Localized Syndemic Assemblages: COVID-19, Substance Use Disorder, and Overdose Risk in Small-Town America

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Pandemics do not exist in isolation and COVID-19 is no exception. We argue that existing health crises, notably substance use disorder (SUD), developed syndemic relationships with COVID-19 that produced compounding deleterious effects. Combining Merrill Singer's theory of syndemics and assemblage theory, we analyze the combinatory impact of overdose and COVID-19 within a localized context. We focus on Sandusky, Ohio, where we combine police reports, in-depth interviews with area residents, and ethnographic data to compare conditions before and after the emergence of COVID-19. We find dramatic shifts in relevant local contexts due to COVID-19, inhibiting existing systems of law and public policy aimed at overdose prevention and SUD treatment. Further, our findings provide evidence of complications in the COVID-19 response originating from the overdose epidemic.

Keywords: syndemics, assemblage theory, small-town crime, overdose, COVID-19

The global health crisis associated with the emergence of the SARS-CoV-2 virus affected nearly every aspect of human society, including complicating existing social problems. For instance, COVID-19 exacerbated various existing health crises, including substance use disorder (SUD), obesity, mental health issues, and incidence of suicide and suicidal ideation (Brenner and Bhugra 2020; Gao et al. 2021; Khan and Smith 2020; Pfefferbaum and North 2020; Schlosser and Harris 2020). SUD is also among the many comorbidities identified as a risk factor for COVID-19 mortality (Volkow 2020). The compound deleterious effects of SUD and COVID-19 make up what the medical anthropologist Merrill Singer dubbed a *syndemic*—each illness making the other more dangerous and their combination making mitigation more difficult (Hill, Sowers, and Mantzoros 2021; Singer 2009). COVID-19 tends to be *synde-*

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mogenic; forming localized syndemic intersections with various health, economic, political, and social ills throughout the existing epidemiological terrain (Singer 2009, 75–78, 227; Horton 2020; Mendenhall 2020).

Syndemics are examples of what the philosophers Gilles Deleuze and Félix Guattari dubbed *assemblages* (Deleuze and Guattari 1987). Assemblages, in their most abstract, are complex systems of nonhierarchical interconnections between component parts, constituting a productive process (Deleuze and Guattari 1987, 48–71; Buchanan 2020).[1] For our purpose, and following the original usage of the term by Deleuze and Guattari, assemblages are arrangements of discrete yet evolving social forces (Deleuze and Guattari 1987, 275–84). Assemblages constantly form new connections at all levels of social life, altering compositions and outcomes from one country, region, or person to the next (22–24, 56–61). Discrete assemblages originate from definitive sociopolitical events, such as sweeping legal changes, policy declarations, or equivalent expressions of juridical power (Buchanan 2020, 30–34; Deleuze and Guattari 1987, 78–79).

Consequently, a syndemic assemblage has the capacity for compound harm that is greater than the sum of its component disorders and augmented through government or legal authority. We focus on the localized effects of the syndemic assemblage because, as Singer and his colleagues assert, "syndemics arise in populations situated in time and space" (Singer, Bulled, and Leatherman 2022, 12). Thus we explore the compound harm stemming from the COVID-19 pandemic and the ongoing problems of SUD and overdose within a localized context in small-town America. Necessarily, we consider the role of COVID-19 mitigation strategies on the availability and efficacy of existing strategies for addressing and preventing overdose, and for treating substance use disorder.[2]

To address the topic, we study the precarity of underresourced social institutions in small towns and rural areas aimed at addressing overdose and SUD within the context of the global COVID-19 pandemic. Our focus on the problem of overdose mortality enables us to also provide evidence for how COVID-19 complicates overdose prevention and treatment service administration. We specifically examine how the various policies put in place to slow the spread of the virus clashed with systems aimed at the treatment of substance use and consider the capacity for community-wide efforts to prevent overdose deaths. To a lesser extent, but still relevant for consideration of syndemics generally, we also illustrate how the ongoing overdose epidemic impedes readiness for the vital support infrastructure tasked with COVID-19 harm mitigation.

THE SHIFTING OVERDOSE EPIDEMIC

Before COVID-19, the U.S. overdose epidemic manifested in distinct yet overlapping waves (see table 1). In the 2000s, the national trend of overprescribing opioid painkillers resulted in a steady increase in overdose deaths in the United States. When the U.S. government recognized the problem, by the late 2000s, they responded with aggressive measures to curb

1. For brevity and to maintain legibility for a broader audience, we opt for a more general definition of assemblage, necessarily avoiding certain terminology associated with the theoretical system. For instance, we refer to assemblages as complex systems as opposed to *nontotalizable multiplicities*, and discuss components of assemblages as "unique, evolving, social forces" as opposed to discussing the *deterritorialization* and *reterritorialization* of *partial objects* within the *socius*. Likewise, we avoid terms such as *stratification*, which mean very different things in sociology than what is used in the Deleuzo-Guattarian concept of assemblage. To better understand the relationship between our terminology and that of assemblage theory, see Deleuze and Guattari 1987; Delanda 2016; Buchanan 2020. For an example of application of assemblage theory in epidemiology, see Gagnon and Holmes 2016.

2. We wish to acknowledge that, although we are investigating the syndemic effect of COVID-19 mitigation strategies, we do not wish our analysis to be used as validation for antivaccine or related discourses. We acknowledge that the harm mitigation plans in place during the study period were, in fact, both necessary and likely prevented death or serious injury due to COVID-19 for millions of Americans.

Table 1. The Overdose Epidemic Wave Model

#	Range*	Apparent Causes	Implicated Substances
Wave 1	2000–2010	Rx opioids, pill mills	prescription opioids
Interwave Period	2010–2013	pill mill crackdown	prescription opioids, heroin
Wave 2	2013–2015	high demand	heroin
Wave 3	2015–2019	high demand	heroin, fentanyl
Wave 4	2019–2020	ubiquity of fentanyl	stimulants, fentanyl
Wave 5	2020–2022**	COVID-19	stimulants, fentanyl

Source: Authors' tabulation based on Ciccarone 2019; Hainer 2019; Alter and Yeager 2020a; Alter and Yeager 2020b.

