# Patient Satisfaction with Injectable Weekly and Monthly Buprenorphine and Buprenorphine Treatment Experience.

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# DISCLOSURES

The study was funded and sponsored by Braeburn Inc.

Dr. Budilovsky-Kelley is an employee of Braeburn Inc.

The information presented today relates to the clinical data associated with CAM2038, an investigational product for the potential treatment of Opioid Use Disorder (OUD). The U.S. Food and Drug Administration (FDA) has granted tentative approval of CAM2038 (buprenorphine) extended-release weekly (8mg, 16mg, 24mg, 32mg) and monthly (64 mg, 96mg, 128mg) injections for the treatment of moderate to severe OUD in patients who have initiated treatment with a single dose of a transmucosal buprenorphine product or who are already being treated with buprenorphine.

With tentative approval, FDA has concluded that CAM2038 has met all required quality, safety and efficacy standards necessary for approval but is not eligible for marketing in the U.S. because of exclusivity considerations.

# BACKGROUND

- Opioid use disorder (OUD) is an escalating public health crisis; provisional estimates suggest more than 49,000 fatal overdoses involving opioids occurred in 2017
- Sublingual buprenorphine is effective in treating OUD, however is associated with limitations:
  - Non-adherence
  - Burdens and stigma to patients and HCPs
  - Diversion, misuse, abuse and accidental pediatric exposure
- CAM2038 is an investigational extended-release buprenorphine (BPN) injection with weekly and monthly dosing options supplied as a prefilled, small-volume injection for the treatment of OUD
- Patient satisfaction of their treatment is an important healthcare outcome used as a measure of quality of care in OUD
- Evidence suggests that patient satisfaction is a signal for positive outcomes in OUD treatment

1. National Institute on Drug Abuse, "Overdose Death Rates". Accessed at https://www.drugabuse.gov/related-topics/trends-statistics/overdose-death-rates on 10/16/2018; 2. Barry, DT, et al. *J Gen Intern Med*. 2007; 3. Trujols, J, et al. *Patient Prefer Adherence*. 2014; 4. Carlson, MJ, et al. *Psychiatr Serv*. 2001; 5. Connery HS. *Harv Rev Psychiatry*. 2015; 6. Bailey JE, et al. *Ann Emerg Med*. 2009; 7. Toce MS et al. *Clin Toxicol (Phila).* 2017; 8. Olsen Y. *JAMA*. 2014; 9. Frost M, et al. *Addiction*. 2019.

# CAM2038: INVESTIGATIONAL BUPRENORPHINE EXTENDED-RELEASE INJECTION FOR SUBCUTANEOUS USE

- Weekly or monthly formulations with multiple dose strengths
- May allow for individualized dosing based on clinical response and tolerability
  - Aligns with treatment guidelines
  - Multiple injection sites (evaluated buttock, abdomen, arm, thigh)
- Low-volume, ready-to-use, pre-filled syringes with 23 gauge needles stored at room temperature
- Administered by healthcare professional



