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Abstract:

The research that was conducted aimed to elicit the influence that pop culture has on recreational drug consumption. Specifically, the usage of the drug codeine has become very popular in social media among many influencers. The research focuses on the prevalence of this drug across several media platforms, alongside the growing rate of consumption globally. Research was conducted primarily through combining various databases at various organizations and this study aims to compile the data into one coherent paper regarding codeine in pop culture. While, it cannot be solely attributed to one specific outlet or influence, this study found that alongside the growing opioid crisis, specifically with codeine, the prevalence of references to codeine and many other opioids has exponentially increased over the past three decades and could have played a large role in the desensitized viewpoint of the drug. All in all, this study shows the power that pop culture and media play in the way that certain drugs are used and can even lead to increased likelihood of recreational consumption.

Introduction:

Codeine, an opioid that has been all over the news and in much of pop culture, is a pharmaceutical drug that was originally utilized to treat mild to severe pain, as well as chronic cough. The drug, first isolated in France by Pierre Robiquet in 1832, was found in the poppy plant and associated with the medicinal relief that morphine provided. Both codeine and morphine are found in the poppy plant and have been utilized for centuries to mitigate ailments. However, in our modern society, codeine has continued to grow in popularity as a recreational drug. Codeine can be seen in lyrics of popular songs, as well as in images posted by several large influencers. Likewise, the drug has been used at a greater rate than ever before by the younger demographic of America. This study aims to answer the question, “to what extent did modern American culture influence the growing recreational use of codeine over its original medicinal value and what were the major factors that led to this rise and change in the context of the drug?” With the prevalence of codeine references in songs, as well as the popularity of these songs, this study aims to research specific trends in American pop culture that may have led to the rise in recreational codeine use. Furthermore, the goal of this study is to ultimately elicit what specific factors in American culture led to the rise in recreational codeine use and where the origins of these influences began.

While the field of codeine and opioids in general is very vast I will be tailoring my research to a more specific task. Instead of looking at all possible drug references or influences in pop culture that may play a factor in the much larger opioid crisis I will be focusing my research on a variety of media outlets such as Instagram, YouTube, Twitter, and TikTok that reference codeine. For example, I will take into account Billboard Top 100 Songs, social media

posts on Instagram and Twitter, and music videos as my main source of information regarding the prevalence of codeine as it stands today. This will allow the study to remain focused on codeine specifically and will set boundaries that eliminate the potential influence of other drugs or references on the data collected.

Methodology:

For this dissertation, I will be conducting primarily qualitative research with a slight focus on quantitative research. The reason for choosing qualitative research as my main form of methodology is due to the fact that I will primarily be analyzing song lyrics, music videos, and images. From here I will take these pieces of information and analyze general trends between codeine consumption and codeine pop culture prevalence that can be found and will ultimately lead to a decisive conclusion relating to codeine. More specifically in regards to qualitative research I will be conducting grounded theory research. In other words I will be analyzing a large variety of media sources and pulling them together to create a cohesive theory. The quantitative research that I will be conducting will occur when comparing general trends and statistics of codeine use over large periods of time. For example, this research style will be very beneficial when comparing codeine use among varying demographic groups in differing decades, as well as comparing the varying amounts of recreational use across American youth over a several year timeline. Furthermore, since this data is primarily numerical, the data will be compiled into charts or graphs to analyze general trends. This will be the easiest and most coherent way to consolidate this information.

The majority of my research will be conducted through the use of databases. Specifically the main databases that I have begun using are JSTOR and Academic Search Complete. These two databases provide a very vast array of information regarding several aspects of codeine, including the chemical breakdown of codeine in the body, to demographic statistical analysis, to a lyric compilation of every song that includes codeine. Similarly, I will also be doing some personal research on my end that will include analyzing the Billboard Top 100 Charts and looking for specific references in songs that have been very recently released, as well as looking at the music videos of these songs to find if the prevalence of codeine is as prominent as it is in the lyrics, if not more. Overall, the majority of my work will be conducted through the use of secondary sources, as well as including any personal findings that I may come across in music videos, lyrics, or images of pop culture influencers.

Throughout the duration of this research I will set aside two days a week minimum to continue searching for secondary sources that provide deeper insight into the codeine crisis in America. The data that will be collected will be compiled into a folder titled “Honors Thesis” in my Google Drive and filtered into different sections based off of what the article addresses. This methodology will allow me to streamline the organization of my honors thesis into a coherent well written paper.

As for the writing style of this study I will begin by describing briefly what exactly codeine is and what its origins are. This will allow for the reader to have a basic understanding of the drug prior to the analysis of the drug's effects on the body and how it is currently being used in our modern society. From here I plan on describing the chemical processes that occur in the body and how the drug works on a physiological level. This section will focus on how the drug works and why these side effects are so desirable among individuals that abuse the substance.

Following this section, I plan on diving into a chronological analysis of the drug from the first time it was isolated all the way up to the 21st century. Along the way I will discuss and cite specific factors that played a role in the development of the recreational use of codeine.

Expected Results and Significance:

The results of this thesis have both a personal relevance to me, as well as a greater significance for the state of our country as a whole. As someone who grew up with chronic asthma and a very persistent cough, codeine was readily prescribed to me as a way to help mitigate my very irritating problem. Thus, this research is under a very familiar umbrella for me since I was prescribed this drug specifically for a medicinal remedy and not for any form of recreational use, such as how it is capable of being abused currently. On a much broader scale this research aims to display the heavy influence that American pop culture plays on the American population, more specifically with codeine use among varying demographics. From simply mentioning the drug in a song to actively consuming it in a music video, this study will display that even the smallest references of recreational codeine use can play a large role in the influence of our society.

