol use (including binge alcohol use) offset by increases in electronic cigarette, marijuana, and opioid use. Primary care physicians have the opportunity to identify adolescents who use illicit substances. The U.S. Preventive Services Task Force and the American Academy of Family Physicians found insufficient evidence to assess the balance of benefits and harms of primary care–based behavioral interventions to prevent or reduce illicit substance use or nonmedical pharmaceutical use in children or adolescents. The American Academy of Pediatrics recommends that clinicians become familiar with Screening, Brief Intervention, and Referral to Treatment initiatives. Validated screening tools that may be used in primary care include the CRAFFT, POSIT, AUDIT, and NIAAA Screening Guide. During the clinical visit, a split-visit model encourages parents to participate in the visit for a limited time but also allows adolescents to have confidential conversations with physicians. Evidence-based treatment modalities range from school- and parent-based interventions to medication-assisted treatment. Brief interventions using components of motivational interviewing may be suitable for addressing substance use, even among adolescents not seeking treatment. Prevention efforts can supplement cessation programs to maximize program effectiveness.

Liu, Y., Smith, N.D.L., Lloyd, S.L., Striley, C.W., & Cottler, L.B. (2020). Prescription stimulant use and associated risk factors for non-oral use among 10 to 18 year olds. *Journal of Psychoactive Drugs*, 52(5), 421-432.

Tags: #youth; #adolescents; #stimulant; #prescription; #RiskFactors

Abstract: Non-medical use, especially non-oral use, of prescription stimulants is a public health concern. This study analyzed data from the National Monitoring of Adolescent Prescription Stimulants Study (N-MAPSS). Users (n = 723) were categorized as oral medical only users (n = 330, 45.6%), any oral non-medical users (n = 270, 37.3%), and any non-oral users (n = 123, 17.0%). The associations between patterns of stimulant use and risk factors were examined using logistic regression. Of the 123 any non-oral users, 79 reported using stimulants intranasally and orally, which was the most prevalent pattern of non-oral use. Among any non-oral users, the most common source of stimulants was from school (63.4%). Non-oral users primarily used stimulants to get high (74.4%) compared to 27.1% among other users. Negative consequences significantly associated with any non-oral use but not with oral non-medical use included needing stimulants to “feel ok,” having trouble with teachers, bosses or friends due to stimulant use, and having anxiety and depression symptoms. In this study, non-oral use of prescription stimulants was associated with additional risks of adverse mental health outcomes compared to medical only use and other forms of non-medical use. Stimulant non-oral use interventions should emphasize the risks of intranasal use of stimulants.

Ludwig, A., et al. (2021). Drug and sexual HIV-risk behaviors among adolescents and young adults with opioid use disorder. *Journal of Substance Abuse Treatment*, 130.

Tags: #adolescents; #YoungAdults; #OUD; #HIV; #RiskBehavior

Abstract: Opioid use disorder (OUD) among adolescents and young adults (youth) is associated with drug use and sexual HIV-related risk behaviors and opioid overdose. This mixed methods analysis assesses risk behaviors among a sample of 15–21-year-olds (N = 288) who were being treated for OUD in a residential drug treatment program in Baltimore, Maryland. Participants were enrolled in a parent study in which they received either extended-release naltrexone (XR-NTX) or Treatment as Usual (TAU), consisting of outpatient counseling with or without buprenorphine, prior to discharge. At baseline, participants were administered the HIV-Risk Assessment Battery (RAB), and clinical intake records were reviewed to determine participants' history of sexual, physical, or other abuse, as well as parental and partner substance use. A sub-sample of study participants completed semi-structured qualitative interviews (N = 35) at baseline, three-, and six-month follow-up periods. This analysis identified gender (e.g., female IRR = 1.63, CI 1.10–2.42, p = .014), the experience of dependence (e.g., previous detoxification IRR = 1.08, CI 1.01–1.15, p = .033) and withdrawal (e.g., severe withdrawal symptoms IRR = 1.41, CI 1.08–1.84, p = .012), and the role of relationships (e.g., using with partner IRR = 2.45, CI 1.15–5.22, p = .021) as influencing high-risk substance use behaviors. Similarly, high-risk sex was influenced by gender (e.g., female IRR = 1.43, CI 1.28–1.59, p < .001), and the role of relationships (e.g., using with partner IRR = 0.78, CI 0.62–0.98, p = .036). These are key targets for future prevention, treatment, and intervention.

Lyoo, I.K., Yoon, S., Kim, T.S., Lim, S.M., Choi, Y., & Kim, J.E. (2015). Predisposition to and effects of methamphetamine use on the adolescent brain. *Molecular Psychiatry*, 20(12), 1516-1524; doi: 10.1038/mp.2014.191

Tags: #adolescent; #methamphetamine; #brain

Abstract: Adolescence is a period of heightened vulnerability both to addictive behaviors and drug-induced brain damage. Yet, only limited information exists on the brain mechanisms underlying these adolescent-specific characteristics. Moreover, distinctions in brain correlates between predisposition to drug use and effects of drugs in adolescents are unclear. Using cortical thickness and diffusion tensor image analyses, we found greater and more widespread gray and white matter alterations, particularly affecting the frontostriatal system, in adolescent methamphetamine (MA) users compared with adult users. Among adolescent-specific gray matter alterations related to MA use, smaller cortical thickness in the orbitofrontal cortex was associated with family history of drug use. Our findings highlight that the adolescent brain, which undergoes active myelination and maturation, is more vulnerable to MA-related alterations than the adult brain. Furthermore, MA-use-related executive dysfunction was greater in adolescent MA users than in adult users. These findings may provide explanation for the severe behavioral complications and relapses that are common in adolescent-onset drug addiction. Additionally, these results may provide insights into distinguishing the neural mechanisms that underlie the predisposition to drug addiction from effects of drugs in adolescents.

Macdonald, E.P. & Howard, A.L. (2020). Peer information and substance use decision making in street-involved youth. *The Journal of Research on Adolescence*, 30(4), 970-988.

Tags: #youth; #SubstanceUse; #peer; #DecisionMaking

Abstract: In the context of adolescent substance use, peers are a primary source of both influence and information. Substance-related peer information sharing is a relatively understudied phenomenon, particularly in street-involved youth. We recruited 84 youth from a community drop-in center to complete a survey assessing substance use and peer influence on drug use. A subset of youth completed a semi-structured interview assessing factors related to peer information sharing around drug use. Results showed that peer influence was highly relevant to drug use patterns in street-involved youth. Trust in the person supplying information, personal and peer experience, and salience of information played important roles in youths' assessments of drug-related information exchanged with peers. Implications for improving community information dissemination strategies are discussed.

Marsch, et al. (2016). A randomized controlled trial of buprenorphine taper duration among opioid-dependent adolescents and young adults. *Addiction*, 111(8), 1406-1415.

Tags: #adolescent; #YoungAdult; #buprenorphine; #MAT; #taper; #RandomizedControlTrial

Abstract: Background and Aims: Few randomized controlled trials have evaluated buprenorphine treatment interventions for opioid-dependent youth. Consequently, optimal administration strategies for this cohort are unclear. Our aim was to evaluate the relative efficacy of two different buprenorphine taper lengths in promoting abstinence from illicit opioids and treatment retention among opioid-dependent youth.

Design: A double-blind, placebo controlled, multicenter randomized controlled trial.

Setting: Two hospital-based research clinics (Manhattan and Brooklyn) in New York City, USA from 2005 to 2010.

Participants: Volunteer sample of 53 primarily Caucasian participants between the ages of 16 and 24 (n = 11 under age 18) who met DSM-IV opioid dependence criteria.

Intervention: Participants were assigned randomly to either a 28-day buprenorphine taper (n = 28) or 56-day buprenorphine taper (n = 25) via a parallel-groups design during a 63-day period. Both groups received behavioral counseling and opioid abstinence incentives. Both taper conditions had a minimum of 1 week of placebo dosing at the end of the taper.

Measurements: The primary outcome was opioid abstinence measured as a percentage of scheduled urine toxicology tests documented to be negative for opioids. The secondary outcome was treatment retention, measured as number of days attended scheduled visits.

Findings: Intent-to-treat analyses revealed that participants who received a 56-day buprenorphine taper had a significantly higher percentage of opioid-negative scheduled urine tests compared with participants who received a 28-day buprenorphine taper [35 versus 17%, $P = 0.039$; Cohen's $d = 0.57$, 95% confidence interval (CI) = 0.02, 1.13]. Participants who received a 56-day buprenorphine taper were retained in treatment significantly longer than participants who received a 28-day buprenorphine taper (37.5 versus 26.4 days, $P = 0.027$; Cohen's $d = 0.63$, 95% CI = 0.06, 1.19). Daily attendance requirement was associated with decreased abstinence and shorter retention compared with a two to three times

weekly attendance requirement, independent of taper duration. Follow-up data were insufficient to report.

Conclusion: Longer (56-day) buprenorphine taper produces better opioid abstinence and retention outcomes than shorter (28-day) buprenorphine taper for opioid-dependent youth.

Mateu-Gelabert, P., et al. (2017). High enhancer, downer, withdrawal helper: Multifunctional nonmedical benzodiazepine use among young adult opioid users in New York City. *International Journal of Drug Policy*, 46, 17-27.

Tags: #YoungAdult; #opioid; #benzodiazepine; #NonmedicalUse

Abstract: Background: Benzodiazepines are a widely prescribed psychoactive drug; in the U.S., both medical and nonmedical use of benzodiazepines has increased markedly in the past 15 years. Long-term use can lead to tolerance and dependence, and abrupt withdrawal can cause seizures or other life-threatening symptoms. Benzodiazepines are often used nonmedically in conjunction with other drugs, and with opioids in particular—a combination that can increase the risk for fatal and non-fatal overdose. This mixed-methods study examines nonmedical use of benzodiazepines among young adults in New York City and its relationship with opioid use.

Methods: For qualitative analysis, 46 90-minute semi-structured interviews were conducted with young adult opioid users (ages 18–32). Interviews were transcribed and coded for key themes. For quantitative analysis, 464 young adult opioid users (ages 18–29) were recruited using Respondent-Driven Sampling and completed structured interviews. Benzodiazepine use was assessed via a self-report questionnaire that included measures related to nonmedical benzodiazepine and opioid use.

Results: Participants reported using benzodiazepines nonmedically for a wide variety of reasons, including: to increase the high of other drugs; to lessen withdrawal symptoms; and to come down from other drugs. Benzodiazepines were described as readily available and cheap. There was a high prevalence (93%) of nonmedical benzodiazepine use among nonmedical opioid users, with 57% reporting regular nonmedical use. In bivariate analyses, drug-related risk behaviours such as polysubstance use, drug bingeing, heroin injection and overdose were strongly associated with regular nonmedical benzodiazepine use. In multivariate analysis, growing up in a middle-income household (earning between \$51,000 and \$100,000 annually), lifetime overdose experience, having ever used cocaine regularly, having ever been prescribed benzodiazepines, recent drug bingeing, and encouraging fellow drug users to use benzodiazepines to cope with opioid withdrawal were consistently strong predictors of regular nonmedical benzodiazepine use.

Conclusion: Nonmedical benzodiazepine use may be common among nonmedical opioid users due to its drug-related multi-functionality. Harm reduction messages should account for the multiple functions benzodiazepines serve in a drug-using context, and encourage drug users to tailor their endorsement of benzodiazepines to peers to include safer alternatives.

McCabe, S.E., Boyd, C.J., Evans-Polce, R.J., McCabe, V.V., Schulenberg, J.E., & Veliz, P.T. (2021). Pills to Powder: A 17-Year transition from prescription opioids to heroin among US adolescents followed into adulthood. *Journal of Addiction Medicine, 15*(3), 241-244.

Tags: #PrescriptionOpioids; #heroin; #adolescents; #longitudinal

Abstract: Objectives: To examine the longitudinal relationships between US adolescents' prescription opioid use and misuse and any subsequent heroin use in adulthood.

Methods: Nationally representative samples of adolescents from 25 independent cohorts were surveyed via self-administered questionnaires and followed from ages 18 to 35 (n = 11,012). Adolescents were divided into 5 subgroups based on survey responses at age 18: no lifetime exposure to prescription opioids (population controls), medical prescription opioid use without a history of nonmedical misuse (medical use only), medical use followed by nonmedical misuse, nonmedical misuse followed by medical use, and nonmedical misuse only. These 5 subgroups were compared on their risk for any heroin use through age 35 (1993–2017). Adolescents who reported lifetime heroin use at age 18 were excluded.