**4 Weekly Doses**

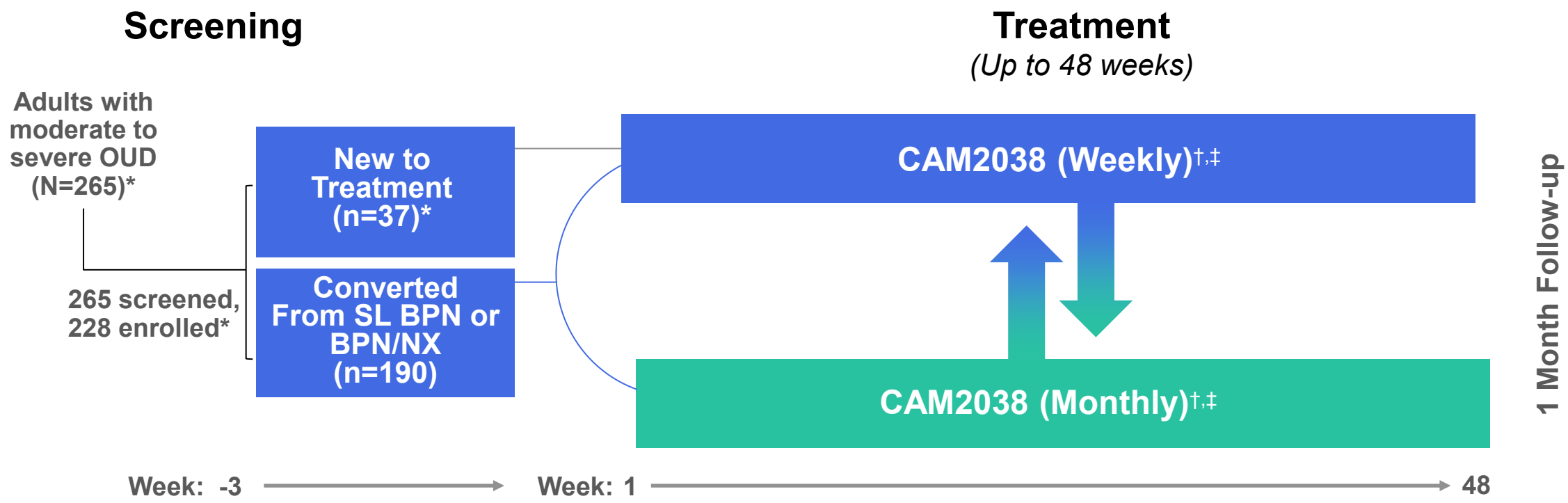


**3 Monthly Doses**

# STUDY HS-14-499

# A phase 3, an open-label, multicenter, flexible dosing, multinational, 48-week study to assess the safety of weekly and monthly CAM2038 injections in the treatment of adult outpatients with moderate to severe opioid use disorder (NCT02672111)

# STUDY HS-14-499: STUDY DESIGN




*New to treatment participants once in mild to moderate withdrawal based on COWS were given a 4 mg test dose of SL BPN/NX at the site on Day 1 and were observed for at least 1 hour prior to administration of CAM2038. One participant was not dosed after enrollment and withdrew consent prior to receiving the first dose of CAM2038.
†Increase or decrease doses.
‡Switch from weekly to monthly or vice versa.
Frost, M., et al., Long-term safety of a weekly and monthly subcutaneous buprenorphine depot (CAM2038) in the treatment of adult outpatients with opioid use disorder. *Addiction*, 2019, https://doi.org/10.1111/add.14636

# DOSE CONVERSION FOR PARTICIPANTS CONVERTING FROM SUBLINGUAL BUPRENORPHINE OR SUBLINGUAL BUPRENORPHINE/NALOXONE TO CAM2038 WEEKLY AND MONTHLY

| SL BPN or SL BPN/NX | WEEKLY (50 mg/ml) [a] | MONTHLY (356 mg/ml) [b] |
|---|---|---|
| ≤6 mg | 8 mg (0.16 mL) | – |
| 8–10 mg | 16 mg (0.32 mL) | 64 mg (0.18 mL) |
| 12–16 mg | 24 mg (0.48 mL) | 96 mg (0.27 mL) |
| 18–24 mg | 32 mg (0.64 mL) | 128 mg (0.36 mL) |

[a] Participants were allowed dose adjustments as needed at scheduled visits or with 8 mg CAM2038 subcutaneous supplemental injections at unscheduled visits up to a maximum weekly dose of 40 mg per week.

[b] Participants who needed additional temporary buprenorphine were allowed a maximum of 2 supplemental injections of 8 mg CAM2038 weekly per week

Dose adjustments could be made at investigator discretion at scheduled visits.

SL BPN, sublingual buprenorphine; SL BPN/NX, sublingual buprenorphine/naloxone

Frost, M., et al., Long-term safety of a weekly and monthly subcutaneous buprenorphine depot (CAM2038) in the treatment of adult outpatients with opioid use disorder. *Addiction*, 2019, https://doi.org/10.1111/add.14636