While this research isn't a groundbreaking notion, it can illustrate the role in which pop culture can influence all aspects of our lives. This research has the potential to show that even beyond codeine use, other factors of our lives are heavily influenced and determined by the mainstream media culture. From what we wear to how we act, all of these can be manipulated by large social media influencers.

Codeine's Origins

To look at the greater impact that codeine is having on our world today we must look at the origins of the drug, as well as how the drug functions on a chemical level within the body. To begin, opium has been a popular plant throughout the recent history of the world due to its pain relieving properties. From China to England and anywhere in between the use of Opium grew in popularity during the 18th and 19th centuries. This high demand for the plant led to the creation of several institutions devoting large amounts of funding to understand the drug on a chemical level. The first breakthrough that propelled the development of codeine occurred in 1804 when a German pharmacist discovered how to isolate morphine from opium (Narconon, 2023).

Morphine is the active ingredient in opium that interrupts central nervous system signaling pathways and acts on opioid receptors on the body. This property of morphine is what gives it the euphoric effect and reduces pain within the body (Health Direct, 2023). From here Pierre Robiquet, in 1832, was able to produce codeine from this isolated morphine compound. This discovery paved the way in which codeine was developed and used. Robiquet's discovery of codeine found it to be less addictive and crippling for patients in cases of severe pain. From this, however, stemmed the cycle of codeine's abuse that would occur over the next two centuries (Narconon, 2023).

This evidence provided above establishes the initial discoveries and developments of codeine that have ultimately contributed to the mainstream recreational use present in our modern society. However, before jumping into the full history of the opioid, one must understand the chemical properties that it possesses and how these characteristics of the drug are absorbed within the human body. Codeine, as an opioid, directly interacts with the blood-brain barrier. The

blood-brain barrier is a filtering mechanism in the brain that is operated by selective capillaries that only allow certain ions and chemicals to pass through. This aspect of the human body is what protects the brain and central nervous system from potent chemicals or harmful properties that are in the blood (Oldendorf et al., 1972). However, codeine and morphine, because of their opioid nature, are able to successfully pass this barrier and become absorbed by the brain. An experiment was conducted in 1972 by the American Association for the Advancement of Science that looked at the potency and absorption rates of codeine compared to morphine and heroin. This experiment was led by W.H. Oldendorf with the goal of seeing the difference that these varying drugs had on the brain in rats. The study injected these rats through an IV with either codeine, morphine, or heroin and looked at the percentage of the drug that remained in the blood plasma, as well as the amount that was absorbed across the blood-brain barrier. Likewise, this study focused on the amount of time that the given drug remained present in the brain before being completely absorbed. It was found that 30 seconds after the injection over 90% of codeine and morphine had left the blood plasma (see Figure 1, Oldendorf et al., 1972) and had traveled across the blood-brain barrier and been absorbed throughout the central nervous system (Oldendorf et al., 1972). Likewise, it was found that the percentage of brain uptake for codeine was roughly 25% higher than that of morphine (see Figure 2, Oldendorf et al., 1972). While codeine did not reach the levels of absorption that heroin did, it still possessed values high enough to raise concern. The physical properties of codeine and heroin that led to these larger values of uptake can be attributed to their greater lipid solubility that allows for better absorption in the brain (Oldendorf et al., 1972). It is also to be noted that codeine reaches its maximum concentration within one to four minutes of absorption and the total percentage of codeine present in the brain exceeds morphine by a factor of ten. This suggests that codeine is a very

potent drug that rapidly becomes absorbed into the brain after consumption and will remain in high quantities for extended periods of time. While codeine is not on the level of heroin in terms of absorption and concentration, it does significantly outnumber the presence of morphine. This evidence displays the potency and effectiveness that codeine presents and thus shows how there is potential for it to become abused recreationally.

After the basic understanding and development of codeine had been discovered, it began being used to treat several illnesses. From pain to diabetes and coughs, the drug was applied to a wide variety of ailments to find its best use. This led to the discovery that codeine contains a property that inhibits the region of the brain associated with generating the impulse to cough and would successfully reduce coughing incidents within patients. Likewise, codeine was also found to drastically reduce symptoms of diarrhea and stomach pain. These findings and the association of codeine being a safe opioid led to its prescription in the early 20th century. However, concerns quickly arose regarding the ease of consumption and its initial popularity due to its effectiveness. These concerns were first addressed by the Canadian Public Health Journal in 1935 in which they stated that they feared codeine might be a habit forming and addictive drug (Canadian Public Health Journal, 1936). They acknowledge that the League of Nations had yet to put any restrictions on the drug and that the United States of America was the first country to put small regulations on the consumption of the drug (Canadian Public Health Journal, 1936). These notions set forth nearly a century ago display the first concerns that this opioid may cause problems due to the popularity amongst the people that utilize it. Likewise, this article displays that the drug had begun to be used more than initially intended, and while not exclusively recreational, showed signs that it could be problematic further down the line. Throughout the majority of the 20th century these notions were largely ignored and codeine was continually

prescribed by doctors worldwide and in several places like the United States, Australia, India, and the United Kingdom could be bought over the counter without proper documentation (McKenzie, 2020). These concerns initially addressed were revisited when the popularity of codeine began to grow alongside the frequency of references made in pop culture. Codeine became a popular recreational drug amongst youth worldwide and eventually, over the last two decades, restrictions have been implemented worldwide. Many countries have increased the difficulty in obtaining the drug and classified it as a highly addictive opioid. For example, the United States of America, France, Hong Kong, India, and several other countries have made codeine illegal without a prescription (McKenzie, 2020). These steps being taken show the increase in popularity that the drug has amassed.

