



First-hand accounts of structural stigma toward people who use opioids on Reddit

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ABSTRACT

People who use opioids face multilevel stigma that negatively affects their health and well-being and drives opioid-related overdose. Little research has focused on lived experience of the structural levels of stigma toward opioid use. This study identified and qualitatively analyzed Reddit content about structural stigma toward opioid use. Iterative, human-in-the-loop natural language processing methods were used to identify relevant posts and comments from an opioid-related subforum. Ultimately, 273 posts and comments were qualitatively analyzed via directed content analysis guided by a prominent conceptualization of stigma. Redditors described how structures—including governmental programs and policies, the pharmaceutical industry, and healthcare systems—stigmatize people who use opioids. Structures were reported to stigmatize through labeling (i.e., particularly in medical settings), perpetuating negative stereotypes, separating people who use opioids into those who use opioids “legitimately” versus “illegitimately,” and engendering status loss and discrimination (e.g., denial of healthcare, loss of employment). Redditors also posted robust formulations of structural stigma, mostly describing how it manifests in the criminalization of substance use, is often driven by profit motive, and leads to the pervasiveness of fentanyl in the drug supply and the current state of the overdose crisis. Some posts and comments highlighted interpersonal and structural resources (e.g., other people who use opioids, harm reduction programs, telemedicine) leveraged to navigate structural stigma and its effects. These findings reveal key ways by which structural stigma can pervade the lives of people who use opioids and show the value of social media data for investigating complex social processes. Particularly, this study’s findings related to structural separation may help encourage efforts to promote solidarity among people who use opioids. Attending to first-hand accounts of structural stigma can help interventions aiming to reduce opioid-related stigma be more responsive to these stigmatizing structural forces and their felt effects.

Introduction

Stigma toward opioid use is a multilevel phenomenon spanning structural, interpersonal, and intrapersonal levels (e.g., punitive laws and policies; negative social attitudes and experiences of discrimination;

and internalization of negative stereotypes; respectively) (Cheetham et al., 2022; McCradden et al., 2019). This multilevel stigma toward opioid use has been associated with range of negative consequences including lower rates of treatment-seeking and worse treatment outcomes among people with opioid use disorder (OUD) (Crapanzano et al.,

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2018; Hammarlund et al., 2018) as well as lower support of public health policies related to opioid use among the general public (Kennedy-Hendricks et al., 2017; Taylor et al., 2021). Further, addressing stigma toward opioid use is especially urgent given how it hinders full implementation of a variety of effective interventions and innovations for addressing the United States (U.S.) overdose crisis (Olsen and Sharfstein, 2014; Tsai et al., 2019; Volkow, 2020). For example, medications for opioid use disorder (MOUD; i.e., methadone, buprenorphine, and extended-release naltrexone) are important tools for preventing overdose deaths, but are vastly underprescribed (Mauro et al., 2022; Xu et al., 2022), which is in no small part due to stigma (Allen et al., 2019; Madden et al., 2021; Wakeman and Rich, 2018). Research may help efforts to reduce stigma toward opioid use, yet research on the topic has focused more on how this stigma operates at the intrapersonal and interpersonal levels than at the structural level (Cheetham et al., 2022; Earnshaw, 2020; Knaak et al., 2020; McCradden et al., 2019).

Structural stigma toward opioid use—which can be conceptualized as opioid-related stigma that is perpetuated and reinforced by socio-cultural norms and policies, practices, and procedures at organizational, institutional, and governmental levels (Corrigan and Nieweglowski, 2018; Hatzenbuehler and Link, 2014)—is already plainly evident in the U.S. context across many domains. There is a generally hostile policy environment in the U.S. that permits—or perhaps even promotes—severe discrimination against people using opioids that can impact the achievement of life goals (e.g., via loss of employment, housing, child custody, and benefits; arrest and incarceration) (Lopez and Reid, 2017). Further, the criminalization of most non-prescription opioid use makes overdose prevention sites and other harm reduction programs (e.g., services that provide sterile needles for injection, supervise consumption, and distribute naloxone) illegal in most contexts (Kennedy and Kerr, 2017). In healthcare, treatment for OUD—and for other substance use disorders—has historically been separated from primary healthcare; this, along with frequently-changing federal and state guidelines and a systemic lack of training around OUD in medical education, can discourage and impede providers from treating OUD (Allen et al., 2019; Antoniou et al., 2019; Hurstak et al., 2017; Olsen and Sharfstein, 2014). In media, news media has long used not only stigmatizing terms (McGinty et al., 2019), but also framings for discussing opioid use that center on criminality (McGinty et al., 2016) and individual culpability (McGinty et al., 2019). Yet even as research increasingly documents these manifestations of structural stigma toward opioid use, first-hand accounts of these structural processes and contexts warrant greater attention.

To bring more nuanced insight into ways structural stigma toward opioid use operates, this study sought to characterize how people who use opioids talk about structural stigma toward opioid use on social media. First, iterative, human-in-the-loop natural language processing methods were used to identify online content that discusses structural stigma from the social media platform Reddit. Reddit is a highly-visited online platform where users (“Redditors”) can engage in discussions and share content anonymously using pseudonymous usernames. Reddit is a highly appropriate platform on which to seek out first-hand accounts; it is publicly accessible, yet the anonymity it provides likely enables greater discussion of stigmatized behaviors (e.g., substance use) (Archibald, 2021). Reddit posts and comments are also longer in word count and contain more potential keywords than other social media platforms (e.g., Twitter/X) (Adams et al., 2019). Second, a directed content analysis was conducted to qualitatively analyze the identified content. The directed content analysis was guided by Link and Phelan (2001)’s conceptualization of stigma, allowing for a broad consideration of structural stigma as when any macro-level entity contributes to one or more component process of stigma. These component processes are labeling (i.e., the processes by which someone is labeled or marked as having a stigmatized status), stereotyping (i.e., the coupling of negative attitudes and beliefs with a label), separation (i.e., considering the stigmatized individual or group as an out-group “other”), and status loss

and discrimination (i.e., the felt and experienced social and economic consequences) within the context of a power differential (Link and Phelan, 2001).

2. Methods

2.1. Data collection

Following data retrieval and preprocessing, an iterative process was used to determine the final analytic sample. This process included one lexical search (i.e., using keywords), three random samples of content from this lexical search, three semantic similarity searches, and several rounds of manual screening throughout. A flowchart depicting this process is provided in Supplemental Fig. 1.

2.1.1. Data retrieval and preprocessing

Reddit is organized into topic-specific subforums called “subreddits” on which Redditors post and comment. The subreddit *r/opiates* (<https://www.reddit.com/r/opiates/>) was chosen for this study from a range of relevant subreddits due to its broad coverage of content related to opioids generally, number of members (over 197,000 members as of May 2023), and length of operation (since 2009).

All posts and comments (hereafter, “records”) on *r/opiates* from March through August 2022 were retrieved from Pushshift.io, a third-party website that hosts Reddit data available for download (<https://pushshift.io/>). Records were then ingested in a popular local search engine, Apache Solr (<https://solr.apache.org/>). A time frame of the six months prior to beginning of the study was chosen to provide the most up-to-date data possible, and six months was thought to ensure enough content for analysis even if accounts of structural stigma were rare. Records were preprocessed by removing those that were cross-posted from other subreddits or reposted within the same subreddit, records that were only a shared URL (i.e., to another Reddit post or outside website), and records authored by AutoModerator (i.e., the automated subforum moderation bot). Though records could be multimedia, only text was used for this analysis. Because of the anonymity of Reddit, demographic information of the Redditors who posted these records was unknown. What is known is that the demographics of Redditors living in the U.S., as of 2019, are estimated to skew male (as opposed to female), younger (ages 18–29), higher income (more than \$50K per year), more formally educated (college graduate), and more suburban and urban in residence (as opposed to rural) (Pew Research Center, 2019). White people are slightly more represented among Redditors relative to the U.S. population (Pew Research Center, 2019).

