

REVIEW ARTICLE

Pediatrics

# Emergency department strategies to combat the opioid crisis in children and adolescents

Cindy D. Chang MD<sup>1</sup> | Mohsen Saidinejad MD, MBA<sup>1</sup> | Zaza Atanelov MD, MPH<sup>2</sup> |  
Ann M. Dietrich MD<sup>3</sup> | Samuel Hiu-Fung Lam MD, MPH<sup>4</sup> | Emily Rose MD<sup>5</sup> |  
Tim Ruttan MD<sup>6</sup> | Sam Shahid MBBS, MPH<sup>7</sup> | Michael J. Stoner MD<sup>8</sup> |  
Carmen Sulton MD<sup>9</sup> | Corrie E. Chumpitazi MD, MS<sup>10</sup> | the ACEP Pediatric Emergency  
Medicine Committee<sup>1</sup>

<sup>1</sup> Department of Emergency Medicine, Harbor UCLA Medical Center, Torrance, California, USA

<sup>2</sup> North Florida Regional Medical Center Emergency Department, HCA/University of Central Florida College of Medicine Consortium, Orlando, Florida, USA

<sup>3</sup> Department of Pediatrics, Ohio University Heritage College of Osteopathic Medicine, Dublin, Ohio, USA

<sup>4</sup> Department of Emergency Medicine, Sutter Medical Center Sacramento, Sacramento, California, USA

<sup>5</sup> Department of Emergency Medicine, Keck School of Medicine of the University of Southern California, Los Angeles, California, USA

<sup>6</sup> Dell Children's Medical Center of Central Texas, Pediatric Emergency Medicine, University of Texas at Austin, Austin, Texas, USA

<sup>7</sup> American College of Emergency Physicians, Dallas, Texas, USA

<sup>8</sup> Nationwide Children's Hospital, The Ohio State University College of Medicine, Columbus, Ohio, USA

<sup>9</sup> Sedation Services, Children's Healthcare of Atlanta at Eagleton, Emory University School of Medicine, Atlanta, Georgia, USA

<sup>10</sup> Department of Pediatrics, Section of Emergency Medicine, Baylor College of Medicine, Houston, Texas, USA

## Correspondence

Corrie E Chumpitazi MD, MS, Baylor College of Medicine, 6621 Fannin Street, Suite A2210, Houston, TX 77030, USA.  
Email: [corriec@bcm.edu](mailto:corriec@bcm.edu)

**Funding and support:** By *JACEP Open* policy, all authors are required to disclose any and all commercial, financial, and other relationships in any way related to the subject of this article as per ICMJE conflict of interest guidelines (see [www.icmje.org](http://www.icmje.org)). The authors have stated that no such relationships exist.

## Abstract

The opioid crisis has greatly affected not only adults but also children as well. As clinicians develop effective approaches to minimize pain and distress in children, the risks and benefits of opioids must be carefully considered. Children of parents with opioid use disorder are also at risk of living in unstable environments, performing poorly academically, engaging in future drug use, and having increased stress, which affects their development before entering adulthood. This statement focuses on the effects of the opioid crisis on children and adolescents and is intended to inform institutional policies, improve education, advocate for evidence-informed guidelines, and improve the care of children affected by the opioid epidemic who are seen in the emergency department.

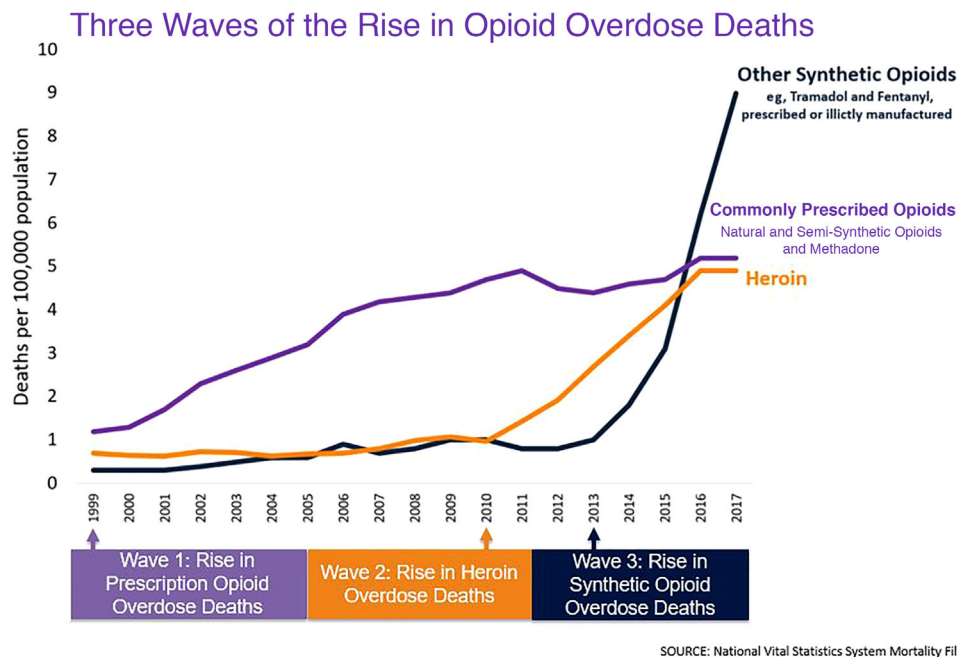
## KEYWORDS

crisis, harms, narcotics, opioid-related disorders, pain management, policy

Supervising Editors: Katherine Edmunds, MD, Med; Sing-Yi Feng, MD.