Note: * All ranges are approximations, based on sources listed above and as corroborated from interviews and other data collection.

** Ongoing at time of publication.

the prescription of opioids, shutting down and prosecuting some medical providers and pharmacists, effectively signaling the end of overprescribing (Quinones 2015). Despite this aggressive response, these government interventions failed to address or curb the elevated demand for opioids (Ciccarone 2019; Quinones 2015). Consequently, many of the millions of Americans using prescription opioids for nonmedical purposes made the transition en masse to heroin around 2010, a shift that accelerated drug overdose mortality (Ciccarone 2019; NASEM 2017). A third, still deadlier, wave of drug overdoses emerged around 2015, when the influx of synthetic opioids, particularly fentanyl and carfentanil, proliferated within the illicit opioid supply as the demand for heroin increased (Ciccarone 2019). Soon after, these potent synthetic opioids made their way into the illicit stimulant supply, precipitating increased overdose deaths among people who use cocaine and methamphetamine, and shifting the nature of the overdose epidemic again (wave 4) (Hainer 2019). Most recently, the emergence of COVID-19 instigated a further spike in demand and subsequent overdose (Alter and Yeager 2020a, 2020b). Ultimately, the effects of the syndemic assemblage resulting from COVID-19 and related mitigation strategies, when coupled with the ongoing overdose epidemic, constituted a fifth distinct wave of overdose mortality (Burgess-Hull et al. 2022).

As the potential for widespread COVID-19 transmission in the United States became apparent in March 2020, federal, state, and local governments instituted sweeping public health policies designed to stop the viral spread. These policies included stay-at-home orders, social distancing requirements, and restrictions on public gatherings. These policies proved vital for the prevention of widespread COVID-19 infection during the early months of the pandemic (IMHE COVID-19 Forecasting Team 2020; Moreland et al. 2020). COVID-19 mitigation policies nonetheless had unintended consequences. Research indicates that results included widespread adverse mental health outcomes stemming from prolonged social isolation (Khan et al. 2022). Likewise, the closure of nonessential businesses, a necessary component of the global response to the pandemic, dramatically decreased the potential for person-to-person viral spread but had the unintended consequence of driving the U.S. unemployment rate to the highest on record, the highest number of jobs being lost in the leisure and hospitality sector (Falk et al. 2021).

In addition to psychological distress and economic uncertainty, U.S. pandemic mitigation strategies complicated or halted the enactment of various federal, state, and local policies aimed at reducing overdose mortality and supporting people seeking SUD services. The results of these complications included a nationwide spike in overdose deaths followed by a new, higher, baseline of domestic overdose

mortality (Becker and Fiellin 2020; Robeznieks 2020; Volkow 2020). The dramatic increase in overdoses and related deaths during the early months of the COVID-19 dwarfed rates from prior months that were already bleak due to the increased presence of fentanyl analogs in the illicit drug supply (Glober et al. 2020; Mason et al. 2021).

Increased overdose risks affected not only individuals with existing SUD but also people with no existing SUD prior to March 2020. In one study of U.S. psychoactive substance use patterns, 18.2 percent of respondents reported an increase in or the initiation of substance use within two months of the initial stay-at-home orders (McKnight-Eily et al. 2021). Thus evidence suggests that mitigation strategies to prevent the spread of COVID-19 may have increased the likelihood of overdose among populations already at risk and among those previously considered not to be at risk.

Interrelatedly, ongoing overdose and SUD complicated COVID-19 responses. Evidence shows that COVID-19 is deadlier among individuals with SUD (Volkow 2020). Likewise, the ongoing overdose crisis contributed to limitations in institutional responses to the virus, such as decreased hospital capacity, and reduced first-responder efficacy (Ochalek et al. 2020; Volkow 2020). Although COVID-19 rendered overdose deadlier through isolation, increased emergency room visits for nonfatal overdoses strained a system already stretched to capacity due to soaring COVID-19 patient numbers (Ochalek et al. 2020).

Localizing the Syndemic Assemblage

As mentioned, we adopt a locally situated perspective. In so doing, we join other researchers addressing issues of locality within the larger global impact of COVID-19. For instance, research shows how community-based organizations (CBOs) in the San Francisco Bay Area shifted their services to better address inequality in the social and structural determinants of health amid the COVID-19 pandemic (Cohen et al. 2022, this issue). SUD and overdose rates varied between urban and non-urban places before the COVID-19 pandemic (Monnat and Rigg 2016; Young, Havens, and Leukefeld 2012). This variation, however, shifted in response to the pandemic. For instance, state-mandated stay-at-home orders were associated with a 17.59 percent increase in overall incidence of overdose nationwide and with increases in overdose numbers in 61.84 percent of counties monitored by the Overdose Detection Mapping Application Program (ODMAP) (Alter and Yeager 2020a, 2020b). Notably, ODMAP reports from five U.S. states detailed a shift in the most severe overdose issues from urban to non-urban counties (Alter and Yeager 2020a, 3). Overdose numbers soared in rural areas, suburbs, small-town micropolitans, and the infrastructurally interdependent surrounding micropolitan statistical areas (μSAs) (Alter and Yeager 2020a, 3).

With the shift from rural to urban in mind, we use a *localizing* view of the global COVID-19 pandemic. Thus we consider how global processes influence conditions within a locality as, in turn, local actors and conditions shape the relevance of global contexts (Long 2003). Addressing syndemics through a localizing perspective offers an opportunity to study the interconnections between diseases and specific local conditions. We therefore conceptualize *localized syndemic assemblages* as a combination of two or more diseases, as enhanced or attenuated through relevant laws, policies, and practices, and situated within the context of specific local conditions.