Results: Adolescents who reported nonmedical prescription opioid misuse followed by medical use or nonmedical misuse only had greater odds of any heroin use in adulthood than population controls. More recent cohorts of adolescents who reported nonmedical misuse or medical use only (compared to older cohorts) had greater odds of any heroin use in adulthood relative to population controls. Nearly 1 in 3 adolescents in recent cohorts who reported nonmedical prescription opioid misuse transitioned to any heroin use.

Conclusions: There is increased risk for heroin use among adolescents who initiated nonmedical misuse or adolescents prescribed opioids in more recent cohorts. These findings indicate historical variation and reinforce the critical role of vigilant monitoring and drug screening to detect high-risk individuals who would benefit from an intervention to reduce later heroin use.

Mennis, J., Stahler, G.J., & Mason, M.J. (2021). Treatment admissions for opioids, cocaine, and methamphetamines among adolescents and emerging adults after legalization of recreational marijuana. *Journal of Substance Abuse Treatment, 122*.

Tags: #adolescents; #EmergingAdult; #treatment; #admissions; #opioids; #cocaine; #methamphetamine

Abstract: Background: A public health concern stemming from recreational marijuana legalization (RML) is the idea that marijuana may act as a "gateway" drug among youth and young adults, where growing marijuana use will lead to increasing substance use disorder (SUD) for "harder" illicit drugs. This study investigates whether SUD treatment admissions for cocaine, opioids, and methamphetamines increased following RML enactment in Colorado and Washington for adolescents and emerging adults.

Methods: We entered annual 2008-2017 treatment admissions data from the SAMHSA Treatment Episode Dataset - Admissions (TEDS-A) into difference-in-differences models to investigate whether the difference in treatment admissions for cocaine, opioids, and methamphetamines among adolescents (12-17), early emerging adults (18-20), and late emerging adults (21-24) before versus after RML enactment differed between Colorado and Washington and states without RML.

Results: There was no significant difference ($p < 0.05$) between Colorado and Washington and other states in the pre- versus postlegalization trajectories of SUD treatment admissions for cocaine, opioids, or methamphetamines for adolescents ($\beta = -0.152$, 95% CI = -0.500, 0.196; $\beta = -0.374$, 95% CI = -1.188, 0.439; $\beta = 0.787$, 95% CI = -0.511, 2.084, respectively), early emerging adults ($\beta = -0.153$, 95% CI = -0.762, 0.455; $\beta = 0.960$, 95% CI = -4.771, 6.692; $\beta = 0.406$, 95% CI = -2.232, 3.044, respectively) or late emerging adults ($\beta = -0.347$, 95% CI = -1.506, 0.812; $\beta = -4.417$, 95% CI = -16.264, 7.431; $\beta = 1.804$, 95% CI = -2.315, 5.923, respectively).

Conclusion: RML in Washington and Colorado was not associated with an increase in adolescent or emerging adult SUD treatment admissions for opioids, cocaine, or methamphetamines. Future studies should extend this research to other states, other substances, for older adults, and over longer time periods; and consider how the effects of drug policies may differ across different jurisdictions.

Mitchell, S.G., Monico, L.B., Gryczynski, J., Fishman, M.J., O'Grady, K.E., & Schwartz, R.P. (2021). Extended-release naltrexone for youth with opioid use disorder. *Journal of Substance Abuse Treatment, 130*

Tags: #youth; #OUD; #naltrexone; #XRNTX

Abstract: Background: Few published research studies have examined the effectiveness of extended-release naltrexone (XR-NTX) for the treatment of opioid use disorder (OUD) among adolescents and young adults.

Methods: This two-group randomized controlled trial recruited 288 youth, ages 15–21, with moderate/severe OUD from a residential addiction treatment program in Baltimore, Maryland. The study randomized the youth within the first week of treatment entry to receive either XR-NTX or treatment-as-usual (TAU; either buprenorphine maintenance treatment or treatment without OUD medication following medically managed withdrawal) prior to discharge, with continued treatment in the community for 6 months. However, due to various reasons spanning patients' and caregivers' preferences and constraints, considerable participant nonadherence to randomized condition occurred (i.e., only 30% of the participants randomized to XR-NTX received an initial injection, while 27% of participants randomized to TAU received an XR-NTX injection at treatment discharge, instead of their assigned treatment). The study used generalized linear mixed modeling (GLiMM) to examine self-reported 90-day opioid, cocaine, marijuana, and alcohol use as well as DSM-5 OUD criteria on “intention-to-treat” (as randomized), “as-received” (XR-NTX vs. not XR-NTX), and “as-medicated” (XR-NTX vs. buprenorphine vs. no medication) bases.

Results: The condition x time interactions in the intention-to-treat analyses failed to reach significance for past-90-day self-reported use of illicit opioids, cocaine, marijuana, or alcohol, or in meeting DSM-5 OUD criteria at 3 or 6 months [all $ps > 0.05$]. However, these findings are of limited interpretive value due to participant nonadherence to their randomized condition. When the study analyzed results by the treatment received at discharge, the “as-received” group x time interaction for illicit opioid use was significant [$p = .003$], with the XR-NTX group reporting less opioid use in the past 90 days at 3 and 6 months. Participants who received their first XR-NTX dose at inpatient discharge ($n = 82$) received, on average, 1.3 subsequent injections in the community over the 6-month study follow-up period. Only 2 of

the 82 study participants received XR-NTX continuously through the 6-month postdischarge follow-up period. Twelve serious adverse events (SAEs) occurred during the study, but the study determined that only 1 was possibly study related (hepatitis C/elevated liver function test results).

Conclusion: None of the condition x time interactions in the intention-to-treat analyses reached significance. Participants' nonadherence may have contributed to the failure to reject the null hypothesis. Irrespective of randomized condition, participants who received XR-NTX for OUD demonstrated low retention in treatment, receiving an average of only 1.3 subsequent injections, yet reported less opioid use at follow-up than participants who did not received XR-NTX. Treatment programs should consider XR-NTX as a treatment option for youth motivated to receive it. Future research should focus on building developmentally informed strategies to improve uptake of and adherence to relapse prevention medication in this population.

Monico, L.B., et al. (2021). Opioid overdose experiences in a sample of US adolescents and young adults: a thematic analysis. *Addiction*, 116(4), 865-873.

Tags: #adolescents; #YoungAdults; #opioid; #overdose; #qualitative

Abstract: Background and Aims: Opioid overdose deaths among adolescents and young adults have risen sharply in the United States over recent decades. This study aimed to explore the nature of adolescent and young adult perspectives on overdose experiences.

Design: This study involved thematic analysis of interviews undertaken as part of a mixed-methods, randomized trial of extended release naltrexone (XR-NTX) versus treatment-as-usual (TAU) for adolescents and young adults (aged 15–21 years) with opioid use disorder (OUD).

Setting: Participants were recruited during a residential treatment episode at Mountain Manor Treatment Center, in Baltimore, MD, USA.

Participants/cases: As part of the qualitative component of this study, 35 adolescents/young adults completed up to three interviews: at baseline, 3 and 6 months after release from residential opioid use disorder treatment.

Measurements: Semi-structured interviews solicited participant experiences with opioid use disorder treatment; their satisfaction with the medications used to treat opioid use disorder; counseling received; current substance use; issues related to treatment retention; their treatment goals; and their future outlook.

Findings: Four broad themes emerged: (1) adolescents/young adults had difficulty identifying overdoses due to interpreting subjective symptoms and a lack of memory of the event, (2) this sample had difficulty perceiving risk that is misaligned with traditional understandings of overdose intentionality, (3) adolescents/young adults did not interpret personal overdose events as a catalyst for behavior change and (4) this sample experienced a greater impact to behavior change through witnessing an overdose of someone in their social network.

Conclusions: The sample of US adolescents and young adults in treatment for opioid use disorder expressed difficulty identifying whether or not they had experienced an overdose, expressed fluctuating intentionality for those events and did not have clear intentions to change their behavior. Witnessing an overdose appeared to be as salient an experience as going through an overdose oneself.

Monnat, S.M. & Rigg, K.K. (2016). Examining rural/urban differences in prescription opioid misuse among US adolescents. *The Journal of Rural Health, 32*(2), 204-218.

Tags: #adolescents; #rural; #urban; #PrescriptionOpioidMisuse

Abstract: Purpose: This study examines differences in prescription opioid misuse (POM) among adolescents in rural, small urban, and large urban areas of the United States and identifies several individual, social, and community risk factors contributing to those differences.

Methods: We used nationally representative data from the 2011 and 2012 National Survey on Drug Use and Health and estimated binary logistic regression and formal mediation models to assess past-year POM among 32,036 adolescents aged 12-17.

Results: Among adolescents, 6.8% of rural, 6.0% of small urban, and 5.3% of large urban engaged in past-year POM. Net of multiple risk and protective factors, rural adolescents have 35% greater odds and small urban adolescents have 21% greater odds of past-year POM compared to large urban adolescents. The difference between rural and small urban adolescents was not significant. Criminal activity, lower perceived substance use risk, and greater use of emergency medical treatment partially contribute to higher odds among rural adolescents, but they are also partially buffered by less peer substance use, less illicit drug access, and stronger religious beliefs.

Conclusions: Researchers, policy makers, and treatment providers must consider the complex array of individual, social, and community risk and protective factors to understand rural/urban differences in adolescent POM. Potential points of intervention to prevent POM in general and reduce rural disparities include early education about addiction risks, use of family drug courts to link criminal offenders to treatment, and access to nonemergency medical services to reduce rural residents' reliance on emergency departments where opioid prescribing is more likely.

Nolte, K., Drew, A.L., Friedmann, P.D., Romo, E., Kinney, L.M., & Stopka, T.J. (2020). Opioid initiation and injection transition in rural northern New England: A mixed-methods approach. *Drug and Alcohol Dependence, 217*.

Tags: #opioid; #injection; #rural

Abstract: Background: In rural northern New England, located in the northeastern United States, the overdose epidemic has accelerated with the introduction of fentanyl. Opioid initiation and transition to opioid injection have been studied in urban settings. Little is known about opioid initiation and transition to injection drug use in rural northern New England.

Methods: This mixed-methods study characterized opioid use and drug injection in 11 rural counties in Massachusetts, Vermont, and New Hampshire between 2018 and 2019. People who use drugs completed audio computer-assisted self-interview surveys on substance use and risk behaviors (n = 589) and shared personal narratives through in-depth interviews (n = 22). The objective of the current study is to describe initiation of opioid use and drug injection in rural northern New England.

Results: Median age of first injection was 22 years (interquartile range 18–28 years). Key themes from in-depth interviews that led to initiating drug injection included normalization of drug use in families and communities, experiencing trauma, and abrupt discontinuation of an opioid prescription. Other factors that led to a transition to injecting included lower cost, increased effect/ rush, greater availability of heroin/ fentanyl, and faster relief of withdrawal symptoms with injection.

Conclusions: Trauma, normalization of drug use, over-prescribing of opioids, and abrupt discontinuation challenge people who use drugs in rural northern New England communities. Inadequate opioid tapering may increase transition to non-prescribed drug use. The extent and severity of traumatic experiences described highlights the importance of enhancing trauma-informed care in rural areas.

Nowotny, K.M., Perdue, T., Cepeda, A., & Valdez, A. (2017). Mental health of heroin users with differing injection drug use histories: A non-treatment sample of Mexican American young adult men. *Drug and Alcohol Dependence, 181*, 124-131.

Tags: #YoungAdult; #MexicanAmerican; #heroin; #InjectionDrugUse; #MentalHealth

Abstract: Background: While the comorbidity of mental health and injecting heroin has been documented, current research is limited by describing the mental health of people who inject drugs without a comparison group and by the lack of research on nontreatment samples in the United States, particularly among Hispanics. The purpose of this study was to examine the association of injecting history (never, former, occasional, and daily) and multiple outcomes of global and mental health using a sample of U.S.-based Latinos not currently in treatment.

Methods: Data are from a sample of street-recruited Mexican American young adult men (n = 275) in San Antonio, TX. Multiple logistic regression and structural equation modeling were used.

Results: Overall 54% of men reported lifetime injecting drug use (20.7% former users, 11.1% occasional users, and 21.9% daily users). We found varying prevalence rates of global and mental health status among different histories of injecting. After covariate adjustment, daily injecting remained strongly associated with all four outcomes: perceived poor health status (AOR = 4.39; p ≤ 0.001), psychological distress (AOR = 2.78; p ≤ 0.05), depression (AOR = 4.37; p ≤ 0.001), and suicidal ideation (OR = 4.75; p ≤ 0.001). Acculturation, gang membership, and incarceration history also emerged as important factors.