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial-NoDerivs](https://creativecommons.org/licenses/by-nc-nd/4.0/) License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2021 The Authors. *JACEP Open* published by Wiley Periodicals LLC on behalf of American College of Emergency Physicians



**FIGURE 1** Three waves of the rise in opioid overdose deaths. (Source: Centers for Disease Control and Prevention website)

## 1 | OPIOID CRISIS: EPIDEMIOLOGY

Opioid abuse has long been reported in the medical literature with the current and most recent opioid epidemic in the United States beginning in the 1990s. The increasing prevalence of opioid abuse has consequences not only for the individual patient but also for communities and the healthcare system as a whole. The economic burden of the opioid epidemic is substantial and worsening. Estimates of overall societal costs associated with opioid use disorders have risen from \$11.8 billion in 2001 to \$78.5 billion in 2013 accounting for healthcare cost, loss of productivity, addiction treatment, and criminal justice involvement.<sup>1-3</sup>

As opioid prescriptions have increased, a sharp rise in deaths from opioid overdose has followed. According to the Centers for Disease Control and Prevention (CDC), almost 400,000 people in the United States have died from prescription and illicit opioid overdose, with 2017 figures being 6 times higher than that of 1999.<sup>4</sup> Abuse of synthetic opioids, such as fentanyl and tramadol, currently contribute to the majority of opioid-related deaths in the United States, now outpacing heroin and prescription drugs<sup>4</sup> (Figure 1). In 2018, 2 out of 3 drug overdose deaths involved an opioid, accounting for nearly 47,000 deaths. Alarming, 32% of these deaths involved prescription opioids, such as methadone, oxycodone, and hydrocodone.<sup>5</sup> Opioid abuse leads many individuals to develop an opioid use disorder, which is defined as a problematic pattern of opioid use that leads to clinically significant impairment or distress.<sup>6</sup>

The opioid epidemic has had a significant impact on adolescents, children, and their families. Between 1999 and 2016, a total of 8986 children and adolescents (age < 20 years) died from prescription and illicit opioid poisonings, with the majority of these deaths being among adolescents aged 15–19 years.<sup>7</sup> Most of these deaths were unintentional (80.8%), whereas 5% and 2.4% were attributed to suicide and

homicide, respectively, and the mortality rate in children under 20 years increased nearly 3-fold over that time period. A recent study that analyzed the National Poison Data System between 2005–2017 found that there were 338,476 opioid poisoning incidents reported in children, with a mean age of 9.74 years and the majority being female individuals.<sup>8</sup> Most opioid poisonings occurred in a bimodal age distribution, with the highest peaks noted in children 4 years or younger and those in 15 to 19 years of age. The younger population experienced accidental ingestions, whereas poisoning in the 15 to 19 years age group were mostly intentional.<sup>8</sup> These alarming statistics should be of great concern for all emergency medicine clinicians nationwide and highlight the need to implement emergency department-based interventions to address the rising crisis.

## 2 | RECOMMENDATIONS FOR CLINICAL PRACTICE IN THE ED

In order to combat the opioid crisis among children and adolescents who present to the ED, emergency clinicians should consider the following strategies:

### 2.1 | Identifying at-risk adolescents

According to the 2018 National Survey on Drug Use and Health report, 699,000 adolescents aged 12–17 years and 1.9 million young adults aged 18–25 years misused opioids in the previous year.<sup>9</sup> Motives include to seek relief from physical pain, to feel good or get high, to relax or help with sleep, to help with feelings or emotions, or to experiment. Multiple studies have shown that poverty, lack of school-

ing, exposure to sexual assault and child abuse, other substance use, depression, and disability put adolescents at increased risk of prescription opioid misuse.<sup>10,11</sup> Because most adults with prescription opioid misuse had challenges with drug abuse as adolescents, it is critical to intervene early before adulthood to prevent further risk of addiction and its consequences.<sup>12</sup> The highest rates of overdose deaths are also among individuals that are 25 to 44 years old.<sup>4</sup>

The ED provides a unique opportunity to identify adolescents at risk for opioid dependence, misuse, and abuse. Adolescents often present to the ED with symptoms of opioid overdose or withdrawal but may also present to the ED with a mental health crisis or have legal consequences from being caught with illegal drug substances. It may be helpful to ask screening questions from a normalizing stand point of, "My patients often tell me about their use of tobacco, alcohol, or other drugs that might be effecting their health; have you used any of these in the past year?"

