

# EMPOWERING YOUTH TO TAKE A STAND AGAINST OPIOIDS

A REPORT ON THE 2018 SUMMER FEND CAMPAIGN





“

*I had a very close friend pass away this year from an opioid overdose. He had two friends with him when it happened, and since they didn't know how to do anything and were too scared to call the police, he passed. Learning what to do when this happens has made me realize how easy it would have been to help him stay alive.*

*\*Matt, 19*

”

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**Quotes from FEND participants are included throughout this report.**

**\*Real names have been changed.**

# ACKNOWLEDGEMENTS

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The implementation of the 2018 summer FEND campaign was a collaborative effort between the Preventum Initiative, technology partner iPug Pty Ltd, and the Vans Warped Tour.

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to keep them safe from prescription opioids has been incredible. Thank you!

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Finally, we'd like to thank the people who joined the FEND Movement during the summer of 2018. Thanks for taking the time to engage, learn, take part, share, and celebrate with us.





**FEND**

FULL ENERGY NO DRUGS



## LETTER TO THE READER

Illegal drug use doesn't always hide in dark corners. More than ever, addiction is linked to the abuse of painkillers originally prescribed by physicians. Alarming, misuse of prescription opioids amongst teens is on the rise: today, drug overdose is the leading cause of death amongst teens, and 65% of drug overdoses in 15 to 19-year-olds are caused by prescription painkillers. Further, there is a demonstrated correlation between the intravenous use of drugs like heroin and fentanyl and prescription opioid abuse. The majority of those who have injected heroin reported painkillers as their entryway into injecting street drugs.

As educators, policy makers, and concerned citizens, we have all of the information needed to help teens make responsible decisions regarding drug use—what's needed going forward are effective communication strategies. Previous educational programs have identified the urgency of stopping addiction and drug use in younger generations. These efforts, however, have fallen short. Although they've preached the dangers of drug use, such campaigns have failed to engage youth by utilizing scare tactics rather than empowering messages. If drug-related deaths amongst this generation are to be prevented, we must equip youth with the tools to act responsibly and quickly, and we must communicate this life-saving information accessibly rather than pedantically.

Enter FEND (Full Energy, No Drugs)—the first prevention campaign of its kind to incorporate gamification, individualization, and real-time reporting. Created by the Preventum Initiative, FEND first rolled out in conjunction with the 2018 Vans Warped Tour (a popular cross-country music tour) in the summer of 2018. FEND provides crucial knowledge about the risks of prescription opioids, addiction and overdose through an interactive smartphone app. By engaging youth on a platform they've already mastered—their smartphone—FEND encourages young people to take responsibility for their choices by transmitting life-saving information effectively and meaningfully. FEND encourages teens to take control of their health while watching out for the wellbeing of friends by presenting crucial facts, figures, and tips for helping loved ones who may be misusing or dependent on prescription opioids. This information is all presented in engaging and relevant ways.



FEND's first summer on the road was an overwhelming success. By partnering with the Vans Warped Tour, FEND gained 32,000 registered supporters and was downloaded to 18,904 smartphones. The platform featured testimonials by musicians, athletes, and influencers, paired with infographics and pop-quizzes in order to make crucial information relatable and relevant. By covering critical topics ranging from the risks associated with opioid misuse to tactics for responding to an overdose, FEND demonstrated the possibilities for tying drug education into the fabric of teens' lives in meaningful and lasting ways. By utilizing baseline and exit surveys, FEND also demonstrated its potential to make measurable changes and impart invaluable knowledge.

This report will lead you through FEND's unique structure; topics covered through app use; our strategies for engagement; and the difference FEND makes in increasing young people's confidence to take action, and mitigating the damage of opioid misuse and addiction. By laying out the problems to be tackled, we'll set the scene of the current opioid crisis as it pertains to youth and show FEND's innovative model for reaching out to this demographic by appealing to their interests and communication styles. The report will then explore baseline data that details FEND users' prior knowledge in order to highlight the realms in which FEND increases awareness. We'll then present the results of our user exit surveys and explore the ways in which FEND demonstrably increases a user's readiness to tackle opioid use in their own lives.

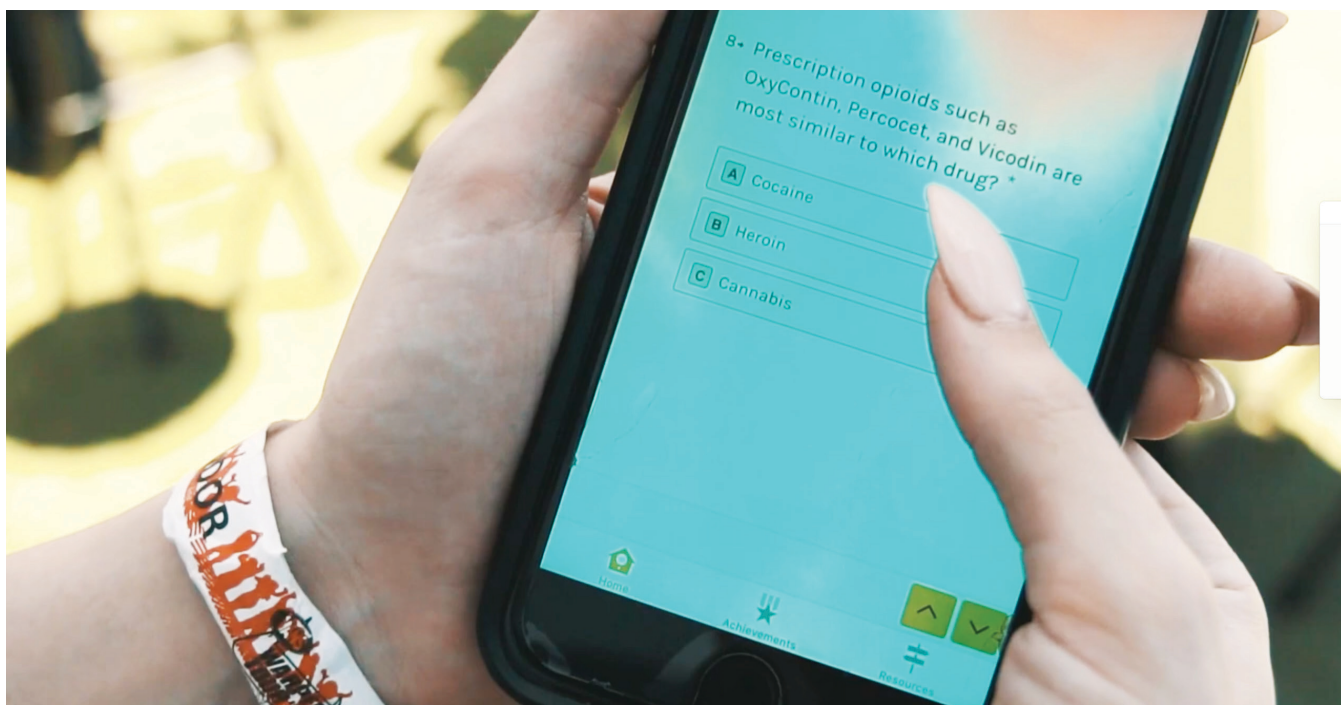
FEND's next steps will be spearheaded by the community it serves—youth and teens. By partnering with local governments, community organizations, corporations and donors, FEND's goal is to reduce the harmful effects of addiction in each state. FEND invites you to join us in taking a stand against opioids to save lives. Welcome to the movement!

Sincerely,

Jacquii Burgess, PhD

Executive Director, Preventum Initiative





## ISSUE

Between 2002-2017, the U.S. experienced a 4.1-fold increase in the total number of overdose deaths involving opioids.<sup>1</sup> Drug overdoses have now surpassed car crashes as the leading cause of accidental death nationwide, and have become the leading cause of death overall for Americans under 50.

Over the past five years, the non-medical use of prescription opioids (prescription painkillers) among youth and adolescents has increased significantly and so too have teen drug overdose deaths. Between 1999-2016 there was a 253% increase in the rate of opioid-related deaths among 15 to 19-year-olds. The majority of these deaths were unintentional.<sup>2</sup>

There is an urgent need to reduce opioid misuse, abuse, overdose and diversion, and raise awareness among teens about risks associated with prescription opioids. According to the National Institute on Drug Abuse, close to half of young people who have injected heroin said they had abused prescription painkillers before they started using heroin.<sup>3</sup>

## FEND – AN INNOVATIVE PREVENTION TOOL

Full Energy, No Drugs) was developed as a prevention campaign aimed at young people to raise awareness and increase knowledge about the risks of prescription opioids, addiction and overdose.

