

The logo features the letters 'P' and 'A' in a bold, white, sans-serif font. To the right of 'A' is a stylized 'X' composed of four white, rounded rectangular bars. A registered trademark symbol (®) is positioned to the upper right of this 'X'. The background is a gradient from dark blue on the left to purple on the right, with scattered white 'x' marks and larger 'X' symbols.

**2023 PAX SLEEP STUDY**

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*Based on an in-house study using biometric and validated psychometric instruments. The FDA has not evaluated or approved these statements. This product is not intended to diagnose, treat, cure, or prevent any disease. Use only as directed.*

# EXECUTIVE SUMMARY

Sleep is vital. But one in three Americans do not get enough sleep<sup>1</sup>, and it's having a detrimental effect on health, wellbeing and public safety — leading to increased risk of heart disease, diabetes, dementia, depression, obesity, weakened immune systems<sup>2</sup> and accidents. Blame it on an “always on” culture, too much screen time, accelerating stresses or worries, or many other causes, but the bottom line is clear.

## We're all very, very tired.

In a society obsessed with quick fixes and hacks, there's no shortage of tools available, from medications to sleep trackers to meditation apps to pillows with promises of perfection. But one potential salve is rising to the top for bleary-eyed consumers across the board: cannabis.

Despite the growing interest, the data has been mixed. Some tout it as the silver bullet to quell all sleep woes, while others claim it makes for an even more disruptive night. And many disagree about which cannabinoids are working the hardest to deliver a blissful night of shuteye.

A leader in cannabis, we decided to find out for ourselves, leveraging PAX's long history of data-driven innovation. Our researchers designed and implemented randomized, crossover, single-blind controlled study using biometric and validated psychometric instruments. The result? Deep insights into what actually works and the development of Sleep by PAX — the newest addition to our cannabis lineup and a product unlike any other.

## Sleep by PAX, backed by real science.

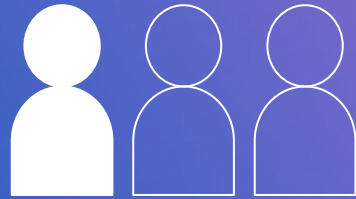
<sup>1</sup>[Center for Disease Control and Prevention](#)

<sup>2</sup>[New York Times](#)

# THE EXHAUSTION EPIDEMIC: STATE OF SLEEP IN THE U.S.

# 70 MILLION

Between 50-70M people have ongoing sleep disorders, according to the American Sleep Association, causing a negative impact on health.<sup>1</sup>



# 1 IN 3

One in three U.S. adults get less than the recommended seven (7) hours of sleep.<sup>2</sup>

# 15 PERCENT

Of adults in the United States report that they have insomnia that interferes with their daytime activities.<sup>3</sup>



# 10%

Nearly 10% of adults in the United States take sleep medications either most days to fall or stay asleep.<sup>4</sup>

<sup>1</sup>American Sleep Association

<sup>2</sup>Center for Disease Control and Prevention

<sup>3</sup>Clinical presentation and diagnosis of obstructive sleep apnea in adults

<sup>4</sup>National Health Interview Survey

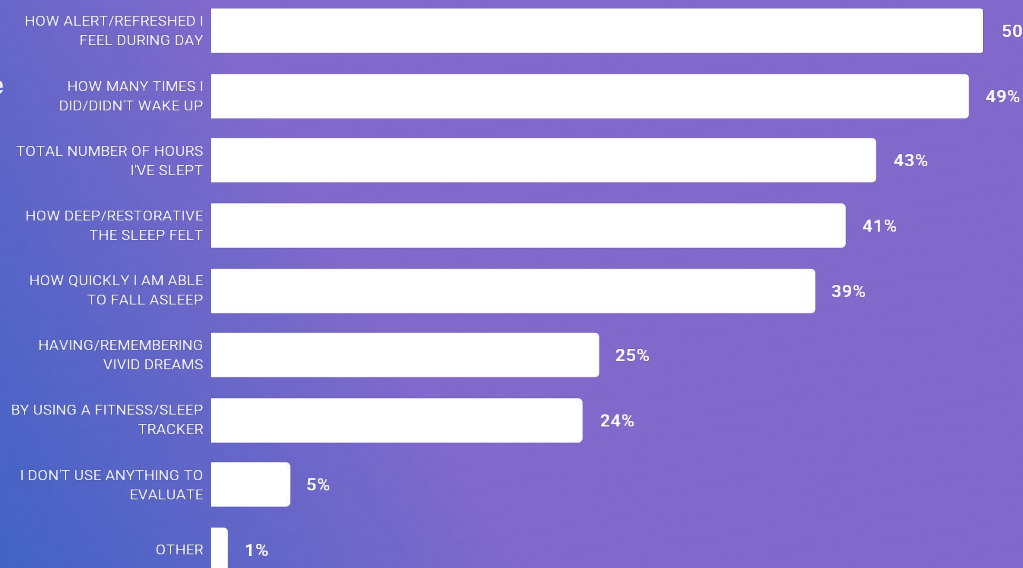
# THE PAX SLEEP SURVEY: CONSUMERS TURNING TO CANNABIS