2.1.2. Lexical search and manual screening

First, a lexical search was performed to identify all records that contained at least one keyword from a chosen set. The set of keywords relevant to structural stigma toward opioid use were sourced from past in-depth interviews and focus groups with physicians and people who have used opioids previously conducted by the first author [ELE], a review of opioid-related subreddits, quotes presented in qualitative literature on opioid use disorder, and a guided meeting with a clinical psychologist who works with people who use opioids [VWJ]. These keywords are available in Supplemental Table 1. The search was performed using Solr. A total of 40,160 records were identified in this lexical search. A random sample of 500 records was then manually screened. The first author [ELE] screened each record for relevance to the topic of structural stigma (i.e., whether the record contained any mention of a structure or a stigma-related process beyond the intrapersonal or interpersonal levels). Sixty-two of 500 records (12%) were screened as relevant.

2.1.3. Semantic similarity search and manual screening

Next, a semantic similarity search of the total dataset was conducted using the 62 records that were screened as relevant. Unlike lexical

search, semantic similarity search uses natural language processing techniques to compare the underlying meaning of records beyond the surface-level words. This allows for finding records discussing the highly similar topics but with different words (e.g., “rehab” vs “residential treatment”). In brief, a semantic similarity search converts the textual records into numeric matrices, which can then be used to assign scores to other records’ matrices denoting how similar the matrix structures are between the two records. The all-mpnet-base-v2 version of Sentence-BERT, a transformer language model specifically designed to compare short passages of text (<https://aclanthology.org/D19-1410/>, <https://huggingface.co/sentence-transformers/all-mpnet-base-v2>; Reimers and Gurevych, 2019), was used to convert the records, and then the matrices were compared with the Faiss library for cosine similarity (Johnson et al., 2021). These cosine similarity scores range from 0 to 1 (for normalized matrices), with 0 indicating no similarity in matrix structure to 1 indicating a perfect match (i.e., the same record). Qualitatively, this means a record that scores closer to 0 has very few similar relationships between words as the reference record, whereas a record that scores closer to 1 has words used together in highly similar ways to the reference record. This search identified 208 records from the total dataset with a cosine similarity score of at least a 0.75. These 208 records were then manually screened for relevance, and 91 (44%) were screened as relevant. There was notable improvement in the percentages of records deemed relevant from this search (i.e., 44% versus 12% from the manual screen following the lexical search alone).

2.1.4. Iteration and determination of the final analytic dataset

To help counter bias that could have arisen from the first random sample of 500 records and subsequent screening (e.g., an over-narrowing of themes related to structural stigma), this three-step process of 1) a manual screen of a random sample of 500 records from the lexical search, 2) a semantic similarity search of the total dataset using relevant records, and then 3) a manual screen of records with at least a 0.75 cosine similarity score was repeated two more times. Across these three iterations, a total of 379 relevant records were identified.

As a final step, duplicate records were removed from the 379 relevant records, then used in one last semantic similarity search of the total dataset. This final semantic similarity search identified 3779 records with at least a 0.75 cosine similarity score. A random sample of 500 of these records was used as the analytic dataset for qualitative analysis (i.e., this final sample was not manually screened for relevance prior to analysis).

2.2. Qualitative data analysis

The final analytic data set was analyzed via a directed content analysis to allow for pre-definition of key expected themes while also allowing for the emergence and inclusion of additional salient themes (Hsieh and Shannon, 2005). The component processes that make up stigma in Link and Phelan’s (2001) conceptualization were used as the *a priori* organizing thematic categories (i.e., labeling, stereotyping, separation, status loss and discrimination, and power).

2.2.1. Coding process

Two coders experienced in opioid-related qualitative analyses and familiar with the orienting stigma framework [ELE, KC] coded the data. Throughout the total process, the two coders met weekly to add sub-themes to the codebook and discuss and resolve discrepancies. First, a subset of 50 (10%) of the total sampled posts was coded to expand the initial codebook. Additional themes and subthemes were added to the final codebook if they were represented in a fair percentage of posts (i.e., more than 5% of posts analyzed). The senior author [MRK] reviewed the codebook after approximately 50% of records were coded; slight adaptations were made, and the codes of the previously coded records were updated. During coding, the five *a priori* organizing thematic categories were renamed to emphasize their structural nature (e.g., “Power”

became “Power structures and their enactors,” “Labeling” became “Structural labeling”), the themes of “Formulations of structural stigma, its manifestations, and its drivers” and “Resources leveraged to navigate structural stigma and its effects” were added, and subthemes were added to each theme.

Steps taken to support rigor included the review of the codebook by a researcher with substantial content expertise [MRK], one of the two coders being a Redditor [KC], and the final codebook and a selection of coded comments being reviewed by and discussed with one person who has lived experience with substance use stigma [EA] as a member check (Hsieh and Shannon, 2005).

2.3. Ethics considerations

This study was reviewed and deemed exempt by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board. Due to the sensitive nature of the topics discussed, two steps were taken to further ensure anonymity of the Redditors quoted (Proferes et al., 2021): 1) no real usernames are provided in the text or in any shared data (Ayers et al., 2018), and 2) the ease of reverse identification was checked by searching each record quoted below to confirm they do not appear in Google search results (Lanthier et al., 2023).

3. Results

3.1. Characteristics of records

Of the 500 randomly sampled records in the analytic sample, a total of 273 records (54.6%) were coded with at least one code, meaning they discussed component processes of structural stigma; formulations of structural stigma, its manifestations, and its drivers; or resources leveraged to counter structural stigma. These 273 records included predominately comments ($n = 239$, 87.5%) rather than original posts. A summary of themes, subthemes, and subthemes’ descriptions, along with example quotes, is provided in Supplemental Table 2. Example quotes are presented below nearly exactly as written in the original record; only clear typographical errors were corrected (e.g., “jsut” to “just”), and brackets denote any added content (e.g., author notes to clarify terms used). Each quote below comes from a unique Redditor; quotes are attributed using a simulated username corresponding to the quote’s number in the analytic dataset (e.g., the 280th quote in the dataset is attributed to “redditor280”).

3.2. Component processes of structural stigma

Overall, the records reflected each of Link and Phelan’s (2001) component process of stigma. Redditors reported knowledge and experience of how power structures—including the government, the pharmaceutical industry, and healthcare systems and embedded providers—stigmatize people who use opioids. Redditors wrote about how these power structures contribute to labeling of people who use opioids, perpetuation of negative stereotypes (e.g., irresponsibility), separation of some people who use opioids from people who do not use opioids and other people who use opioids (e.g., as either using “legitimately” or “illegitimately”), and experiences of status loss and discrimination (e.g., denial of healthcare, loss of employment).