Site of the Research

Sandusky, Ohio, is a Rust Belt town with a population of approximately twenty-five thousand residents, situated along the shoreline of Lake Erie (U.S. Census Bureau 2019). Sandusky, and the rest of Erie County, comprise the Sandusky μSA. The main industry is tourism and hospitality. The town's main tourist attraction, Cedar Point Amusement Park, draws millions of visitors to the area annually (OLESI 2017). Despite the popularity of Cedar Point, Sandusky has had decades of economic uncertainty and has poverty and violent crime rates far above the national average (U.S. Census Bureau 2019; Hackworth 2018). Sandusky also hosts a thriving illicit drug market, as evidenced by a recent seventeen-count indictment in U.S. District Court involving seven Sandusky residents, and by several other court cases in recent years, in-

cluding *State v. Reed*,[3] *State v. Leavell*,[4] and *State v. Nettles* (Dunn 2019).[5] The town's vital tourism industry, perennial economic blight, and active clandestine drug economy establish Sandusky as a dynamic research setting, full of complexity, and contradictions. This dynamism provides a distinct challenge to existing conceptions of small-town life and the potential impact a global pandemic may have on the lives of small-town residents.

RESEARCH DESIGN

We advance the literature on syndemics through a novel consideration of the local effects of COVID-19, SUD, and overdose in Sandusky, Ohio, and the surrounding μSA (Long 2003; Singer 2009). In so doing, we show how two otherwise thoughtful public health plans clashed to create unforeseen consequences. We draw on ethnographic, interview, and institutional data to identify relevant aspects of the local SUD and overdose assemblage before the COVID-19 pandemic, contrasting these elements with the subsequent syndemic assemblage. We consolidate ongoing ethnographic data collection, police incident reports, and interviews with local area residents during an eleven-month pre-COVID comparison period and again during the first eleven months of the pandemic.

The Sandusky Police Department (SPD) makes incident reports available publicly through a case reporting system called Glyph reports. We extract all available Glyph reports related to drug overdoses before and during the COVID-19 pandemic. We collect and analyze all available reports from the following three categories: narcotics overdose, EMS-overdose or poisoning, and death investigations (collectively *overdose calls*).[6] We carefully read each Glyph report, employing thematic coding of the reporting officer's narrative of the event. We code Glyph report data, both to compare report rates and to identify shifts in narrative thematic patterns. Our findings provide relevant insights from police engagement with overdose events, highlighting the importance of community involvement, including eyewitness reporting, as a prerequisite for effective emergency response by police and other first responders.

In addition to Glyph reports, we conduct interviews with participants who live and work in the Sandusky μSA, including interviews with first responders, medical professionals, and people with SUD or a relevant personal history of psychoactive substance use. Using the best practices set forth by qualitative researcher methodologists Yan Zhang, Barbara Wildemuth, and Michael Quinn Patton; we opt for an ongoing unstructured interview approach (Zhang and Wildemuth 2009; Patton 2002). We employ thematic coding to address issues and conditions that exist throughout the study period and add greater depth to the identification of situational changes emerging during the COVID-19 period.

Our interview sample consists of thirty-two in-person and telephone interviews; seventeen before COVID-19 and thirteen after. We interviewed a total of twenty-five participants, some participants receiving follow-up interviews within the study period. Every participant either works or resides in Sandusky and all have some relationship, personally or professionally, to SUD and overdose. Interview participants include one active fentanyl and methamphetamine user ($n = 1$), several former drug users ($n = 19$), some of whom are now either recovery professionals ($n = 6$) or active nonprofessional recovery advocates in the community ($n = 4$). The interview sample includes four area residents with no relevant substance use history but possessing relevant professional insights, including a former parole officer, and a full-time emergency medical technician (EMT) and

3. *State v. Reed*, 2020-Ohio-138.

4. *State v. Leavell*, 2016-Ohio-5275.

5. *State v. Nettles*, 2018-Ohio-4908, appeal allowed, 2019-Ohio-1315, 155 Ohio St. 3d 1419, 120 N.E.3d 865.

6. Death investigations are conducted for a variety of reasons and in a variety of circumstances. We coded the narrative in each death investigation and consulted outside sources to confirm that the death involved an overdose.

Table 2. Erie County, Ohio: SUD, Overdose Mitigation Strategies, and Syndemic Disruptions

September 2016	ORC 2925.11 strengthens legal protection for 'Good Samaritans.'
January 2018	ECHD opens detox facility and adopts Project DAWN.
March 2020	Several area manufacturing companies temporarily shut down.
April 13, 2020	IRS begins distributing Economic Impact Payments.
April 2020	Erie County's unemployment rate becomes the highest in the state at 25.4 percent.
May 2020	Erie County's unemployment rate remains the highest in the state: 19.9 percent.
July 2020	Ohio records a 29 percent increase in overdose deaths for the first half of 2020.
July 13, 2020	Erie County experiences a 23 percent increase in COVID-19 cases and a sharp increase in emergency room visits within a two-week period.
August 5, 2020	Erie County Health Department announces a major spike in overdoses.

Source: Authors' tabulation.

911 dispatcher. We combine these data with ethnographic research and information from available community resources to provide an in-depth interrogation of the syndemic assemblage of COVID-19, SUD, and overdose.

BACKGROUND

In the years preceding the COVID-19 pandemic, federal, state, and local county government agencies initiated several legal and policy changes to address the steady increase of overdose deaths. Table 2 provides a timeline for some of the most significant changes relevant to the Sandusky μSA, beginning with the 2016 update to Ohio Revised Code 2925.11; better known as Ohio's Good Samaritan Law (Ohio Legislative Service Commission 2019).[7] The updated law shields most bystanders from arrest or prosecution if police find drugs during an overdose, a policy known to dramatically increase the likelihood of bystanders calling 911 (Banta-Green et al. 2011; Jakubowski et al. 2018) Erie County Health Department later established the area's only state-run detox facility, adopted Ohio's Project DAWN initiative to facilitate the distribution of naloxone (Narcan), and developed an official relationship with local CBO, Sandusky Artisans Recovery Community Center (SARCC) (Jackson 2018; Ohio Department of Health 2020; SARCC 2019).