The campaign is rolled out on the FEND app, and incorporates gamification strategies to engage participants.

Unlike the “Just say no” campaigns in the past, FEND encourages youth to engage in their health in a whole

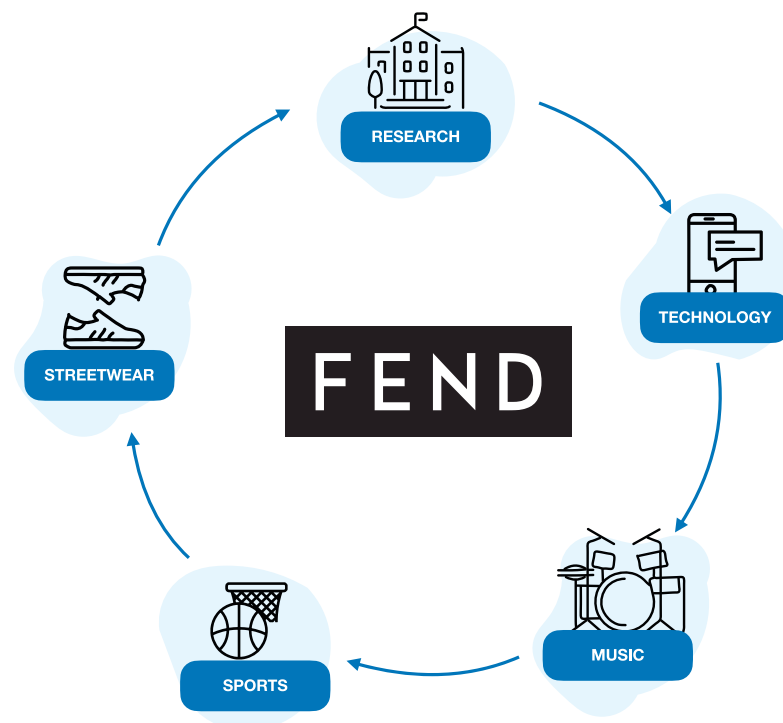


new way— through their smartphones. Smartphones are the primary means of communication for 95% of American teens.<sup>4</sup>

Using the unique combination of evidence-based research, world-first technology, a cutting-edge streetwear brand, musicians from different genres and other influencers, the FEND Movement speaks directly to young people in a language they understand, with content that is relatable and relevant.

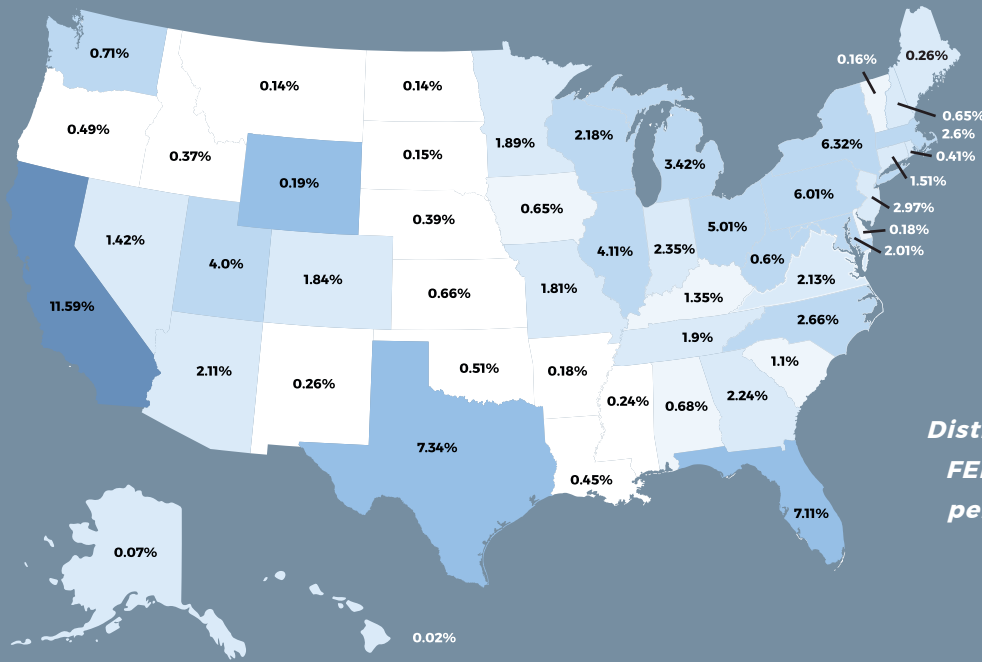
FEND empowers young people to take control of their health, make informed choices, and take a stand against opioids.

Between March 2nd and October 31st 2018, FEND rolled out with the Vans Warped Tour – a cross-county music tour that went to 38 cities across the US and Canada during the summer of 2018. FEND engaged tens of thousands of youth over this period: 32,000 registered as FEND supporters, 18,904 downloaded the FEND app, 15,238 completed the baseline survey; 3716 of which also completed an exit survey.



## RESULTS FROM THE FEND SUMMER TOUR

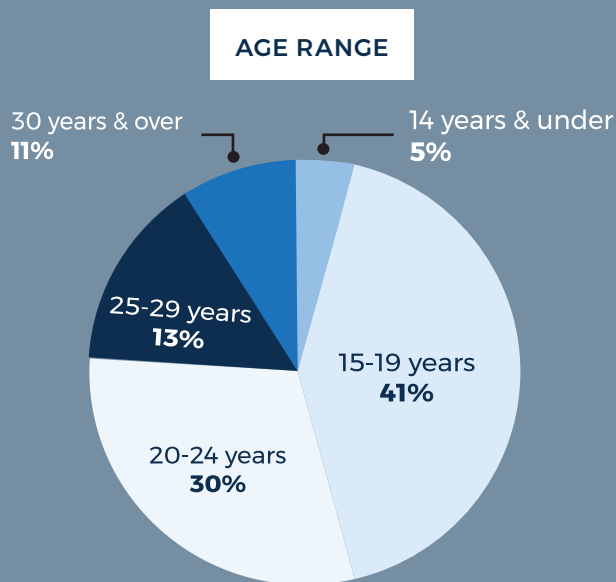
This report begins with a snapshot of what is known about opioids, addiction, and overdose from a cross-section of young people around the US from data gathered from the FEND baseline survey. Next, the report highlights the efficacy of the FEND campaign in improving knowledge as shown in those who completed the exit survey. This is further broken down in an analysis of participants under 20 years of age to see the impact of FEND among different age groups. This collection of data will be used in the further development of FEND as it rolls out to states across the US, and to support future research projects. An independent research institution is currently evaluating these results and, following third-party analysis, the results will be published in peer-reviewed publications.



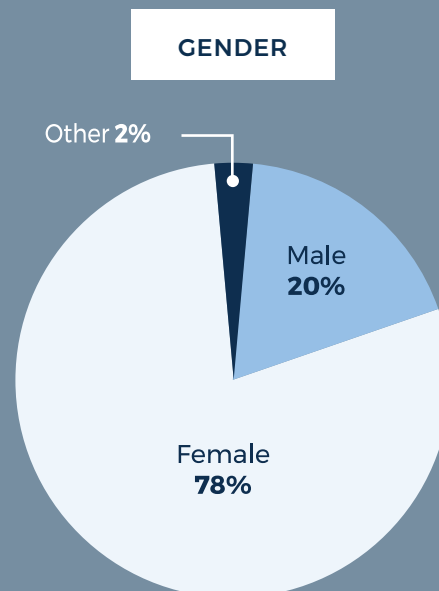
**Figure 1:**  
Distribution of US-based FEND users (shown as percentage per state)

## THE FEND AUDIENCE

In total, 15,238 people completed the FEND baseline survey, of which 14,758 (96.8%) were based in the US and 477 (3.13%) in Canada. The states with the highest number of participants were California (12%), Texas (7%), Florida (7%), New York (6%) and Pennsylvania (6%). The map above shows the distribution of FEND users who completed the baseline survey as percentage per state.