3.2.1. Power structures and their enactors

Redditors named three main categories of power structures and their enactors: governmental systems and policies, pharmaceutical companies, and healthcare providers. In addition to naming the “government” generally as a stigmatizing power structure, Redditors also named specific U.S. government agencies such as the Food and Drug Administration (FDA), Drug Enforcement Agency (DEA), and Transportation Security Administration (TSA), as well as overarching government policy campaigns (e.g., the War on Drugs). Pharmaceutical companies were

sometimes discussed together as “pharma,” and other times Purdue Pharma (i.e., the company that manufactured and marketed OxyContin and other opioid pain medications) was named specifically. Governmental systems and policies and pharmaceutical companies were often conceptually linked in the same record, such as in this record that mentioned pharmaceutical companies, the FDA, and the government in general:

Had pharmaceutical companies not lied about how addictive these [opioids] are (Which is a direct issue with the FDA), the government would not have put such a tight hold on the regulations. That creates a crisis. Not “drug addicts” – redditor39

Redditors also frequently mentioned individuals embedded in these structures—most often healthcare providers and typically physicians—in their experiences of structural stigma. These individuals were seen as operating with absolute authority and in ways that directly reflected national- or state-level policies and healthcare institution practices and procedures. In so doing, Redditors positioned healthcare providers as structural actors who enacted structural stigma, such as through refusing to prescribe opioids for chronic pain on account of governmental restrictions:

This is why the suicide rate among chronic pain patients has gone up by over 400%. But no one seems to care when WE die. I took the same med[ication], same dose, for 30 years. My doctor quit with no warning and not one of his partners would prescribe anything for me. So I had to go cold turkey. I’m now almost completely bedridden, have no hope, and am just trying to get up the courage to enact a permanent solution. It sucks. Fuck the DEA and the CDC. – redditor397

3.2.2. Structural labeling

Redditors mentioned various systems, practices, and procedures that labeled an individual as someone who uses opioids, mostly in medical settings. These included opioid use and other substance use being recorded in medical charts, prescription drug management programs requiring reporting of the prescription and use of opioids, and required urine tests to confirm opioid use prior to prescription of MOUD. Redditors expressed how these processes made them feel like they “raise red flags” or are seen as a “junkie” when asking for desired medication or wanting to talk to their doctor about non-opioid-related concerns. One Redditor described how being labeled as someone who has taken MOUD in their medical chart has had lasting effects, making them feel like they are being seen through the lens of the pejorative label of “addict” in clinical interactions:

personally I hate it. been stuck in it for years trying to get off Suboxone [a combination medication of buprenorphine and naloxone]. my doc put me on it to get off norco [a combination medication of hydrocodone and acetaminophen] ... he should have just tapered me off but now I’m flagged as an addict. – redditor484

Redditors also described how structural-level efforts to address the overdose crisis have changed how structural labeling occurs and have heightened its consequences, such as denial of desired medication:

Good lucking getting pain meds as a new patient to a different doctor. Especially when they look at your past medical history. Basically impossible in the US now with the crack down. – redditor60

3.2.3. Stereotypes that influence navigation of structures

Although structural labeling in and of itself may be clinically important, Redditors also described how it made them more susceptible to stereotypes that pervade structures and influence experiences, especially in medical settings. Stereotypes were relatively rarely mentioned, with the most common stereotype mentioned being the assumption that people who use opioids are irresponsible or untrustworthy. For example,

one Redditor reported they would stop taking their MOUD prior to medical procedures to avoid being stereotyped by their doctor:

I’m very careful before surgery, I should pass a drug test in case the surgeon or Anesthetics Dr which my pain specialist is, any of those types thinking ... hmmm is this bitch partying ? She’s on subs must be, un trust worthy, that crap.. – redditor29

These stereotypes of irresponsibility and untrustworthiness also affected individuals’ social and life goals, with Redditors explaining how healthcare providers as well as the government and media can make people who use opioids feel untrusted to meet social and economic expectations (e.g., be a good father, maintain employment). The second most frequent stereotype mentioned was MOUD as not being seen as treatment for addiction, but rather as just addiction to another substance. This stereotype, when mentioned, seemed to majorly influence how people who use opioids navigate and use different structural resources related to MOUD (e.g., making it harder to talk to physicians about MOUD, perceiving less support from family and friends while taking MOUD).

3.2.4. Structural separation: “legitimate” versus “illegitimate” opioid use

The predominant form of structural separation discussed was how structures can consider some people who use opioids as using “legitimately,” such as patients in need of opioids due to other health concerns (e.g., cancer, chronic pain), versus using “illegitimately” (i.e., recreationally, selling them, or otherwise using them not as prescribed). This structural separation was seen to create an apparent hierarchy of people who use opioids, in which one’s degree of “legitimacy” in using opioids is evaluated by the presence of other health and pain conditions. In some cases, Redditors themselves reified this separation, such as this Redditor who also talked about legislative efforts that seek to exclusively benefit those who “legitimately” use opioids:

The thing that I don’t understand is that the medical system always blames addiction and not the addict abusing their meds. It’s a disease and they have sympathy for them. Sooo..then why are chronic pain patients judged so harshly and the blame of their disease or traumatic injury is placed on them?? It’s completely unfair. WHY not blame the damn disease/injury instead of the innocent pain patient trying to navigate a world where they are shamed/looked down on/stigmatized/judged along with bearing the weight of their serious health issues? It’s not right at all. We are fighting to create a bill in my State that makes it so that legit chronic pain patients here are ensured proper Pain Care. And that involves having access to all treatment modalities. – redditor47

However, this structural separation did not always mean that those more likely considered “legitimate patients” would not be subjected to structural stigma. One Redditor responded to a post from a Redditor with cancer-related pain, giving advice on how to navigate the current structural context after they were denied opioids by their primary care provider:

First of all I’m so sorry about the diagnosis, God bless. My advice would be go to different ERs doctors etc everyday, see with your insurance what is covered and keep trying and trying, not to give bad advice but worst comes to worst hit the streets if you need it that bad and it sounds like you do. Unfortunately doctors have a stick up their asses now a days about opiates and are so hesitant even with people in need like you, especially with a cancer diagnosis the doc shouldn’t hesitate – redditor140

To a lesser extent than the “legitimate” versus “illegitimate” dichotomy, records also reflected additional forms of structural separation. These included structural separation between those who abstain from opioids entirely versus people who take MOUD, as well as between people who used opioids before fentanyl was prominent versus those just starting to use opioids.

3.2.5. Structural status loss/discrimination

Structures and systems were also seen as contributing to experiences of status loss and discrimination, both within medical settings and in life generally. Redditors described experiences of discrimination within medical settings more frequently than discrimination in other settings. This discrimination could take a variety of forms, including healthcare providers refusing to prescribe opioids when requested, refusing to refill prescriptions, or providing inadequate care for presenting conditions. Less often, Redditors also encountered denial of care that came from other structural factors such as insurance policies (e.g., insurance plans differing between states and thus not being able to afford the resources they wanted to access).