# STUDY 499: PARTICIPANT DEMOGRAPHICS AND BASELINE CLINICAL CHARACTERISTICS (overall safety population)*

| | Converted from SL BPN or BPN/NX N=190 | New to treatment N=37 | Overall N=227 |
|---|---|---|---|
| **Age, yr, mean (SD)** | 41.3 (9.64) | 41.8 (9.41) | 41.4 (9.59) |
| **Male, n (%)** | 119 (62.6) | 24 (64.9) | 143 (63.0) |
| **White, n (%)** | 183 (96.3) | 20 (54.1) | 203 (89.4) |
| **BMI, kg/m$^2$, mean (SD)** | 26.7 (5.84) | 25.3 (5.33) | 26.5 (5.77) |
| **Employed, n (%)** | 106 (55.8) | 13 (35.1) | 119 (52.4) |
| **Arrest history, n (%)** | 82 (43.2) | 26 (70.3%) | 108 (47.6%) |
| **Substance abuse history** | | | |
| Time to first opioid abuse, yr, mean (SD) | 14.7 (8.48) | 15.7 (8.98) | 14.8 (8.55) |
| Time to first diagnosis, yr, mean (SD) | 9.8 (7.60) | 10.0 (8.60) | 9.8 (7.75) |
| Heroin as primary opioid of use, n (%) | 97 (51.1) | 37 (100.0) | 134 (59.0) |
| **Baseline withdrawal and cravings** | | | |
| COWS at baseline, mean score (SD) | 2.0 (2.7) | 10.6 (3.7) | 3.4 (4.3) |
| SOWS at baseline, mean score (SD) | 4.7 (8.1) | 27.1 (15.3) | 8.3 (12.7) |
| Desire to use VAS at baseline, mean score (SD) | 11.7 (24.2) | 74.8 (24.8) | 22.0 (33.7) |
| Need to use VAS at baseline, mean score (SD) | 11.7 (23.8) | 76.3 (24.9) | 22.3 (33.8) |

*Safety population - All participants who were enrolled and received a dose of CAM2038. BMI, body mass index; BPN, buprenorphine; COWS, Clinical Opiate Withdrawal Scale (0–48); DSM-V, Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition; SD, standard deviation; SL BPN, sublingual buprenorphine; SOWS, Subjective Opioid Withdrawal Scale (0–64); VAS, visual analogue scale (0–100 mm).