In addition to this question, ED clinicians and/or ancillary staff can also consider using a validated substance abuse screening questionnaire, such as the CRAFFT (Car, Relax, Alone, Forget, Friends, Trouble) tool or Brief Screener for Tobacco, Alcohol, and Other Drugs (BSTAD), to screen for non-medical use of opioids among adolescents, as well as to screen for other drug use.<sup>13-18</sup> Adolescents report greater comfort and likelihood of truthful responses with self-administered questionnaires compared to face-to-face questioning.<sup>19,20</sup>

## 2.2 | Identifying at-risk children with parents who are struggling with opioid use disorder

Recognition of parental opioid abuse, which affects pediatric health outcomes, is also necessary to address the opioid crisis' effects on children. Nationwide, opioid use among pregnant women has increased, leading to a higher rate of infants experiencing symptoms of opioid withdrawal after birth.<sup>19,20</sup> Opioid use among pregnant women is associated with food insecurity and housing instability. These hardships increase risk of depression, intimate partner violence, and delivery of a low-birth-weight infant.<sup>21,22</sup> Despite some pregnant women receiving prenatal care and treatment for opioid use disorder, risk of intimate partner violence is increased.<sup>23</sup> Children who grow up in households where opioid misuse is common also experience increased life stressors, such as parental neglect, higher risk for mental health problems and future drug use, accidental opioid poisoning, and unstable family environments with possible foster care placement or loss of a parent because of substance use disorder.<sup>24</sup> These social determinants of health put children and teenagers at risk of growing up in an unstable environment where they are exposed early in life to opioid misuse, substance use, and possibly subject to drug-related environments.<sup>25</sup>

These adverse childhood events prevent children from growing in a nurturing environment that is critical to their development.

The ED setting presents an excellent opportunity to screen for at-risk children of parents with opioid use disorder. In both adult and pediatric EDs, all individuals are seen regardless of ability to pay, bringing in a large number of individuals who face substance use disorders, food

insecurity, housing instability, and poverty. All EDs should consider having a coordinated and multidisciplinary effort to screen for individuals in their community who suffer from opioid use disorders.

## 2.3 | Establishing an opioid prescription stewardship program

In 2017, over 3.2 million opioid prescriptions were filled for patients <19-years-old in the United States, and just over 10% of those in the 15-19 year age group have filled an opioid prescription in their lifetime.<sup>26</sup> These adolescent years of experimentation bring the largest peak of non-medical opioid use.<sup>27</sup> In 2016, the prevalence of self-reported prescription pain reliever misuse among the 12-17 year age group was 3.5% and increased to 7.1% in the 18-25 year age group (compared to 4.3% for the overall population).<sup>26</sup> Research has shown that increased rates in opioid prescriptions led to more individuals needing treatment for opioid use disorders.<sup>28</sup> Although no clear data exist on the number of opioid addictions resulting from filling or taking a prescription for a single medical encounter, adolescents and young adults who have used prescription opioids are at increased risk of heroin use in the future.<sup>29-31</sup> In a nationwide survey, 12.4% of high school seniors reported lifetime non-medical opioid use, and 1.2% reported lifetime heroin use.<sup>32</sup>

One of the areas of improvement is to implement guidelines in the ED that promote prescribing the lowest quantity of an opioid medication for the shortest period that a patient may need when treating acute pain. It is important for all ED clinicians to adequately treat pain but to prescribe a limited amount. It is known that the majority of adolescents with prescription opioid misuse obtained opioids from a relative or friend.<sup>33</sup> Organized opioid prescribing guidelines in the emergency setting can lead to a standardized and consistent pain management, with an overall decrease in acute parenteral opioid use as well as discharge prescriptions.<sup>34</sup> Oral hydrocodone-containing prescriptions have shown a significant decrease (up to 55%) with the Drug Enforcement Agency (DEA) schedule change from schedule III to schedule II.<sup>35</sup> This change required a written and hand signed prescription be obtained with a visible DEA number for hydrocodone and no refills to be permitted. In the ED, guidelines regarding dosage amount, frequency, and duration of opioid prescriptions should be created to aid all clinicians caring for children and adolescents. Although studies report that <7 days of opioid analgesics<sup>36</sup> are sufficient for most patients seen in primary care settings, for emergency clinicians the goal is often to provide a supply of 3 days or less to ensure the patient establishes care with their primary or specialty referral physician for close follow-up and monitoring. This is also supported by the 2019 surveillance report prepared by the National Center for Injury Prevention and Control, CDC, and the US Department of Health and Human Services where they recommend practitioners to prescribe opioids at the lowest effective dose and that a supply of 3 or fewer days is sufficient and >7 days will rarely be needed in most cases of acute pain unrelated to surgery or trauma.<sup>37</sup> This is supported by the literature that children in acute pain have their most severe pain controlled in that window. Thus, the Amer-

ican College of Emergency Physicians Clinical Policy for adult patients stating that if deemed appropriate, only low-dose, short-acting opioids with a short duration of therapy should be prescribed applies to children as well.<sup>38</sup>

Another area for improvement is creating guidelines on the use of non-opioid treatment options whenever possible for all patients. Clinicians should be prepared to counsel patients on pain management at home with non-opioid alternatives and to use opiate medications only as an adjunct for severe pain and not as a first-line therapy.

ED prescribing clinicians should use their corresponding state's-controlled substance use review system to check how often patients are receiving opioid prescriptions. These drug monitoring programs allow clinicians to safely evaluate whether a patient has become chronically dependent on opiate use.

## 2.4 | Education for practicing and future ED clinicians

To better care for children, it is important for all physicians to be educated on the current opioid crisis, provided with strategies to identify adolescents or parents at risk of opioid use disorder, taught on social determinants of health that affect patients with opioid use disorders, and trained on acute and chronic pain management with opioids and non-opioid alternatives.