COVID-19 produced significant negative economic impacts for the Sandusky μSA. Tourism and manufacturing, both central to the local economy, experienced an almost total shutdown for several months. Manufacturers deemed nonessential laid off thousands of area residents (Harrington 2020; Sandusky Register 2020). The Cedar Point amusement park delayed its season by nearly four months and maintained limited operations throughout the remainder of its seasonal schedule (Naymik 2020). As a result, Erie County's unemployment rate was 25.4 percent in April 2020, maintaining the highest unemployment rate in Ohio for two months (Bureau of Labor Statistics 2020). The high rate is particularly relevant within this study due to the positive association between economic stressors and substance use (Bruguera et al. 2018).

FINDINGS

The contrast between Sandusky's overdose and substance use problem before and during the COVID-19 pandemic illustrates the consequences of local syndemic assemblages. Sandusky experienced a greater than 50 percent increase in overdose calls between the pre-COVID ($n = 63$) and COVID-19 ($n = 95$) study periods. Moreover, six deaths were confirmed during the COVID-19 study period and none reported in the pre-COVID period.

The strongest thematic categories in the

7. Two policies cover eyewitnesses, ORC 2925.11B(2)(c)(i), and persons experiencing an overdose, ORC 2925.11B(2)(c)(ii).

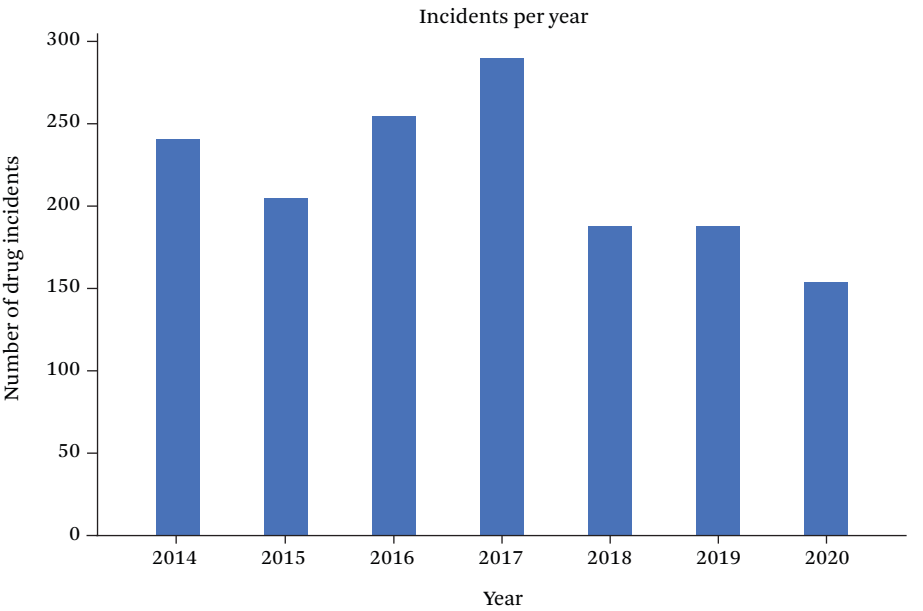
data concern the use of Narcan by police officers, citizen knowledge of Narcan deployment and availability, and the observance of new laws and policies. Before COVID-19, prior interactions with individuals who had a history of overdose helped police make fast decisions to deploy life-saving treatments such as Narcan. Illicit substances were ever present but often included ersatz synthetic opioids, even in the case of psychostimulants, a substitution that rendered all such substances deadlier. Among people who use drugs, *user-dealers*, or people who both consume and sell drugs, keep Narcan handy to avoid overdoses. First responders deal with resuscitating individuals, including friends, and loved ones. None of these elements disappeared due to COVID-19. On the contrary, general and economic uncertainty, social isolation, and the inability of government institutions to accommodate at-risk populations combined to exacerbate the already worrisome local overdose and SUD situation.

Police Data on Substance Use and Overdose

Figure 1 plots the number of drug-related police interactions in Sandusky in recent years, demonstrating the pervasive presence of illicit psychoactive substances. At first glance, the number of drug-related police contacts in Sandusky for 2020 may suggest a decrease in drug availability, as the number represents a seven-year low. In truth, this mirrors the national trend during the early months of the COVID-19 pandemic as policing priorities changed and overall crime rates declined (Abrams 2021; Sisak, Bleiberg, and Dazio 2020). Notably, the decrease in police drug contacts is far less pronounced in Sandusky than in most major metropolitan areas during, and because of, stay-at-home orders (Abrams 2021).

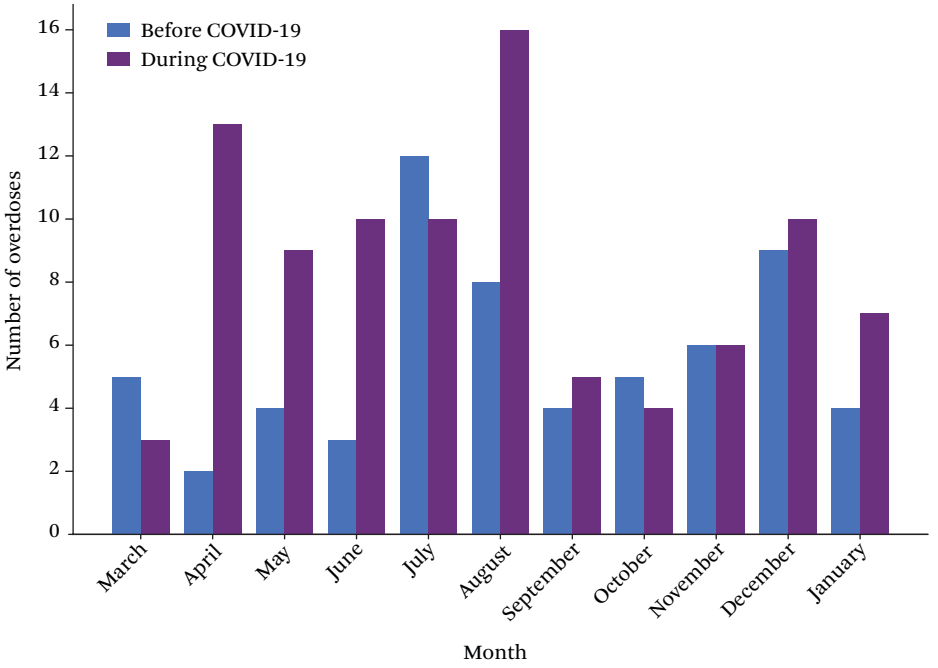
Figure 2 compares the number of overdose calls in each matched month of the studied period. Despite decreased drug contacts overall, overdose calls increased during the COVID-19 period. From April to June 2020, when unemployment was highest in Erie County and tighter restrictions caused social and economic uncertainty, the number of overdose-related calls for service significantly outpaced the prior year. The month with the highest overall calls for service, August 2020, coincided with a significant spike in overdoses in the county (Jackson 2020a). More overdose