Redditors repeatedly stated how the chosen systemic responses to the opioid epidemic have pushed individuals out of the medical system and into sourcing opioids from less regulated sources. One Redditor saw the current structural restrictions as harming everyone, and especially people whom they perceive to have “legitimate” need for opioids:

Just something to mention about laws changing and people who are prescribed not addicts—I’ve went to a pain clinic for over a decade now [...] Pain clinics when I first started—people would get a lot of meds. A lot would sell the extra meds. It was relaxed environments. Today’s world, people get far less and now supplement with fent [anyl]. [...] I don’t think the change in laws [to limit opioid prescribing] helped at all. In fact, it’s made people worse. Because granny used get by off her 4 10mg percs [Percocet pills] a day. But now she is on 3 7.5MG hydros [hydrocodone pills] [and] she is taking those damn mboxes [counterfeit oxycodone M30 pills] on the side and her addiction is worse. – redditor295

The effects of structural discrimination discussed in these records ranged from the immediate (e.g., being denied opioids for tooth pain at the ER) to a chain of events that could be extremely consequential, and even fatal. For example, this Redditor described how fatalities can occur when people seek opioids outside of medical settings after being suddenly denied them by their healthcare provider:

I lost a dear friend a few years ago for this very reason. He had chronic pain from years of contact sports. His provider cut him off and he turned to the streets. He overdosed on one oxy that was laced. One pill! He was a husband and father and lost his life. Not because he was trying to get high but because he was trying to reduce his pain enough to live his life. And I fully blame our government and healthcare system. Pain management should not be taboo. – redditor53

Although less common than mentions of inadequate medical care or outright denial of care, Redditors also described mistreatment leading to loss of status and life opportunities across structural domains entirely outside of healthcare-related systems: employment, housing, and carceral settings (e.g., jails). Examples given included being unable to retain employment due to opioid use (e.g., via mandated drug tests, withdrawal making it difficult to come into work) and experiencing severe withdrawal in jail because of a lack of provision of MOUD.

3.3. Formulations of structural stigma, its manifestations, and its drivers

Redditors posted robust conceptualizations of how and why structural stigma toward opioid use exists. A majority of these formulations centered on how historic and ongoing structural stigma manifests in the criminalization of substance use and is driven by profit motive, ultimately leading to the current state of the overdose crisis and pervasiveness of fentanyl in the drug supply. Although presented separately in [Supplemental Table 2](#), many of these themes are linked together in the records identified in this study. For example, one Redditor described how they see pharmaceutical companies and the U.S. government working in tandem to profit from the overdose crisis:

I think that whatever prescription drug makers want to happen, will happen. [...] Slowly I believe the constraints the US has put on the medical field will be lightened over time. As you said the needle exchanges, narcan, safe user centers are all in place by drug manufacturers. #1 it makes them look like they are interested in the well being of narcotic pain patients, #2 it is part of their "I'm sorry" program. But mostly and more importantly it's to begin a new Era of safe using of opioid drugs. Their profits are down in the US but up world wide. They're quietly lobbying for new and safer methods of distributing. Instead of pill mills, there are now pain clinics. Soon enough the public view will be satisfied with the "crackdown" on over prescribing doctors. And they'll usher in even more pain doctors across the states that have shown their numbers decrease in prescribed opioid deaths and increased in aftermarket synthetic opioid deaths. Either way, it will always be a supply and demand issue. As I said before whatever direction the manufacturers decide they want to go in, that's the way it will go. They have more power than just about any entity in the country including the Whitehouse. Maybe even the mediaweeeellllll maybe not that much power. Haha – redditor225

In addition to the overdose crisis being a commonly mentioned manifestation of structural stigma stemming from governmental programs and policies, it was also seen as a driver of structural stigma. One Redditor described how media coverage of the overdose crisis, particularly coverage related to fentanyl, has enabled even greater stigma and criminalization toward people who use opioids:

Yea I never understood this. My condolences to all the people who have OD [overdosed] and died or been affected from this [fentanyl use], but I think they [the media] are talking about pure, pharmaceutical grade fentanyl, which is almost never the kind people are actually using on the street. It's [the physiological effect of fentanyl has] been totally sensationalized to spread fear and make harsher criminal penalties for drug users. – redditor403

Some Redditors pointed toward drivers of structural stigma beyond profit motive, such as seeing manifestations of structural stigma (e.g., the pervasiveness of fentanyl) as means for broader social control of less powerful groups:

Too bad fentanyl is the next phase in the government abuse of the underclass so it will continue until they figure something even sicker out – redditor323

Moreover, these formulations of structural stigma all underscored that Redditors felt targeted and trapped by this process, its manifestations, and its drivers. One Redditor described how they feel helpless as the government’s criminalization of drugs and profit-motivated cartels ensure they only have access to fentanyl, even though that is less preferable:

fentanyl is here to stay as long as prohibition js [just saying]. Fentanyl is insanely cheap, insanely potent, short acting, and entirely synthetic. The benefits that these things over dealers / cartels are enormous. We can talk about the old days [when heroin was widely available] as much as we want but I'm gonna buy whatever dope they are selling cause I fucking need to. – redditor46

3.3.1. Resources leveraged to navigate structural stigma and its effects

3.3.1.1. Structural resources. Some records highlighted resources that can be leveraged to counter structural stigma. Redditors mentioned many ways that structures were helpful rather than harmful, including policies that promote harm reduction approaches to drug use and expand access to MOUD, non-profits and websites that provide material resources such as fentanyl test strips, and clinics and telemedicine for accessing treatment and support. Paradoxically, methadone clinics were

frequently mentioned as both stigmatizing and a crucial structural resource.

3.3.1.2. Interpersonal resources. Many Redditors mentioned feeling emotionally and materially supported by those they trust, which could include romantic partners, family members, friends, and even healthcare providers with whom they have strong rapport. These sources of support were commonly mentioned as key resources for resisting stigmatizing structures and their effects, as were other interpersonal relationships that are more transactional in nature; a handful of Redditors described that trust in their supplier helps them feel safer as fentanyl, its analogues, and xylazine are becoming increasingly common in the drug supply.

3.3.1.3. Reddit as a resource. Many records reflected Reddit itself as being an important resource to navigate structural stigma and its negative consequences. Redditors sometimes used Reddit as a resource for concerns stemming from newer trends in the drug use landscape (e.g., increasing prevalence of xylazine) that may not be as addressable by using other existing structural and interpersonal resources. More commonly, Redditors posted on r/opiates for general advice on how to overcome or work around negative experiences, such as not being able to get access to desired medication:

While I'm relieved atm [at the moment], I'm also scared that this [running out of medication] will continue to happen. I guess I need to know the best plan to wean down so that this doesn't happen again next month. Obviously I know I'm taking more than I'm prescribed since I ran out 5 days early. That's 25 pills. What do you guys suggest? Thanks for listening. – redditor280.

4. Discussion

By focusing on first-hand accounts and formulations, this study highlights nuances of how structural stigma toward opioid use operates, is felt, and is understood by the individuals and communities it negatively affects. Redditors reported awareness of how power structures and their enactors label, perpetuate stereotypes, separate, and engender status loss/discrimination. Structural status loss/discrimination was the most represented component process of structural stigma in these records; this likely reflects the relative ease of making direct connections between lived experiences of enacted structural stigma and the stigmatizing structural entity (e.g., government, insurance, doctors) (Abrams et al., 2020). Conversely, the ways structures perpetuate stereotypes was infrequently discussed in these records, but stereotyping language (e.g., addict, junkie) was frequently used by Redditors about themselves. This could be due to the relative difficulty of pointing to specific stigmatizing entities as generating or perpetuating a stereotype. On the other hand, it could be that people who use opioids consider the structures that cause this stereotyping self-evident or not worth explicitly tracing.