Some of the challenges that ED clinicians and their trainees face are (1) how to recognize pain in children, (2) how to ensure we are not undertreating acute pain, and (3) how to know when intravenous opioids are indicated for pain management in children. In the ED, clinicians often struggle to quantify pain and anxiety in their pediatric patients. Younger children are unable to verbalize pain, and preadolescent school-aged children may not be able to describe or quantify pain well. Children with complex medical conditions whose pain responses may be difficult to interpret and older children who are non-verbal pose additional challenges when attempting to interpret pain level. For these children, parent or caregiver input is invaluable as each child expresses pain uniquely. Pain is common in children and is frequently underrecognized and undertreated.<sup>39,40</sup> Despite the significant challenges related to the opioid epidemic, it nonetheless remains the case that in the acute phase, pain is often not well addressed in the emergency setting. Patients with severe acute pain present a challenge to emergency clinicians who must balance the benefits and risks of using opioids to manage pediatric pain. Intravenous opioid medications such as morphine and fentanyl are commonly and effectively used to treat pain because of their quick onset and predictable dosing and are often used for a variety of conditions including fractures, appendicitis, burns, malignancy, and complex laceration repairs. In the acute setting, these medications are essential in the appropriate management of pain in children and should not be withheld for fear of creating dependence. Current research suggests that untreated pain may have significant impacts on pain sensitivity, immune functioning, attitudes, and health-care behavior.<sup>41</sup> Pain that is not addressed and controlled can cause both psychological and physiological harm to a child, leading to fur-

ther impaired functioning and disruption in families. Additionally, children who experience acute pain have increased anxiety and lasting fear about future painful encounters.<sup>42</sup>

Physicians also should involve the entire care team in education on the proper use of opioid and non-opioid alternatives in pediatric patients and the issues highlighted here that affect patient care. It is, therefore, important to correctly identify which child needs opioids to manage their pain in the ED and which child can receive an opioid alternative that can be equally useful. All ED clinicians should be educated on non-opioid pain medication alternatives, including non-steroidal anti-inflammatory drugs, acetaminophen, ketamine, and topical or local analgesics. Distraction and child life programs, if available, can also yield effective results, working both on one's anxiety and focusing away from the acute pain. In 2009, a randomized clinical trial between ibuprofen versus acetaminophen with codeine for pediatric arm fractures showed that there were no significant differences in analgesia between either medications and that children taking ibuprofen in the outpatient setting had fewer side effects and better functional outcomes.<sup>43</sup> Increasing analgesia and opioid-alternatives awareness by physicians through quality initiatives, especially when tied to maintenance of certification, and prescription drug monitoring program mandates offer exciting areas of further research to provide a route to assist with the mission of both education and practice change.

Furthermore, parental education during patient encounter and upon discharge is of utmost importance. Parents should be educated on pain management at home with non-opioid pain medication alternatives and to selectively use opioid medications only when necessary for breakthrough pain. ED clinician should be prepared to educate parents on the benefits and risks of using opioid medications and standardized discharge education on opioid safe storage and disposal information should be provided to patients and their families.

## 2.5 | Initiating medication-assisted treatment in the ED

According to a 2016 policy statement by the American Academy of Pediatrics, medication-assisted treatment (MAT) should be increasingly made available for adolescents and young adults suffering from opioid use disorder.<sup>44</sup> Currently, buprenorphine, a partial opioid agonist, is approved by the US Food and Drug Administration for patients 16 years and older and can be prescribed by physicians who complete 8 hours of training and apply for a prescription waiver.<sup>45</sup> Buprenorphine is currently used as a treatment for opioid use disorder to help with opioid withdrawal symptoms and craving. Over the past years, there have been 2 randomized controlled trials that have shown that combining buprenorphine with substance use counseling improves short-term outcomes for children as young as 13 years of age.<sup>46,47</sup> A non-fatal opioid overdose in the ED is an opportunity to engage adolescents in a MAT program to reduce further risk of opioid-related mortality; however, a study from Massachusetts showed that only 8% of adolescents who had a non-fatal opioid overdose were given MAT within the next 12 months.<sup>24,48</sup> Most of the current MAT literature comes

from the adult population, and further research in the pediatric population is necessary to ensure that all physicians and healthcare practitioners are comfortable with providing MAT treatment to at-risk adolescents.

Providing care for parents with opioid use disorders offers a different set of challenges. Parents and pregnant mothers who misuse opioids may be resistant to seeking treatment for fear of losing custody of their children. Approximately one third of mothers in treatment for opioid use disorders have had a child removed from their home previously.<sup>49</sup> Family dissolution is common once a parent is found to be using illegal substances, and reunification rates are lower for parents with opioid use than those with alcohol or cocaine use.<sup>50</sup> However, it has been shown that MAT in combination with a child welfare-based intervention program is positively associated with parents retaining custody of their children.<sup>51</sup> Further efforts combining pharmacologic treatment, counseling and behavioral therapy, and child-welfare agencies that focus on parental support and training are essential in order to meet the needs of children and their families who suffer from opioid abuse. Family reunification is also important given that parents with opioid use disorders who have custody of their children have higher rates of recovery.<sup>52</sup> Most patients who present to the ED with opioid withdrawal symptoms or after an overdose present an opportunity for clinicians to consider offering MAT. In addition to providing MAT, it is important for all clinicians to also consider naloxone for at-risk adolescents and educate them on its use.<sup>53</sup>