Conclusion: This study provides new information about the relationship between mental health and injecting heroin use.

Findings: Support the need to consider mental health states among people who inject drugs, and to examine varying histories of injecting with socially and culturally relevant factors.

Osborne, V., Serdarevic, M., Striley, C.W., Nixon, S.J., Winterstein, A.G., & Cottler, L.B. (2020). Age of first use of prescription opioids and prescription opioid non-medical use among older adolescents. *Subst Use Misuse, 55*(14), 2420-2427.

Tags: #adolescents; #prescription; #opioids; #NMOU

Abstract: Non-medical use (NMU) of prescription opioids is of concern due to the opioid epidemic in the United States. Objective: We examined sex differences in the effect of age of first use of prescription opioids on prescription opioid NMU among 17- and 18-year olds.

Methods: The National Monitoring of Adolescent Prescription Stimulants Study (N-MAPSS) recruited youth 10-18 years from 10 United States cities between 2008 and 2011 (n = 11,048). The cross-sectional survey included questions on past 30 day prescription opioid use (10,965 provided responses; 278 age 17 to 18 years who used opioids in past 30 days), with NMU defined as non-oral use and/or use of someone else's opioids. Nonparametric survival analysis with lifetable estimates was used to examine age at first use. Binomial logistic regression was conducted predicting any NMU, adjusted for covariates.

Results: Among 278 youth 17 to 18 years, a significant difference in age of first use between those with MU only and any NMU (p < .0001) was observed. Each one year increase in age resulted in a 33% decrease in the odds of any prescription opioid NMU compared to MU only, after controlling for covariates (Odds Ratio = 0.67, 95% Confidence Interval: 0.47,0.96). Sex differences in age at first use were not observed.

Conclusions: Risk of past 30 day prescription opioid NMU decreased by a third for each one year increase in age of first use, after adjustment for other covariates. Use of prescription opioids in young adolescents may need to be limited where possible and researched further.

Palamar, J.J., Le, A., & Mateu-Gelabert, P. (2018). Not just heroin: Extensive polysubstance use among US high school seniors who currently use heroin. *Drug and Alcohol Dependence, 188*, 377-384

Tags: #heroin; #PolysubstanceUse; #HighSchool

Abstract: Background: Heroin-related deaths are on the rise in the US and a large portion of heroin overdoses involve co-use of other drugs such as benzodiazepines. A better understanding of heroin polysubstance use patterns could help discern better prevention measures.

Methods: Data were examined from past-month ("current") heroin users from a nationally representative sample of high school seniors in the Monitoring the Future study (2010–2016, n = 327). We examined how past-month use and frequency of use of various drugs relate to frequency of current heroin use using chi-square and multivariable ordinal logistic regression.

Results: Prevalence of any past-month use of various other drugs (and past-month use 10+ times) tends to increase as the frequency of heroin use increases; however, other drug use tends to decline among those reporting the use of heroin 40+ times in the past month. In multivariable models controlling for demographic characteristics, most levels of alcohol use were associated with decreased odds of higher-

frequency heroin use ($p < .05$). Nonmedical opioid (aOR = 5.84, $p = .037$) and tranquilizer (aOR = 14.63, $p = .045$) use 40+ times in the past month were associated with increased odds of higher-frequency heroin use.

Conclusions: High school seniors who use heroin also use multiple other drugs. Increases in the frequency of heroin use are associated with shifts in the nature and frequency of polysubstance use, with a higher frequency of heroin use associated with the highest percentage and frequency of use of depressants (nonmedical opioid and benzodiazepine use), compounding the risk of overdose. Prevention measures should consider polysubstance use patterns among heroin-using adolescents.

Park, T.M. & Haning, T.F. (2016). Stimulant use disorders. *Child Adolesc Psychiatr Clin N Am*, 25(3), 461-471.

Tags: #adolescents; #stimulants; #methamphetamine

Abstract: Compared with other illicit substances, stimulants are not commonly used by adolescents; however, they represent a serious concern regarding substance use among youths. This article uses methamphetamine as a model for stimulant use in adolescents; cocaine and prescription stimulants are also mentioned. Methamphetamine use among adolescents and young adults is a serious health concern with potentially long-term physical, cognitive, and psychiatric consequences. Brain development and the effects of misusing stimulants align such that usage in adolescents can more dangerous than during adulthood. It seems helpful to keep in mind the differences between adolescents and young adults when implementing interventions.

Pielech, M., Lunde, C.E., Becker, S.J., Vowles, K.E., & Sieberg, C.B. (2020). Comorbid chronic pain and opioid misuse in youth: Knowns, unknowns, and implications for behavioral treatment. *American Psychologist*, 75(6), Special Issue: Psychology's Role in Addressing the Dual Crises of Chronic Pain and Opioid-Related Harms. 811-824.

Tags: #youth; #comorbidity; #ChronicPain; #OpioidMisuse; #MetaAnalysis; #treatment

Abstract: Chronic pain and opioid misuse occur in pediatric populations and can be associated with a range of negative adverse outcomes that may persist into adulthood. While the association between chronic pain, opioid prescribing, and opioid-related adverse consequences is reasonably well established in adults, the relation in pediatric patients is not well understood and the long-term impact of opioid exposure during childhood is yet to be fully revealed. The present review draws from the available literature on chronic and acute pediatric pain prevalence and treatment, opioid misuse, and adolescent substance use to address knowns and unknowns of comorbid pediatric chronic pain and opioid misuse. Additionally, gaps in knowledge regarding the prevalence and etiology of co-occurring chronic pain and opioid misuse in youth are identified. Hypothesized, modifiable risk factors associated with both pediatric pain and opioid misuse are considered. Due to a lack of empirically supported integrated treatments for comorbid chronic pain and opioid misuse in youth, this review examines the evidence base and best practices from both the chronic pain and opioid treatment literature to guide treatment

recommendations for these comorbid conditions in youth. Recommendations are then provided to promote screening and mitigate risk of chronic pain and opioid misuse across a range of pediatric settings. Lastly, a comprehensive agenda to prevent and treat chronic pain and opioid misuse in adolescents and young adults is discussed.

Pike, J.R., Fadardi, J.S., Stacy, A.W., & Xie, B. (2021). The prospective association between illicit drug use and nonprescription opioid use among vulnerable adolescents. *Preventive Medicine, 143*

Tags: #adolescents; #IllicitDrugUse; #NonmedicalPrescriptionOpioidUse

Abstract: In recent years, more than half of all drug overdose deaths in United States involved an opioid. To address this epidemic, antecedents to opioid misuse must be identified and empirically validated. The objective of the current investigation was to examine whether illicit drug use was prospectively associated with nonprescription opioid use among adolescents from a vulnerable population with a greater prevalence of substance abuse. A population-based cohort study of 1060 adolescents from 29 alternative high schools in southern California was conducted over a two-year period. A total of 929 adolescents (mean age 17.5 years, 49.9% female, 76.4% Hispanic) who had not experimented with nonprescription opioids at the baseline assessment were included in the analytic sample. The outcome was self-reported use of nonprescription opioids within two years. The predictors tested were illicit drug use, illicit drug use excluding marijuana, and the use of nonmedical marijuana. Covariates included age, sex, ethnicity, socioeconomic status, parental education, weekly income, sensation seeking, stress, anxiety, depression, and the use of alcohol and nicotine products. Multilevel, covariate-adjusted logistic regression models indicated that the odds of experimentation with nonprescription opioids was greater among adolescents who had used illicit drugs or illicit drugs excluding marijuana. Nonmedical marijuana use alone was a statistically significant predictor in unadjusted but not covariate-adjusted models. While prior studies have examined the progression from nicotine, alcohol, and marijuana use to nonprescription opioid use, the present findings emphasize the importance of illicit drug use as a detectable and empirically supported risk factor for future opioid misuse.

Prince, M.A., Conner, B.T., Davis, S.R., Swaim, R.C., & Stanley, L.R. (2021) Risk and protective factors of current opioid use among youth living on or near American Indian reservations: An application of machine learning. *Translational Issues in Psychological Science*. Advance online publication.

Tags: #youth; #AmericanIndians; #MachineLearning; #opiates; #ProtectiveFactors; #RiskFactors; #cocaine

Abstract: Opioid use among youth, particularly among American Indian (AI) youth, is rising, resulting in a large number of accidental overdoses and deaths. In order to develop effective prevention strategies, we need to use exploratory data analysis to identify previously unknown predictors of opioid use among youth living on or near reservations. The present study is an application of Machine Learning, a type of exploratory data analysis, to the Our Youth, Our Future epidemiological survey (N = 6482) to determine salient risk and protective factors for past 30-day opioid use. The Machine Learning algorithm identified 11 salient risk and protective factors. Importantly, highest risk was conferred for those reporting recent

cocaine use, having ever tried a narcotic other than heroin, and identifying as American Indian. Protective factors included never having tried opioids other than heroin, infrequent binge drinking, having fewer friends pressuring you to use illicit drugs, initiating alcohol use at a later age, and being older. This model explained 61% of the variance in the training sample and, on average, 24% of the variance in the bootstrapped samples. Taken together, this model identifies known predictors of 30-day opioid use, for example, recent substance use, as well as unknown predictors including being AI, Snapchat use, and peer encouragement for use. Notably, recent cocaine use was a more salient predictor of recent opioid use than lifetime opioid use.

Rabinowitz, J.A., et al. (2021). Early childhood behavioral and academic antecedents of lifetime opioid misuse among urban youth. *The Journal of Clinical Child & Adolescent Psychology*.

Tags: #youth; #OpioidMisuse; #urban; #ChildhoodBehavior

Abstract: Objective: Opioid misuse has become an epidemic in the United States. In the present study, we examine potential malleable early childhood predictors of opioid misuse including whether childhood achievement, aggressive behavior, attention problems, and peer social preference/likability in first grade predicted opioid misuse and whether these relationships differed depending on participant sex.

Method: Data are drawn from three cohorts of participants (N = 1,585; 46.7% male) recruited in first grade as part of a series of elementary school-based, universal preventive interventions conducted in a Mid-Atlantic region of the US. In first grade, participants completed standardized achievement tests, teachers reported on attention problems, and peers nominated their classmates with respect to their aggressive behavior and social preference/likability. At approximately age 20, participants reported on their misuse of opioids defined as lifetime use of heroin or misuse of prescription opioids.

Results: Higher levels of peer nominations for aggressive behavior in first grade predicted a greater likelihood of opioid misuse. An interaction between participant sex and attention problems was observed such that females higher in attention problems were more likely to misuse opioids, particularly prescription opioids, than females lower in attention problems. An interaction was also found between participant sex and peer likability such that males lower in peer-nominated likability were more likely to misuse opioids relative to males higher in likability.

Conclusion: Given the malleable nature of attention problems, aggression, and social skills in early childhood, prevention programs that target these behaviors during this developmental period may attenuate risk for opioid misuse.

Rahmandar, M.H., Williams, F.S., & Kuhns, L.M. (2021). Understanding risk factors for persistent opioid use among youths. *JAMA Netw Open*, 4(4), e214904.

Tags: #youth; #OpioidUse; #RiskFactors

Abstract: None. [Invited Commentary]

Robinson, C.A. & Wilson, J.D. (2020). Management of opioid misuse and opioid use disorders among youth. *Pediatrics*, 145, s2.

Tags: #youth; #OpioidMisuse; #OUD; #management

Abstract: In response to the growing impact of the current opioid public health crisis in the United States on adolescents and young adults, pediatricians have an expanding role in identifying opioid use early, preventing escalation of risky use, reducing opioid-related harms, and delivering effective therapies. Research and expert consensus suggest the use of brief interventions focused on reducing risks associated with ongoing opioid use and using motivational interviewing strategies to engage youth in treatment. Because fatal opioid overdose remains a major cause of opioid-related mortality among youth, delivering overdose education as part of any visit in which a youth endorses opioid use is one evidence-based strategy to decrease the burden of opioid-related mortality. For youth that are injecting opioids, safe injection practices and linkage to needle or syringe exchanges should be considered to reduce complications from injection drug use. It is crucial that youth be offered treatment at the time of diagnosis of an opioid use disorder (OUD), including medications, behavioral interventions, and/or referral to mutual support groups. The 2 medications commonly used for office-based OUD treatment in adolescents are extended-release naltrexone (opioid antagonist) and buprenorphine (partial opioid agonist), although there is a significant treatment gap in prescribing these medications to youth, especially adolescents <18 years of age. Addiction is a pediatric disease that pediatricians and adolescent medicine physicians are uniquely poised to manage, given their expertise in longitudinal, preventive, and family- and patient-centered care. Growing evidence supports the need for integration of OUD treatment into primary care.