Importantly, Redditors clearly perceive how structural stigma toward opioid use generates separation between people who use opioids and the general public, as well as between different groups of people who use opioids. Redditors then also reproduced these separations in their own posts and comments, most often in the ways that some Redditors who viewed themselves as using opioids “legitimately” differentiated themselves from those who used them recreationally. Structural stigma in general has been noted to infiltrate groups of people to sow intragroup division and generate intragroup health disparities (Mitchell et al., 2021). These sorts of distinctions observed in these data also align with past work that has noted an apparent hierarchy of people who “deserve” opioid medication that is perpetuated and held by the general public, healthcare providers, and people who use opioids themselves (McCadden et al., 2019). Further, this phenomenon of stigma leading to

intragroup separation has been qualitatively documented among people who use drugs, on the bases of criteria including drug of choice, social positionings (e.g., race/ethnicity, gender, age), and perceived senses of morality, control, and victimhood (Sibley et al., 2023).

Although not a predefined theme for this analysis, the identified records contained a wealth of resources that people who use opioids leverage when navigating structural stigma toward opioid use and its negative effects. These resources included policies that expand access to MOUD, clinics and programs that provide treatment, telemedicine, non-profits and websites that provide test strips, personal relationships with friends, support from family members, rapport with healthcare providers, and Reddit itself. These resources, in turn, are potential elements that can be included, advocated for, or further leveraged by interventions seeking to promote the health and well-being of people who use opioids. The resources mentioned also spanned the structural and interpersonal levels—and included structures that provided community (i.e., Reddit)—which points toward the promise of multilevel interventions drawing on more than one level of resource provision or reinforcement (Cheetham et al., 2022; Knaak et al., 2020; Rao et al., 2019). The findings around the importance of interpersonal resources in navigating stigmatizing structures are mirrored in other studies documenting the benefits of social support among people who use opioids and similar populations (e.g., people with a history of injection drug use), particularly following the start of the COVID-19 pandemic (Bunting et al., 2021; Patel et al., 2023). Researchers can play a role in evaluating these resources and their use to ensure they are readily and equitably accessible. For example, structural resources mentioned by Redditors that have become more common after the start of the COVID-19 pandemic (e.g., flexibility in methadone take-home policies, telemedicine) are promising means to counter structural stigma and promote health equity if implemented with this intention (Krawczyk et al., 2023; Uscher-Pines et al., 2023).

Moreover, the nuances in how structural stigma operates revealed in this analysis have important implications for programs and interventions intended to benefit the health of people who use opioids. Most notably, the structural separation reported in these results point toward the importance—if not the imperative—of programmatic efforts that push back against intragroup division and promote solidarity among people who use drugs. Working against intragroup division is in alignment with both formal definitions and people who use drugs’ conceptualizations of harm reduction (Boucher et al., 2017; Faulkner-Gurstein, 2017; Marlatt, 1996), as well as the stated missions of specific conferences (e.g., the Infinite Pathways Conference) and statewide and regional centers (e.g., the Connecticut Community for Addiction Recovery; <https://ccar.us/about-ccar/>). Reddit itself may be an important site for solidarity-building for some individuals (Bunting et al., 2021; Valdez and Patterson, 2022). Through promoting solidarity across people who use opioids and between people who use opioids and their communities, resources can be shared to a greater degree and change can be better advocated for by larger coalitions.

This study also adds to a burgeoning set of innovative social media research studies and points to potential further uses of social media in health-related research. This study’s use of Reddit content as narratives has been used in studies of experiences other than substance use, such as mental health among people with rheumatoid arthritis (Park et al., 2020), health-related concerns around vaping (DeLucia et al., 2023), and intersectional stigma faced by people who experienced sexual assault (Lanthier et al., 2023). Though there are studies related to opioid use that thematically analyze Reddit data (El-Bassel et al., 2022; Kaufman et al., 2021; Sarker et al., 2022b), there appears to be only one other analysis that uses Reddit content to understand stigma toward opioid or any substance use (Kepner et al., 2022). This study does include a structural level of stigma in its analysis; however, it differs from the present study in that it looks specifically at treatment and recovery subreddits and uses only a lexical search of “stigma” and its variations (e.g., “stigmatizing,” “stigmatized”) to identify posts for its analysis

(Kepner et al., 2022).

Further, social media in general holds promise as a data source for studying highly stigmatized—and in the case of much opioid use, illegal—behaviors and their associated social processes like structural stigma. Compared to this analysis's focus on first-hand accounts of the complex social process of structural stigma, past social media analyses looking at opioid use specifically have instead focused primarily on surveillance of opioid use behaviors (Arya et al., 2022; Sarker et al., 2022a), experiences with MOUD (Graves et al., 2022; Krawczyk et al., 2021; Spadaro et al., 2022), and attempts to apply diagnostic criteria to posters (Sarker et al., 2020). As an area of future application of these or similar methods, the degree to which specific policies and emerging trends in the drug landscape (e.g., the increasing prevalence of xylazine) were discussed in this study's analyzed records encourage use of similar methods for policy impact evaluation or drug supply safety surveillance.

4.1. Limitations

This study's findings should be interpreted in light of its limitations. First, the Reddit content analyzed in this study may not include the experiences of structural stigma faced by the most marginalized groups. In general, Reddit is most used by people in the U.S., and Redditors are more likely to be male, White, younger, have more formal education, and reside in suburban or urban areas than the overall U.S. population (Pew Research Center, 2019). Moreover, whether someone posts on Reddit in general is influenced by access and use of the Internet, and whether someone posts on r/opiates is likely shaped by internalized stigma. It is possible that certain groups known to have high internalized stigma around their substance use (e.g., pregnant individuals), even when on Reddit, refrain from posting. Second, the anonymity of Reddit obfuscates the sociodemographic characteristics of Redditors, meaning it was not possible in this study to examine first-hand perceptions and experiences of structural stigma across and among specific sociodemographic groups in specific places (e.g., specific U.S. states, cross-country comparisons). Further work—especially qualitative research—can build on this study's findings and take an intersectional approach to investigating experiences of structural stigma for many groups known to face more stigma and have even steeper barriers to treatment (e.g., Black people, Latinx people, women, low-income people, and pregnant people) (Goodyear et al., 2022; Hansen et al., 2016; Krawczyk et al., 2017; Kulesza et al., 2016; Syvertsen et al., 2021). In particular, consideration of racism's multilevel intersections with stigma toward opioid use is critically important; all-drug overdose rates among Black adults surpassed the rates among White adults for the first time since 1999 (Friedman and Hansen, 2022) and opioid use and its stigma are racialized in the U.S. (Hansen and Netherland, 2016; Hart and Hart, 2019). There may also be key differences in stigma faced by groups based on the combination of substances used in addition to opioids; overdose deaths are being increasingly attributed to fentanyl and polysubstance use rather than a single drug alone (Mattson et al., 2021).

Limitations of this study's methods may have also led to key aspects of structural stigma toward opioid use being missed. In particular, there was a predominance of healthcare-related keywords used in the lexical searches, mostly due to the health focus of the source material used to generate initial terms. Certain aspects of structural stigma that occur mostly outside of healthcare structures may have been less represented, while those occurring mostly within healthcare structures may have been more represented. Future work would benefit from more direct inclusion of people who use opioids as key informants in developing sets of keywords that reflect recent structural trends (e.g., including telemedicine-related keywords) and to explore other relevant domains or relationships between domains (e.g., further exploring the ways structural stigma shapes interpersonal support).