We wanted to hear from existing cannabis consumers to understand their sleep habits, their perceptions of good and bad sleep, and how they are currently using cannabis to get more rest. To get to the heart of this, we conducted an extensive survey with over 500 participants, focused on both male and female consumers.

According to the PAX Sleep Survey, more than half of cannabis consumers are already using the plant to get a better night's sleep. Confirming what we already know, consumers are seeking deeper, more restful sleep with the ability to fall and stay asleep more easily.

Our survey found that cannabis consumers with sleep issues typically prefer fast-acting inhalable options, like pre-rolls, vaporizers and bongs, to help them feel the effects and get to sleep more quickly.

## SLEEP QUALITY INDICATORS



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# RANDOMIZED & SINGLE BLIND: PUTTING EFFICACY TO THE TEST

**To establish a scientific basis around efficacy with a focus on safety, we designed randomized, crossover, single-blind controlled sleep studies.**

At PAX, we've spent years delving deep into cannabis science, developing products based on some of the most stringent quality, toxicology and safety evaluation standards in the industry.

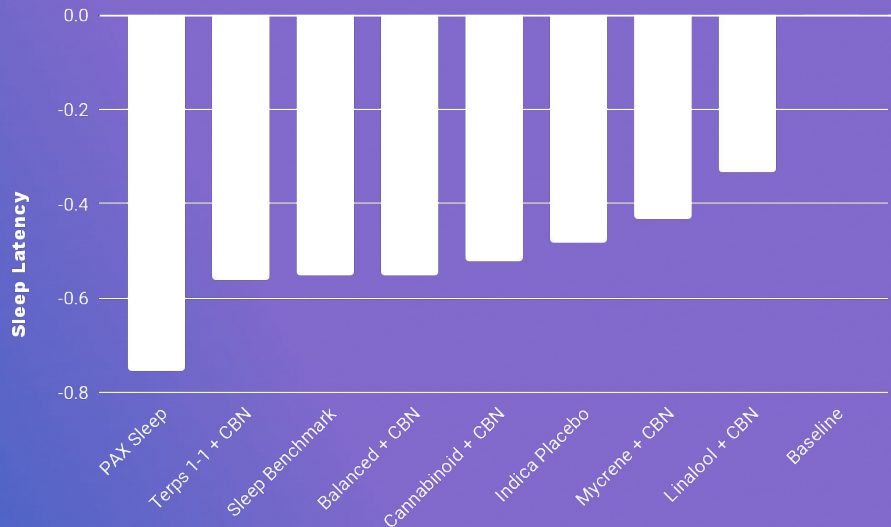
Our sleep study protocol was reviewed by our Health Advisory Board, a team of external leaders in medicine, cannabinoid science and behavioral health. We studied 44 participants who met the criteria for subclinical insomnia and did not report being affected by sleep apnea, mental health or other risk factors.

We developed multiple formulations and included a cannabinoid-only control, a benchmark control and an active placebo control. Each product was tested using a combination of biometric data supported by commercial wearables and validated psychometric instruments for both qualitative and quantitative feedback around factors that influence the sleep experience.

# PRODUCT RESULTS: FALL ASLEEP FASTER

*Specially formulated to deliver faster, deeper and more restorative sleep.\**

Sleep by PAX® users reported an average 44% improvement in falling asleep faster.