Romero-Gonzalez, M., Shahanaghi, A., DiGirolamo, G.J. & Gonzalez, G. (2017). Buprenorphine-naloxone treatment responses differ between young adults with heroin and prescription opioid use disorders. *The American Journal on Addictions*, 26(8), 838-844.

Tags: #YoungAdults; #prescription; #OUD; #heroin; #BuprenorphineNaloxoneTreatment

Abstract: Background and Objectives: Opioid use disorder among young adults is rising sharply with an increase in morbidity and mortality. This study examined differences in treatment response to a fixed dose of buprenorphine-naloxone between heroin (HU) and prescriptions opioids (POU) users.

Methods: Eighty opioid dependent young adults (M = 22 years) were treated with buprenorphine-naloxone 16–4 mg/day for 8 weeks. Differences between HU (N = 17) and POU (N = 63) on changes in weekly opioid use, opioid craving, withdrawal, and depression symptoms were analyzed with mixed-effects regression models.

Results: The HU had an overall mean proportion of weekly opioid use of .32 (SD = .14) compared to POU's weekly mean of .24 (SD = .15) showing a significant main effect (Z = 2.21, p = .02). Depressive symptoms (CES-D scores) were elevated at baseline for both groups (HU: M = 23.1, SD = 11.9; PO: M = 22.2, SD = 9.4), but only POU improved significantly to a score of 9.88 (SD = 7.4) compared to HU's

score of 18.58 (SD = 10.3) at week 8 ($Z = 2.24, p = .02$). There were no significant differences in treatment retention, craving, or withdrawal symptoms.

Discussion and Conclusions: Treatment response to 16-4 mg/day of buprenorphine–naloxone was significantly diminished for heroin users relative to opioid prescription users in weekly opioid use. Heroin users also had persistent depressive symptoms suggesting the need for close monitoring.

Scientific Significance: These data suggest that young heroin users might require higher doses of buprenorphine.

Russell, B.S., Trudeau, J.J., & Leland, A.J. (2015). Social influence on adolescent polysubstance use: The escalation to opioid use. *Substance Use & Misuse, 50*(10), 1325-1331.

Tags: Adolescent; #OpioidUse; #PolysubstanceUse

Abstract: Background: Fewer than 9% of 12–17 year olds in need (~146,000 of 1.7 million) receive inpatient or outpatient substance abuse recovery services or other mental health services (SAMHSA, 2012). The literature on adolescent addiction is sparse, however, as most published addiction recovery efforts involve adult populations—often college students.

Objectives: The present study examined social influences on escalating substance use (from tobacco, alcohol, and marijuana use to polysubstance use involving opioids) for students enrolled in recovery high schools.

Methods: A sample of 31 adolescents enrolled in substance use recovery high schools were surveyed on their patterns of substance use leading to their abuse of opioids.

Results: Youth who begin their substance use as young as age 8 are often pressured by peer culture to do so and come from substance-using families. Their escalation in polysubstance use to a pattern including opioids was also most often attributed to peer influence over several years.

Conclusions/Importance: This paper is one of scant few that address patterns of use in high school students. Perhaps most salient from this study are the tertiary prevention implications: similar to their adult counterparts, students enrolled in recovery high school programs are likely from substance-using families and have combined complex constellations of substances including opioids by dint of their relationships with substance-using peers.

Saloner, B., Feder, K.A, & Krawczyk, N. (2017). Closing the medication-assisted treatment gap for youth with Opioid Use Disorder. *JAMA Pediatrics, 171*(8), 729-731.
doi:10.1001/jamapediatrics.2017.1269

Tags: #youth; #OUD; #MAT; #buprenorphine; #methadone

Abstract: Editorial.

Schepers, S. T., Arndt, D. L., Rogers, R. D., Hedeker, D., & de Wit, H. (2019). Subjective responses to amphetamine in young adults with previous mood elevation experiences. *Psychopharmacology*, 236(11), 3363–3370.

Tags: #youth; #AlcoholAbuse; #hypomania

Abstract: Rationale: One risk factor for alcohol and substance misuse is hypomanic experiences, or periods of mood elevation. Young people who report hypomanic states are more likely to develop bipolar disorder (BP), and BP and other mood disorders increase the risk of addiction. We recently reported that young adults with a history of mood elevation experience less subjective effects from a low dose of alcohol, which may be predictive of future alcohol use. The finding with alcohol raised the question of whether this dampened response to a drug also applies to other drugs, such as amphetamine.

Objective: This study assessed responses of d-amphetamine in healthy young adults with varying experiences of mood elevation, as measured by the Mood Disorders Questionnaire (MDQ).

Methods: Healthy 18-19-year-olds (N = 30) with a range of MDQ scores participated in three 4-h laboratory sessions in which they received placebo, 10 mg, or 20 mg d-amphetamine. They completed mood questionnaires and cardiovascular measures.

Results: Individuals with higher MDQ scores reported less stimulation and euphoria after 10 mg, but not 20 mg, d-amphetamine, than individuals with lower scores. MDQ scores were not related to cardiovascular responses to the drug.

Conclusions: A history of mood elevation experiences or hypomania states is related to dampened response to a low dose of a psychostimulant drug, extending previous findings with dampened response to alcohol. This phenotype for mood disorders of dampened responses to drugs may contribute to risk for subsequent drug use or misuse.

Sheridan, D.C., Laurie, A., Hendrickson, R.G., Fu, R., Kea, B., & Horowitz, B.Z. (2016) Association of overall opioid prescriptions on adolescent opioid abuse. *J Emerg Med*, 51(5), 485-490.

Tags: #adolescent; #opioid; #prescription

Abstract: Background: Opioid abuse is a public health epidemic in the United States. Much literature has focused on the prescribing practices of physicians and opioid misuse by adults. However, there are limited data on the effect of opioid prescriptions on adolescent recreational ingestion of these medications.

Objectives: The objective of this study was to assess for a relationship between opioid prescribing practices across the United States and adolescent opioid ingestion calls to poison centers.

Methods: This was an observational study using the National Poison Data System. The study population consisted of poison center calls regarding adolescents between 2005 and 2010 in the database with a

coding of "intentional abuse" and an opioid ingestion. National opioid prescription estimates were generated using nationally representative outpatient and inpatient databases.

Results: There were 4186 adolescent opioid ingestion calls during the study period. There was a general increase between 2005 and 2010 in both teen opioid abuse calls (617 in 2005 to 782 in 2010) and national opioid prescriptions (approximately 78 million in 2005 to 108 million in 2010). For each opioid prescription increase per 100 persons per year, the annual teen opioid abuse calls increased by 1.8% (95% confidence interval 0.9-2.8%), equivalent to an absolute increase of about 0.04 to 0.05 calls per 100,000 teens annually.

Conclusions: There appears to be an association between opioid prescriptions nationally and poison center calls for adolescent opioid ingestions. This is particularly important in this patient population because of impulsivity and early exposure to substance abuse. Providers should be aware of the nonmedical use of opioids by adolescents and educate patients accordingly.

Slobodin, O. (2020). The utility of the CPT in the diagnosis of ADHD in individuals with substance abuse: A systematic review. *European Addiction Research, 26*, 283–294.

Tags: #SubstanceUse; #SUD; #ADHD; #comorbidity; #review; #MetaAnalysis

Abstract: *Background:* Early identification of attention-deficit/hyperactivity disorder (ADHD) in individuals with substance use disorders (SUD) is important because ADHD has an adverse effect on the development and course of SUD. Given the limited validity of self-report measures of ADHD in individuals with SUD, it is important to investigate the utility of the continuous performance test (CPT) in classifying ADHD in adults with SUD.

Objective: This review aims to examine the quantitative similarities and differences in CPT performance of adults with ADHD, SUD, and their comorbidity to determine if a distinct neurocognitive profile exists for each.

Method: A systematic review of CPT studies that included patients with the comorbidity of ADHD and SUD and a comparison group of one of the disorders alone was conducted. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were used.

Results: Eight studies were identified with sample sizes ranging from $n = 17$ to $n = 386$. The comorbidity of ADHD and SUD was, mostly, not associated with higher rates of commission and omission errors than either disorder alone. However, the comorbidity of ADHD and SUD was more likely to be associated with increased deficits in response time variability compared with individuals with ADHD alone.

Conclusions: This review highlights the shortage of large-scale CPT research involving patients with ADHD and SUD. The CPT might be sensitive to attentional deficits, but it lacks specificity for the classification of adult ADHD, SUD, or their comorbidity, and the CPT is thus not useful in discriminating comorbid ADHD and SUD from either disorder alone. Future CPT research should explore whether specific attentional deficits account for the development and persistence of SUD. Such research should also reach beyond traditional CPT measures and include other cognitive and behavioral deficits that were associated with ADHD, such as distractibility and hyperactivity.

Smith, N.Z.Y., Vasquez, P.J., Emelogu, N.A., Hayes, A.E., Engebretson, J., & Nash, A.J. (2020). The good, the bad, and recovery: Adolescents describe the advantages and disadvantages of alternative peer groups. *Substance Abuse: Research and Treatment, 14*, 1-9.

Tags: #adolescents; #recovery; #peer; #GroupTreatment

Abstract: In 2017, approximately 1.5 million American adolescents had a substance use disorder (SUD). Adolescents with SUD risk hindering their neurological development, which can result in problems with memory and self-regulation, and in turn disrupt their education, relationships, and life opportunities. Treating adolescents with SUD is challenging. Thus, effective models that help adolescents engage in long-term recovery are needed. The Alternative Peer Group (APG) is an adolescent recovery support model that incorporates pro-recovery peers and sober social activities into standard continuing care practices. In this qualitative study thematic content analysis methods were used to explore transcripts from in-depth interviews with adolescent APG participants collected in a prior study. The aim of this secondary analysis was to get a clear understanding of adolescents' perceptions of the advantages and disadvantages of APGs for supporting SUD recovery. Findings suggest that pro-recovery peer and adult role models, structured activities and a positive social climate that promotes fun, a sense of belonging, and accountability are continuing care elements that are likely to help adolescents resolve their ambivalence about SUD recovery and increase their motivation to engage in the hard work of recovery. These findings can inform the design of effective recovery support model services that promote long-term recovery for adolescents with SUD.

Smyth, B.P., Elmusharaf, K., & Cullen, W. (2018). Opioid substitution treatment and heroin dependent adolescents: reductions in heroin use and treatment retention over twelve months. *BMC Pediatrics, 18*(1).

Tags: #adolescents; #heroin; #methadone; #buprenorphine; #TreatmentAdherence

Abstract: Background: Opioid dependence is a major health concern across the world and does also occur in adolescents. While opioid substitution treatment (OST) has been thoroughly evaluated in adult populations, very few studies have examined its use in adolescents. There are concerns that OST is underutilised in adolescents with heroin dependence. We sought to measure changes in drug use among adolescents receiving OST and also to examine treatment attrition during the first 12 months of this treatment.

Methods: We included all heroin dependent patients aged under 18.5 years commencing OST at one outpatient multidisciplinary adolescent addiction treatment service in Dublin, Ireland. Psycho-social needs were also addressed during treatment. Drug use was monitored by twice weekly urine drugs screens (UDS). Change in the proportion of UDS negative for heroin was examined using the Wilcoxon signed rank test. Attrition was explored via a Cox Regression multivariate analysis.

Results: OST was commenced by 120 patients (51% female and mean age 17.3 years). Among the 39 patients who persisted with OST until month 12, heroin abstinence was 21% (95% confidence interval

[CI] = 9-36%) at month three and it was 46% (95% CI = 30-63%) at month 12. Heroin use declined significantly from baseline to month three ($p < 0.001$) and from month three to month 12 ($p = 0.01$). Use of other drugs did not change significantly. People using cocaine during month 12 were more likely to be also using heroin ($p = 0.02$). Unplanned exit occurred in 25% patients by 120 days. The independent predictors of attrition were having children, single parent family of origin, not being in an intimate relationship with another heroin user and evidence of cocaine use just before treatment entry.

Conclusions: We found that heroin dependent adolescent patients achieved significant reductions in heroin use within three months of starting OST and this improved further after a year of treatment, about half being heroin abstinent at that stage. Patient drop out from treatment remains a challenge, as it is in adults. Cocaine use before and during treatment may be a negative prognostic factor.