**Figure 2:**  
Age breakdown of FEND users (n = 15238)



**Figure 3:**  
Gender breakdown of FEND users (n = 15238)

# BASELINE DATA

WHAT YOUNG PEOPLE KNOW  
ABOUT PRESCRIPTION OPIOIDS,  
ADDICTION AND OVERDOSE

DATA BASED ON FEND BASELINE SURVEY  
COMPLETED BY 15,238 PEOPLE

After downloading the free FEND app from the Apple App store or Google Play store, participants completed a short survey that included demographic items (such as date of birth, gender and zip code), and questions to assess their knowledge about prescription opioids, the risks associated with opioid use, addiction, and overdose. The aim of this survey was to understand what these people knew about prescription opioids, and provide a baseline to measure the efficacy of the FEND campaign against to gauge change in knowledge, attitudes and behavioral intent. Results from the baseline survey are summarized below. For some questions the results are given for those participants under 20 years (<20) compared with those participants 20 years and older (20+).

## **PRESCRIPTION OPIOIDS (QUESTIONS 1 & 2)**

71% of participants identified heroin as the drug most similar to prescription opioids (out of heroin, cocaine or cannabis). Participants under 20 years were less likely to choose heroin compared to participants 20 years and older (67% <20 / 74% 20+).

**95%** of participants knew prescription painkillers were equally as addictive as illicit street drugs.

## **ADDICTION (QUESTIONS 3, 4 & 5)**

**89%** of participants knew dependence/addiction to prescription opioids can occur in as few as 4-5 days.

When asked about factors that increase risk of becoming addicted to prescription opioids, **85%** of participants recognized that 'anyone is at risk'. Mental health problems (6.7%) and addicted family members (6.2%) were also noted.

**42%** of participants <20 years believe avoiding addiction is simply a matter of self-control (35% 20+ years).

## **RISKS (QUESTIONS 6 & 7)**

**80%** of participants correctly chose opioids over alcohol (11.7%) and cocaine (5.1%) as the substance that causes the most overdose deaths in young people. However, many participants did not realize how easily an opioid overdose can occur.

**51%** of participants <20 did not know the inherent danger of mixing alcohol and other sedatives with opioids, compared with 39% 20+ years.

“

*I've always known that opioids were dangerous once a person got addicted to them. I never realized how common it was for people to overdose on opioids. Before downloading this app, I didn't know what to do or the signs to look for when there is an overdose. Now, I know the symptoms and what position to put the body in. I now know how to save someone's life.*

**\*Chad, 16**

”



# OVERDOSE

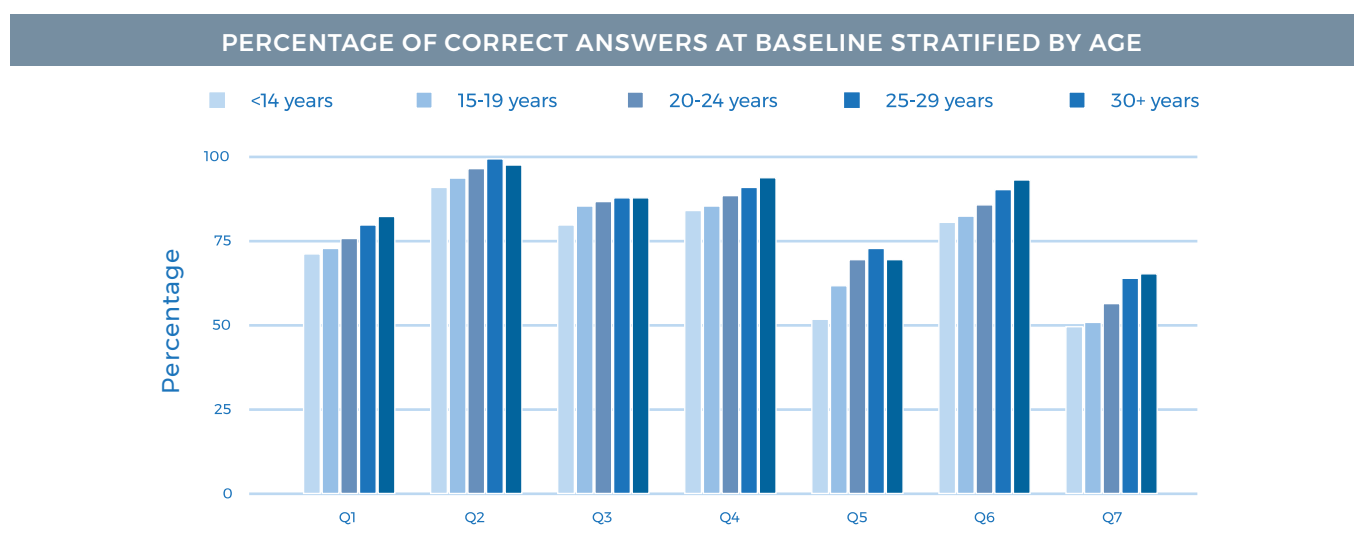
Participants were asked to select the signs of an opioid overdose from a list of eight, of which four were correct. **49%** correctly chose all four signs (44% <20 / 54% 20+).

- **84%** slow or shallow breathing (82% <20 / 86% 20+)
- **85%** not responsive (83% <20 / 87% 20+)
- **68%** blueish lips and nails (64% <20 / 71% 20+)
- **64%** cold skin (60% <20 / 67% 20+)
- **67%** shaking or fitting (67% <20 / 67% 20+)
- **63%** rapid heartbeat (65% <20 / 61% 20+)
- **61%** large pupils (61% <20 / 61% 20+)
- **49%** blood-shot eyes (51% <20 / 47% 20+)

Participants were then asked how to respond to someone they suspected of having an opioid overdose from a list of six options, of which three were correct. **44%** correctly chose all three correct answers (**42%** <20 / **47%** 20+).

- **98%** call 911 (98% <20 / 97% 20+)
- **73%** put person on their side (74% <20 / 72% 20+)
- **56%** administer Naloxone (52% <20 / 59% 20+)
- **9%** throw cold water on (8% <20 / 10% 20+)
- **4%** Give a cup of coffee (4% <20 / 4% 20+)
- **1%** let them sleep it off (1% <20 / 1% 20+)

Overall, baseline data showed there was no significant difference in knowledge based on gender; however, stratifying the percentage of correct answers by age showed that higher age was associated with higher knowledge.



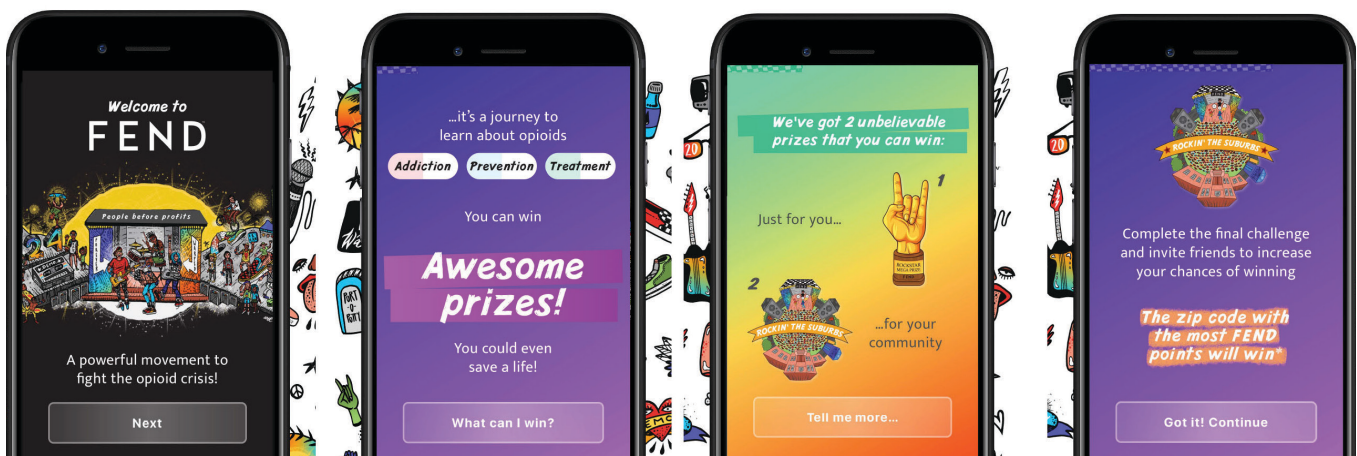
**Figure 4:** Percentage of correct answers stratified by age (n = 15,238)





# THE FEND CAMPAIGN

COMBINING EVIDENCE-BASED CONTENT WITH GAMIFICATION STRATEGIES TO ENGAGE YOUTH IN AN OPIOID OVERDOSE PREVENTION CAMPAIGN



Many unhealthy behaviors can begin during adolescence, including drug use. FEND takes a harm reduction and minimization approach to the use of illegal drugs and the misuse of legal drugs such as prescription opioids. This approach acknowledges that some young people will experiment with and use these drugs. Adolescents and young adults who experiment with non-medical use of prescription opioids are at risk of developing opioid addiction; therefore, effective prevention strategies are needed to stop new cases from developing. The aim of the FEND campaign is to prevent and reduce drug related harm by raising awareness among young people about the risks associated with prescription opioids.