Lower Score = Improved sleep onset latency

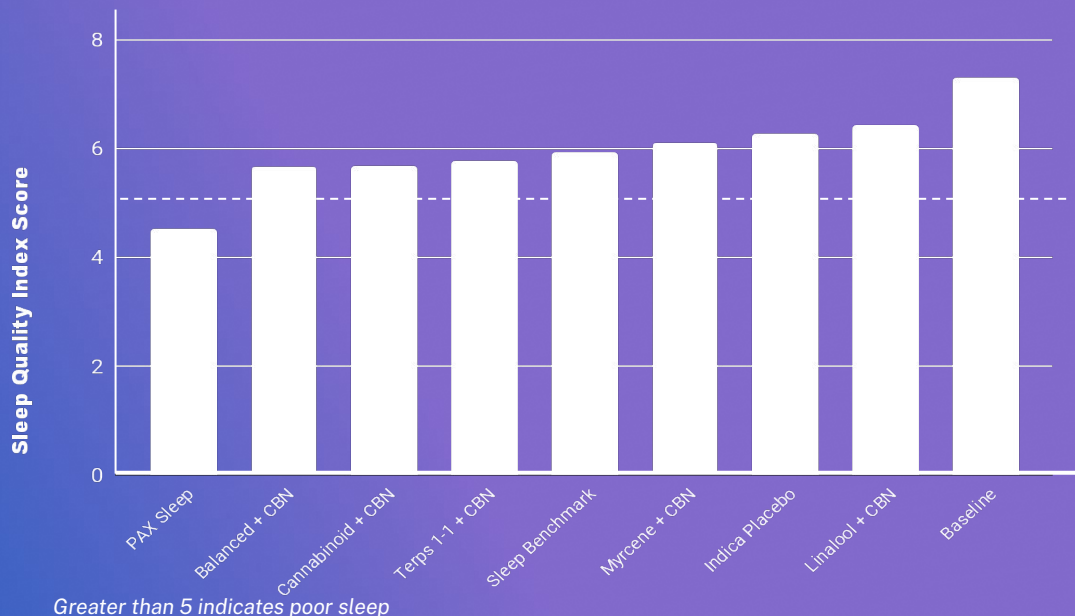
Sleep onset latency is the amount of time it takes a person to fall asleep after turning the lights off.

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# PRODUCT RESULTS: BETTER SLEEP QUALITY

*Specially formulated to deliver faster, deeper and more restorative sleep.\**

Sleep by PAX® users reported a 38% improvement in sleep quality.

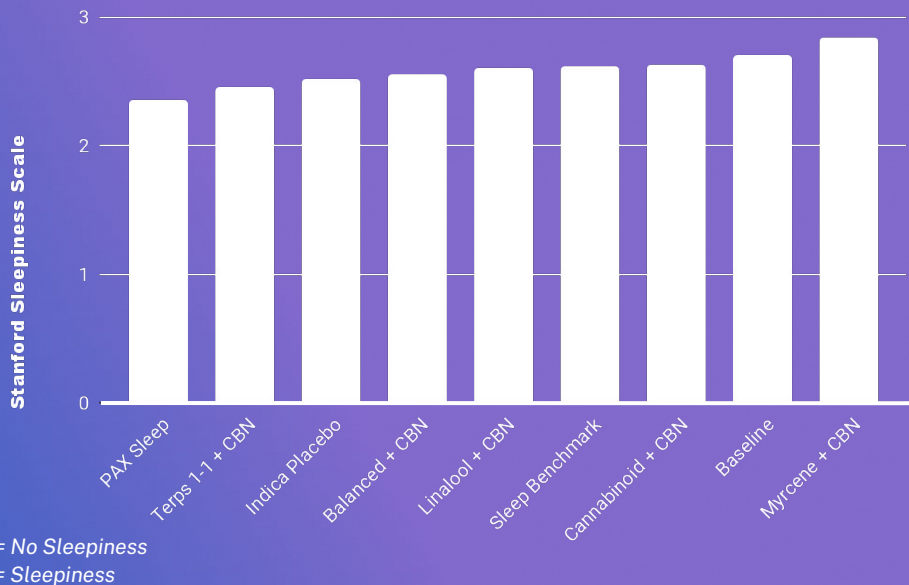


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# PRODUCT RESULTS: NO NEXT DAY GROGGINESS

*Specially formulated to deliver faster, deeper and more restorative sleep.\**

Sleep by PAX® had the lowest level of next day sleepiness, outperforming all other products in the study.



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# KEY FINDINGS: IT'S MORE THAN JUST INDICA

While many consumers who use cannabis for sleep claim to prefer indicas, these common strain labels are largely meaningless — particularly when it comes to sleep efficacy. This classification system was created to help consumers understand potential effects; however, it is not an accurate representation of cannabinoid profiles and shouldn't be used as the primary decision making tool for selecting sleep products.