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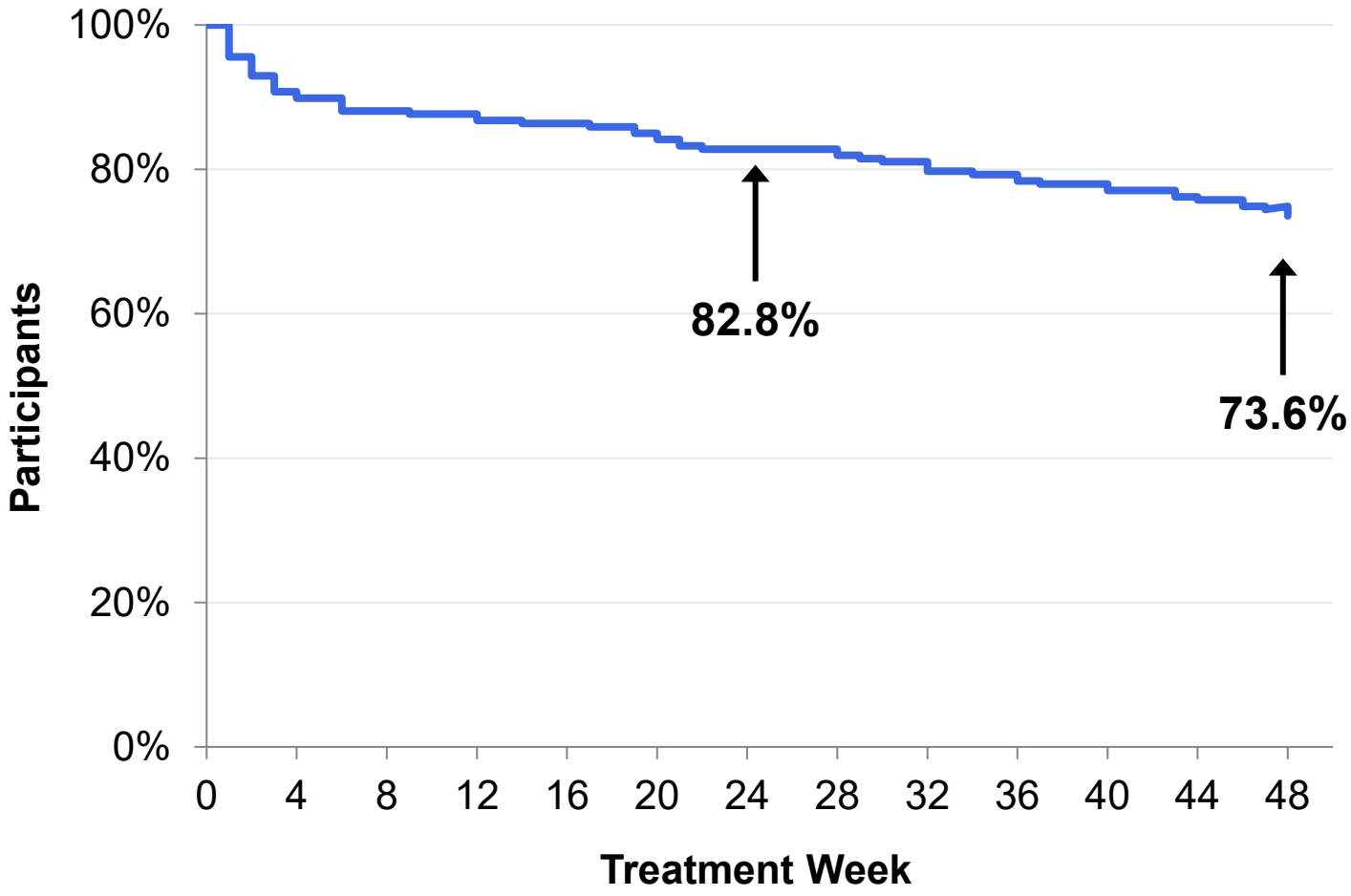
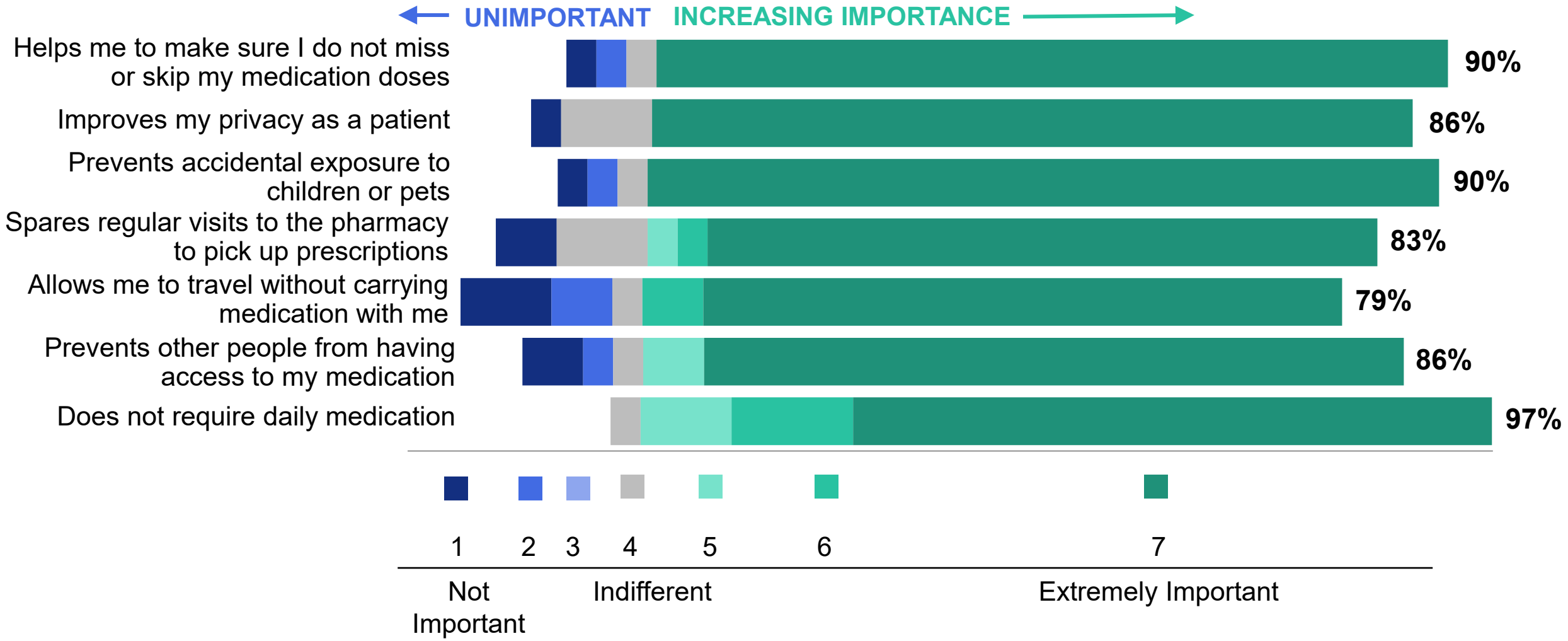
# STUDY 499: TREATMENT PERIOD COMPLETION