The Society for Adolescent Health and Medicine. (2021). Position Paper: Medication for Adolescents and Young Adults with Opioid Use Disorder. *Journal of Adolescent Health, 68*, 632-636.

Tags: #adolescents; #YoungAdults; #OUD; #MOUD

Abstract: Opioid-related morbidity and mortality have risen in many settings globally. It is critical that practitioners who work with adolescents and young adults (AYAs) provide timely, evidence-based treatment for opioid use disorder (OUD). Such treatment should include medications for opioid use disorder (MOUD), including buprenorphine, naltrexone, and methadone. Medication treatment is associated with reduced mortality, fewer relapses to opioid use, and enhanced recovery and retention in addiction care, among other positive health outcomes. Unfortunately, the vast majority of AYAs with OUD do not receive medication. The Society for Adolescent Health and Medicine recommends that AYAs be offered MOUD as a critical component of an integrated treatment approach. Barriers to receipt of medications are widespread; many are common to high-, middle-, and low-income countries alike, whereas others differ. Such barriers should be minimized to ensure equitable access to youth-friendly, affirming, and confidential addiction treatment that includes MOUD. Robust education on OUD and medication treatment should be provided to all practitioners who work with AYAs. Strategies to reduce stigma surrounding medication—and stigma experienced by individuals with substance use disorders more generally—should be widely implemented. A broad research agenda is proposed with the goal of expanding the evidence base for the use and delivery of MOUD for AYAs.

Spada, M., Kmiec, J., Glance, J.B., & Gopalan, P. (2020). Consideration of opioid agonist treatment in a pregnant adolescent: A case report and literature review. *Substance Abuse, 41*(2), 181-185.

Tags: #adolescent; #pregnant; #OpioidAgonist; #treatment; #CaseReport; #review

Abstract: Background: Opioid use greatly increases the risk of overdose death, as well as contracting human immunodeficiency virus (HIV) and hepatitis. Opioid agonist treatment is recommended for pregnant women who are dependent on opioids. However, there is a dearth of studies on the use of opioid agonist treatment in pregnant teenagers.

Case: Ms. A, a 15 year-old G1PO in foster care, presented to our tertiary women's hospital requesting opioid agonist treatment for use of pill opioids. She reported nasal inhalation of 5–6 opioid tablets daily, with recent attempts to self-taper using nonprescribed buprenorphine since learning of her pregnancy. Last reported opioid use was >24 hours prior to admission. Urine drug testing was positive only for opioids (negative for buprenorphine and methadone). She did not exhibit significant withdrawal symptoms while hospitalized. The psychiatric treatment team recommended deferring opioid agonist treatment and pursuing outpatient substance use treatment. Unfortunately, Ms. A did not attend outpatient treatment and was lost to follow up.

Discussion: Based upon our experience and review of the studies regarding opioid use disorder (OUD) and perinatal and adolescent opioid use, we recommend that pregnant adolescents with OUD be referred to opioid agonist treatment with buprenorphine or methadone. Studies specifically addressing opioid agonist treatment in pregnant teenagers are needed.

Squeglia, L.M., Fadus, M.C., McClure, E.A., Tomko, R.L., & Gray, K.M. (2019). Pharmacological treatment of youth substance use disorders. *Journal of Child and Adolescent Psychopharmacology, 29*(7).

Tags: #youth; #SUD; #pharmacology; #treatment

Abstract: While the majority of youth who experiment with alcohol and drugs do not develop problematic levels of use, 5% of adolescents and 15% of young adults meet criteria for a substance use disorder (SUD). Pharmacotherapy, in combination with behavioral interventions, has the potential to increase the likelihood of successful treatment for youth struggling with SUD; however, the literature in this area is limited. To date, there are no Food and Drug Administration (FDA)-approved medications for adolescent SUD, other than buprenorphine, which has been approved down to 16 years of age for opioid use disorder. Despite alcohol and cannabis being the most commonly used substances during adolescence, only three medications have been tested among this demographic, and only two have warranted further study (i.e., naltrexone for alcohol and N-acetylcysteine for cannabis use disorder). Although less common in adolescents and young adults, the most promising pharmacological findings for this age group are for opioid (buprenorphine) and tobacco (bupropion and varenicline) use disorders. In addition, despite the recent marked increases in electronic nicotine delivery systems (i.e., vaping) among youth, treatment strategies are still in their infancy and no recommendation exists for how to promote cessation for youth vaping. Current findings are limited by: small, demographically homogeneous samples; few trials, including a substantial number of youth younger than 18; low retention; medication adherence rates; and minimal information on effective dosing levels and long-term outcomes. Overall, pharmacotherapy may be a potentially effective strategy to increase treatment effects; however, more rigorous research trials are warranted before FDA approval would be granted for any of the potential adjunctive medications in this age group.

Stahler, G.J. & Mennis, J. (2020). The effect of medications for opioid use disorder (MOUD) on residential treatment completion and retention in the US. *Drug and Alcohol Dependence, 212*(1).

Tags: #MOUD; #OpioidUseDisorder; #ResidentialTreatment; #completion; #retention

Abstract: Background: This study examines whether MOUD increases treatment completion and retention in both short-term (ST) and long-term (LT) residential programs using a national dataset.

Methods: Data were extracted from the 2015–2017 TEDS-D (Treatment Episode Dataset-Discharge) datasets for opioid using adults in ST (n = 87,296) and LT (n = 66,623) residential treatment. Primary outcome variables were treatment completion and retention (ST: length of stay >10 days; LT: >90 days). Logistic regression estimated the effects of MOUD on the probability of treatment completion and retention separately for ST and LT residential treatment, controlling for individual background characteristics.

Results: Only 18% of clients in residential treatment programs had MOUD in their treatment plans. For ST residential treatment, MOUD was associated with a 40% increased likelihood of treatment completion (OR = 1.404) and 34% increased retention (OR = 1.337). For LT residential treatment, MOUD was associated with a 26% reduced likelihood of treatment completion (OR = 0.743) and no significant increase in retention. Post hoc analysis suggests insurance coverage may be influencing outcomes.

Conclusions: Despite MOUD being a standard of care for OUD, MOUD is particularly under-utilized in residential treatment. Further research should focus on how best to integrate MOUD within short-term residential treatment and to explore the potential viability of MOUD in long-term residential programs. Given the risk of overdose following residential treatment, for at least short-term residential programs, this setting may be advantageous for integrating psychosocial treatments with early MOUD engagement in a structured therapeutic environment as part of a long-term continuum of care recovery program.

Steele, D.W., et al. (2020, May). Interventions for substance use disorders in adolescents: A systematic review [Internet]. Rockville (MD): Agency for Healthcare Research and Quality (US). Report No.: 20-EHC014. *AHRQ Comparative Effectiveness Reviews*.

Tags: #adolescents; #interventions; #SUD; #CBT; #GroupTherapy; #peers; #MotivationalInterviewing; #review

Abstract: *Objectives:* This systematic review (SR) synthesizes the literature on behavioral, pharmacologic, and combined interventions for adolescents ages 12 to 20 years with problematic substance use or substance use disorder. We included interventions designed to achieve abstinence, reduce use quantity and frequency, improve functional outcomes, and reduce substance-related harms.

Data sources: We conducted literature searches in MEDLINE, the Cochrane CENTRAL Trials Registry, Embase, CINAHL, and PsycINFO to identify primary studies meeting eligibility criteria through November 1, 2019.

Review methods: Studies were extracted into the Systematic Review Data Repository. We categorized interventions into seven primary intervention components: motivational interviewing (MI), family focused therapy (Fam), cognitive behavioral therapy (CBT), psychoeducation, contingency management (CM), peer group therapy, and intensive case management. We conducted meta-analyses of comparative studies and evaluated the strength of evidence (SoE). The PROSPERO protocol registration number is CRD42018115388.

Results: The literature search yielded 33,272 citations, of which 118 studies were included. Motivational interviewing reduced heavy alcohol use days by 0.7 days/month, alcohol use days by 1.2 days/month, and overall substance use problems by a standardized mean difference of 0.5, compared with treatment as usual. Brief MI did not reduce cannabis use days (net mean difference of 0). Across multiple intensive interventions, Fam was most effective, reducing alcohol use days by 3.5 days/month compared with treatment as usual. No intensive interventions reduced cannabis use days. Pharmacologic treatment of opioid use disorder led to a more than 4 times greater likelihood of abstinence with extended courses (2 to 3 months) of buprenorphine compared to short courses (14 to 28 days).

Conclusions: Brief interventions: MI reduces heavy alcohol use (low SoE), alcohol use days (moderate SoE), and substance use–related problems (low SoE) but does not reduce cannabis use days (moderate SoE). Nonbrief interventions: Fam may be most effective in reducing alcohol use (low SoE). More research is needed to identify other effective intensive behavioral interventions for alcohol use disorder. Intensive interventions did not appear to decrease cannabis use (low SoE). Some interventions (CBT, CBT+MI, and CBT+MI+CM) were associated with increased cannabis use (low SoE). Both MI and CBT reduce combined alcohol and other drug use (low SoE). Combined CBT+MI reduces illicit drug use (low SoE). Subgroup analyses of interest (male vs. female, racial and ethnic minorities, socioeconomic status, and family characteristics) were sparse, precluding conclusions regarding differential effects. Pharmacological interventions: longer courses of buprenorphine (2–3 months) are more effective than shorter courses (14–28 days) to reduce opioid use and achieve abstinence (low SoE). SRs in the college settings support use of brief interventions for students with any use, heavy or problematic use. More research is needed to identify the most effective combinations of behavioral and pharmacologic treatments for opioid, alcohol, and cannabis use disorders.

Tanner-Smith, E.E., Nichols, L.M., Loan, C.M., Finch, A.J., & Moberg, D.P. (2021). Recovery high school attendance effects on student delinquency and substance use: the moderating role of social problem solving styles. *Prevention Science, 21*, 1104-1113.

Tags: #RecoveryHighSchools; #students; #SubstanceUse; #ProblemSolving

Abstract: Recovery high schools (RHSs) provide educational programming and therapeutic support services for young people in recovery from substance use disorders (SUDs). The objectives of this study were to examine whether students with SUDs who attended RHSs report less delinquency and substance use than students with SUDs who attended non-RHSs, and how students' social problem solving styles might moderate those associations. Participants were students from a longitudinal quasi-experimental study of adolescents who enrolled in high schools after receiving treatment for SUDs. The propensity-score balanced sample included 260 adolescents (143 in RHSs, 117 in non-RHSs) enrolled in schools in Minnesota, Wisconsin, or Texas (M age = 16; 83% White; 44% female). Negative binomial regression models were used to compare delinquency and substance use outcomes for RHS and non-RHS students at 6-month and 12-month follow-ups. The results indicated that students attending RHSs after discharge from SUD treatment reported less frequent delinquent behavior while intoxicated, and fewer days of substance use relative to students attending non-RHSs. Negative problem solving styles moderated the effect of RHS attendance on substance use outcomes, with RHSs providing minimal beneficial effects for those students endorsing maladaptive problem solving styles. We conclude that

RHSs offer a promising continuing care approach for adolescents in recovery from SUD problems, but may vary in their effectiveness for students with impulsive, careless, or avoidant problem solving styles.

Thrul, J., Rabinowitz, J.A., Reboussin, B.A., Maher, B.S., & Jalongo, N.S. (2021). Adolescent cannabis and tobacco use are associated with opioid use in young adulthood—12-year longitudinal study in an urban cohort, *Addiction*, 116(3), 643-650

Tags: #adolescent; #cannabis; #tobacco; #OpioidUse; #YoungAdult; #urban; #longitudinal

Abstract: Background and aims: Cannabis, tobacco and alcohol use are prevalent among youth in the United States and may be risk factors for opioid use. The current study aimed at investigating associations between developmental trajectories of cannabis, tobacco and alcohol use in adolescence and opioid use in young adulthood in an urban cohort over the span of 12 years.

Design: Cohort study of adolescents originally recruited for a randomized prevention trial with yearly assessments into young adulthood.

Setting: Nine urban elementary schools in Baltimore, MD in the United States.

Participants: Participants (n = 583, 86.8% African American, 54.7% male) were originally recruited as first grade students.

Measurements: Cannabis, tobacco and alcohol use were assessed annually from ages 14–18 years and opioid use from ages 19–26. Socio-demographics were assessed at age 6. Intervention status was also randomly assigned at age 6. Gender, race, free/reduced-priced lunch and intervention status were included as covariates in individual and sequential growth models.