Content on the FEND app was developed based on evidence-based research and is delivered in a way that is both relatable and relevant to the youth audience. We used a variety of mediums to deliver the content messages: videos, animations, games, infographics and influencer testimonials, each of which aimed to reinforce identified learning objectives through pop quizzes.

Importantly, gamification strategies were employed in the FEND campaign. Gamification is the process of applying game-like rewards and activities in non-game settings to increase motivation, engagement, and move people towards preferred behaviors. Gamification techniques have been used as a strategy to influence knowledge, attitudes and health-related behavior changes in smartphone apps with very positive results.<sup>6</sup> Gamification capitalizes on the psychological motivation behind people's choices, using the motivational drivers of game elements to increase participants' intrinsic and extrinsic motivation. Intrinsic motivation relates to internal rewards, or doing something because it is of interest or satisfying in itself. Extrinsic motivation is doing something to obtain an external reward or goal.

The FEND campaign tapped into both intrinsic and extrinsic motivation. It incorporated points, badges, leader-boards, games, prizes and rewards to keep users engaged and motivated. Our partnership with the Vans Warped Tour also provided many opportunities to offer exclusive prizes and rewards such as meet-and-greets with favorite artists and bands, "swag" and backstage passes as incentives for participants to engage with the FEND app content.

The FEND campaign focused on 4 key areas:

- **Opioids 101: basic information about prescription opioids**
- **Opioid misuse, dependence and addiction**
- **Opioid overdose: how to recognize and respond**
- **Taking action: creating an opioid safe home, how to safely dispense opioids, getting help.**

“

*Last week I sprained my ankle playing soccer. The ER doctor gave me a script for 30-days Oxycodone. But a few days ago I got the FEND app and learned you can get addicted to opioids in 4-5 days! The doctor never told me that. I stopped taking the tablets straight away. Thank you for giving people this information.”*

*\*Jayden, 17*

”



# OPIOIDS 101

When used appropriately, prescription opioids can be effective in treating severe pain. They can also produce a 'high' that makes them prone to misuse, and are highly addictive. Many teens and young adults don't understand the risks involved in misusing prescription opioids; some mistakenly thinking prescription opioids are safer than illicit street drugs because they are prescribed by a physician or dentist. The fact is the chemical makeup of heroin is the same as many prescribed painkillers, which makes them highly addictive.

The multiple content pieces in this section of the app included information on:

- What opioids are
- Common prescription opioid names and their associated street names
- The risks of misuse, dependency, addiction and overdose
- How prescription opioids differ from other recreational drugs
- The highly addictive nature of prescription opioids, even when they're prescribed by a doctor or dentist
- The heightened risk of overdose when mixing prescription opioids with alcohol, anti-depressants and other substances
- The similarities between heroin and prescription painkillers
- The link between current teen heroin users and previous misuse of prescription opioids
- The current statistics on teen overdose deaths from prescription opioids
- Party safety tips (know what you're taking, strategies for "having your friends' backs")
- Safe use, storage and disposal of legally prescribed opioids.



# OPIOID MISUSE, DEPENDENCE AND ADDICTION

Prescription opioids, whether used as prescribed by a doctor or taken non-medically to get high or relax, can lead to dependence and addiction. According to the Centers for Disease Control and Prevention (CDC), among patients prescribed one day of initial opioid treatment, the probability of continued opioid use 12 months later is 6%.<sup>7</sup> The CDC recommends doctors limit initial opioid prescriptions to 3 days or less for most patients with acute pain.

Addiction is considered a pediatric disease because 75-90% of people who become addicted to drugs first started using as teenagers. In fact, the risk of becoming addicted is inversely correlated with the age of first use. Those who use addictive substances before age 15 are 6.5 times as likely to develop addiction as those who delay use until age 21 or older.<sup>8</sup>

No one starts using prescription opioids with the intention of becoming addicted, yet many people find themselves struggling with misuse, abuse and addiction. Raising awareness among adolescents about how quickly opioid dependence and addiction can occur, and increasing understanding about addiction as a disease of the brain, can decrease the stigma associated with substance use disorder that often stops people from seeking the help or treatment they need.

The multiple content pieces in this section included information on:

- How anyone can get addicted to prescription opioids
- The fact that addiction is a disease and not a lack of self-control
- Why opioids are so addictive
- The options for help available if you or someone you know is misusing or addicted
- How opioid dependence and addiction can be treated
- The fact that recovery from addiction is difficult and requires professional help
- How opioid addiction can occur even when taking them as prescribed by your doctor
- How you can become addicted to prescription painkillers in as few as 4-5 days
- The options for speaking with your doctor about opioid alternatives if you have an injury or surgery; how to ask for a 3-day prescription; and the importance of using prescriptions only as directed
- Testimonials from musicians and professional athletes in recovery.

“

*I'm in Rescue/EMS and see the end result of opioid use weekly usually. It is a huge problem in my community and is horrifyingly sad. The most interesting thing on FEND for me is seeing how you broke down what to do to help people who have overdosed so that anyone, even without medical training, can help if they encounter someone in need.*

**\*Casey, 23**

”

# OPIOID OVERDOSE

As well as the risk of misuse, dependence and addiction associated with prescription opioids, there is also the high risk of overdose and death. Opioid overdoses have increased significantly across all regions of the United States for both men and women in most age groups. In adolescents aged 15-19, drug overdose deaths involving opioids more than tripled between 1999 and 2015.<sup>8</sup> In 2015, 80% of teen drug overdose deaths were accidental; 65% were from prescription opioids.<sup>8,9</sup>

Opioids effect the part of the brain that regulates breathing. An opioid overdose occurs when the drug attaches to enough brain receptors that the body forgets to breathe. Taking opioids in high doses, or combining them with alcohol and other sedatives, increases the risk of respiratory depression and fatal drug overdose. Raising awareness about the risks and frequency of opioid overdose among young people, and increasing the ability to recognize and respond to an opioid overdose quickly, can save lives.

The multiple content pieces in this section of the app included information on:

- The frequency of drug related death in young people
- The fact that the majority of drug related deaths in teens are accidental, and that many of these are caused by prescription opioids
- Information on how to recognize and quickly respond to an opioid overdose, which could save a life
- The signs of an opioid overdose
- What to do if you suspect someone is overdosing
- What Naloxone is and how it can be used to reverse an opioid overdose
- How to administer Narcan nasal spray
- How to put someone on his or her side (in the recovery position)
- Good Samaritan /drug immunity laws.





# TAKING ACTION

The taking action portion of the campaign was developed to support each of the other key areas of FEND discussed previously. The goal is to encourage participants to act on what they have learned in order to empower and motivate participants to be pro-active.

Content in this section included information on:

## - **The steps for creating an opioid safe home:**

- Check the medicine cabinet in your home for unused or out of date opioids.
- Locate a drug drop-off location near you (the FEND app has the built-in functionality that allows users to put in their zip-code and locate the nearest drug drop-off)
- If someone in the home is using prescription opioids ensure they are kept in a locked medicine cabinet, or out of sight and reach of young children and animals.
- Discuss the dangers of prescription opioids with your family and friends
- Consider getting a script for Naloxone if you or someone in your family is prescribed opioids
- Consider keeping Naloxone (Narcan nasal spray) in your home if you have a friend or family member who is misusing prescription opioids in case of an overdose.