MAT has also become the standard of treatment for pregnant women with opioid use disorder and has been shown to be safe and effective in pregnancy.<sup>54-56</sup> However, system-level barriers exist that prevent successful entry of pregnant women into MAT programs, with only 26% of drug courts allowing pregnant women to be treated with MAT despite evidence that shows that MAT increases the likelihood of family reunification.<sup>24,51</sup> In the country, less than half of the states have substance use treatment programs specifically for pregnant women, and most of these programs are located in urban areas.<sup>57,58</sup> There is an urgent need to provide nationally a coordinated and evidence-based approach treatment for all parents and pregnant women with opioid use disorders. Several screening tools, such as the SURP-P (Substance Use Risk Profile-Pregnancy) scale, 4P's Plus, National Institute on Drug Abuse Quick Screen-ASSIST (Modified Alcohol, Smoking and Substance Involvement Screening Test), and the Parent Screening Questionnaire have been used to identify those at risk for substance use disorders, but further work is needed to better identify parents with opioid use disorders.<sup>59-61</sup>

## 2.6 | Policy advocacy

Several opioid reduction policies in the United States have been created to combat the opioid epidemic. Some of these policies achieving widespread adoption include prescription drug monitoring programs, pain clinic legislation, and opioid prescribing guidelines. Policies and guidelines aimed at opioid reduction help decrease pediatric opioid poisoning across age groups.<sup>8</sup> ED clinicians are on the frontlines of provid-

ing care for all patients with opioid use disorder and can therefore provide valuable information on prevention and treatment. The opioid epidemic is a public health crisis and emergency clinicians have a unique opportunity to advocate to both state and federal governments to create effective legislation that addresses the national crisis without compromising patient care. On a national level, ED clinicians can continue to advocate for (1) expanded MAT options and opioid alternatives for pain management to be covered by insurance companies, (2) increased substance abuse treatment centers and recovery sites, (3) increased counseling or behavioral therapies for patients with opioid use disorder, and (4) increased funding for evidence-based research to address the opioid crisis.

## 3 | DISCUSSION

The current opioid epidemic in the United States has become a major public health crisis. The ED setting offers a unique opportunity for clinicians to provide multidisciplinary care for children and adults who are affected by the opioid crisis. To ensure that children and adolescents grow in a safe and nurturing environment, we must be able to provide improved treatments for parents with opioid use disorder, which includes the provision of medication-assisted treatment in the ED. Birth outcomes and child safety have improved over the years with increased availability of buprenorphine and methadone for pregnant women and parents with opioid use disorders.<sup>51,60</sup> ED-initiated buprenorphine with coordinated follow-up treatment has been shown to be more effective than referral and brief intervention alone by significantly increasing engagement in addiction treatment, reducing self-reported illicit opioid use, and decreasing use of inpatient addiction treatment services.<sup>62</sup> In addition to these challenges, substance use treatment alone is not enough to target the needs of families who are often affected by coexisting problems, such as poverty, mental health, domestic violence, and homelessness.<sup>63</sup> Statewide opioid reduction policies have shown to decrease opioid related deaths by identifying at risk patients of both illicit and prescription opioids in the adult population.<sup>2</sup> As the country continues to implement more of these policies, it will be important to assess the impact that these have on the care of children.

ED clinicians are on the front line of caring for patients with opioid dependence, from treatment of withdrawal symptoms to signs of opioid overdose, psychiatric or medical emergencies, and trauma. Many patients who present with opiate overdose tend to have a repeated event after an ED visit and may experience multiple overdose events before a fatal outcome.<sup>64</sup> One of the challenges of providing appropriate care and counseling for patients with opioid use disorder in the ED is time. ED clinicians are often working in a chaotic environment and juggling multiple tasks, making it difficult to find time to counsel patients and provide them with appropriate long-term follow-up. This is important given that the transition from an ED visit to a substance abuse treatment center is a critical time for patients and coordinated care is essential to prevent opioid withdrawal and relapse.<sup>65</sup> It is important for institutions to create and implement policies that address the

opioid epidemic in the ED while understanding the workplace challenges that ED clinicians face.

EDs across the country should consider the following strategies to address the opioid epidemic in children:

1. Establishing a multidisciplinary team of ED clinicians, nurse educators, social workers, substance abuse counselors, mental health workers, and community partners
2. Provide training for ED clinicians to screen for at risk children and children of parents with opioid use disorders
3. Provide opportunities for physicians to become trained in administration of MAT and help them apply for a prescription waiver so that they can prescribe it to patients who would benefit from it before ED discharge
4. Coordinate with social work, local substance use rehabilitation centers, and primary care to arrange for close outpatient follow-up
5. In a coordinated effort with other ancillary staff, address social determinants of health such as food and housing insecurity that may provide additional challenges for a patient to follow through with treatment
6. Establish quality improvement measures to track how many patients with opioid use disorder who present to the ED are offered MAT and outpatient referral
7. Ensure patients and families are provided information on opioid safe storage and disposal

## 4 | CONCLUSION

The opioid epidemic has incapacitated many children and their families. The ED setting is an excellent place to provide a comprehensive, multidisciplinary, evidence-based approach treatment for all patients with opioid abuse and opioid use disorders. Increased advocacy is needed to improve on nationwide policies to provide pharmacological treatment to patients with opioid use disorders in addition to counseling and therapy. ED clinicians have a responsibility to provide the shortest effective course of medications to treat pain and anxiety in patients to prevent opioid misuse or accidental overdose. Institutional regulations and guidelines should be developed nationwide to ensure that opioids are diligently prescribed. Future research is needed to assess the impact of current interventions to improve the care of children who are affected by the opioid epidemic.