- 167/227 (73.6%) of the participants completed the end of treatment visit at day 337
- The mean (SD) duration of overall treatment was 39.1 (16.2) weeks

Frost, M., et al., Long-term safety of a weekly and monthly subcutaneous buprenorphine depot (CAM2038) in the treatment of adult outpatients with opioid use disorder. *Addiction*, 2019, https://doi.org/10.1111/add.14636

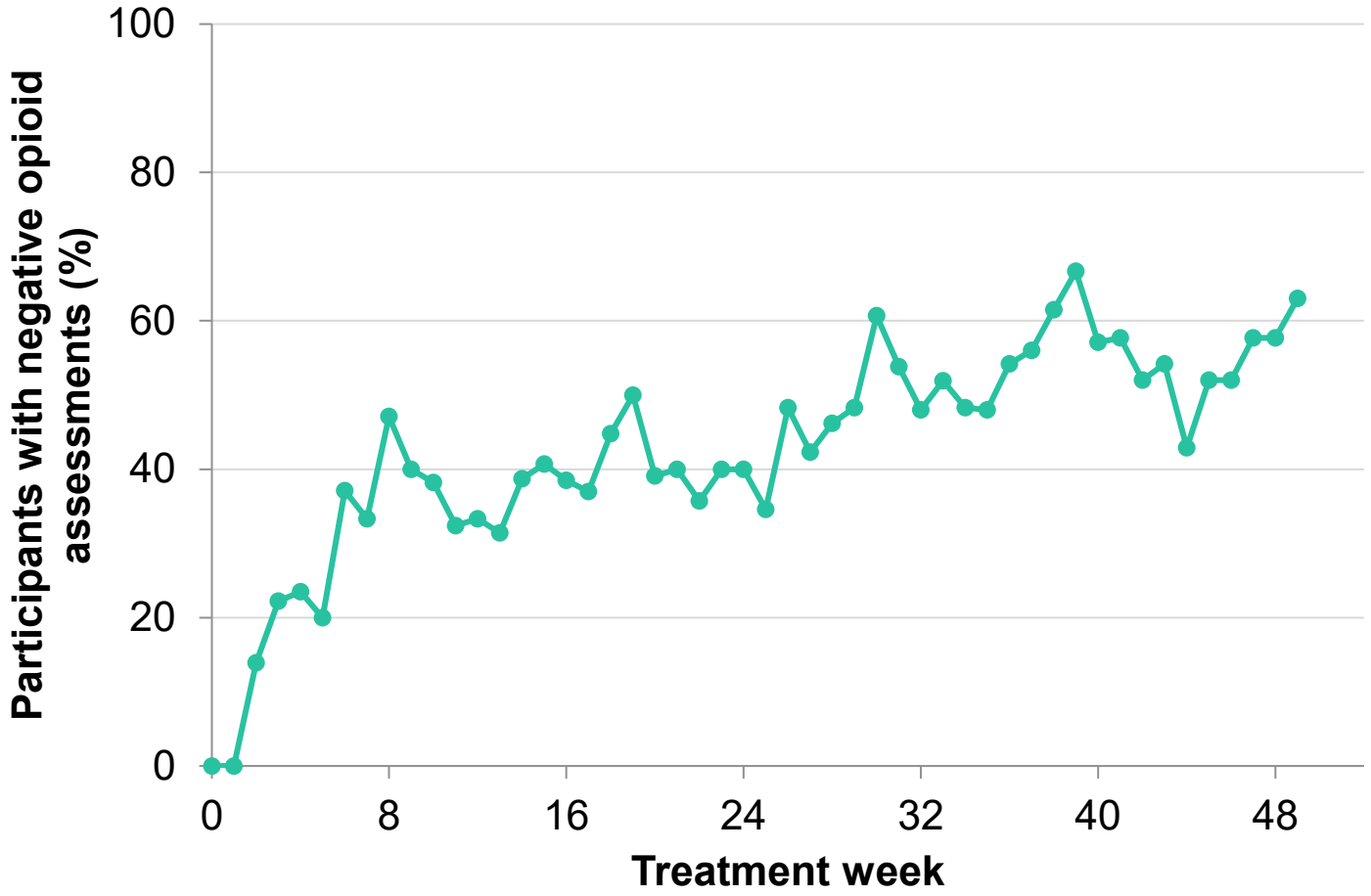
# STUDY 499: CHARACTERISTICS OF BPN TREATMENT THAT ARE IMPORTANT TO PARTICIPANTS NEW TO TREATMENT at MONTH 12 (n=29)




Data shown is percentage of participants who responded with that rating. The total percentage of patients who responded 5,6, or 7 for each item is shown to the right.