5. Conclusion

People who use opioids face structural labeling, stereotyping, separation, and status loss and discrimination from a variety of power structures and their enactors. Further, Reddit offers a window into ways that people who use opioids can and do articulate robust formulations of structural stigma and its drivers and manifestations, as well as the structural and interpersonal resources they use to navigate structural stigma and its effects. By proactively seeking and being responsive to first-hand accounts of structural stigma, public health research and practice may be better able to leverage and improve upon existing resources accessed by this population, work toward actively countering structural stigma in its various forms and component processes (e.g., by countering structural separation through promoting solidarity), and ultimately, help improve the health and well-being of people who use opioids.

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CRedit authorship contribution statement

Evan L. Eschliman: Writing – review & editing, Writing – original draft, Visualization, Supervision, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Karen Choe:** Writing – review & editing, Writing – original draft, Investigation, Formal analysis. **Alexandra DeLucia:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Data curation. **Elizabeth Addison:** Writing – review & editing, Validation, Investigation. **Valerie W. Jackson:** Writing – review & editing, Validation, Investigation. **Sarah M. Murray:** Writing – review & editing, Supervision. **Danielle German:** Writing – review & editing, Supervision. **Becky L. Genberg:** Writing – review & editing, Supervision. **Michelle R. Kaufman:** Writing – review & editing, Writing – original draft, Validation, Funding acquisition, Conceptualization.

Declaration of competing interest

The authors report no conflicts of interest.

Data availability

This analysis used publicly accessible social media data.

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Appendix A. Supplementary data

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References

- Abrams, J.A., Tabac, A., Jung, S., Else-Quest, N.M., 2020. Considerations for employing intersectionality in qualitative health research. *Soc. Sci. Med.* 258, 113138 <https://doi.org/10.1016/j.socscimed.2020.113138>.