Figure 1. Yearly Number of Drug Contacts by Sandusky Police



Source: Authors' tabulation.

Figure 2. Overdoses in Sandusky



Source: Authors' tabulation.
Note: March 9, 2019, through January 31, 2020, and March 9, 2020, through January 31, 2021.

calls were made for service during the COVID-19 period in eight out of the eleven months relative to the pre-COVID period. The COVID-19 period also had a higher number of overdose calls for service overall.

Overdose Reversal and Official Use of Narcan

Glyph reports demonstrate that knowledge of signs of overdose, access to Narcan, and changes in drug policy all factor into the official SPD overdose response, both before and during COVID-19. In their reports, officers regularly explain how they know someone was experiencing an overdose. Common symptoms of overdose noted by officers include pinpoint pupils, skin with a blue or purple hue, trouble breathing, and appearing lifeless. Officers used these observations and any information from witnesses on the scene to justify deploying Narcan before emergency medical services (EMS) arrived. Narcan had a positive effect in most cases, though sometimes it took multiple doses from police officers and other first responders. Officers applied numerous medical techniques to reverse an overdose. For instance, one report stated, "An officer attempted a sternum rub in attempts to wake Bonnie. I administered 2 doses of nasal Narcan with attempts to rouse [her] between them. Bonnie was barely breathing and still unconscious. SFD arrived on scene and administered an additional 8 doses of Narcan."

Police employed sternum rubs and cardiopulmonary resuscitation (CPR), sometimes in tandem with the deployment of Narcan. In total, Narcan was deployed in 71 percent of overdose calls across both study periods.

Officers relied on prior knowledge of an individual's substance use history in their decision to deploy Narcan. The data included several such cases, reports referencing as many as five prior overdoses known to the police. One officer explained his decision-making calculus: "I had prior knowledge that Danielle was [a] user of opiates so I administered 1 dose of Narcan and began chest compression to get the oxygen moving through her lungs. I received reaction to the first dose and administered an-

other. I continued the compressions and [she] woke up."

This excerpt illustrates an essential aspect of small-town police involvement in life-saving medical treatment. The likelihood is greater that police officers in small-town settings might be familiar with prior drug use or overdose among their constituents than their counterparts in larger jurisdictions.

Police capacity to respond to the incidence of overdose relies heavily on the information of bystanders and their capacity to contact authorities. Before COVID-19, this capacity was greatly expanded by Ohio's Good Samaritan Laws. Friends, acquaintances, or strangers that witnessed an overdose, whether in a private residence or public space, could dial 911 and report the incident, even if they might otherwise fear their own drug charges from such an interaction. As we show later, the social isolation from stay-at-home orders meant to stop the spread of the coronavirus had the unintended consequence of reducing the likelihood that an eyewitness would be present at the time of an overdose. Relatedly, as the next section illustrates, a well-informed citizenry, once able to react immediately to an overdose event, was rendered ineffectual by social distancing guidelines.

Civilian Narcan Use

Before COVID-19, Glyph reports describe bystanders, friends, family, and other witnesses deploying Narcan directly before police arrived at an overdose call. One report reads, "On arrival, I was directed to the kitchen where Otto was unconscious on the floor. Several empty packs of Narcan were laying next to [him]. There were several subjects in the residence who left as soon as I arrived."

Bystander deployment of Narcan has important implications. First, it illustrates community members' awareness and the capacity to recognize and reverse an overdose. Lisa told officers that a man had overdosed in front of her in one such incident: "so she ran next door and borrowed Narcan from the neighbors." Lisa's actions represent cases where bystanders might not have Narcan on their person but possess knowledge of other community members who do. Witnesses provided detailed information to SPD, local EMS, or Sandusky Fire Department (SFD) regarding Narcan administration.

Second, an unknown number of residents have overdosed and avoided contact with police through peer or bystander intervention. Prior to the COVID-19 pandemic, this meant that someone using substances with overdose potential could rely on a friend or co-user to reverse an overdose if needed. During the COVID-19 period, however, social isolation and long-term stay-at-home orders enhanced this population's vulnerability, due to a lack of available bystanders to witness and report an overdose.

Law, Policy, and Procedure

The Glyph reports document the enactment of Good Samaritan Laws before the emergence of COVID-19. SPD officers cross-referenced a mobile digital terminal system, called ALERT, to determine whether criminal charges were warranted at the scene of an overdose. In keeping with Ohio law, one officer reported as follows: "I checked ALERT and learned that Richard had no previous overdoses, so Richard will not be charged with Possession of Marijuana or Drug Paraphernalia. Due to this, these items were retained and placed in the Evidence Receiving Room (ERR) for disposal."

Richard, an eyewitness who might have otherwise fled the scene without contacting authorities, reported the overdose and stayed onsite long enough to interact with the reporting officer. Examples such as these provide instrumental insight, further illustrating the importance of Good Samaritan Laws. Unfortunately, the need for social distancing necessarily reduced the efficacy of these laws, contributing to the syndemic effect of COVID-19 on overdose prevention.