Clinical Study Report (CSR) HS-14-499

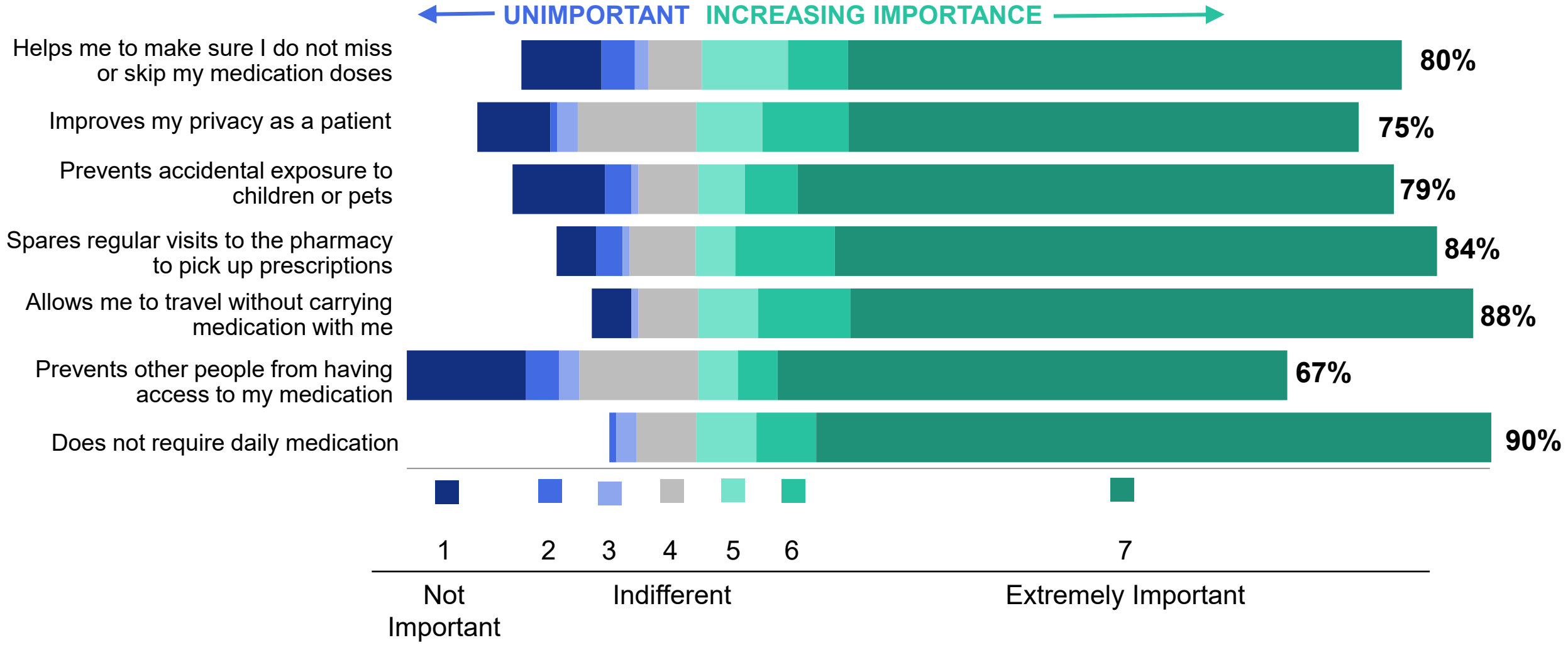
# STUDY 499 SECONDARY ENDPOINT: PROPORTION OF NEGATIVE OPIOID ASSESSMENTS FOR NEW TO TREATMENT PARTICIPANTS (n=37)




- All new-to-treatment participants were positive for illicit opioids at baseline; the percentage of the composite negative opioid assessments at last study visit increased to 63.0% at end of treatment period