- Adams, N., Artigiani, E.E., Wish, E.D., 2019. Choosing your platform for social media drug research and improving your keyword filter list. *J. Drug Issues* 49, 477–492. <https://doi.org/10.1177/0022042619833911>.
- Allen, B., Nolan, M.L., Paone, D., 2019. Underutilization of medications to treat opioid use disorder: what role does stigma play? *Subst. Abuse* 40, 459–465. <https://doi.org/10.1080/08897077.2019.1640833>.
- Antoniou, T., Ala-Leppilampi, K., Shearer, D., Parsons, J.A., Tadrous, M., Gomes, T., 2019. “Like being put on an ice floe and shoved away”: a qualitative study of the impacts of opioid-related policy changes on people who take opioids. *Int. J. Drug Pol.* 66, 15–22. <https://doi.org/10.1016/j.drugpo.2019.01.015>.
- Archibald, M., 2021. Reddit Statistics for 2022: Eye-Opening Usage & Traffic Data [WWW Document]. <https://foundationinc.co/lab/reddit-statistics/>. accessed 5.19.22.
- Arya, S., Nagappala, S., Krawczyk, N., Gu, Y., Meacham, M.C., Bunting, A.M., 2022. Fentanyl in pressed oxycodone pills: a qualitative analysis of online community experiences with an emerging drug trend. *Subst. Use Misuse* 57, 1940–1945. <https://doi.org/10.1080/10826084.2022.2120365>.
- Ayers, J.W., Caputi, T.L., Nebeker, C., Dredze, M., 2018. Don't quote me: reverse identification of research participants in social media studies. *NPJ. Digital Med.* 1, 30. <https://doi.org/10.1038/s41746-018-0036-2>.
- Boucher, L.M., Marshall, Z., Martin, A., Larose-Hébert, K., Flynn, J.V., Lalonde, C., Pineau, D., Bigelow, J., Rose, T., Chase, R., Boyd, R., Tyndall, M., Kendall, C., 2017. Expanding conceptualizations of harm reduction: results from a qualitative community-based participatory research study with people who inject drugs. *Harm Reduct. J.* 14, 18. <https://doi.org/10.1186/s12954-017-0145-2>.
- Bunting, A.M., Frank, D., Arshonsky, J., Bragg, M.A., Friedman, S.R., Krawczyk, N., 2021. Socially-supportive norms and mutual aid of people who use opioids: an analysis of Reddit during the initial COVID-19 pandemic. *Drug Alcohol Depend.* 222, 108672. <https://doi.org/10.1016/j.drugalcedp.2021.108672>.
- Cheetham, A., Picco, L., Barnett, A., Lubman, D.I., Nielsen, S., 2022. The impact of stigma on people with opioid use disorder, opioid treatment, and policy. *SAR* 13, 1–12. <https://doi.org/10.2147/SAR.S304566>.
- Corrigan, P.W., Nieweglowski, K., 2018. Stigma and the public health agenda for the opioid crisis in America. *Int. J. Drug Pol.* 59, 44–49. <https://doi.org/10.1016/j.drugpo.2018.06.015>.
- Crapanzano, K.A., Hammarlund, R., Ahmad, B., Hunsinger, N., Kullar, R., 2018. The association between perceived stigma and substance use disorder treatment outcomes: a review. *Subst. Abuse Rehabil.* 10, 1–12. <https://doi.org/10.2147/SAR.S183252>.
- DeLucia, A., Poliak, A., Zhu, Z., Pitts, S.R., Navarro, M., Shojai, S., Ayers, J.W., Dredze, M., 2023. Automated Discovery of Perceived Health-Related Concerns about E-Cigarettes from Reddit. Presented at the Annual Meeting of the Society for Research on Nicotine and Tobacco, San Antonio, Texas, p. 189.
- Earnshaw, V.A., 2020. Stigma and substance use disorders: a clinical, research, and advocacy agenda. *Am. Psychol.* 75, 1300–1311. <https://doi.org/10.1037/amp0000744>.
- El-Bassel, N., Hochstatter, K.R., Slavina, M.N., Yang, C., Zhang, Y., Muresan, S., 2022. Harnessing the power of social media to understand the impact of COVID-19 on people who use drugs during lockdown and social distancing. *J. Addiction Med.* 16, e123–e132. <https://doi.org/10.1097/ADM.0000000000000883>.
- Faulkner-Gurstein, R., 2017. The social logic of naloxone: peer administration, harm reduction, and the transformation of social policy. *Soc. Sci. Med.* 180, 20–27. <https://doi.org/10.1016/j.socscimed.2017.03.013>.
- Friedman, J.R., Hansen, H., 2022. Evaluation of increases in drug overdose mortality rates in the US by race and ethnicity before and during the COVID-19 pandemic. *JAMA Psychiatr.* 79, 379–381. <https://doi.org/10.1001/jamapsychiatry.2022.0004>.
- Goodyear, K., Ahluwalia, J., Chavanne, D., 2022. The impact of race, gender, and heroin use on opioid addiction stigma. *J. Subst. Abuse Treat.* 143, 108872. <https://doi.org/10.1016/j.jsat.2022.108872>.
- Graves, R.L., Perrone, J., Al-Garadi, M.A., Yang, Y.-C., Love, J., O'Connor, K., Gonzalez-Hernandez, G., Sarker, A., 2022. Thematic analysis of Reddit content about buprenorphine-naloxone using manual annotation and natural language processing techniques. *J. Addiction Med.* 16, 454–460. <https://doi.org/10.1097/ADM.0000000000000940>.
- Hammarlund, R.A., Crapanzano, K.A., Lu, L., Mulligan, L.A., Ward, K.M., 2018. Review of the effects of self-stigma and perceived social stigma on the treatment-seeking decisions of individuals with drug- and alcohol-use disorders. *SAR* 9, 115–136. <https://doi.org/10.2147/SAR.S183256>.
- Hansen, H., Siegel, C., Wanderling, J., DiRocco, D., 2016. Buprenorphine and methadone treatment for opioid dependence by income, ethnicity and race of neighborhoods in New York City. *Drug Alcohol Depend.* 164, 14–21. <https://doi.org/10.1016/j.drugalcedp.2016.03.028>.
- Hart, C.L., Hart, M.Z., 2019. Opioid crisis: Another mechanism used to perpetuate American racism. *Cultur. Divers. Ethnic Minor. Psychol.* 25 (1), 6–11. <https://doi.org/10.1037/cdp0000260>.
- Hatzenbuehler, M.L., Link, B.G., 2014. Introduction to the special issue on structural stigma and health. *Soc. Sci. Med. Struct. Stigma and Popul. Health* 103, 1–6. <https://doi.org/10.1016/j.socscimed.2013.12.017>.
- Hsieh, H.-F., Shannon, S.E., 2005. Three approaches to qualitative content analysis. *Qual. Health Res.* 15, 1277–1288. <https://doi.org/10.1177/1049732305276687>.
- Hurstak, E.E., Kuschel, M., Chang, J., Ceasar, R., Zamora, K., Miaskowski, C., Knight, K., 2017. The risks of opioid treatment: perspectives of primary care practitioners and patients from safety-net clinics. *Subst. Abuse* 38, 213–221. <https://doi.org/10.1080/08897077.2017.1296524>.
- Johnson, J., Douze, M., Jegou, H., 2021. Billion-scale similarity search with GPUs. *IEEE Trans. Big Data* 7, 535–547. <https://doi.org/10.1109/TBDATA.2019.2921572>.
- Kaufman, M.R., Bazell, A.T., Collaco, A., Sedoc, J., 2021. “This show hits really close to home on so many levels”: an analysis of Reddit comments about HBO's Euphoria to understand viewers' experiences of and reactions to substance use and mental illness. *Drug Alcohol Depend.* 220, 108468. <https://doi.org/10.1016/j.drugalcedp.2020.108468>.
- Kennedy, M.C., Kerr, T., 2017. Overdose prevention in the United States: a call for supervised injection sites. *Am. J. Publ. Health* 107, 42–43. <https://doi.org/10.2105/AJPH.2016.303523>.
- Kennedy-Hendricks, A., Barry, C.L., Gollust, S.E., Ensminger, M.E., Chisolm, M.S., McGinty, E.E., 2017. Social Stigma Toward Persons With Prescription Opioid Use Disorder: Associations With Public Support for Punitive and Public Health-Oriented Policies. *PS* 68, 462–469. <https://doi.org/10.1176/appi.ps.201600056>.
- Kepner, W., Meacham, M.C., Nobles, A.L., 2022. Types and sources of stigma on opioid use treatment and recovery communities on Reddit. *Subst. Use Misuse* 57, 1511–1522. <https://doi.org/10.1080/10826084.2022.2091786>.
- Knaak, S., Livingston, J., Stuart, H., Ungar, T., 2020. Combating Mental Illness- and Substance Use-Related Structural Stigma in Health Care. *Mental Health Commission of Canada, Ottawa, Canada*.
- Krawczyk, N., Bunting, A.M., Frank, D., Arshonsky, J., Gu, Y., Friedman, S.R., Bragg, M.A., 2021. “How will I get my next week's script?” Reactions of Reddit opioid forum users to changes in treatment access in the early months of the coronavirus pandemic. *Int. J. Drug Pol.* 92, 103140. <https://doi.org/10.1016/j.drugpo.2021.103140>.
- Krawczyk, N., Feder, K.A., Fingerhood, M.I., Saloner, B., 2017. Racial and ethnic differences in opioid agonist treatment for opioid use disorder in a U.S. national sample. *Drug Alcohol Depend.* 178, 512–518. <https://doi.org/10.1016/j.drugalcedp.2017.06.009>.
- Krawczyk, N., Rivera, B.D., Levin, E., Dooling, B.C.E., 2023. Synthesising evidence of the effects of COVID-19 regulatory changes on methadone treatment for opioid use disorder: implications for policy. *Lancet Public Health* 8, e238–e246. [https://doi.org/10.1016/S2468-2667\(23\)00023-3](https://doi.org/10.1016/S2468-2667(23)00023-3).
- Kulesza, M., Matsuda, M., Ramirez, J.J., Wertz, A.J., Teachman, B.A., Lindgren, K.P., 2016. Towards greater understanding of addiction stigma: intersectionality with race/ethnicity and gender. *Drug Alcohol Depend.* 169, 85–91. <https://doi.org/10.1016/j.drugalcedp.2016.10.020>.
- Lanthier, S., Mason, R., Logie, C.H., Myers, T., Du Mont, J., 2023. “Coming out of the closet about sexual assault”: intersectional sexual assault stigma and (Non) disclosure to formal support providers among survivors using Reddit. *Soc. Sci. Med.* 115978. <https://doi.org/10.1016/j.socscimed.2023.115978>.
- Link, B.G., Phelan, J.C., 2001. Conceptualizing stigma. *Annu. Rev. Sociol.* 27, 363–385. <https://doi.org/10.1146/annurev.soc.27.1.363>.
- Lopez, K., Reid, D., 2017. Discrimination against Patients with Substance Use Disorders Remains Prevalent and Harmful: the Case for 42 CFR Part 2. *Health Affairs*. URL. <https://www.healthaffairs.org/doi/10.1377/hblog20170413.059618/full/>. accessed 3.23.19.
- Madden, E.F., Prevedel, S., Light, T., Sulzer, S.H., 2021. Intervention stigma toward medications for opioid use disorder: a systematic review. *Subst. Use Misuse* 56, 2181–2201. <https://doi.org/10.1080/10826084.2021.1975749>.
- Marlatt, G.A., 1996. Harm reduction: come as you are. *Addictive Behaviors*. *Addiction '96 (Treatment Across the Addictions)* 21, 779–788. [https://doi.org/10.1016/0306-4603\(96\)00042-1](https://doi.org/10.1016/0306-4603(96)00042-1).
- Mattson, C.L., Tanz, L.J., Quinn, K., Kariisa, M., Patel, P., Davis, N.L., 2021. Trends and geographic patterns in drug and synthetic opioid overdose deaths—United States, 2013–2019. *MMWR (Morb. Mortal. Wkly. Rep.)* 70, 202.
- Mauro, P.M., Gutkind, S., Annunziato, E.M., Samples, H., 2022. Use of medication for opioid use disorder among US adolescents and adults with need for opioid treatment, 2019. *JAMA Netw. Open* 5, e223821. <https://doi.org/10.1001/jamanetworkopen.2022.3821>.
- McCraden, M.D., Vasileva, D., Orchanian-Cheff, A., Buchman, D.Z., 2019. Ambiguous identities of drugs and people: a scoping review of opioid-related stigma. *Int. J. Drug Pol.* 74, 205–215. <https://doi.org/10.1016/j.drugpo.2019.10.005>.
- McGinty, E.E., Kennedy-Hendricks, A., Baller, J., Niederdeppe, J., Gollust, S., Barry, C.L., 2016. Criminal activity or treatable health condition? News media framing of opioid analgesic abuse in the United States, 1998–2012. *PS* 67, 405–411. <https://doi.org/10.1176/appi.ps.201500065>.
- McGinty, E.E., Stone, E.M., Kennedy-Hendricks, A., Barry, C.L., 2019. Stigmatizing language in news media coverage of the opioid epidemic: implications for public health. *Prev. Med.* 124, 110–114. <https://doi.org/10.1016/j.ypmed.2019.03.018>.
- Mitchell, U.A., Nishida, A., Fletcher, F.E., Molina, Y., 2021. The long arm of oppression: how structural stigma against marginalized communities perpetuates within-group health disparities. *Health Educ. Behav.* 48, 342–351. <https://doi.org/10.1177/10901981211011927>.
- Olsen, Y., Sharfstein, J.M., 2014. Confronting the stigma of opioid use disorder—and its treatment. *JAMA* 311, 1393–1394. <https://doi.org/10.1001/jama.2014.2147>.
- Park, J.Y.E., Howren, A.M., Davidson, E., De Vera, M.A., 2020. Insights on mental health when living with rheumatoid arthritis: a descriptive qualitative study of threads on the Reddit website. *BMC Rheumatol.* 4, 62. <https://doi.org/10.1186/s41927-020-00163-2>.
- Patel, E.U., Astemborski, J., Feder, K.A., Rudolph, J.E., Winiker, A., Sosnowski, D.W., Kirk, G.D., Mehta, S.H., Genberg, B.L., 2023. Temporal association of pre-pandemic perceived social support with psychological resilience and mental well-being during the COVID-19 pandemic among people with a history of injection drug use. *Drug Alcohol Depend.* 244, 109802. <https://doi.org/10.1016/j.drugalcedp.2023.109802>.
- Pew Research Center, 2019, June 12. Who uses YouTube, WhatsApp and Reddit. *Pew Research Center. Internet, Science & Tech.* <https://www.pewresearch.org/internet/chart/who-uses-youtube-whatsapp-and-reddit/>.