Drug User-Dealers, Narcan, and the Availability of Narcotics

As confirmed in police Glyph reports, substances such as the highly potent synthetic opioid fentanyl, and its more concentrated analog carfentanil, remained readily available in the local drug supply alongside cannabis, methamphetamine, and other psychoactive substances. Although less readily available than metham-

phetamine and fentanyl, heroin and cocaine are also present throughout the study period. Frequently, substances sold as heroin or fentanyl may instead contain carfentanil or some other, highly concentrated opioid, making the potency variable and the risk of overdose greater. Our data shows that, for this and several reasons, many local user-dealers, those who both use and sell illicit psychoactive substances, maintain a ready supply of Narcan.

Much of our information on the inner workings of the local drug market comes from Zachary, a one-time user-dealer and frequent user of heroin, fentanyl, and methamphetamine. Zachary has intimate and extensive knowledge of local fentanyl and methamphetamine availability in Sandusky. Zachary informs us that he regularly purchases fentanyl from as many as six user-dealers, many of whom he has known most of his life.

User-dealers often use their residences for illegal drug sales. Most people selling fentanyl expect buyers to use some portion of their product onsite in front of them to prove that they are not working with the police. This, however, creates an additional concern: the potential for a customer to overdose onsite. According to Zachary, the concern, then, is that if an overdose proves fatal, the user-dealer might then "catch a body," that is, be charged with involuntary manslaughter. These concerns motivate user-dealers to maintain a supply of Narcan in house. Zachary illustrates such a scenario: "My one buddy, I've known him forever. He sells dope. So, like I said, somebody went to his house to get some. And he wasn't letting nobody use at his house because of that reason, but he must have been comfortable letting this kid. I don't know how long, how much he did, but he f—ing fell out. Luckily, they had Narcan at the house. The Narcanned him and brought him back to, but it's just too scary, man."

User-dealers have multiple reasons to maintain a ready supply of Narcan to prevent the death of friends and customers and prevent their overdoses. Zachary's account mirrors the use of Narcan by ordinary citizens in the Glyph reports but also confirms that, unbeknownst to police and official records, nonfatal overdose events are occurring in the community.

To further supplement official police data on area overdoses, we spoke with Joe, an EMT and 911 dispatcher working in the Sandusky μSA. Joe has extensive and up-to-date knowledge of the local overdose problem. Although police are routinely onsite for overdose calls, EMTs are more intimately acquainted with the outcomes of overdose victims, whether fatal or otherwise. Joe's experience as a small-town EMT includes responding to overdose calls for friends, neighbors, and relatives. According to Joe, and later corroborated by a few of his fellow EMTs, this was a common occurrence before COVID-19. As stressful and emotionally tasking as his position was before COVID-19, Joe later explains that the pandemic made the local drug problem, and his job more broadly, significantly worse. We next provide an in-depth description of the syndemic impact of COVID-19 on first responders, substance users, and recovery support personnel in the area.

THE SYNDEMIC IMPACT OF COVID-19

As the threat of the SARS-CoV-2 virus became a reality in the United States, federal and state governments announced strategies designed to slow the viral spread based on guidelines from federal and state agencies. The CDC recommended the restriction of large gatherings and travel, widespread stay-at-home orders for high-density population centers, and closing schools to impede community spread (Schuchat and CDC COVID-19 and Response Team 2020). The widespread layoffs, cancellation or delay of medical and psychiatric treatment, and suspension of daily routine that followed were known risk factors for anxiety and depression (Blustein et al. 2020; Venkatesh and Edirappuli 2020). Relatedly, research identified COVID-19 as a risk factor for new addictive behaviors, relapse, and SUD, citing decreases in overall health and wellness resulting from social isolation, fear of job loss, and concerns over financial stability and viral infection (Dubey et al. 2020). Taken together, the negative unintended consequences of COVID-19 precautions constitute a second-order impact with syndemogenic effects.

At the start of the COVID-19 study period, as Ohio issued stay-at-home orders, problem drug use and overdose increased in the Sandusky area. For area residents dealing with SUD, the

loss of regular routine and services meant an increased potential for relapse (Dubey et al. 2020). Mental health support, treatment for addiction, and recovery support services disappeared for weeks as providers scrambled to transition from in-person to digital formats. Several certified peer recovery specialists (CPRS) asserted that the loss of vital mental health and recovery resources, coupled with prolonged social isolation, caused the spike in overdose deaths.

As the early months of the pandemic progressed, most recovery professionals and volunteers transitioned to virtual meeting platforms though a few opted to disregard CDC guidelines and reinstate in-person meetings. The transition to virtual recovery services, a lifesaver for some, proved impossible for others due to a lack of access to digital communications technology. COVID-19 also meant that first responders worked longer hours, often short staffed due to outbreaks of the virus within their ranks, and that colleagues quit because of burnout. Although first responders cope with fatigue, uncertainty, and constant risk, peer recovery supporters report trauma fatigue, exasperation, and frustration associated with an inability to provide services at the rate they could before COVID-19.

Recovery Services During COVID-19

One major local syndemic effect in the early months of the pandemic was the short-term loss and long-term impediment of community-based and professional addiction services, such as 12-Step groups and intensive outpatient programs (IOPs). The recovery professionals we interviewed implicated social distancing guidelines in an inability to provide official and unofficial addiction and recovery services. The result, according to our interview participants, was a rise in relapses that led to the spike in overdose deaths during the early months of the pandemic.

The lack of available services, along with the implicit need to move in-person services to virtual left several within the local recovery community uneasy. In the early days of statewide and national shutdowns, Howard, a CPRS, began implementing a plan to host virtual meetings through SARCC. As a person in addiction recovery with a 12-Step background, Howard values his anonymity and initially expressed reluctance in virtual meetings, saying, "my confidentiality is shot, I didn't have any interest in it." Still, he began the process and became a major proponent for virtual recovery meetings. Additionally, Howard and his partner are both immunocompromised and cite virtual meetings as a significant factor in their continued health and wellness.