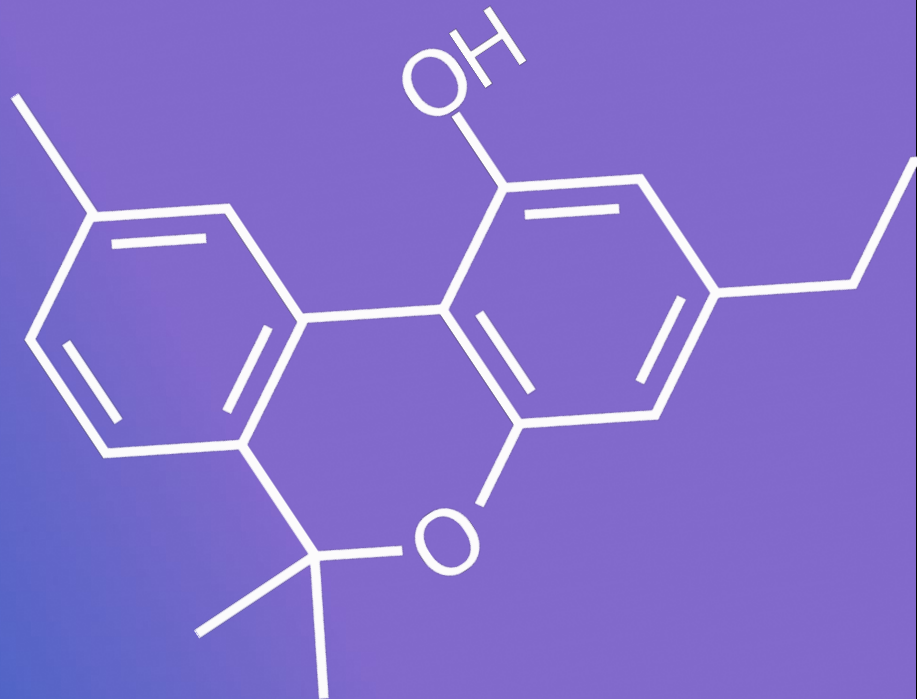
We found that indica-dominant strains are not all you need for sleep. Instead, it's all about nailing a unique blend of cannabinoids and terpenes -which work together to deliver the nightly peace we're all looking for. As a result, our unique formula shows a 25% improvement over generic indica.



# KEY FINDINGS: RETHINKING CBN FOR SLEEP

Cannabinol (CBN) is a cannabinoid that forms when THC degrades, and is both naturally occurring in the cannabis plant and can be synthesized. Based on studies dating back to 1975, it's often found to have a sedating effect and therefore is frequently included in cannabis sleep product formulations. However, our sleep studies did not indicate CBN was the key component to restfulness.

We tested multiple blends until we found the right combination of THC, terpenes and naturally occurring CBN that makes sleep deep, rest restorative, and waking hours satisfying. Our sleep formula shows a 21% improvement over other cannabis sleep products.



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# KEY FINDINGS: TERPENES PLAY AN IMPORTANT ROLE

Any industry insider will tell you that terpenes are finally starting to get their moment in the sun. These aromatic compounds are major biosynthetic building blocks that interact with the endocannabinoid system and play a pivotal role in enhancing the effects of cannabinoids. Not surprisingly, in addition to supporting the plant's survival in nature, certain terpenes are increasingly believed to have significant therapeutic effects with the potential to benefit many things, including sleep quality.

Sleep by PAX's proprietary blend of cannabinoids and terpenes are designed to help users fall asleep faster, stay asleep longer, and wake up more refreshed.



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# THANK YOU

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WARNING: Overconsumption of Marijuana Concentrate may lead to Psychotic symptoms and/or Psychotic disorder, Mental Health Symptoms/Problems, Cannabis Hyperemesis (CHS), and Cannabis use disorder/dependence, including physical and psychological dependence.

Please Consume Responsibly. This product may cause impairment and may be habit forming. There may be health risks associated with consumption of this product.

This product has not been analyzed or approved by the Food and Drug Administration (FDA). There is limited information on the side effects of using this product, and there may be associated health risks. Marijuana use during pregnancy and breast-feeding may pose potential harms. It is against the law to drive or operate machinery when under the influence of this product. KEEP THIS PRODUCT AWAY FROM CHILDREN. There may be health risks associated with consumption of this product. Marijuana can impair concentration, coordination, and judgment. The impairment effects of Edibles may be delayed by two hours or more. In case of accidental ingestion, contact poison control hotline 1-800-222-1222 or 9-1-1. This product may be illegal outside of MA.

NOT FOR SALE TO MINORS