Codeine's Current Trends in Music

Lean, the popular recreational drug involving a codeine mixture of sprite, codeine and Jolly Ranchers, gets its name from the position that people often stand in after consuming the opioid. Due to Lean's potent nature, the drug often makes people sluggish and alters their ability to balance. Thus, people that consume this drug can often be seen slouched or swaying back and forth in a sense of euphoria. Specifically, the mass popularity of Lean consumption truly began in Houston, Texas during the 1990's (McKirnan et al, 2013). This spike in popularity can be attributed to rap artist and producer DJ Screw who created a genre of rap music inspired by the intoxication of codeine and promethazine. This new category of rap was called "chopped and screwed" and highlighted the euphoric feeling associated with the consumption of codeine (McKirnan et al, 2013). While the notion of consuming codeine for the "high" associated with it

isn't new by any means, the rise in popularity truly exploded following this new style of rap that pushed opioid consumption to the forefront. Since the heightened popularity created in Houston during the 1990's, codeine has continued to climb the Billboard charts in terms of frequency. Over the past two decades the reference to opioids and other substances has exponentially increased (Peteet et al, 2021). Particularly, in the genres of rap and hip-hop music. These genres are often associated with younger generations of people, typically ranging from 16 years old to 25 years old. These years of a young adult's life are very moldable and can be easily influenced by the world around them. In other words, the trends of the modern media and agenda pushed by big influencers can have significant impacts on the lifestyle choices made by young adults. One of the biggest outlets for influence arises in the form of music. The world of music is prevalent in the daily lives of millions of people and oftentimes the style of music one listens to can be rather reflective on the choices they make from a day to day basis. One study conducted by researchers at the University of Cincinnati and Loma Linda University looked at trends in Billboard's top 25 rap songs from the years 2007 and 2017 (Peteet et al, 2021). This study focused on identifying the frequency of references to an opioid, such as codeine, or any other substance that could be abused in song lyrics and compared the data between the two years. Peteet found that among the top 25 rap songs of 2007 there were only 5 explicit references to drugs, with a majority of these references being vague in nature (See Figure 3, Peteet et al, 2021). In other words, the references to the drugs being used were broad with terms like "pillz" or "x." While these terms do refer to substance abuse, they are very indirect about which specific drug is being cited and would be harder for a general listener to identify which euphoric drug is being referenced in the song. On the other hand, Peteet assessed the top 25 rap songs of 2017 and found that the references to drugs had increased by 1,780% from 5 in 2007 to 94 in 2017. Among the 94 references to drugs,

85% were direct references to specific opioids (See Figure 3, Peteet et al, 2021). This is a massive shift in just a decade and directly shows the frequency in which the general audience is being exposed to high profile drugs. Likewise, the nature in which these drugs are being referenced is much more forward. For example, in the song “Black Beatles” by Rae Sremmurd featuring Gucci Mane, which was ranked the 6th best rap song of 2017, the song's lyrics explicitly state “pint of lean, pound of weed, and a kilo...” (Peteet et al, 2021). This level of forwardness with reference to illegal substances wasn’t only present in this song, but many others like it in 2017. In French Montana’s “Unforgettable” featuring Swae Lee, the song makes a round-a-bout reference to codeine saying “I got a little drink, but it’s not Bacardi” (Peteet et al, 2021). These two examples are only a few of the many references that were made to drugs and particularly codeine throughout rap in 2017 (See Figure 4, Peteet et al, 2021). Similarly, the International Study of Psychological Studies conducted research during the year of 2020 that looked at the top 40 charting songs of all time that made some form of reference to codeine and the associations that were expressed in the lyrics. The International Study of Psychological Studies identified the variety of names used to reference codeine and documented their frequency. These names include: lean, purple drank, sizzurp, dirty sprite, purple tonic, purp, and many others like it (Tetty et al, 2020). Their research found that lyrics that included a codeine reference were often paired with another activity typically associated with feeling good or having a sense of euphoria (Tetty et al, 2020). For example, codeine was referenced being taken alongside another drug in 37.5% of the 40 songs (See Figure 5, Tetty et al, 2020). Likewise, codeine was cited in 15% of songs where sexual activities were also being mentioned (See Figure 5, Tetty et al, 2020). Several other examples occur where codeine is sung alongside drinking, partying, and many other forms of activities typically associated with fun or enjoying

oneself (Tetty et al, 2020). This research points to the notion that codeine is becoming increasingly desensitized to the general public and is often associated with actions that have connections to a euphoric state of mind. Not only are these songs explicitly referencing an opioid in a positive manner, but these lyrics are reaching a large audience due to the fact that they are reaching the top charts of Billboard Music. Thus, these lyrics are highly visible to many young adults because of the frequency at which these songs are being played on social media.