Months after the initial shock of global shutdown and widespread social isolation, most 12-Step and similar recovery meetings switched from an in-person to a virtual meeting format or went to a group telephone system. Despite these resources, many area residents still had no way to access these services. A few CPRS and volunteer peer supporters point out that not all their clients have access to laptops or smartphones. Many vulnerable people became isolated during stay-at-home orders because of this new digital divide.

Gary, a CPRS who personally relies on 12-Step recovery meetings, decided to start an open-air Narcotics Anonymous (NA) meeting in a public park while social distancing guidelines still limited public gatherings. Gary estimates that this weekly NA meeting averages fifteen to twenty people, more than the CDC recommendation for public gatherings at the time. Gary expressed a belief that the need for in-person meetings outweighed the potential risk of COVID-19 transmission: "For a while we didn't have meetings. I think after like seventy-five or eighty days, and a few phone calls from people I said, well, you know what, let's get together. You know, I got a lot of people [saying] 'no, no, no, no.' I said, well, the disease [of addiction] is running rampant right now. We need to get together. Sometimes, just the fellowship helps you."

Gary's assertion that addiction is "running rampant" during the early months of the COVID-19 pandemic, though it does not fully recognize the safety concerns inherent in the spread of SARS-CoV-2, nonetheless points out the concern among those in the recovery community. As we demonstrate, by the time of Gary's decision to hold an open-air NA meeting, COVID-19 had already become associated with a massive increase in overdose deaths in the local area.

Mental Health During a Syndemic

Mental health challenges are associated with new substance abuse and relapse (Dubey et al. 2020). Area residents we interviewed described emergent mental distress due to social isolation and a pervasive fear of the unknown. Relatedly, medical professionals pointed to a potential mental health crisis in the Sandusky area due to COVID-19. Because trauma, depression, and suicidal ideation are all associated with an enhanced risk of overdose, we highlight how these risk factors increased in prevalence within the area due to COVID-19 (APA 2013).

In our discussion with Howard, he expressed concerns that a severe mental health crisis had developed in the area because of COVID-19. Like Howard, both a CPRS and a paraprofessional working with the Erie County Health Department, many of his colleagues straddle multiple institutional and noninstitutional roles and echoed this concern. Irene, a CPRS who manages a local crisis hotline for a local hospital, is also active in the 12-Step recovery community. Irene expressed concerns over the interrelated health crises of alcohol and other drug abuse (AOD) alongside mental health in the area. Irene explained that, like overdose death rates, area suicide rates were "going through the roof" during the COVID-19 study period. She further described that the local crisis hotline experienced a dramatic increase in calls, especially among adolescents, "because of COVID." When asked whether these adolescents were calling due to mental health or substance abuse issues, Irene replied, "Both. You know, how it is with adolescents and kids, a lot of them don't want to admit to AOD issues, because they're afraid of getting in trouble. But I have had some that do. A huge majority of it is, with the adolescents, is suicidal thoughts. Because I feel like typically, the parents feel like they can handle it until it reaches that level."

Irene, like Howard, hoped to sound the alarm about widespread declines in mental health in the Sandusky area due to COVID-19. Despite the dire state of mental health locally, Irene sought to maintain a positive overall outlook during our discussion. For Irene, and many of the people we interviewed, any positivity was hard fought, if possible.

Patricia, a former opioid addict turned volunteer recovery advocate, decried the loss of regular in-person contact. She espoused newfound pessimism in explaining that COVID-19 rendered her work, connecting active drug users with recovery services, nearly impossible. Worse still, Patricia described the chaotic uncertainty and recurring tragedy that she experienced as halfway houses and sober living facilities abruptly reduced their capacity or ceased operations entirely in the early weeks of adjusting to COVID-19 restrictions. She explained: "Unfortunately, there's so many different facets to this nightmare that there is not a solution. It's not just a financial solution, because I had an eighteen-year-old girl that I had in [a sober living house] for six months. Then when COVID happened; she left, lived in a tent, got her stimulus check, and was dead within twelve hours [in a nearby city]."

Patricia insisted that this story was not unique and that situations had not improved after the initial lockdown period. Patricia reported that, in a rural county adjacent to Erie County, fifty-eight people overdosed between mid-December 2020 and mid-January 2021; about 40 percent were fatal.

Patricia continued to explain that restrictions related to COVID-19 forced her clients to contend with months-long wait times for medically assisted treatment (MAT). State laws require that MAT prescriptions be refilled in person. In addition to long waits for MAT, IOP providers that once served upward of twenty-five people per day capped their enrollment at ten participants to comply with social distancing protocols. Patricia described the precarity of the situation, further aggravated by the death of loved ones due to COVID-19, through the experiences of two of her colleagues: "[My one friend is] heartbroken. There was a two-week period where every other day she was posting one of her girls had overdosed and died, and it just broke my heart because she doesn't do the job for the money. [My other friend] lost her father to COVID complications, and she's [only able to serve] half of her IOP class."

Institutional Disarray

Interviews repeatedly implicate COVID-related restrictions as contributing factors in delays and breakdowns in services and public safety. Likewise, interview participants highlighted the inability of government agencies to address issues posed by COVID-19 restrictions and the impact these failures had on vulnerable populations. For instance, Patricia tells of an issue that she encountered at several county jails in the area: a failure to produce COVID-safe ways for inmates to be reached by anyone outside the county lockup. Before COVID-19, most local county jails maintained a videophone system to communicate with inmates. Ordinarily, videophones are available for public use via a proprietary prepaid phone card and accessible in a public lobby area. During the height of COVID-19 restrictions, videophones were inaccessible. Patricia explained how this restriction affects an already damaged system of justice during the pandemic: "[Attorneys] are struggling with not being able to have communication with their clients prior to hearings that are being postponed beyond belief. They're postponed six months out! They can't see their clients. Their clients are sitting in jail without any treatment services, without any religious services, without any visitation."

This failure to address gaps in existing communications systems placed undue stress on inmates, their families, and legal representation. Patricia adds that other services available to inmates before the pandemic, including addiction treatment, were suspended because of COVID-19.