## - **Getting help**

- Details for online and phone drug counselling services
- Locate a treatment center near you (available on the FEND app via zip-code as mentioned above)
- How to talk to a friend or family member who is misusing or addicted to prescription opioids.

## - **Staying safe**

- Strategies for telling friends about the dangers of prescription opioids, and communicating how to recognize and respond to an opioid overdose
- Ways to spread awareness of the Good Samaritan / drug immunity laws and how to best look out for each other.



# RESULTS

## THE IMPACT OF THE FEND CAMPAIGN

Data based on FEND baseline and exit  
surveys completed by 3716 participants

# IMPACT OF THE FEND CAMPAIGN

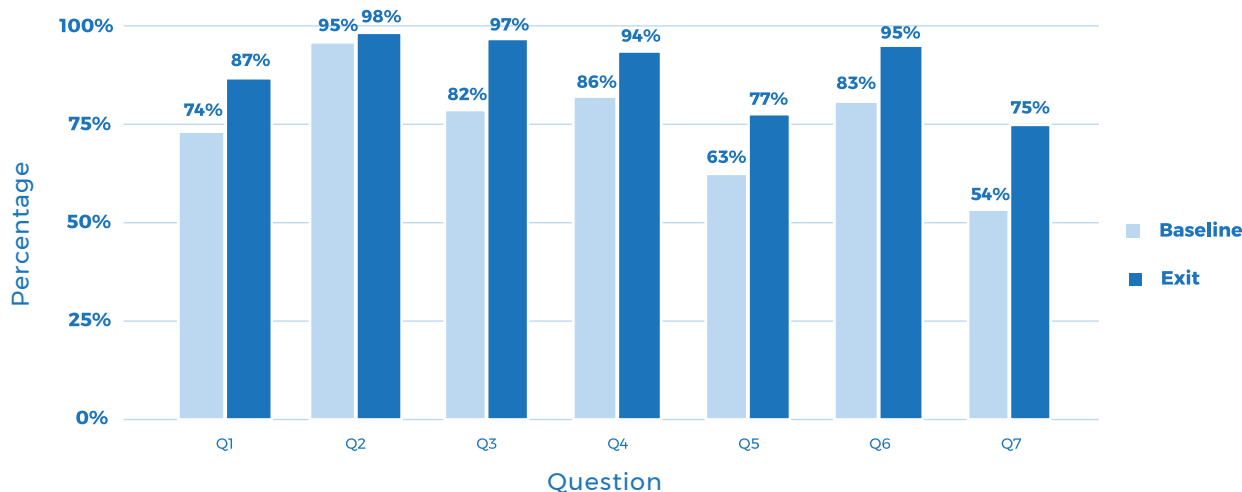
The following pages summarize the impact and efficacy of FEND as an opioid awareness and prevention campaign aimed at young people. The results highlight the overall change in knowledge and attitudes of participants who completed the exit survey. These findings compare the baseline and post-test (exit) data from 3716 participants. Participants were given a two-week delay period between when they viewed the final FEND content and were able to complete the exit survey. This was done to measure longer-term knowledge retention and knowledge change, given that immediate post-tests can result in knowledge that is mostly lost to recall over the ensuing days and weeks.

The results are presented for individual questions/answers as well as an overall knowledge score. A sub-group analysis of results for participants aged less than 20 years is also highlighted.

			BASELINE	EXIT
<b>PRESCRIPTION OPIOIDS</b>				
Q1	Prescription opioids such as OxyContin, Percocet, and Vicodin are most similar to	Cannabis Cocaine *Heroin	5% 21% 74%	2% 11% 87%
Q2	Prescription painkillers are LESS addictive than other illicit drugs	True *False	5% 95%	2% 98%
<b>ADDICTION</b>				
Q3	You can become addicted to opioids in as few as 4-5 days	*True False	82% 18%	97% 3%
Q4	You are most likely to become addicted to opioids if you have/are	*Anyone is at risk Mental health problems Addicted family member Homeless Older	86% 6.5% 6% 1% .5%	94% 3% 2% .5% .5%
Q5	Avoiding addiction is simply a matter of exercising self-control	True *False	37% 63%	23% 77%
<b>RISKS</b>				
Q6	Young people are most likely to die from an overdose of	Alcohol Cocaine *Opioids	12% 5% 83%	3% 2% 95%
Q7	Which category of drugs is most dangerous to use when taking prescription painkillers (opioids)?	Hallucinogens (i.e. ecstasy, acid) *Sedatives (i.e. alcohol, cough syrup) Stimulants (i.e. cocaine, methamphetamines)	16% 54% 30%	5% 75% 20%
<b>*correct answer</b>				

**Table 1:** Change in knowledge in participants who completed baseline and exit surveys (n = 3716)

Participants had a clear improvement in knowledge between baseline and exit, as shown in the tables and figures in this section. Figure 5 highlights the increase in percentage of correct answers across the opioid risk questions.



**Figure 5:** Percentage of correct answers across baseline and exit surveys (n = 3716)

		BASELINE	EXIT	CHANGE
<b>PRESCRIPTION OPIOIDS</b>				
<b>Which of the following are signs of an opioid overdose?</b>	*Slow or shallow breathing	87%	90%	+ 3%
	*Cold skin	64%	76%	+ <b>12%</b>
	*Blueish lips and nails	72%	83%	+ <b>11%</b>
	*Not-responding	88%	91%	+ 3%
	Bloodshot eyes	47%	31%	- <b>16%</b>
	Shaking / fitting	65%	34%	- <b>31%</b>
	Rapid heart beat	62%	35%	- <b>27%</b>
Large pupils	59%	36%	- <b>23%</b>	
<b>Which of the following should you do if someone has overdosed?</b>	*Call 911	99%	99%	-
	*Lay them on their side (in the recovery position)	74%	93%	+ <b>19%</b>
	*Administer Naloxone (a drug that reverses overdose)	61%	85%	+ <b>24%</b>
	Let them sleep it off	1%	1%	-
	Shock them by throwing cold water on them	8%	5%	- 3%
	Give them a stimulant (like coffee)	4%	5%	+ 1%
<b>*correct answer</b>				

**Table 2:** Change in knowledge regarding recognizing and responding to an opioid overdose (n = 3716)



Results also show a clear improvement in knowledge regarding recognizing and responding to an opioid overdose between baseline and exit.

In addition to messages on how to recognize and respond to an opioid overdose, information about drug immunity/Good Samaritan laws were provided in the FEND campaign.

These laws are designed to encourage people to call for medical assistance if they witness an overdose. The law protects the person overdosing as well as the witness from being charged or arrested for being under the influence of drugs, possession, and paraphernalia. However, if people are unaware about receiving immunity, their fear of consequences may cause hesitation and in many cases lead to the decision not to act at all.

Participants were asked if prior to viewing the content on FEND they were aware (or had previously heard) of the Good Samaritan laws. More than half (52%) of participants had not. In fact, 65% of participants ranked learning about this as one of the most interesting things on the FEND app.