Findings: There were significant positive associations between the cannabis use intercept at age 14 and the opioid use intercept at age 19 (beta = 1.43; P = 0.028), the tobacco use intercept at age 14 and the opioid use intercept at age 19 (beta = 0.82; P = 0.042). Specifically, more frequent use of cannabis or tobacco at age 14 was associated with more frequent use of opioids at age 19.

Conclusions: Cannabis and tobacco use in early adolescence may be risk factors for opioid use in young adulthood among African Americans living in urban areas.

Tucker, J.S., Davis, J.P., Seelam, R., Stein, B.D., & D'Amico, E.J. (2020). Predictors of opioid misuse during emerging adulthood: An examination of adolescent individual, family and peer factors. *Drug and Alcohol Dependence*, 214. DOI: 10.1016/j.drugalcdep.2020.108188.

Tags: #EmergingAdulthood; #OpioidMisuse; #peer; #predictors

Abstract: Introduction: Opioid misuse has reached epidemic proportions among emerging adults in the U.S. To inform prevention efforts, this study examined adolescent factors related to alcohol and marijuana (AM) use that are associated with a higher or lower risk for opioid misuse during emerging adulthood.

Methods: We used 11 waves of survey data from a diverse California cohort (N = 6,509). Predictor variables from waves 1-7 (ages 11-17) included individual (resistance self-efficacy, positive expectancies) family (older sibling and important adult use), and peer (perceived norms, time spent with peers who use, peer approval) factors. Opioid misuse at wave 8 (mean age = 18.3) and wave 11 (mean age = 21.6) included heroin and nonmedical prescription drug use.

Results: Initial latent growth models (LGMs) indicated that nearly all intercepts and slopes for individual, family, and peer AM factors predicted opioid misuse at waves 8 and 11. These associations were reduced to non-significance after adjusting for prior other substance use with the exception of three intercepts: positive expectancies, peer approval, and older sibling use predicted a higher probability of opioid misuse at wave 8.

Conclusions: Stronger AM positive expectancies, perceived peer approval of AM use, and older sibling AM use during adolescence are associated with a higher likelihood of opioid misuse during the transition to emerging adulthood. However, most adolescent factors were no longer associated with subsequent opioid misuse after adjusting for history of other substance use, highlighting the importance of considering the larger context of substance use in studies of opioid misuse among young people.

Van Winkle, P.J., Ghobadi, A., Chen, Q., Menchine, M., & Sharp, A.L. (2020). Opioid prescribing patterns in emergency departments and future opioid use in adolescent patients. *American Journal of Emergency Medicine, 38*(11)

Tags: #adolescent; #opioid; #PrescribingPatterns; #EmergencyDepartment

Abstract: Objective: Evidence suggests that exposure to opioids in adolescence increases risk of future opioid use. We evaluate if exposure to high versus low intensity opioid prescribers in the Emergency Department (ED) influences the risk of future opioid use in adolescents.

Methods: Retrospective study of opioid-naïve patients 10 to 17 years seen in one of 14 EDs between January 2013 and December 2014. We categorized ED providers into quartiles according to the proportion of encounters resulting in opioid prescriptions. Primary outcome was use of opioids in the subsequent 12 months. Analysis adjusted for patient characteristics and compared future use of opioids for patients seen by the lowest versus the highest prescribing quartiles.

Results: We included 9,688 patient encounters evaluated by the lowest opioid prescribing physician quartile versus 9,467 in the highest. The highest quartile gave opioid prescriptions to 14.9% of their patients compared to 2.8% for the lowest quartile. No association with future opioid use was found for patients evaluated by low versus high prescriber quartiles (OR 0.99, 95% CI 0.90-1.08). Patients with increasing age (OR 2.15, 95% CI 1.92-2.42) and white versus Hispanic ethnicity (OR 1.55, 95% CI 1.33-1.80) were associated with recurrent opioid use.

Conclusion: We found no association between high intensity opioid prescribers and recurrent 12 month use of opioids in opioid-naïve adolescents seen in the ED. This likely reflects various factors that put adolescents at risk for recurrent opioid use and may indicate the importance of the second prescription from primary care after initial exposure to opioids.

Volkow, N.D., Han, B., Einstein, E.B., & Compton, W.M. (2021). Prevalence of substance use disorders by time since first substance use among young people in the US. *JAMA Pediatrics*, 175(6), 640-643.

Tags: #youth; #SUD; #initiation; #PrescriptionMisuse

Abstract: Earlier age at drug initiation has been shown to be associated with faster transition to substance use disorder (SUD).¹ However, prevalence of specific SUDs as a function of time since first substance use among young people has not, to our knowledge, been investigated. We examined the prevalence of specific SUDs since first drug use (including tobacco, alcohol, cannabis, cocaine, methamphetamine, and heroin) or prescription misuse (including opioids, stimulants, and tranquilizers) in adolescents aged 12 to 17 years and young adults aged 18 to 25 years.

Vosburg, S.K., Eaton, T.A., Sokolowska, M., Osgood, E.D., Ashworth, J.B., Trudeau, J.J., Muffett-Lipinski, M., & Katz, N.P. (2016). Prescription opioid abuse, prescription opioid addiction, and heroin abuse among adolescents in a recovery high school: a pilot study. *Journal of Child & Adolescent Substance Abuse*, 26(2)

Tags: #PrescriptionOpioid; #opioid; #heroin; #adolescents; #RecoveryHighSchool

Abstract: The progression from prescription opioid (RXO) abuse to RXO addiction is not well understood in adolescents, nor is the progression from RXO addiction to heroin abuse. The purpose of this pilot study was to characterize the development of RXO drug abuse, RXO drug addiction, and heroin abuse in a small cohort of adolescents recovering from opioid addiction at Massachusetts Recovery High Schools (RHS). A self-report questionnaire was administered to 31 adolescent, former RXO abusers across two Massachusetts RHS. RXO abuse was primarily initiated due to curiosity; RXOs were initially obtained through illicit and licit methods. Fifty-eight percent (N = 18) of the RXO abusers became addicted to RXOs. Many addicted adolescents initiated RXO abuse under the influence of marijuana, yet believed that they became addicted due to the stress from difficult life situations. A subgroup indicated they abused and became addicted to RXOs that had been obtained from legitimate prescriptions due to their pain. Sixteen percent (N = 5) of the sample abused heroin. Most heroin abusers (4/5) were addicted to RXOs prior to onset of heroin use. Heroin abusers indicated that they considered using heroin after they began tampering with RXOs. A portion of the sample felt that abuse deterrent formulations (ADFs) would have reduced their RXO use. This pilot study discovered areas where further research could be targeted, such as drug combinations, adolescent coping mechanisms, adolescent pain management, and the use of ADFs to disrupt the transition from RXO addiction to heroin use.

Vosburg, S.K., Faraone, S.V., Newcorn, J.H., Rostain, A.L., Findling, R.L., Butler, S.F., Govoni, T.D., Green, J.L. (2020). Prescription stimulant nonmedical use among adolescents evaluated for substance use disorder treatment (CHAT™). *Journal of Attention Disorders*.

Tags: #adolescent; #prescription; #NonmedicalUse; #stimulant; #SUD

Abstract: Objective: The purpose of the present study was to characterize prescription stimulant non-medical use (NMU) in adolescents between the ages of 13 and 18 years seeking treatment for substance use disorder (SUD) with the Comprehensive Health Assessment Tool for Teens (CHAT™).

Method: Adolescents being evaluated for SUD treatment between Q1 2010 and Q3 2017 (n = 20,189) completed the CHAT™.

Results: About 4.3% of the sample (N = 867) of adolescents in SUD treatment reported past 30-day prescription stimulant NMU. Compared to those without past 30-day prescription stimulant NMU, more reported a lifetime diagnosis of learning disorder or ADHD, more took medication for emotional, behavioral, or learning disorders, received past-month inpatient treatment, or were currently not enrolled in school. Prescription stimulants were most often taken orally for NMU, however, approximately half reported using alternate routes of administration, the most prominent of which was intranasal use.

Conclusion: About 4.3% of adolescents in SUD treatment evaluation reported past 30-day prescription stimulant NMU. Greater percentages of lifetime learning disorder, medication use, past-month inpatient treatment, school unenrollment, and overall substance misuse were associated with prescription stimulant NMU, as were alternate routes of administration. These data reveal an ongoing, persistent level of past-30-day NMU of prescription stimulants among adolescents being evaluated for SUD treatment.

Walker, K.S., Bonny, A.E., McKnight, E.R. & Nahata, M.C. (2020). Impact of office-based opioid treatment on emergency visits and hospitalization in adolescents with opioid use disorder. *The Journal of Pediatrics*, 219, 236-242

Tags: #adolescents, #OpioidUseDisorder, #OBOT, #treatment, #emergency

Abstract: Objective: To determine if engagement in office-based opioid treatment decreases emergency department, urgent care visits, and hospitalizations for acute opioid-related events (OREs) among adolescents with opioid use disorder.

Study design: This retrospective cohort study identified all emergent and outpatient visits among adolescents, age 10-19 years, referred for office-based opioid treatment between January 1, 2006 and December 31, 2016. Patients were dichotomized into 2 cohorts: those who did and did not engage in office-based opioid treatment. The primary end point was the difference in the proportion of visits over the study period for acute OREs between cohorts and within the office-based opioid treatment cohort before and after referral. Secondary end points assessed change in the proportion of outpatient visits for treatment unrelated to opioid use disorder.

Results: Four hundred five emergent and outpatient visits were identified: 285 (70.4%) in the office-based opioid treatment cohort and 120 (29.6%) in the non-office-based opioid treatment cohort. After office-based opioid treatment engagement, 27.8% of visits in the office-based opioid treatment cohort were for acute OREs vs 80.8% in the non-office-based opioid treatment cohort (OR, 0.092; 95% CI, 0.052-0.160; P < .001). Outpatient visits in the office-based opioid treatment cohort were 10.9 times

that of non-office-based opioid treatment (OR, 10.9; 95% CI, 6.23-19.16; $P < .001$). Within the office-based opioid treatment cohort, emergent visits decreased from 76.1% to 27.8% (OR, 0.121; 95% CI, 0.070-0.210; $P < .001$) and the odds of outpatient services was 8.3 times more after engagement (OR, 8.27; 95% CI, 4.78-14.4, $P < .001$).

Conclusions: The absolute decrease in emergent visits for acute OREs was 53% in adolescents engaged in office-based opioid treatment, representing a relative decrease of 65.6% compared with adolescents not engaged. An analysis of visits before and after office-based opioid treatment demonstrated similar decreases, suggesting that office-based opioid treatment has a significant impact in decreasing acute OREs in the adolescent population.

Walley, A.Y., et al. (2020). Association between mortality rates and medication and residential treatment after in-patient medically managed opioid withdrawal: a cohort analysis. *Addiction*, 115(8), 1498-1508.

Tags: #mortality; #medication; #residential; #inpatient; #treatment; #opioid; #MedicallyManagedOpioidWithdrawal

Abstract: Background and aim: Medically managed opioid withdrawal (detox) can increase the risk of subsequent opioid overdose. We assessed the association between mortality following detox and receipt of medications for opioid use disorder (MOUD) and residential treatment after detox.

Design: Cohort study generated from individually linked public health data sets.

Setting: Massachusetts, USA.

Participants: A total of 30 681 opioid detox patients with 61 819 detox episodes between 2012 and 2014.

Measurements: Treatment categories included no post-detox treatment, MOUD, residential treatment or both MOUD and residential treatment identified at monthly intervals. We classified treatment exposures in two ways: (a) 'on-treatment' included any month where a treatment was received and (b) 'with-discontinuation' individuals were considered exposed through the month following treatment discontinuation. We conducted multivariable Cox proportional hazards analyses and extended Kaplan-Meier estimator cumulative incidence for all-cause and opioid-related mortality for the treatment categories as monthly time-varying exposure variables.

Findings: Twelve months after detox, 41% received MOUD for a median of 3 months, 35% received residential treatment for a median of 2 months and 13% received both for a median of 5 months. In on-treatment analyses for all-cause mortality compared with no treatment, adjusted hazard ratios (AHR) were 0.34 [95% confidence interval (CI) = 0.27-0.43] for MOUD, 0.63 (95% CI = 0.47-0.84) for residential treatment and 0.11 (95% CI = 0.03-0.43) for both. In with-discontinuation analyses for all-cause mortality, compared with no treatment, AHRs were 0.52 (95% CI = 0.42-0.63) for MOUD, 0.76 (95% CI = 0.59-0.96) for residential treatment and 0.21 (95% CI = 0.08-0.55) for both. Results were similar for opioid-related overdose mortality.