Codeine in Pop Culture

The growing use of codeine seems to be connected with the prevalence and frequency of its use being displayed across social media. As previously discussed, codeine is very frequently cited in the lyrics of many popular songs throughout modern pop culture. The popularity of codeine in music must also be studied alongside the celebrities that endorse and promote the drug. For many young adults, celebrities are frequently worshiped as icons or role models and oftentimes these influencers create trends that the youth of America typically follow. With that being said, as more celebrities are being seen in association with the drug, the fear of its harmful effects are quickly overlooked because of the status that the opioid has been given. Several examples of celebrities and their association with the drug have been witnessed over the last decade. One notable case that occurred was the arrest of former Oakland Raiders quarterback JaMarcus Russell for the possession of large quantities of codeine (McKirnan et al, 2013). JaMarcus Russell was a well known NFL player and was a role model for many kids aspiring to play professional football. This incident ultimately displayed a high profile athlete and his association with codeine. Likewise, in pop culture there have been several music artists who

have based their name or personality off of their enjoyment for codeine. Rappers such as Yung Lean and Joey Purp have explicitly developed stage names in reference to the substance (Tettey et al, 2020). Other rappers such as Lil Peep and Mac Miller have also made codeine a central aspect of their personality (Tettey et al, 2020). Additionally, these rappers have also bolstered the notion of codeine as a gang drug. In other words, they have glorified the use of codeine in gang related activities with groups such as the Bloods and Crips by making it appear cool and trendy. From high profile athletes to rappers and producers the subject of codeine has become very desensitized. With the repeated references to the substance in pop culture, the fear of codeine's side effects such as liver failure, depression, and seizures are quickly overlooked because of the drug's association with being cool in today's culture. As mentioned above, the youth of America typically value celebrities very highly and often attempt to mimic their behavior. This notion can be seen with a large majority of codeine users coming from the age bracket of 17 years old to 25 years old (See Figure 6, McKirnan et al, 2013). Even beyond the boundaries of the United States of America there are significant levels of consumption amongst this age group. Many countries in Europe have also witnessed an increase in non-medical uses of codeine (See Figure 7, Hockenhull et al, 2022). Additionally, there appears to be little correlation among varying races with codeine consumption. However, codeine consumption is significantly higher in urban areas (McKirnan et al, 2013). This significant difference in consumption across varying home locations can be attributed to the lifestyle in which codeine is frequently mentioned and seen. In many rap lyrics, artists frequently reference growing up in the poorer areas of the city (See Figure 8, Tettey et al, 2020). Similarly, the music videos for many rap songs are often filmed in urban areas with activities of partying and consuming drugs displayed in the background (See

Figure 8, Tettey et al, 2020). Thus, these factors could potentially play a role in influencing the varying levels of consumption across different types of housing locations.

These rather recent trends in codeine consumption are continuing to grow at an alarming rate in the United States of America, as well as the rest of the globe. With the frequency of codeine in pop culture growing, the notion of the drug as a social symbol will also continue to grow. The drug as a whole will continue to become desensitized in our modern culture and will continue to be consumed at rates higher than ever before. This issue needs to be addressed before the lives of many people are radically altered.

Suggested Course of Action

To improve the situation at hand regarding codeine consumption requires a methodical approach in limiting its prevalence in our modern culture by increasing collaboration between drug manufacturers, policy makers, and social media outlets.

Over the past decade, several countries across the world have made strides in limiting the accessibility of codeine due to the rising opioid crisis. Countries such as France, Austria, Germany, and the United States of America have limited the frequency in which codeine can be prescribed and in general the process of obtaining this substance has been made very difficult (McKenzie, 2020). Likewise, several alternative, less potent, medications in these countries are being pushed as substitutes for codeine. These initial steps will begin to help limit the growing codeine consumption problem that has developed. However, these attempts must be paired with assistance from policy makers in limiting the prevalence of the drug on social media. Whether limiting the ability to reference the drug or simply ban the inclusion of the substance in songs

and media there must be some cooperative measures taken. Utilizing these organizations and groups to mitigate an ongoing problem can create significant change that can save the lives of many people.