“ *I have personally never had anyone I know become addicted to opioids nor have I had to help someone who has overdosed on them but since I've gotten the FEND app and extended my knowledge on the subject I'm confident I have the ability to help identify and treat someone who has overdosed on them. I could save a life!*”

\*Celia, 20

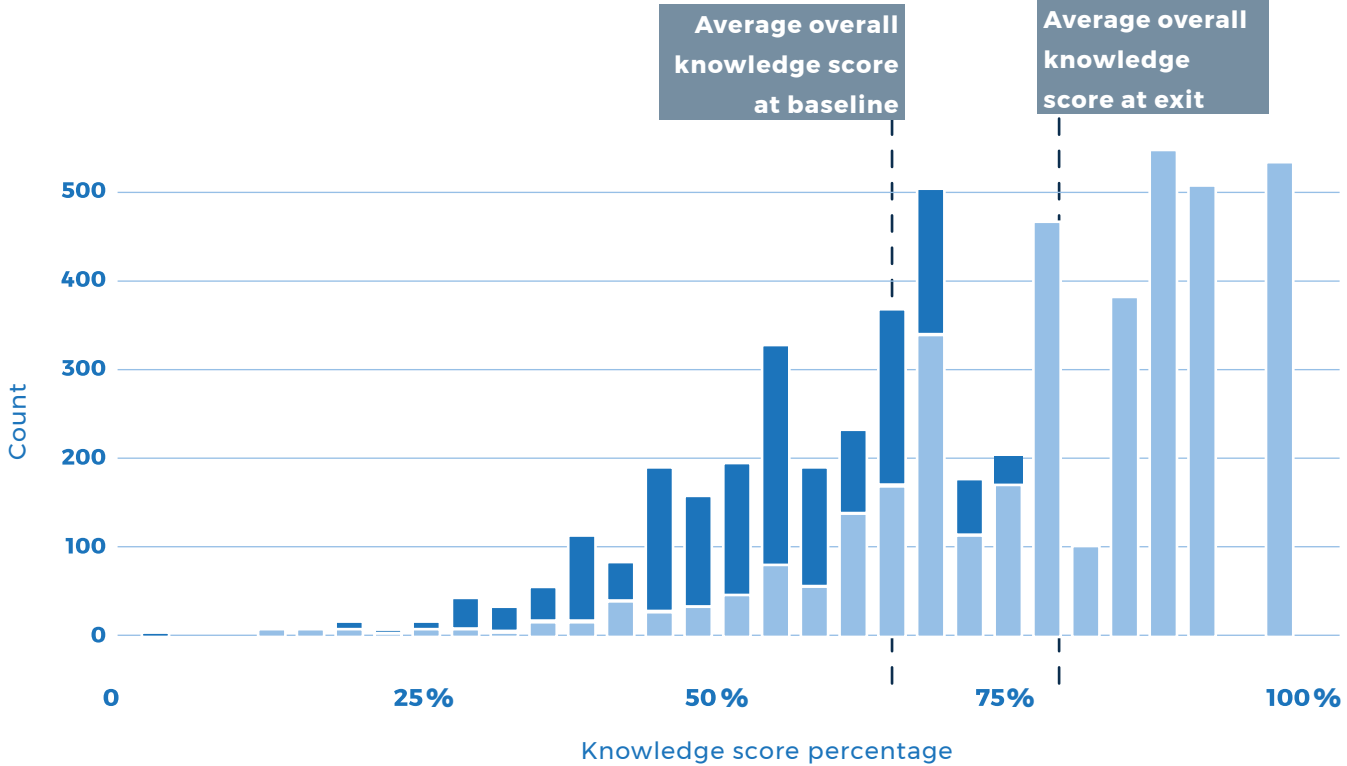
”



# OVERALL KNOWLEDGE SCORE

An overall knowledge score was developed to easily calculate a change in knowledge percentage between baseline and exit surveys (this score is explained in detail in the Methodology section of this report). Participants were awarded one point for each correct answer, then the number of incorrect answers was subtracted from that. The maximum possible overall knowledge score was 11 and the lowest possible score was 0.

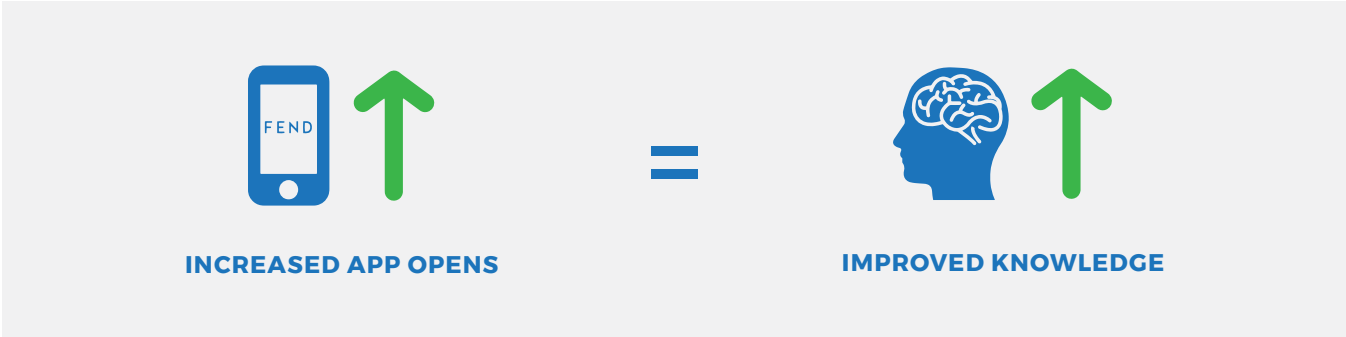
Figure 6 highlights the significant increase in overall knowledge score between baseline and exit. The average increase in knowledge percentage was 15.7% (P <0.001). The percentage of participants that scored 100% was also higher in the exit survey (13.8% vs 2.4% at baseline). The average overall knowledge score increased from ~66% to ~85%.



**Figure 6:** Knowledge distribution for baseline and exit surveys (n = 3716)

# GAMIFICATION AND APP ENGAGEMENT

The results of the exit survey demonstrate the benefits of incorporating gamification into drug-related education. Results show that higher app activity—including the number of app opens and time spent utilizing the app—correlated directly with participants' final scores.



Additionally, those with a lower level of prior knowledge about opioids at baseline tended to engage with the app more frequently, increasing their score significantly by the end of the program.



# CONFIDENCE, ATTITUDES AND ACTION

Three additional questions were asked to gauge participants confidence in recognizing an opioid overdose, and the likelihood in checking their home for unused opioids and disposing of them, and talking to a friend/family member who may be using, misusing, abusing prescription painkillers.

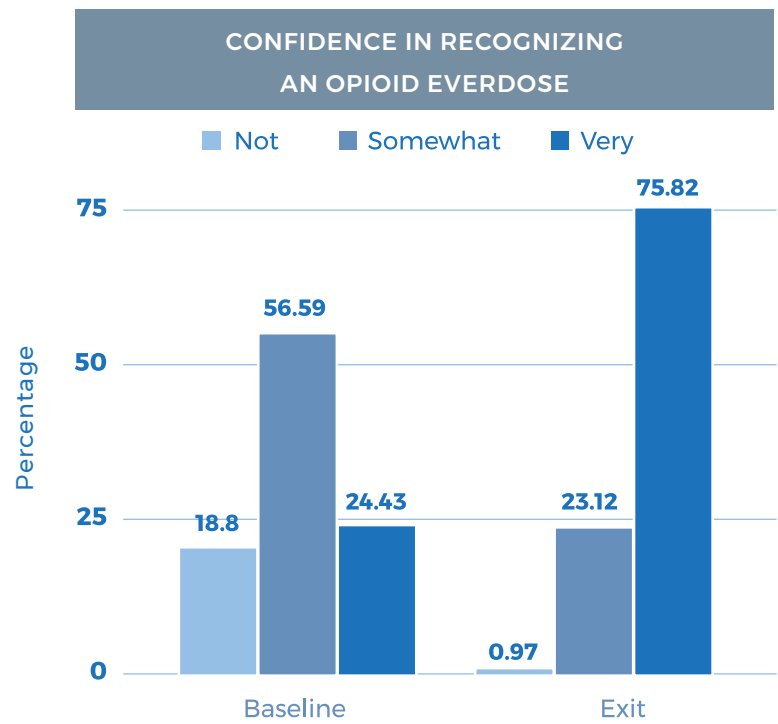
## CONFIDENCE IN RECOGNIZING AN OPIOID OVERDOSE

At baseline and again in the exit survey (prior to being asked to name the signs of an opioid overdose) participants were asked to rate their confidence in recognizing the signs of an overdose by completing the following question:

*I am \_\_\_\_ confident I could recognize the signs of an opioid overdose (choose the word that best describes how you feel: very, somewhat, not).*

At baseline, older participants were more confident in their ability to recognize an opioid overdose, as were males compared to females and other gender. However, this pattern changed at exit with females increasing confidence to very likely by 69%. The intervention also reduced the initial effect of age.

The percentage that chose 'very likely' increased from 24% at baseline to 76% at exit (~50% increase), as shown in Figure 7, signifying that FEND was significantly associated with increased confidence in recognizing signs of opioid overdose ( $P < 0.001$ ).