Conclusions: Among people who have undergone medically managed opioid withdrawal, receipt of medications for opioid use disorder, residential treatment or the combination of medications for opioid use disorder and residential treatment were associated with substantially reduced mortality compared with no treatment.

Weerakoon, S.M., Keeton, J.M., Vidot, D.C., Arheart, A.L., & Messiah, S.E. (2020). Relationship between risky behaviors and non-prescription opioid use among Asian American youth. *Journal of Ethnicity in Substance Abuse.*

Tags: #youth; #RiskBehavior; #NonprescriptionOpioid; #AsianAmerican

Abstract: Asian Americans (AA) are a highly understudied population and are often considered the “model minority” for health. However, there is a dearth of research on risky behaviors associated with opioid use in AA teens. Data among AA youth aged 12 to 16 was collected from the 2017 Youth Risk Behavior Surveillance System. Multivariate logistic regression models were run to determine associations between opioid use and risky behaviors, controlling for age and sex. Findings showed that opioid use is significantly associated with weapon carrying, risky sexual behavior, and body image. These conclusions inform public health practice on substance abuse treatment in AA teens.

Welsh, J.W., et al. (2021). Adaptation and Pilot Testing of the Women’s Recovery Group for Young Adults (WRG-YA). *Alcoholism Treatment Quarterly, 39(2), 225-237.*

Tags: #YoungAdult; #recovery; #SubstanceUse; #GroupTreatment; #women; #gender

Abstract: Gender-specific substance use disorder treatment has demonstrated promise in adult women, but is relatively unexplored in young adults. To address the specific needs of young adult females, the manual-based Women’s Recovery Group (WRG) was adapted for women ages 18–25. Treatment engagement and retention, group cohesiveness, satisfaction, and substance use outcomes were measured during group treatment and at 1-month follow up. This pilot supports the feasibility and initial acceptability of the adapted form of the WRG for young adults. Data from this study may inform future gender-specific treatment approaches for substance use disorders in younger populations.

Welsh, J.W., Passetti, L.L., Funk, R.R., Smith, J.E., Meyers, R.J., & Godley, M.D. (2019). Treatment retention and outcomes with the Adolescent Community Reinforcement Approach in emerging adults with opioid use. *Journal of Psychoactive Drugs, 5*

Tags: #EmergingAdults; #YoungAdults; #OpioidUseDisorder; #ACRA

Abstract: Treatment retention and engagement of emerging adults with opioid use disorders can be particularly challenging. This study compares treatment outcomes of young adults with primary opioid use (OU) to those with primary marijuana or alcohol use (MAU), who received the Adolescent Community Reinforcement Approach (A-CRA), an evidence-based therapy for the treatment of substance use. The MAU and OU groups were comprised of an outcome sample of 419 young adults

ages 18–25. Groups were compared on intake demographics, clinical characteristics, and measures of treatment retention and other associated factors, including treatment initiation and engagement. Outcome measures were administered at A-CRA intake and at 3, 6, and 12 months post-intake. Both groups were similar in treatment retention, initiation, and engagement. Both groups showed a similar decrease in alcohol ($p < .001$) and marijuana use ($p < .001$). The OU group had significantly less opioid use at 3 months ($p < .001$) and maintained this decrease, but did not improve to the level observed in the MAU group at the 12-month follow-up. The Adolescent Community Reinforcement Approach merits further study as a behavioral treatment for young adults with opioid use.

Wenzel, K., Selby, V., Wildberger, J., Lavorato, L., Thomas, J. & Fishman, M. (2021). Choice of extended release medication for OUD in young adults (buprenorphine or naltrexone): A pilot enhancement of the Youth Opioid Recovery Support (YORS) intervention. *Journal of Substance Abuse Treatment, 125*

Tags: #ExtendedRelease; #MOUD; #XRMOUD; #OpioidUseDisorder; #buprenorphine; #naltrexone; #YouthOpioidRecoverySupport

Abstract: Background: The Youth Opioid Recovery Support (YORS) intervention is a promising approach for the treatment of opioid use disorder (OUD) in young adults that seeks to improve adherence to extended-release medications for OUD (XR-MOUD) and reduce opioid relapse through assertive outreach techniques. YORS was previously tested with individuals seeking extended-release naltrexone (XR-NTX), but has not been tested on individuals pursuing extended-release buprenorphine (XR-BUP).

Methods: This pilot study tested the YORS intervention among a group choosing either XR-MOUD compared to historical treatment as usual (H-TAU) and intervention conditions from a previous study. This study also tested feasibility of a stepped care approach using a protocol for transition to standard care. Twenty-two young adults (ages 18–26) with OUD intending to pursue outpatient treatment with XR-NTX ($n = 11$) or XR-BUP ($n = 11$) were recruited from inpatient treatment and received 12–24 weeks of the YORS intervention.

Results: Participants in YORS compared to H-TAU received more outpatient doses at 12 weeks (1.91 vs. 0.40, $p < .001$) and 24 weeks (3.76 vs. 0.70, $p < .001$), had lower relapse rates at 12 weeks (36.4% vs. 75.0%; $p = .012$) and 24 weeks (52.9% vs. 95.0%; $p = .003$), and had greater cumulative relapse-free survival over 24 weeks (HR = 2.65, 95% CI: 1.17–6.02, $p < .05$). Rates of continuing MOUD in a standard care setting after the intervention ended were extremely poor. Outcomes did not differ by medication choice.

Conclusions: These results are consistent with previous findings and demonstrate feasibility and efficacy of YORS with patient choice of medication. The results highlight the need for innovative strategies to sustain positive outcomes and step-down care successfully in these vulnerable young adults.

Westbrook, S. R., Carrica, L. K., Banks, A., & Gulley, J. M. (2020). AMPed-up adolescents: The role of age in the abuse of amphetamines and its consequences on cognition and prefrontal cortex development. *Pharmacology, biochemistry, and behavior*, 198, 173016.

Tags: #amphetamine; #methamphetamine; #AdolescentBrainDevelopment

Abstract: Adolescent use of amphetamine and its closely related, methylated version methamphetamine, is alarmingly high in those who use drugs for nonmedical purposes. This raises serious concerns about the potential for this drug use to have a long-lasting, detrimental impact on the normal development of the brain and behavior that is ongoing during adolescence. In this review, we explore recent findings from both human and laboratory animal studies that investigate the consequences of amphetamine and methamphetamine exposure during this stage of life. We highlight studies that assess sex differences in adolescence, as well as those that are designed specifically to address the potential unique effects of adolescent exposure by including groups at other life stages (typically young adulthood). We consider epidemiological studies on age and sex as vulnerability factors for developing problems with the use of amphetamines, as well as human and animal laboratory studies that tap into age differences in use, its short-term effects on behavior, and the long-lasting consequences of this exposure on cognition. We also focus on studies of drug effects in the prefrontal cortex, which is known to be critically important for cognition and is among the later maturing brain regions. Finally, we discuss important issues that should be addressed in future studies so that the field can further our understanding of the mechanisms underlying adolescent use of amphetamines and its outcomes on the developing brain and behavior.

Westenberg, J.N., et al. (2021). Treatment approaches and outcome trajectories for youth with high-risk opioid use: A narrative review. *Early Intervention in Psychiatry*. Online Version of Record before inclusion in an issue.

Tags: #youth; #HighRisk; #OpioidUseTreatment; #MetaAnalysis

Abstract: Aim: First use of opioids often happens in adolescence and an increasing number of opioid overdoses are being reported among youth. The purpose of this narrative review was to present the treatment approaches for youth with high-risk opioid use, determine whether the literature supports the use of opioid agonist treatment among youth and identify evidence for better treatment outcomes in the younger population.

Methods: A search of the literature on PubMed using MeSH terms specific to youth, opioid use and treatment approaches generated 1436 references. Following a screening process, 137 papers were found to be relevant to the treatment of high-risk opioid use among youth. After full-text review, 19 eligible studies were included: four randomized controlled trials, nine observational studies and six reviews.

Results: Research for the different treatment options among youth is limited. The available evidence shows better outcomes in terms of retention in care and cost-effectiveness for opioid agonist treatment than abstinence-based comparisons. Integrating psychosocial interventions into the continuum of care for youth can be an effective way of addressing comorbid psychiatric conditions and emotional drivers of substance use, leading to improved treatment trajectories.

Conclusions: From the limited findings, there is no evidence to deny youth with high-risk opioid use the same treatment options available to adults. A combination of pharmacological and youth-specific psychosocial interventions is required to maximize retention and survival. There is an urgent need for more research to inform clinical strategies toward appropriate treatment goals for such vulnerable individuals.

Wilson, J.D., Abebe, K.Z., Kraemer, K., Liebschutz, J., Merlin, J., Miller, E., Kelley, D., & Donohue, J. (2021). Trajectories of opioid use following first opioid prescription in opioid-naive youths and young adults. *JAMA Netw Open*, 4(4), e214552.

Tags: #youth; #YoungAdult; #OpioidUse; #PrescriptionOpioids; #OpioidNaive

Abstract: Importance: Although prescription opioids are the most common way adolescents and young adults initiate opioid use, many studies examine population-level risks following the first opioid prescription. There is currently a lack of understanding regarding how patterns of opioid prescribing following the first opioid exposure may be associated with long-term risks.

Objective: To identify distinct patterns of opioid prescribing following the first prescription using group-based trajectory modeling and examine the patient-, clinician-, and prescription-level factors that may be associated with trajectory membership during the first year.

Design, Setting, and Participants: This cohort study examined Pennsylvania Medicaid enrollees' claims data from 2010 through 2016. Participants were aged 10 to 21 years at time of first opioid prescription. Data analysis was performed in March 2020.

Main Outcomes and Measures: This study used group-based trajectory modeling and defined trajectory status by opioid fill.

Results: Among the 189 477 youths who received an initial opioid prescription, 107 562 were female (56.8%), 81 915 were non-Latinx White (59.6%), and the median age was 16.9 (interquartile range [IQR], 14.6-18.8) years. During the subsequent year, 47 477 (25.1%) received at least one additional prescription. Among the models considered, the 2-group trajectory model had the best fit. Of those in the high-risk trajectory, 65.3% (n = 901) filled opioid prescriptions at month 12, in contrast to 13.1% (n = 6031) in the low-risk trajectory. Median age among the high-risk trajectory was 19.0 years (IQR, 17.1-20.0 years) compared with the low-risk trajectory (17.8 years [IQR, 15.8-19.4 years]). The high-risk trajectory received more potent prescriptions compared with the low-risk trajectory (median dosage of the index month for high-risk trajectory group: 10.0 MME/d [IQR, 5.0-21.2 MME/d] vs the low-risk trajectory group: 4.7 MME/d [IQR, 2.5-7.8 MME/d]; $P < .001$). The trajectories showed persistent differences with more youths in the high-risk trajectory going on to receive a diagnosis of opioid use disorder (30.0%; n = 412) compared with the low-risk group (10.1%; n = 4638) ($P < .001$).

Conclusions and Relevance: This study's results identified 2 trajectories associated with elevated risk for persistent opioid receipt within 12 months following first opioid prescription. The high-risk trajectory was characterized by older age at time of first prescription, and longer and more potent first

prescriptions. These findings suggest even short and low-dose opioid prescriptions can be associated with risks of persistent use for youths.

Wilson, J.D., Vo, H., Matson, P., Adger, H., Barnett, G., & Fishman, M. (2017). Trait mindfulness and progression to injection use in youth with opioid addiction. *Substance Use & Misuse, 52*(11), 1486-1493.