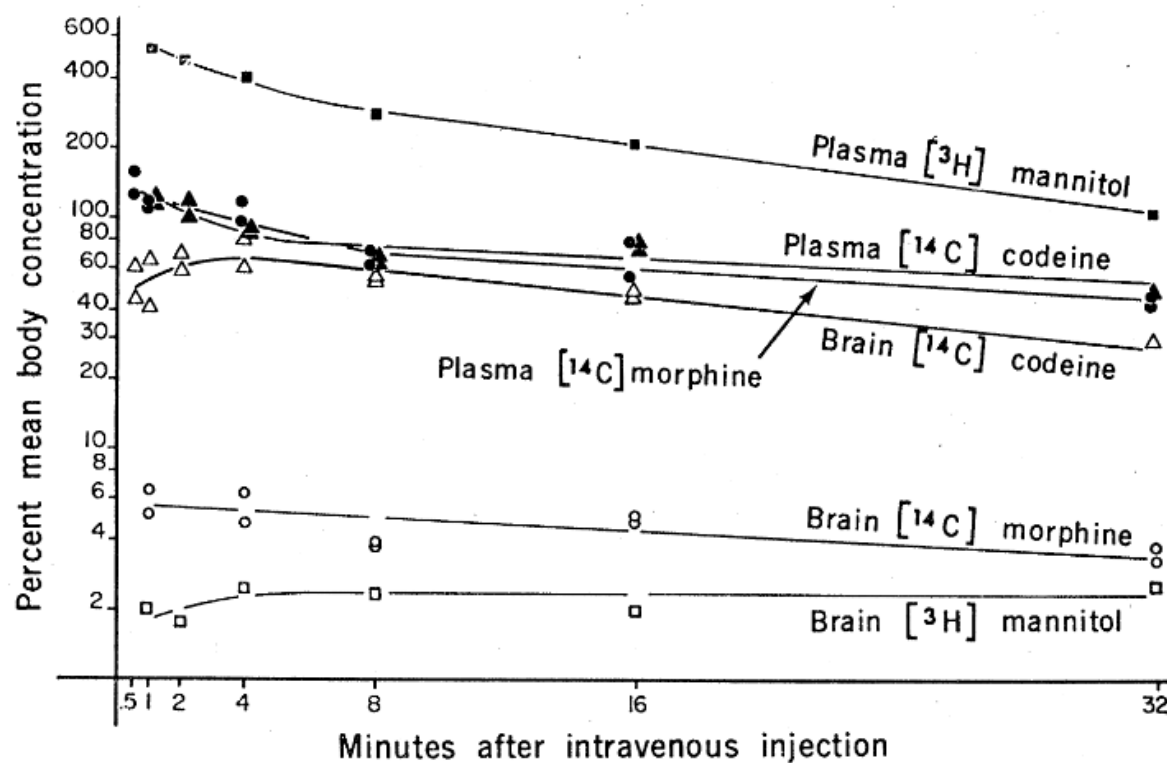
Conclusion

Over the past century the recreational consumption of codeine has exponentially grown to levels that have never been seen before. Alongside this rapid growth in the abuse of codeine, the frequency in which the drug has been referenced across social media has also grown. From popular song lyrics, to music videos, to celebrity endorsement, and even high profile athletes the prevalence of codeine in our modern culture is high. The subject of codeine has become increasingly desensitized in our modern society. When analyzing the way in which codeine is being referenced it is no surprise that the youth of America have begun experimenting with this euphoric drug. From displaying scenes at a party in music videos to describing the amazing feeling that the drug produces the substance is being broadcasted in a positive manner. These factors and statistics have elicited concern from several countries and international agencies. These concerns have led to increasing the regulations put on the drug and making the substance more difficult to obtain. These initial steps will continue to help limit the accessibility of codeine. However, this is also an ethical issue. Many innocent young adults are experiencing adverse health effects because of the drug (Narconon, 2023). From seizures to death, the potency of codeine must be contained in order to protect the future of not only the United States of America, but the globe. The codeine consumption problem also elicits the notion that pop culture

plays a large role in shaping the youth of the world and must be monitored closely as it can possess harmful side effects onto the moldable future of the world.

Appendix

Figure 1



985

Figure 1. Percent Mean Body Concentration of Morphine and Codeine after Intravenous Injection. After codeine and morphine were injected in lab rats the percent uptake and concentration in the body were documented. Codeine was more potent in percent absorbed across the blood brain barrier when compared to morphine across the entire duration that was studied. Taken from Oldendorf et al., 1972.