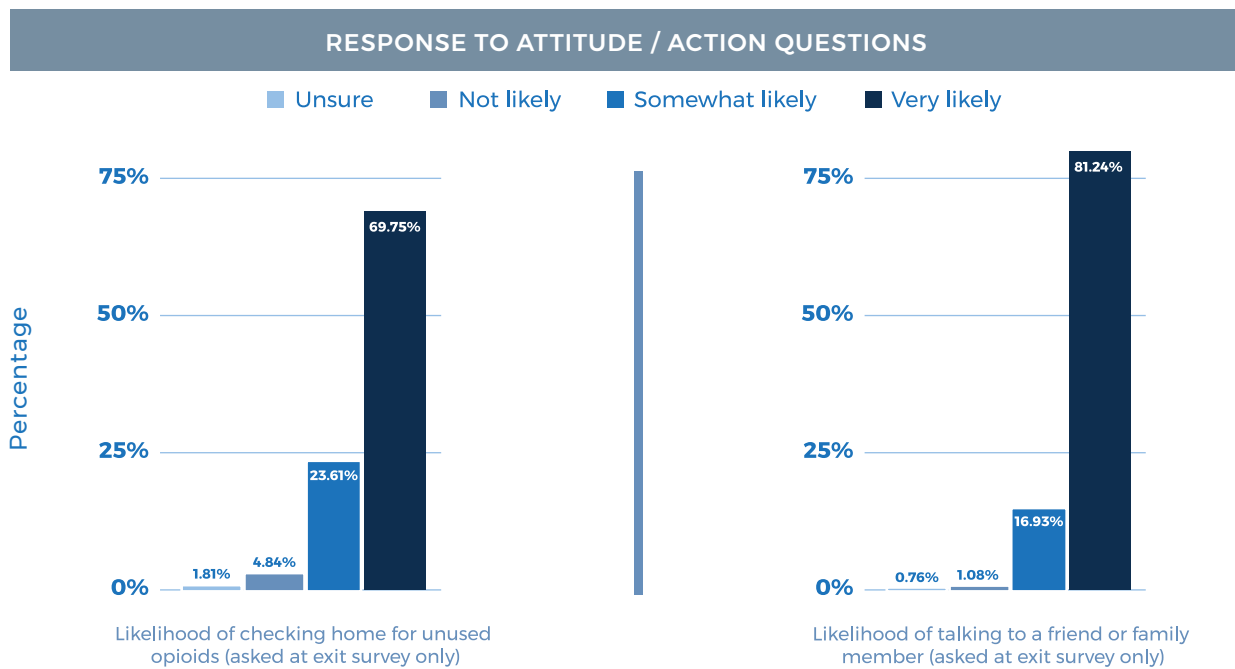
**Figure 7:**  
*Confidence in recognizing an opioid overdose across baseline and exit surveys*

## ATTITUDES AND ACTION

In the exit survey only, participants were asked:

- *How likely are you to check your home for unused or out of date prescription painkillers and dispose of them at a drug drop-off location? (unsure, not likely, somewhat likely, very likely)*
- *How likely are you to talk to a friend or family member who may be using or abusing prescription painkillers? (unsure, not likely, somewhat likely, very likely)*

The majority of the respondents chose 'very likely' for both questions (69.75% and 81.24%) as shown in Figure 8 below. Results show that older participants (>20) were more likely to check the home for unused drugs compared to younger participants, as were females and other gender compared to males. This high likelihood of talking to family and friends about prescription opioids shown in Figure 8 is encouraging and has the possibility of increasing awareness beyond FEND users.



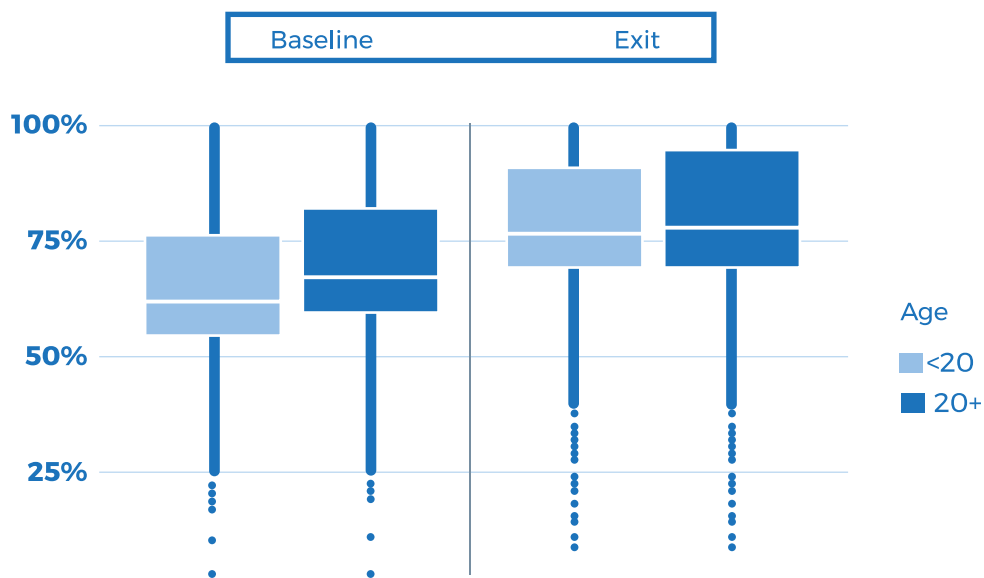
**Figure 8:** Likelihood of doing follow-up actions

## SUB-GROUP ANALYSIS OF PARTICIPANTS UNDER 20-YEARS OF AGE

This section highlights the performance of FEND participants aged less than 20 years who completed the exit survey (n=1856).

This sub-group made up roughly half of the baseline and exit cohort.

As discussed earlier and shown in Figure 9, knowledge at baseline for participants <20 was lower compared to those aged >20. However, at exit the overall knowledge scores for the sub-group showed a statistically significant increase in knowledge score ( $P < 0.001$ ). The average increase in knowledge percentage was 17%, which represents almost a 30% increase in knowledge score. The final knowledge score was similar between the sub-group and those >20, which shows the FEND campaign can positively affect the knowledge score irrespective of age.



**Figure 9:**

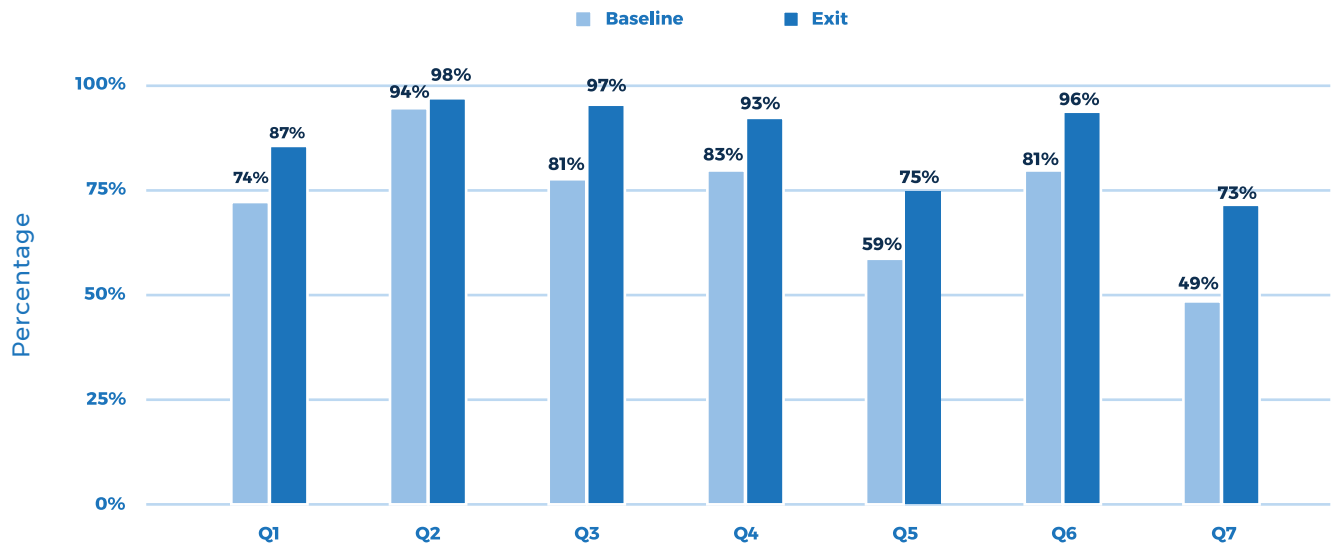
*Knowledge score percentage between baseline and exit surveys by age group*

“ I’ve heard how dangerous opioids are, but nobody tells me why and what I can do if someone is overdosing. The FEND app has really taught me what to do how to help and really makes me want to spread awareness because this is so serious. This doesn’t just target a specific group of teens but everyone is vulnerable in this situation because anyone can be prescribed this drug. I would love to learn so much more, but in the meantime I’m glad I know how to help.