Tags: #youth; #opioid; #addiction; #injection; #mindfulness

Abstract: Background: Many youth initiate opioid misuse with prescription opioids and transition over time to more severe substance-using behaviors, including injection. Trait mindfulness is a potentially protective factor. Objectives: This is a cross-sectional study characterizing a sample of opioid-using youth by level of mindfulness and examines the potential effect modification of emotion regulation on the relationship between mindfulness and progression to injection opioid use. Methods: A convenience sample of 112 youth (ages 14–24) was recruited during an episode of inpatient detoxification and residential treatment for opioid use disorders. We examined emotion regulation (Difficulties in Emotion Regulation Scale), mindfulness (Child Acceptance and Mindfulness Measure), and opioid use. We completed multivariable regressions stratified by degree of emotion regulation looking at relationship of mindfulness on time to injection use from age of first prescription opioid. Results: Youth had difficulties in emotion regulation ($m = 104.2$; $SD = 2.41$) and low mindfulness ($m = 19.1$; $SD = 0.59$). While we found overall that mindfulness was associated with time to progression to injection opioid use, there was significant effect modification. Among youth with high levels of difficulty in emotion regulation, those with high mindfulness trait had quicker progressions to injection (-1.31 years; $p = .003$). In contrast, youth with normal emotion regulation and high mindfulness trait had a slower progression to injection (1.67 years; $p = .041$). Conclusion/Importance: Our study showed a majority of youth presenting with opioid use disorders have impairments in emotion regulation and deficits in trait mindfulness. The relationship between mindfulness and opioid use is impacted by emotion regulation capacity. More research is needed to understand the various facets of mindfulness and how they interact with emotion regulation in youth.

Windisch, K.A. & Kreek, M.J. (2020). Review of addiction risk potential associated with adolescent opioid use. *Pharmacology Biochemistry and Behavior, 198*.

Tags: #adolescent; #OpioidUse; #addiction; #risk; #review

Abstract: Adolescence is a critical period of development with robust behavioral, morphological, hormonal, and neurochemical changes including changes in brain regions implicated in the reinforcing effects of drugs such as opioids. Here we examine the preclinical and, where appropriate complementary clinical literature, for the behavioral and neurological changes induced by adolescent opioid exposure/use and their long-term consequences during adulthood. Adolescent opioid exposure results in a widened biphasic shift in reinforcement with increased impact of positive rewarding aspects during initial use and profound negative reinforcement during adulthood. Females may have enhanced vulnerability due to fast onset of antinociceptive tolerance and reduced severity of somatic withdrawal

symptoms during adolescence. Overall, adolescent opioid exposure, be it legally prescribed protracted intake or illicit consumption, results in significant and prolonged consequences of increased opioid reward concomitant with reduced analgesic efficacy and exacerbated somatic withdrawal severity during opioid use/exposure in adulthood. These findings are highly relevant to physicians, parents, law makers, and the general public as adolescent opioid exposure/misuse results in heightened risk for substance use disorders.

Woodcock, E.A., Lundahl, L.H., Stoltman, J.J.K., & Greenwald, M.K. (2015). Progression to regular heroin use: Examination of patterns, predictors, and consequences. *Addictive Behaviors, 45*, 287-293.

Tags: #heroin; #predictors

Abstract: Background: The present study retrospectively evaluated the chronology and predictors of substance use progression in current heroin-using individuals.

Methods: Out-of-treatment heroin users (urinalysis-verified; N = 562) were screened for laboratory-based research studies using questionnaires and urinalysis. Comprehensive substance use histories were collected. Between- and within-substance use progression was analyzed using stepwise linear regression models.

Results: The strongest predictor of onset of regular heroin use was age at initial heroin use, accounting for 71.8% of variance. The strongest between-substance predictors of regular heroin use were ages at regular alcohol and tobacco use, accounting for 8.1% of variance. Earlier onset of regular heroin use (≤ 20 years) vs. older onset (≥ 30 years) was associated with a more rapid progression from initial to regular use, longer duration of heroin use, more lifetime use-related negative consequences, and greater likelihood of injecting heroin. The majority of participants (79.7%) reported substance use progression consistent with the gateway hypothesis. Gateway-inconsistent individuals were more likely to be African American and to report younger age at initial use, longer duration of heroin use, and more frequent past-month heroin use.

Conclusions: Our findings demonstrate the predictive validity and clinical relevance of evaluating substance use chronology and the gateway hypothesis pattern of progression.

Wu, L., Zhu, H. & Swartz, M.S. (2016). Treatment utilization among persons with opioid use disorder in the United States. *Drug and Alcohol Dependence, 169*, 117-127

Tags: #OpioidUseDisorder; #treatment

Abstract: Background: The United States is experiencing an opioid overdose epidemic. Treatment use data from diverse racial/ethnic groups with opioid use disorder (OUD) are needed to inform treatment expansion efforts.

Methods: We examined demographic characteristics and behavioral health of persons aged ≥ 12 years that met criteria for past-year OUD (n = 6,125) in the 2005–2013 National Surveys on Drug Use and

Health (N = 503,101). We determined the prevalence and correlates of past-year use of alcohol/drug use treatment and opioid-specific treatment to inform efforts for improving OUD treatment.

Results: Among persons with OUD, 81.93% had prescription (Rx) OUD only, 9.75% had heroin use disorder (HUD) only, and 8.32% had Rx OUD + HUD. Persons with Rx OUD + HUD tended to be white, adults aged 18–49, males, or uninsured. The majority (80.09%) of persons with OUD had another substance use disorder (SUD), and major depressive episode (MDE) was common (28.74%). Of persons with OUD, 26.19% used any alcohol or drug use treatment, and 19.44% used opioid-specific treatment. Adolescents, the uninsured, blacks, native-Hawaiians/Pacific-Islanders/Asian-Americans, persons with Rx OUD only, and persons without MDE or SUD particularly underutilized opioid-specific treatment. Among alcohol/drug use treatment users, self-help group and outpatient rehabilitation treatment were commonly used services.

Conclusions: Most people with OUD report no use of OUD treatment. Multifaceted interventions, including efforts to access insurance coverage, are required to change attitudes and knowledge towards addiction treatment in order to develop a supportive culture and infrastructure to enable treatment-seeking. Outreach efforts could target adolescents, minority groups, and the uninsured to improve access to treatment.

Yedinak, J.L., Kinnard, E.N., Hadland, S.E., Green, T.C., Clark, M.A., & Marshall, B.D.L. (2016). Social context and perspectives of non-medical prescription opioid use among young adults in Rhode Island: A qualitative study. *The American Journal on Addictions, 25*(8), 659-665.

Tags: #YoungAdults; #NonmedicalUse; #PrescriptionOpioid; #NMPO

Abstract: Background and Objectives: This pilot study examined the context of nonmedical prescription opioid (NMPO) use and related risk behaviors among young adults in Rhode Island, a New England region with markedly high prevalence of NMPO use and overdose mortality.

Methods: We conducted semi-structured interviews (n = 13) with young adults (18–29-year-olds) who reported current or recent NMPO use. We also conducted focus groups (two groups, n = 14 total) with professional service providers recruited from service organizations. Data were audio-recorded, transcribed, and key themes were analyzed.

Results: Participants discussed high levels of access to prescription opioids for nonmedical use via prescriptions originally provided to family and friends. The contexts described by participants included social environments such as parties, in which mixing opiates with benzodiazepines, alcohol or other types of drugs, and incidents of unintentional overdose were reported. Participants attributed risk for overdose to individual-level factors (e.g.: users who “couldn’t handle it”), rather than contextual factors, and described negative reactions to being labeled as an “addict” or “addicted.” Professional service providers had first-hand experience with young adults in treatment settings, yet limited exposure to young adults who were treatment naïve.

Conclusions: Young adult NMPO users described social settings where polysubstance use and pill use were common and highlighted an aversion to being labeled as having a substance use disorder.

Scientific Significance: To reduce harms of NMPO use among young adults, interventions should address the social context in which drug use and risk behaviors occur.

Yockey, R.A., King, K.A., & Vidourek, R.A. (2020). Non-medical prescription opioid use among US youth: 2015-2018. *The American Journal of Drug and Alcohol Abuse*, 46(4), 498-505.

Tags: #OpioidUse; #youth; #prescription; #ANMOU

Abstract: Background: Non-medical opioid use (NMOU) is a national public health concern with no signs of abating. While much research has focused on opioid use among adults, significant gaps exist on NMOU among youth.

Objective: The present study sought to identify the prevalence and correlates to NMOU use among a national sample of US youth ages 12–17 years old over multiple years of data.

Methods: The National Survey on Drug Use and Health, a repeated, cross-sectional, nationally representative survey of youth and adults in the US, was analyzed. Aggregated NSDUH data (2015–2018) was used to analyze NMOU among 54,866 youth (28,032 males, 26,834 females). Weighted analyses were conducted to determine significant associations to past-year non-medical opioid use.

Results: Weighted analyses revealed that 3.36% of youth used opioids non-medically in the past year. Compared to 2015, there was a significant decrease in the odds of past-year use in 2017 and 2018. NMOU users tended to be African American, Hispanic, reported major depression in the past year, and engaged in fighting with other youth. Compared to non-users of illegal drugs, youth who used marijuana, alcohol, and cigarettes were more likely to use opioids in the past year.

Conclusion: The present study found that opioid use is declining among youth. Findings may aid harm reduction efforts, theory-based clinical interventions, and health prevention messaging on opioid use.

Yule, A.M., Lyons, R.M., & Wilens, T.E. (2018). Opioid Use Disorders in Adolescents—Updates in Assessment and Management. *Current Pediatric Reports*, 6, 99-106.

Tags: #adolescents; #OUD; #assessment; #management

Abstract: Purpose of Review: To review information specific to adolescents regarding trends in opioid use, risk factors for opioid misuse, medical co-morbidity, and treatment updates.

Recent Findings: Although opioid misuse in adolescents is uncommon, it is associated with morbidity and mortality such as hepatitis C and overdose. Adolescents commonly start with prescription opioid misuse before transitioning to heroin use. The existing literature supports the use of buprenorphine/naloxone for the treatment of adolescent opioid use disorders. Safe medication storage and disposal is important to decrease adolescent prescription opioid misuse.

Summary: Opioid misuse occurs in adolescents, and pediatric providers need to remain up to date.

Zaso, M.J., Park, A., & Antshel, K.M. (2015). Treatments for adolescents with comorbid ADHD and substance use disorder: A systematic review. *Journal of Attention Disorders*, 24(9), 1215-1226.

Tags: #adolescents; #SUD; #ADHD; #comorbid

Abstract: Objective: Comorbid ADHD and substance use disorder (SUD) presents frequently in adolescence, a developmental period that may promote the emergence of substance misuse among individuals with ADHD. Comorbid ADHD and SUD in adolescence results in significant and unique treatment challenges, necessitating examination into effective interventions.

Method: This systematic review examined existing research into the treatment of comorbid adolescent ADHD and SUD.

Results: Findings from a small number of pharmacological intervention studies suggest potential efficacy of extended-release stimulant and nonstimulant medications. Efficacy of psychotherapeutic interventions has not been systematically examined.

Conclusion: Current research on treatments for comorbid ADHD and SUD in adolescence is limited. Future placebo-controlled clinical trials using large samples are needed to examine the efficacy of psychotherapeutic interventions, the heightened risk of prescription stimulant misuse, and the long-term maintenance of treatment gains in this population. Clinical guidelines for the treatment of comorbid ADHD and SUD are discussed.

Zhang, S., Lim, Y., Boyas, J.F., & Burlaka, V. (2020). Family structure and youth illicit drug use, use disorder, and treatment services utilization. *Children and Youth Services Review*, 111.

Tags: #youth; #IllicitDrugUse; #FamilyStructure; #treatment; #utilization

Abstract: *Objectives:* The study aimed to examine family structure's relation to youth illicit drug use, use disorders, and treatment services utilization.

Methods: Using pooled data from the 2015 to 2017 National Survey on Drug Use and Health, we examined the prevalence of youth (12–17 years old) past-year and lifetime illicit drug use (N = 41,579), drug use disorders among each type of drug users (n = 149–5,445), and treatment service utilization among youth with drug use disorders (n = 1,335) across two-parent, one-parent, and no-parent families. Bivariate analyses and logistic regression models were used to compare differences across family structure.

Results: On average about 25% youth ever used illicit drugs, 20% of the past-year users had a drug use disorder, and less than 10% of the past-year users with disorders received treatment services. Family structure was associated with drug use prevalence, in particular, the use of marijuana, heroin/cocaine/methamphetamine, and hallucinogens, but was not related to the rate of drug use disorders and treatment service utilization, even after adjusting for covariates.

Conclusions: The findings suggest that family structure is associated with youth drug use initiation but not drug use disorders or treatment service utilization. Youth in single and non-parent families are especially vulnerable to drug use initiation and should be specifically targeted by prevention programs.

Zimilch, R. (2017). Why are teens not being treated for opioid use disorders: Early intervention for adolescents is the key to heading off a cascade into lifelong addiction. *Contemporary Pediatrics*, July 11

Tags: #youth; #TreatmentServices; #utilization; #FamilyStructure

Abstract: Editorial