Figure 2

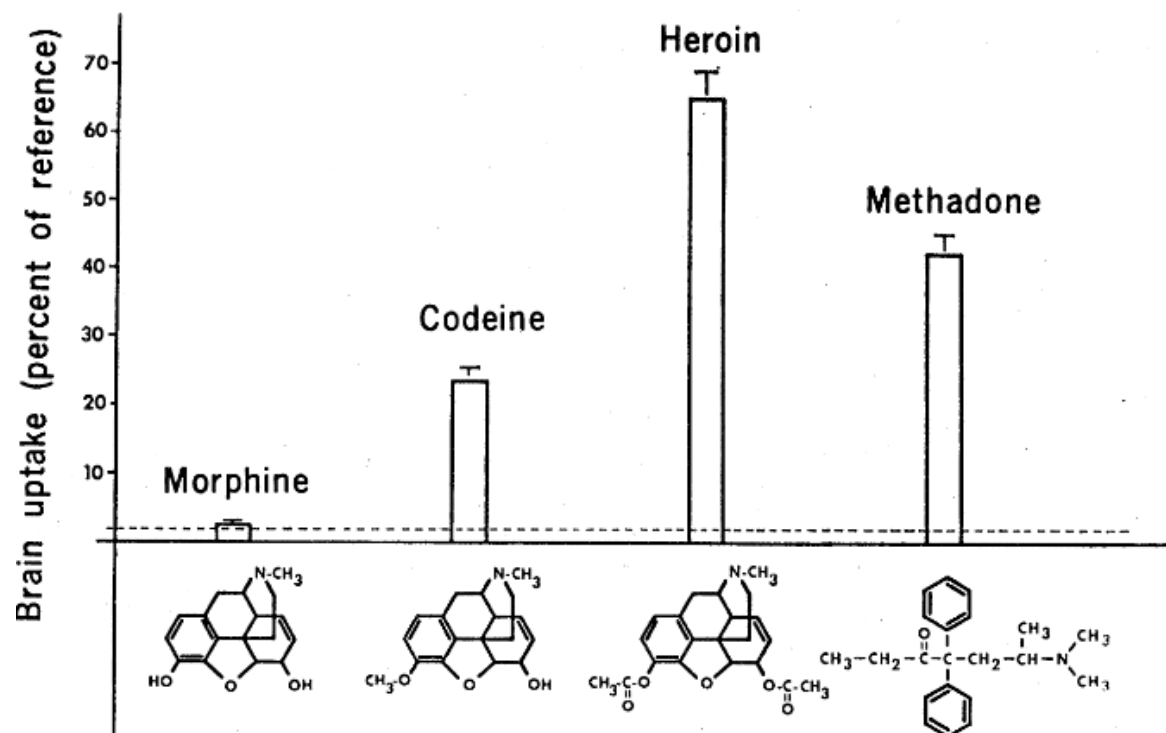


Figure 2. Brain Uptake Comparing Heroi, Codeine, Methadone, and Morphine. Chart showing the chemical structure of the four drugs that were studied and the percentage of the drug that was taken up by the brain. Heroin was found to be the most significant drug that passed the blood brain barrier, followed by methadone and codeine. Morphine was significantly lower than codeine and heroin. For a relatively common drug codeine had a ~20% brain uptake. Taken from Oldendorf et al., 1972.

Figure 3

Drug class	2007	2017
Analgesics and opioids	0	80
CNS depressants	1	2
Stimulants	1	0
General (e.g. <i>pillz</i>)	2	4
Other drug class	1	1
New terms	0	7
Total	5	94

Figure 3. Chart Showing the Different Drugs that were Referenced in Songs in the years 2007 and 2017.

Diagram showing the difference in drug related lyrics in a decade. The number increased from 5 mentions in the top charts of rap songs of 2007 to 94 references in 2017. Taken from Peteet et al, 2021.

Figure 4

Ranking by year	Writer(s)/Artist	Track no.	Song title	Lyric excerpt
2007				
#8	Bridges et al. (2006)/Ludacris (Feat. Mary J. Blige)	13	'Runaway love'	'So she pops X to get rid of all the pain'
#11	Carter, Cartagena, and Storch (2006)/Fat Joe (Feat. Lil' Wayne)	7	'Make it rain'	'My dirty bro sippin' that promethazine'
#14	Williams et al. (2006)/Rich Boy (Feat. Polow da Don)	4	'Throw some D's'	'...lean in my cup purp in my blunt'
2017				
#1	Duckworth, Hogan, and Williams (2016)/Kendrick Lamar	8	'Humble'	'Watch my soul speak, you let the meds talk, ayy'
#3	Woods et al. (2016)/Migos (Feat. Lil Uzi Vert)	4	'Bad and boujee'	'Pour a four, I'm droppin' muddy,...- Kid Cudi (drank)'
#4	Kharbouch et al. (2016)/French Montana (Feat Swae Lee)	2	'Unforgettable'	'I got a little drink but it's not Bacardi'
#5	Wilburn et al. (2017)/Future	7	'Mask off'	'Percocets (ya), molly, Percocets (Percocets),.....'
#6	Brown et al. (2016)/Rae Sremmurd (Feat. Gucci Mane)	5	'Black beatles'	'Pint of lean, pound of weed, and a kilo'

Figure 4. Chart Depicting the Top Charting Songs of 2007 and 2017 with their Associated Explicit Drug-Related Lyrics. The figure above shows the top charting rap songs of the given years, where they peaked at, as well as the explicit drug reference they use. 2007 had three songs spread throughout the top 20 referencing drugs, whereas 2017 had the top 5 songs all explicitly reference drug usage. Taken from Peteet et al, 2021.

Figure 5

	<i>Song Theme</i>	<i>Frequency</i>
1.	Use of lean with another drug	37.5%
2.	General Use or Mention of the Term Lean (not connected with any other behavior, substance, or emotional state.	27.5%
3.	Use of lean during sexual activity	15%
4.	Use of lean with soda	12.5%
5.	Use of lean to help with sleep	5%
6.	Use of lean as an alternative to alcohol	5%
7.	Use of lean while driving	5%
8.	Use of lean for mental distress	5%

Figure 5. Chart Displaying the Associated Behaviors Mentioned Alongside Codeine in Lyrics. The chart above breaks down the behaviors and activities that were associated with the consumption of codeine in rap lyrics over the past decade (2007 to 2017.) The chart shows that oftentimes the drug is mentioned alongside the use of other illicit drugs or activities associated with partying. Taken from Tetley et al, 2020.

Figure 6

Purple drank use by demographics and drug use.