- Proferes, N., Jones, N., Gilbert, S., Fiesler, C., Zimmer, M., 2021. Studying Reddit: a systematic overview of disciplines, approaches, methods, and ethics. *Soc. Media + Soc.* 7, 205630512110190 <https://doi.org/10.1177/20563051211019004>.
- Rao, D., Elshafei, A., Nguyen, M., Hatzembuehler, M.L., Frey, S., Go, V.F., 2019. A systematic review of multi-level stigma interventions: state of the science and future directions. *BMC Med.* 17, 41. <https://doi.org/10.1186/s12916-018-1244-y>.
- Reimers, N., Gurevych, I., 2019. Sentence-BERT: sentence embeddings using siamese BERT-networks. In: *Proceedings of the 2019 Conference on Empirical Methods in Natural Language Processing and the 9th International Joint Conference on Natural Language Processing (EMNLP-IJCNLP)*, pp. 3982–3992.
- Sarker, A., Al-Garadi, M.A., Ge, Y., Nataraj, N., Jones, C.M., Sumner, S.A., 2022a. Signals of increasing co-use of stimulants and opioids from online drug forum data. *Harm Reduct. J.* 19, 51. <https://doi.org/10.1186/s12954-022-00628-2>.
- Sarker, A., DeRoos, A., Perrone, J., 2020. Mining social media for prescription medication abuse monitoring: a review and proposal for a data-centric framework. *J. Am. Med. Inf. Assoc.* 27, 315–329. <https://doi.org/10.1093/jamia/ocz162>.
- Sarker, A., Nataraj, N., Siu, W., Li, S., Jones, C.M., Sumner, S.A., 2022b. Concerns among people who use opioids during the COVID-19 pandemic: a natural language processing analysis of social media posts. *Subst. Abuse Treat. Prev. Pol.* 17, 16. <https://doi.org/10.1186/s13011-022-00442-w>.
- Sibley, A.L., Baker, R., Levander, X.A., Rains, A., Walters, S.M., Nolte, K., Colston, D.C., Piscalko, H.M., Schalkoff, C.A., Bianchet, E., Chen, S., Dowd, P., Jaeb, M., Friedmann, P.D., Fredericksen, R.J., Seal, D.W., Go, V.F., 2023. “I am not a junkie”: social categorization and differentiation among people who use drugs. *Int. J. Drug Pol.* 114, 103999 <https://doi.org/10.1016/j.drugpo.2023.103999>.
- Spadaro, A., Sarker, A., Hogg-Bremer, W., Love, J.S., O'Donnell, N., Nelson, L.S., Perrone, J., 2022. Reddit discussions about buprenorphine associated precipitated withdrawal in the era of fentanyl. *Clin. Toxicol.* 60, 694–701. <https://doi.org/10.1080/15563650.2022.2032730>.
- Syvertsen, J.L., Toneff, H., Howard, H., Spadola, C., Madden, D., Clapp, J., 2021. Conceptualizing stigma in contexts of pregnancy and opioid misuse: a qualitative study with women and healthcare providers in Ohio. *Drug Alcohol Depend.* 222, 108677 <https://doi.org/10.1016/j.drugalcdep.2021.108677>.
- Taylor, B.G., Lamuda, P.A., Flanagan, E., Watts, E., Pollack, H., Schneider, J., 2021. Social stigma toward persons with opioid use disorder: results from a nationally representative survey of U.S. Adults. *Subst. Use Misuse* 56, 1752–1764. <https://doi.org/10.1080/10826084.2021.1949611>.
- Tsai, A.C., Kiang, M.V., Barnett, M.L., Beletsky, L., Keyes, K.M., McGinty, E.E., Smith, L.R., Strathdee, S.A., Wakeman, S.E., Venkataramani, A.S., 2019. Stigma as a fundamental hindrance to the United States opioid overdose crisis response. *PLoS Med.* 16, e1002969 <https://doi.org/10.1371/journal.pmed.1002969>.
- Uscher-Pines, L., Riedel, L.E., Mehrotra, A., Rose, S., Busch, A.B., Huskamp, H.A., 2023. Many Clinicians Implement Digital Equity Strategies to Treat Opioid Use Disorder: study examines clinicians' use of telehealth and digital equity strategies to treat opioid use disorder. *Health Aff.* 42, 182–186. <https://doi.org/10.1377/hlthaff.2022.00803>.
- Valdez, D., Patterson, M.S., 2022. Computational analyses identify addiction help-seeking behaviors on the social networking website Reddit: insights into online social interactions and addiction support communities. *PLOS Digit Health* 1, e0000143. <https://doi.org/10.1371/journal.pdig.0000143>.
- Volkow, N.D., 2020. Stigma and the toll of addiction. *N. Engl. J. Med.* 382, 1289–1290. <https://doi.org/10.1056/NEJMp1917360>.
- Wakeman, S.E., Rich, J.D., 2018. Barriers to medications for addiction treatment: how stigma kills. *Subst. Use Misuse* 53, 330–333. <https://doi.org/10.1080/10826084.2017.1363238>.
- Xu, K.Y., Mintz, C.M., Presnall, N., Bierut, L.J., Grucza, R.A., 2022. Comparative effectiveness associated with buprenorphine and naltrexone in opioid use disorder and cooccurring polysubstance use. *JAMA Netw. Open* 5, e2211363. <https://doi.org/10.1001/jamanetworkopen.2022.11363>.