## REFERENCES

1. Birnbaum HG, White AG, Reynolds JL, et al. Estimated costs of prescription opioid analgesic abuse in the United States in 2001: a societal perspective. *Clin J Pain*. 2006;22(8):667-676.
2. Strassels SA. Economic burden of prescription opioid misuse and abuse. *J Manag Care Pharm*. 2009;15(7):556-562. <https://doi.org/10.18553/jmcp.2009.15.7.556>.
3. Florence CS, Zhou C, Luo F, Xu L. The economic burden of prescription opioid overdose, abuse, and dependence in the United States, 2013. *Med Care*. 2016;54(10):901-906.
4. Centers for Disease Control and Prevention. Drug Overdose Deaths in the United States, 1999–2017. <https://www.cdc.gov/nchs/data/databriefs/db329-h.pdf> Accessed June 24, 2021.
5. Wilson N, Kariisa M, Seth P, et al. Drug and opioid-involved overdose deaths – United States, 2017–2018. *MMWR Morb Mortal Wkly Rep*. 2020;69:290-297.
6. American Psychiatric Association. Opioid Use Disorder. <https://www.psychiatry.org/patients-families/addiction/opioid-use-disorder/opioid-use-disorder>. Accessed June 24, 2021.
7. Gaither JR, Shabanova V, Leventhal JM. US National trends in pediatric deaths from prescription and illicit opioids, 1999–2016. *JAMA Netw Open*. 2018;1(8):e186558.
8. Toce MS, Michelson K, Hudgins J, Burns MM, Monuteaux MC, Bourgeois FT. Association of state-level opioid-reduction policies with pediatric opioid poisoning. *JAMA Pediatr*. 2020;174(10):961-968.
9. Key Substance Use and Mental Health Indicators in the United States: results from the 2018 National Survey on Drug Use and Health. U.S. Department of Health and Human Services. Substance Abuse and Mental Health Services Administration. Center for Behavioral Health Statistics and Quality. HHS Publication No. PEP19-5068. 2019. [www.samhsa.gov](http://www.samhsa.gov) Accessed June 24, 2021.
10. Ford JA. Prescription opioid misuse among adolescents. *Pediatrics Clin N Am*. 2019;66:1099-1108.
11. Schepis TS, Teter CJ, McCabe SE. Prescription drug use, misuse, and related substance use disorder symptoms vary by educational status and attainment in U.S. adolescents and young adults. *Drug Alcohol Depend*. 2018;189:172-177.
12. Griesler PC, Hu M, Wall MM, et al. Nonmedical prescription opioid use by parents and adolescents in the US. *Pediatrics*. 2019;143. <https://doi.org/10.1542/peds.2018-2354>.
13. Screening for substance use in the pain management setting from the National Institute of Drug Abuse <https://www.drugabuse.gov/nidamed-medical-health-professionals/screening-tools-resources/screening-tools-for-adolescent-substance-use> Accessed June 24, 2021.
14. Kelly SM, Gryczynski J, Gwin Mitchell S, Kirk A, O'Grady KE, Schwartz RP. Validity of brief screening instrument for adolescent tobacco, alcohol, and drug use. *Pediatrics*. 2014;133(5):819-816.
15. McCabe SE, West BT, Teter CJ, Cranford JA, Ross-Durow PL, Boyd CJ. Adolescent nonmedical users of prescription opioids: Brief screening and substance use disorders. *Addict Behav*. 2012;37(5):651-656. <http://doi.org/10.1016/j.addbeh.2012.01.021>.
16. Sheno RP, Linakis JG, Bromberg JR, et al. Predictive validity of the CRAFFT for substance use disorder. *Pediatrics*. 2019;144(2):e20183415.
17. CRAFFT tool. [www.crafft.org](http://www.crafft.org). Accessed June 24, 2021.
18. Pfaff N, DaSilva A, Ozer E, Kaiser SV. Adolescent risk behavior screening and interventions in hospital settings: a scoping review. *Pediatrics*. 2021;147:e2020020610.
19. Patrick SW, Schumacher RE, Benneyworth BD, Krans EE, McAllister JM, Davis MM. Neonatal abstinence syndrome and associated health care expenditures: United States, 2000–2009. *JAMA*. 2012;307(18):1934-1940.
20. Patrick SW, Davis MM, Lehmann CU, Cooper WO. Increasing incidence and geographic distribution of neonatal abstinence syndrome: United States 2009 to 2012. *J Perinatol*. 2015;35(8):650-655.
21. Frank DA, Casey PH, Black MM, et al. Cumulative hardship and well-being of low-income, young children: multisite surveillance study. *Pediatrics*. 2010;125:e1115-e1123.
22. Carrion BV, Earnshaw VA, Kershaw T, et al. Housing instability and birth weight among young urban mothers. *Journal of Urban Health*. 2015;92(1):1-9.
23. Rose-Jacobs R, Trevino-Talbot M, Vibbert M, Lloyd-Travaglini C, Cabral HJ. Pregnant women in treatment for opioid use disorder: material