Characteristics	N (%)	Users % (N)	Non-users % (N)	p-value
Gender				
Male	1136 (48.4%)	9.3% (105)	90.7% (1028)	p < .001
Female	1210 (51.6%)	3.9% (47)	96.1% (1162)	
Race				
White	1574 (68.9%)	6.1% (96)	93.9% (1478)	p = .001
African-American	557 (24.4%)	5.4% (30)	94.6% (526)	
Hispanic	64 (2.8%)	15.6% (10)	84.4% (54)	
Asian	20 (0.9%)	5.1% (1)	94.7% (18)	
Native American	70 (3.1%)	14.7% (10)	85.3% (58)	
Age				
17–19	1214 (51.9%)	6.2% (75)	93.8% (1138)	p = .913
20–22	951 (40.7%)	7.0% (66)	93.0% (883)	
23–25	95 (4.1%)	6.3% (6)	93.7% (89)	
26 or older	77 (3.3%)	6.6% (5)	93.4% (71)	
Class year				
Freshman/sophomore	1619 (70.0%)	6.5% (105)	93.5% (1511)	p = .907
Junior/senior	695 (30.0%)	6.6% (46)	93.4% (648)	
GPA				
3.01–4.0	1025 (43.6%)	5.1% (52)	94.9% (972)	p < .001
2.01–3.0	828 (35.2%)	8.4% (69)	91.6% (757)	
1.01–2.0	143 (6.1%)	9.9% (14)	90.1% (128)	
0.0–1.0	14 (0.6%)	28.6% (4)	71.4% (10)	
No GPA	339 (14.4%)	3.8% (13)	96.2% (326)	
Student athlete				
No	2222 (94.6%)	6.5% (145)	93.5% (2073)	p = .679
Yes	125 (5.3%)	5.6% (7)	94.4% (118)	
Fraternity/sorority				
No	1978 (84.3%)	6.4% (127)	93.6% (1847)	p = .807
Yes	369 (15.7%)	6.8% (25)	93.2% (344)	
Employed				
No	1646 (70.1%)	6.6% (109)	93.4% (1535)	p = .909
Part-time	622 (26.5%)	6.1% (38)	93.9% (582)	
Full-time	79 (3.4%)	6.3% (5)	93.7% (74)	
Home location				
Rural	949 (41.2%)	4.0% (38)	96.0% (911)	p < .001
Suburban	1078 (46.7%)	7.3% (79)	92.7% (999)	
Urban	279 (12.1%)	12.2% (34)	87.8% (245)	
Family income				
Under \$24,999	200 (8.9%)	6.6% (13)	93.4% (185)	p = .408
\$25,000–\$49,999	317 (14.1%)	4.1% (13)	95.9% (304)	
\$50,000–\$74,999	442 (19.6%)	6.6% (29)	93.4% (412)	
\$75,000–\$99,999	374 (16.6%)	7.0% (26)	93.0% (347)	
Over \$100,000	921 (40.9%)	7.3% (67)	92.7% (854)	
Sexual orientation				
Heterosexual	2254 (97.2%)	6.3% (141)	93.7% (2110)	p = .012
LGBT	64 (2.8%)	14.1% (9)	85.9% (55)	
Alcohol use				
No	287 (12.2%)	0% (0)	100% (286)	p < .001
Yes	2058 (87.8%)	7.4% (152)	92.6% (1904)	
Marijuana use				
No	980 (41.9%)	0.7% (7)	99.3% (971)	p < .001
Yes	1361 (58.1%)	10.7% (145)	89.3% (1215)	

Figure 6. Chart with Demographic Data Related to Codeine Use Among Varying Social Brackets. The chart above breaks down the general population of the United States into a variety of differing classifications and shows the percentage of people that have consumed codeine recreationally, as well as other drugs to draw a correlation in recreational use. Taken from McKirnan et al, 2013.