\*Jesse, 16

”





**Figure 10** Percentage of correct answers across baseline and exit surveys within sub-group

Table 3 shows that in the sub-group the percentage of incorrect answers for signs for an opioid overdose decreased in the exit survey by roughly 50% when compared to baseline, while the percentage of correct answers increased.

Regarding how to respond to an overdose, the percentage that chose 'Lay them on their side (in the recovery position)' increased to almost 100% (93.3%) while the percentage that selected 'Administer Naloxone (a drug that reverses overdose)' increased by ~30% compared to baseline.

QUESTION		BASELINE	EXIT	CHANGE
<b>Which of the following are signs of an opioid overdose?</b>	*Slow or shallow breathing	85%	88%	+ 3%
	*Cold skin	61%	74%	+ <b>13%</b>
	*Blueish lips and nails	69%	82%	+ <b>13%</b>
	*Not-responding	87%	91%	+ 4%
	Bloodshot eyes	47%	30%	- <b>17%</b>
	Shaking / fitting	64%	31%	- <b>33%</b>
	Rapid heart beat	62%	33%	- <b>29%</b>
	Large pupils	58%	34%	- <b>24%</b>
	<b>Which of the following should you do if someone has overdosed?</b>	*Call 911	99%	99%
*Lay them on their side (in the recovery position)		75%	93%	+ <b>18%</b>
*Administer Naloxone (a drug that reverses overdose)		58%	86%	+ <b>28%</b>
Let them sleep it off		1%	1%	-
Shock them by throwing cold water on them		7%	4%	- 3%
Give them a stimulant (like coffee)		3%	5%	- 2%

\*correct answer

**Table 3:** Change in knowledge regarding recognizing and responding to an opioid overdose within sub-group (n = 1856)



## DISCUSSION

The results highlighted in this report demonstrate the FEND campaign to be an effective tool for changing knowledge about prescription opioids in young people.

To our knowledge, FEND is the first app-based prevention campaign aimed at raising awareness amongst young people about risks associated with prescription opioids. This approach has proven effective in several ways:

- Improving knowledge, confidence and attitudes around prescription opioids.
- Using gamification strategies to keep participants engaged with the app.
- Developing evidence-based content that is relatable and relevant to young people of various ages.

App-based campaigns provide the opportunity to engage with people wherever they are and whenever it suits them to see content. The use of smartphones to deliver information in a way that is interactive and engaging, rather than a one-way flow of static communication, is also compelling. App-based campaigns can cater to participants' different learning styles—whether it's visual, auditory, or kinesthetic—through the delivery of various message types, such as animations, videos, or infographics, and make it appealing to a broader, diverse audience.

Tapping into the status of bands, musicians and athletes as influencers to adolescent and young adult audiences is an effective way to expand reach and acceptability of public health messages to youth.

Prescription opioid misuse, abuse, overdose and diversion is a major public health issue that urgently requires prevention efforts. The Substance Abuse and Mental Health Services Administration (SAMHSA) estimates that one dollar spent on prevention could save \$18-30 on treatment and healthcare costs down the line.<sup>10</sup>

FEND provides evidence-based, relatable and relevant content to audiences that effectively raises awareness and changes knowledge and attitudes.

FEND is now rolling out into states and cities across the US through partnerships with state governments, foundations and private organisations. Campaigns can be tailored to specific audiences and include broader drug prevention messages that target other misused medications and substances. FEND also incorporates real-time monitoring, which allows stakeholders to have a clear, up-to-date overview of how the campaign is progressing.

If you would like to bring FEND to your state, city, or specific audience, please contact us.



# METHODOLOGY

Between March 2nd and October 31st, 2018, FEND engaged participants on the FEND app. As part of the onboarding sequence, participants were required to complete a short survey that included demographic factors (date of birth, zip code, and gender) and an 10-item questionnaire. This baseline questionnaire was completed by 15,238 people. The same 10-item questionnaire, with two additional attitudinal/action questions was completed as a post-test exit survey by 3,716 participants.

## A. KNOWLEDGE SCORING

Seven questions were used to assess the knowledge of the FEND participants in baseline and exit surveys. For these questions, participants were awarded 1 point for each correct answer. For check-box questions (overdose signs and responding to an overdose), the total number of correct and incorrect answers was first calculated. The number of incorrect answers was then subtracted from the number of correct answers. Weighting was then applied to calculate the total number of correct answers for each participant. The percentage of correct answers was calculated by dividing the number of correct answers by total number of valid questions.

## B. DESCRIPTIVE STATISTICS

Responses for various questions were summarized using counts and percentages while knowledge score was summarized using mean  $\pm$  standard deviation. Bar plots were used to visually compare the responses for questions across various age groups and compare the percentage of correct answers between pre-test (baseline) and post-test (exit) surveys. Box plots were used to visualize the distribution of knowledge score across age groups. Histograms were used to compare the distribution of knowledge score percentage between pre-test and post-test surveys. Only participants who completed both surveys were included in the analysis (n = 3716). Sub-group analysis was performed to explore the pattern of responses within the < 20 years age group (n = 1856).

## C. ANALYSIS OF CHANGE IN KNOWLEDGE SCORE

Pre-test and post-test knowledge scores were compared using paired samples t-test. Only participants who completed both surveys were included in the analysis. The null hypothesis of no difference in knowledge scores between both surveys was tested.  $\mu_1 = \mu_2$

## D. MULTIVARIATE ANALYSIS OF KNOWLEDGE SCORE PERCENTAGE

Linear mixed modelling was used to assess the association of survey type (pre-test vs. post-test), age (< 20 vs. 20+ years), and app engagement (log number of app opens) with the change in knowledge score. The statistical significance of the previously mentioned effects (P values) was assessed using the Type III sum of square with Kenwood-Roger approximation. Two-tailed hypothesis testing was performed at the 0.05 significance level. Regression coefficients were calculated for the abovementioned predictors. They represent the average increase in knowledge score percentage for each 1 unit increase in the predictor.

## E. ANALYSIS OF CONFIDENCE IN IDENTIFYING AN OPIOID OVERDOSE

Chi-square test of independence was used to initially assess whether the distribution of responses was significantly associated with the intervention i.e. whether the distribution of responses across pre-test and post-test was significantly different from what is expected under the null hypothesis.

Generalized linear mixed modelling (mixed binary logistic regression) was used to assess predictors of confidence in identifying an opioid overdose. Responses were first dichotomized into not likely/somewhat likely as category 1 and very likely as category 2. Age, gender, and the intervention (FEND campaign) were included as predictors. Two-way Interaction terms between intervention and both age and gender (age\*intervention and gender\*intervention) were also included in the model to assess how the combined effect of these three variables affect the responses. Odds ratios (OR) were calculated for various predictors i.e. the odds of choosing very likely in the target group compared to the odds of choosing very likely in the reference group. Hypothesis testing was performed at 0.05 significance level.



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## **The greatest worst days of my life**

*Nearly five years, I've been on this trip  
and was there ever a destination?  
Was I to fly to the moon on a big spaceship  
or suffer through eternal damnation?*

*I know I've had more than enough  
and I think I'm ready to change now  
I know that this is gonna get rough  
and I gotta do it alone, somehow.*

*So I sit in the shower for days on end  
I ride the waves of withdrawal  
my dirty bucket is my new best friend  
and all I do is puke and bawl.*

*It's hard to see the light ahead  
I try to let go of despair  
my sanity is hanging on by a thread  
but Will & Grace keeps me going, I swear.*

*Despite my body's fierce protest  
and my guts being stabbed by a knife  
I know that what I'm doing is best  
These are the greatest worst days of my life.*

**\*Emma, 20**