First responders dealt with long shifts for days or weeks during the early months of the pandemic. These extended hours, coupled with increased health risks, led to career-ending burnout. Joe described working long hours as an EMT and 911 dispatcher and struggling to manage the stress of being on the front lines of an overdose epidemic during a viral pandemic. When we interviewed Joe, his day included a standard twelve-hour shift as a 911 dispatcher: the shortest shift for him in weeks and the first of a scheduled ten-day stretch. COVID-19 outbreaks forced multiple ambulance stations in the area to close due to a lack of available staff. Joe's station, too, was short staffed for months. This resulted in chronic exhaustion, or burnout, for EMTs and other first responders. In addition to burnout, viral outbreaks, and related first-responder turnover; Joe stated that EMTs were forced to reuse personal protective equipment "until they're soiled." This likely contributed to several of Joe's fellow EMTs contracting COVID-19, resulting in fewer available EMTs and longer work shifts for those who remained. Joe explained: "People are burned out, or tired. My boss, who just left here a few minutes ago, has not seen his house in three days. He's been hopping from station to station to station because we're closed. We got people out sick, and we got people quitting because they're tired. They're burned out! They're sick of getting run. You come in on an ambulance and you're gonna run twenty-three or twenty-four hours, and it's gonna be nonstop balls-to-the-wall."

Another aspect of the impossible working situations for EMTs was patient transport logistics. When COVID-19 infection rates were at their peak, hospitals statewide filled up with patients, forcing ambulances in Joe's company to transport patients upward of a hundred miles to the nearest available facility. This excess travel decreased first-responder capacity to respond to drug overdoses and other life-threatening emergencies. Conversely, until first responders began receiving the new COVID-19 vaccine, toward the end of the study period, every overdose call constituted another chance for an EMT to contract COVID-19. If we consider the decrease in first-responder readiness, as Joe illustrates, alongside the increase in substance use relapses among people in long-term recovery, as Gary suggests, and the widespread mental health struggles that Irene dealt with daily through the local crisis hotline—the syndemic effects of COVID-19 on the health of the local population in general, and elevated overdose mortality risk, becomes evident. Likewise, Joe points out that the increase in overdose calls diminished EMT readiness, leading to longer wait times for COVID-19 patients needing transportation to hospitals and other emergency care necessities.

DISCUSSION

The local syndemic assemblage of COVID-19, SUD, and drug overdose exacerbated already staggering overdose death rates. Extensive layoffs, an indirect effect of government COVID-19 safety guidelines, illustrate the multiplicative effects of COVID-19 on poverty, itself already endemic in the Sandusky area. The lives of the area's most vulnerable residents shifted from challenging to critical when economic uncertainty increased and vital social institutions shut down. Mental health deterioration at the community level, suicidal ideation increasing among adolescents, and problem substance use all fall under the heading of collectively enmeshed public health crises within the local area alongside the threat of the SARS-CoV-2 virus (Singer 2009).

Having focused on how COVID-19 made the overdose and substance use problems worse, we believe it is important to reiterate that substance use also increases the potential for COVID-19 illness to be more life threatening (Gao et al. 2021; Volkow 2020). In a more localized context, drug-seeking behavior such as breaking stay-at-home orders to procure psychoactive substances added increased risk for COVID-19 transmission.

The Sandusky μSA syndemic assemblage, though unique in its composition, provides useful principles for future research. Social structural elements exist as components of an assemblage within a localized sociogeographic context. Rather than focusing exclusively on any one element (such as access to Narcan) in isolation, we seek out many relevant elements and consider how they function together as a system. Without taking the syndemic relationships between diseases and social ills into account, health and public policy responses fail to account for distinct, yet recognizable, variation in risk and outcome.

Sandusky represents a single small-town area, with its own distinct local syndemic assemblage. We recognize that other areas will have differing syndemic assemblages. Consider, for instance, a similarly populated area with higher-than-average incomes; their COVID-19 risk may be the same, as could their chances of overdose. However, the more affluent area is less likely to be significantly affected by layoffs and to have greater resources to access supplemental mental health and recovery services. Thus assessment and planning for future syndemics, and the recognition of existing syndemics, requires local assessment of potential complications from emerging or proposed guidelines, policies, or procedures.

Our data suggest several potential policy interventions. Our research suggests the necessity for enhanced mental health and wellness services for all community members during global crises and prolonged periods of socioeconomic uncertainty. Any plan seeking to address social isolation to promote community health, especially mental health, must first address the digital divide within the community. Finally, we assert the need for future crisis planning to presuppose the potential for localized syndemic effects and consider the interaction of existing public health epidemics and relevant socioeconomic conditions when formulating mitigation strategies.

We argue that any consideration of locally overlapping health crises in isolation mischaracterizes their cumulative impact. COVID-19 initiated an unprecedented change to daily life and social conditions globally, but syndemics are best understood within their local contexts. The overdose epidemic was never an isolated issue, implicating various inequalities as contributing factors and potential outcomes. Although referring to COVID-19 as a pandemic and characterizing SUD, overdoses, and related deaths collectively as an epidemic, we must stress that they are in no way distinct in terms of effects when cooccurring. Our research illustrates this.

CONCLUSION

In this study, we consider official police data, qualitative interview, and ethnographic data to explore the synergistic interaction between the emergence of COVID-19 and a community experiencing a deadly overdose epidemic. We assert that the two crises combined, and thus made up a syndemic, creating unique complications within the local, small-town context. It is this context, the laws, local socioeconomic conditions, and access to needed services, that join to form the local syndemic assemblage. In this study, we consider the laws, policies, and

services operating in Sandusky, Ohio. We find the life-saving availability of naloxone (Narcan) by first responders and Good Samaritan laws aimed to help overdose reporting were obstructed by COVID-19 guidelines and the policies they precipitated. COVID-19 further complicated the existing overdose situation in the local area, posing new obstacles for people seeking services for substance use disorder, and for service providers. Our research demonstrates how COVID-19 exacerbated the ongoing overdose crisis, amalgamating with it to form a distinct syndemic assemblage and ensuring that any interventions that failed to address both problems were unable to address either.

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