- hardships and psychosocial factors. *Addict Behav.* 2019;98:106030. <https://doi.org/10.1016/j.addbeh.2019.106030>.
24. Winstanley EL, Stover A. The impact of the opioid epidemic on children. *Clin Ther.* 2019;41(9):1655-1662.
  25. Mitchell KJ, Nolte K, Turner HA, Hamby S, Jones LM. Exposure to medication overdose as an adversity in childhood. *J Pediatr Nurs.* 2018;38:127-132.
  26. Mazer-Amirshahi M, Mullins PM, Rasooly IR, et al. Trends in prescription opioid use in pediatric emergency department patients. *Pediatr Emerg Care.* 2014;30(4):230-235.
  27. Austic E, McCabe SE, Stoddard SA, et al. Age and cohort patterns of medical and nonmedical use of controlled medication among adolescents. *J Addict Med.* 2015;9(5):376-382.
  28. Volkow ND, Frieden TR, Hyde PS, Cha SS. Medication assisted therapies - tackling the opioid-overdose epidemic. *N Engl J Med.* 2014;370:2063-2066.
  29. Cerda M, Santaella J, Marshall BD, et al. Nonmedical prescription opioid use in childhood and early adolescence predicts transitions to heroin use in young adulthood: a national study. *J Pediatr.* 2015;167(3):605-12.e1-2.
  30. McCabe SE, West BT, Veliz P, et al. Trends in medical and nonmedical use of prescription opioids among US adolescents: 1976-2015. *Pediatrics.* 2017;139(4):e20162387.
  31. Sharma B, Bruner A, Barnett G, et al. Opioid Use Disorders. *Child Adolesc Psychiatr Clin N Am.* 2016;25(3):473-487.
  32. Palamar JJ, Shearston JA, Dawson EW, et al. Nonmedical opioid use and heroin use in a nationally representative sample of us high school seniors. *Drug Alcohol Depend.* 2016;158:132-138.
  33. National Survey on Drug Use and Health. Source of the last pain reliever that was misused. 2016. [www.samhsa.gov/data/sites/default/files/NSDUH-FFR1-2016/NSDUH-FFR1-2016.htm#opioid6](http://www.samhsa.gov/data/sites/default/files/NSDUH-FFR1-2016/NSDUH-FFR1-2016.htm#opioid6). Accessed June 24, 2021.
  34. Ghobadi A, Van Winkle PJ, Menchine M, et al. Reduction of parenteral opioid use in community emergency departments following implementation of treatment guidelines. *Acad Emerg Med.* 2018. Online ahead of print.
  35. Chumpitazi CE, Rees CA, Camp EA, et al. Decreased opioid prescribing in a pediatric emergency department after the rescheduling of hydrocodone. *J Emerg Med.* 2017;52(4):547-553.
  36. Mundkur M, Franklin J, Abdia Y, et al, MMWR. United States: days' Supply of Initial Opioid Analgesic Prescriptions and Additional Fills for Acute Pain Conditions Treated in the Primary Care Setting. *Morb Mortal Wkly Rep.* 2019;68(6):140-143.
  37. 2019 Annual surveillance report of drug-related risks and outcomes – United States. Surveillance Special Report. Centers for Disease Control and Prevention, U.S. Department of Health and Human Services: Centers for Disease Control and Prevention. <https://www.cdc.gov/drugoverdose/pdf/pubs/2019-cdc-drug-surveillance-report.pdf>. Accessed June 24, 2021.
  38. American College of Emergency Physicians Clinical Policies Subcommittee (Writing Committee) on Opioids, Hatten BW, Cantrill SV, Dubin JS, Ketcham EM, Runde DP, Wall SP, Wolf SJ. Clinical policy: critical issues related to opioids in adult patients presenting to the emergency department. *Ann Emerg Med.* 2020;76(3):e13-e39.
  39. Pope N, Tallon M, McConigley R, et al. The experiences of acute non-surgical pain of children who present to a healthcare facility for treatment: a systematic review protocol. *JBI Database System Rev Implement Rep.* 2015;13(10):12-20.
  40. Rupp T, Delaney KA. Inadequate analgesia in emergency medicine. *Ann Emerg Med.* 2004;43(4):494-503.
  41. Pate J, Blount R, Choen L, et al. Childhood medical experience and temperament as predictors of adult functioning in medical situations. *Child Health Care.* 1996;25(4):281-298.
  42. Cohen LL, Lemanek K, Blount RL, et al. Evidence-based assessment of pediatric pain. *J Pediatr Psychol.* 2008;33(9):939-955. discussion 56-7.
  43. Drendel AL, Gorelick MH, Weisman SJ, et al. A randomized clinical trial of ibuprofen versus acetaminophen with codeine for acute pediatric arm fracture pain. *Ann Emerg Med.* 2009;54(4):553-560.
  44. American Academy of Pediatrics. Committee on substance use and prevention. medication-assisted treatment of adolescents with opioid use disorders. *Pediatrics.* 2016;138(3):e20161893
  45. Substance Abuse and Mental Health Services Administration. The determinations report: a report on the Physician Waiver Program established by the Drug Addiction Treatment Act of 2000 ("DATA") 2006. [https://www.samhsa.gov/sites/default/files/programs\\_campaigns/medication\\_assisted/determinations-report-physician-waiver-program.pdf](https://www.samhsa.gov/sites/default/files/programs_campaigns/medication_assisted/determinations-report-physician-waiver-program.pdf). Accessed November 2, 2020
  46. Marsch LA, Bickel WK, Badger GJ, et al. Comparison of pharmacological treatments for opioid-dependent adolescents: a randomized controlled trial. *Arch Gen Psychiatry.* 2005;62(10):1157-1164.
  47. Woody GE, Poole SA, Subramaniam G, et al. Extended vs short-term buprenorphine-naloxone for treatment of opioid-addicted youth: a randomized trial. *JAMA.* 2008;300(17):2003-2011.
  48. Chatterjee A, Larochelle MR, Xuan Z. Non-fatal opioid-related overdoses among adolescents in Massachusetts 2012-2014. *Drug Alcohol Depend.* 2019;194:28-31.
  49. Taplin S, Mattick RP. The nature and extent of child protection involvement among heroin-using mothers in treatment: high rates of reports, removals at birth and children in care. *Drug Alcohol Rev.* 2015;34:31e37.
  50. Choi S, Ryan JP. Co-occurring problems for substance abusing mothers in child welfare: matching services to improve family reunification. *Children and Youth Services Review.* 2007;29:1395-1410.
  51. Hall MT, Wilfong J, Huebner RA, Posze L, Willauer T. Medication-assisted treatment improves child permanency outcomes for opioid-using families in the child welfare System. *J Subst Abuse Treat.* 2016;71:63-67.
  52. Comiskey CM. A 3-year longitudinal study comparing drug treatment outcomes for opioid users with and without children in their custodial care at intake. *J Subst Abuse Treat.* 2013;44:90e96.
  53. Eswaran V, Allen KC, Bottari DC, et al. Take-home naloxone program implementation: lessons learned from seven chicago-area hospitals. *Ann Emerg Med.* 2020;76(3):318-327.
  54. Mattick RP, Breen C, Kimber J, Davoli M. Methadone maintenance therapy versus no opioid replacement therapy for opioid dependence. *Cochrane Database Syst Rev.* 2009;3:CD002209.
  55. Jones HE, Heil SH, Baewert A, et al. Buprenorphine treatment of opioid-dependent pregnant women: a comprehensive review. *Addiction.* 2012;107(1):5-27.
  56. Minozzi S, Amato L, Bellisario C, Ferri M, Davoli M. Maintenance agonist treatments for opiate-dependent pregnant women. *Cochrane Database Syst Rev.* 2013;12:CD006318.
  57. Guttmacher Institute. Substance use during pregnancy. 2020. <https://www.guttmacher.org/state-policy/explore/substance-use-during-pregnancy>. Accessed June 24, 2021.
  58. Terplan M, Longinaker N, Appel L. Women-centered drug treatment services and need in the United States, 2002-2009. *Am J Public Health.* 2015;105(11):e50-e54.
  59. Coleman-Cowger VH, Oga EA, Peters EN, Trocin KE, Koszowski MarkK. Accuracy of three screening tools for prenatal substance use. *Obstet Gynecol.* 2019;133(5):952-961.
  60. Patrick SW, Schiff DM, Committee on Substance Use and Prevention. A public health response to opioid use in pregnancy. *Pediatrics.* 2017;139(3):e20164070.
  61. Smith VC, Wilson CR, COMMITTEE ON SUBSTANCE USE AND PREVENTION. Families affected by parental substance use. *Pediatrics.* 2016;138(2):e20161575.
  62. D'Onofrio G, O'Connor PG, Pantaloni MV, et al. Emergency department-initiated buprenorphine/naloxone treatment for opioid