Figure 7

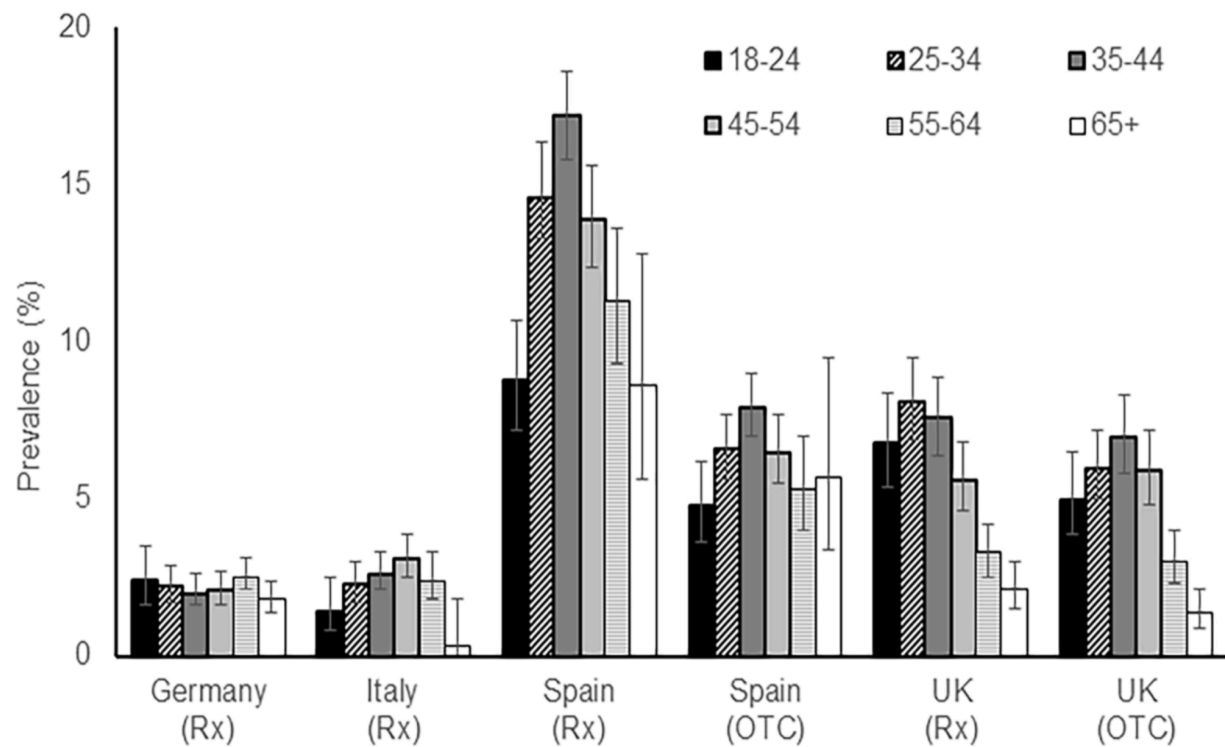


Figure 7. Percentage of People Across Europe that have tried Codeine Recreationally Across Different Age Brackets. The bar graph above shows the percentage of people across several large countries in Europe that have tried codeine recreationally. Large variations among countries and their consumption rates, yet a general trend occurs that younger demographics of people are more inclined to have tried the drug. Taken from Hockenhull et al, 2022.

Figure 8

<i>Artist</i>	<i>Song Name</i>	<i>Lyric (s)</i>	<i>Theme (s)</i>
Young Thug	Two Cups Stuffed	"L-E-A-N-I-N-G/Lean, lean, lean, lean, lean lean lean", "Uno dos cups stuffed!/Uno dos cups stuffed!/Uno dos cups stuffed!/Uno dos cups stuffed!"	General mention of lean
Migos	Hannah Montana	"Hannah Montana I'm sellin' them bricks out the Phantom/Got Hannah Montana I'm drinking the lean out the Fanta"	Lean used in combination with soda
2 Chainz	Gasolean	"Yeah, I'm on that gas/And yeah, I'm on that lean/We mix it all together and we call it gasolean"	Lean used with another drug
Ab-soul	Thorns and Horns	"gas" is another word for marijuana "I got some lean up in my Sprite/I call it the Jesus Juice/What would Jesus do? Whoo!"	Lean used in combination with soda
French Montana	Work	Baby don't pray for me, pray for the weak/I'm drinkin' lean, it help me sleep/Illuminati? I'm from the streets/Never sold my body, we takin' bodies"	Lean to help with sleep

Fat Trel	Fresh	"You can try but I really dont fight/Drinkin' lean finna catch me a flight"	General use of lean
Flatbush Zombies	Drug Parade	"Join the regime/Whole sheet of LSD for the team/Eyes low, sour dies[el]/She sippin' that Jeremy Lean"	Lean used with another drug
Fredo Santana	Like Woah	"Man I smoke a lot of O's/Sip lean and I fuck a lot of hoes/Got a big ass gun (woah)/And that bitch gonna blow like woah"	Lean use during sexual activity
Future	Shit	""My ambitions as a rider/Sippin' on lean getting higher/██████ I'm a codeine buyer/No you not a foreign whip driver"	General use of lean
Juicy J	Trippy	"Hit the weed man, tell him that I need a bag/Wake up every morning and I take a drag/Take the blunt, dip it in the lean then I laugh/In your baby mama ear and I'm gonna smash"	Lean used with another drug.

Jarren Benton	Lean	"You put the codeine in the Sprite/And then you mix it all up/Then you sip it slow/That's how them killas get fucked up/We call it Lean"	Use of lean with soda
Juicy J	Smoke	"Cali weed in a dutch/Purple lean in my cup/Smokin' while I'm drivin'/[REDACTED] we be fucked up"	Lean used with another drug. Use of lean while driving
Kevin Gates	4:30am	Gladiators on deck/Drug user, don't drink sprite/And when I do, it ain't pink sprite/A lot of lean, it's purple"	Use of lean with soda
Kid Ink	Iz U Down	"Just pour me up, higher/I'm sippin' lean like I'm on a fuckin' diet/L.A. [REDACTED] 'bout to start a fuckin' riot/Why you tryna deny it?"	General use of lean.
King Louie	My Hoes They Do Drugs	"Now I don't know about you, cuz/My hoes they drugs/Pop a bean, pourin' lean/My hoes they do drugs/Now I don't know about you, cuz/My hoes they drugs/Poppin' Molly, rolling weed up"	1. Use of lean during sex 2. Use of lean with another drug

Future	Dirty Sprite	"One, two cups keep my ice cool/Three or four zips have me leaning like a fool/Purple Sprite on top of ice/I'm rocking ice I'm dirty sprite"	Use of lean with soda
Lil Wayne	Bitches and Bottles	"Man I'm on that lean/Liquor for the bitches/Who fuckin' wit me?/All I hear is crickets"	Lean as an alternative to alcohol
Mac Miller	Loud	"Hear that Jerm beat banging with a glass of lean/When I went to every high school class would be/Tryna fuck the female faculty"	General use of lean
Souljah Boy	Zan with that Lean	"Zan with that lean/Soulja Boy be clean/True Religion jeans/Shit you never seen/Fresh up on that scene"	Use of lean with other drugs
Juicy J	Juicy J Can't	"Lean overflowing like New Orleans' broken levies/No relationship with hoes, I just want that Becky/I'm bout my money, I gets my fetti/Street [REDACTED] North Memphis, bitch I still rep it"	General use of lean

Figure 8. Top Charting Songs that Reference Codeine with their Corresponding Lyrics: This figure depicts the top charting songs in recent history that have made reference to codeine in some form. Likewise, the lyrics have been explicitly listed in which codeine was referenced with the situation in which they are described immediately to the right. Taken from Tetley et al, 2020.

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