- dependence: a randomized clinical trial. *JAMA*. 2015;313(16):1636-1644.
63. Feder KA, Letourneau EJ, Brook J. Children in the opioid epidemic: addressing the next generation's public health crisis. *Pediatrics*. 2019;143(1):e20181656.
64. Morizio KM, Baum RA, Dugan A, Martin JE, Bailey AM. Characterization and management of patients with heroin versus nonheroin opioid overdoses: experience at an academic medical center. *Pharmacotherapy*. 2017;37(7):781-790.
65. Johns SE, Bowman M, Moeller FG. Utilizing buprenorphine in the emergency department after overdose. *Trends Pharmacol Sci*. 2018;39(12):998-1000.
66. Jasik CB, Berna M, Martin M, Ozer EM. Teen Preferences for Clinic-Based Behavior Screens: Who, Where, When, and How?. *Journal of Adolescent Health*. 2016;59 (6):722-724.
67. Knight JR, Harris SK, Sherritt L, et al. Adolescents' Preferences for Substance Abuse Screening in Primary Care Practice. *Substance Abuse*. 2007;28(4):107-117.

**How to cite this article:** Chang CD, Saidinejad M, Atanelov Z, et al., the ACEP Pediatric Emergency Medicine Committee. Emergency department strategies to combat the opioid crisis in children and adolescents. *JACEP Open*. 2021;2:e12512. <https://doi.org/10.1002/emp2.12512>