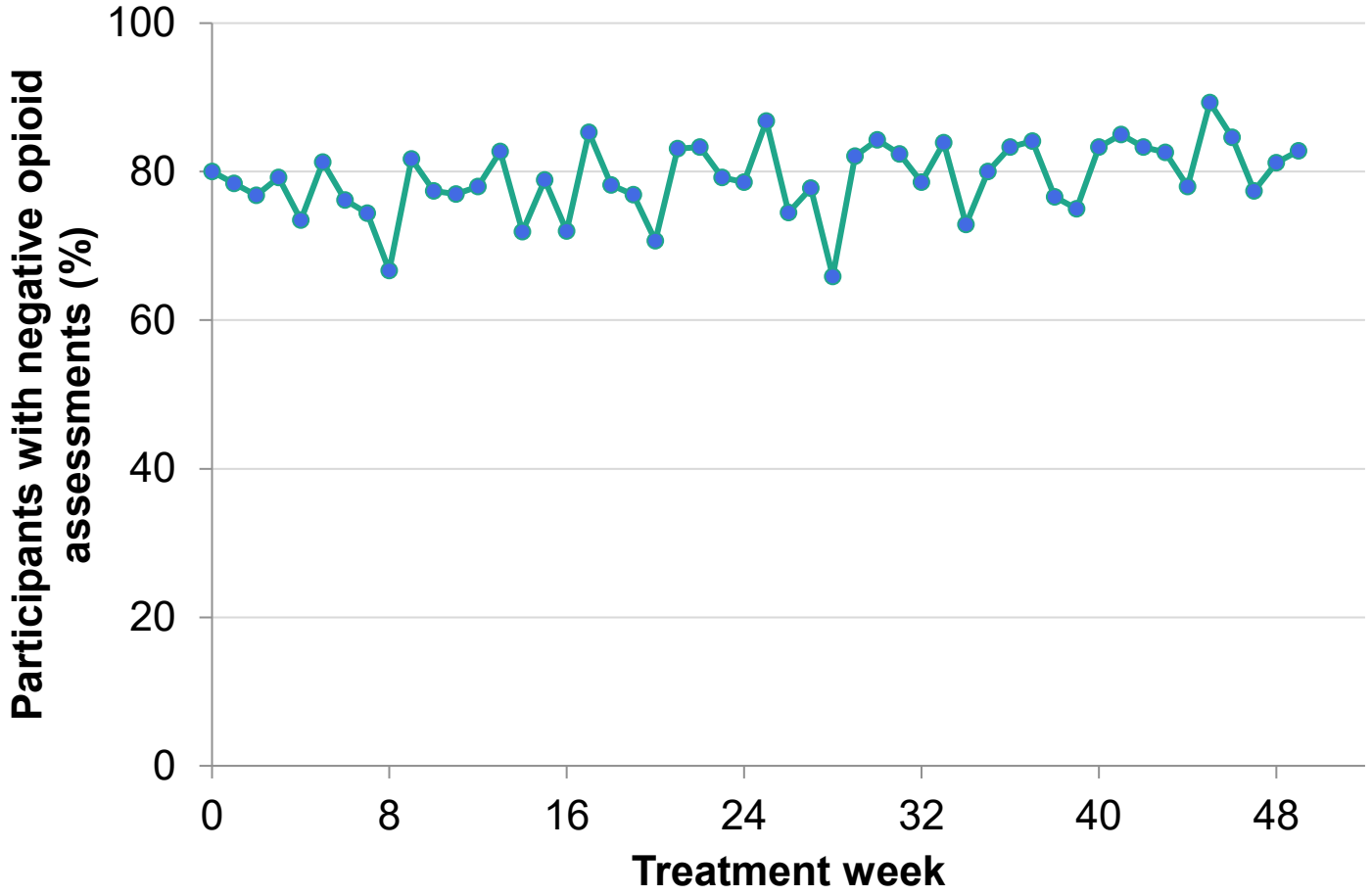
Frost, M., et al., Long-term safety of a weekly and monthly subcutaneous buprenorphine depot (CAM2038) in the treatment of adult outpatients with opioid use disorder. *Addiction*, 2019, https://doi.org/10.1111/add.14636

# STUDY 499: CHARACTERISTICS OF BPN TREATMENT THAT ARE IMPORTANT TO PARTICIPANTS CONVERTED FROM SL BPN at MONTH 12 (n=133)




Data shown is percentage of participants who responded with that rating. The total percentage of patients who responded 5,6, or 7 for each item is shown to the right. For the item “helps me not miss or skip medication doses,” n=132

# STUDY 499 SECONDARY ENDPOINT: PROPORTION OF NEGATIVE OPIOID ASSESSMENTS FOR PARTICIPANTS CONVERTED FROM SL BPN/NX (n=190)

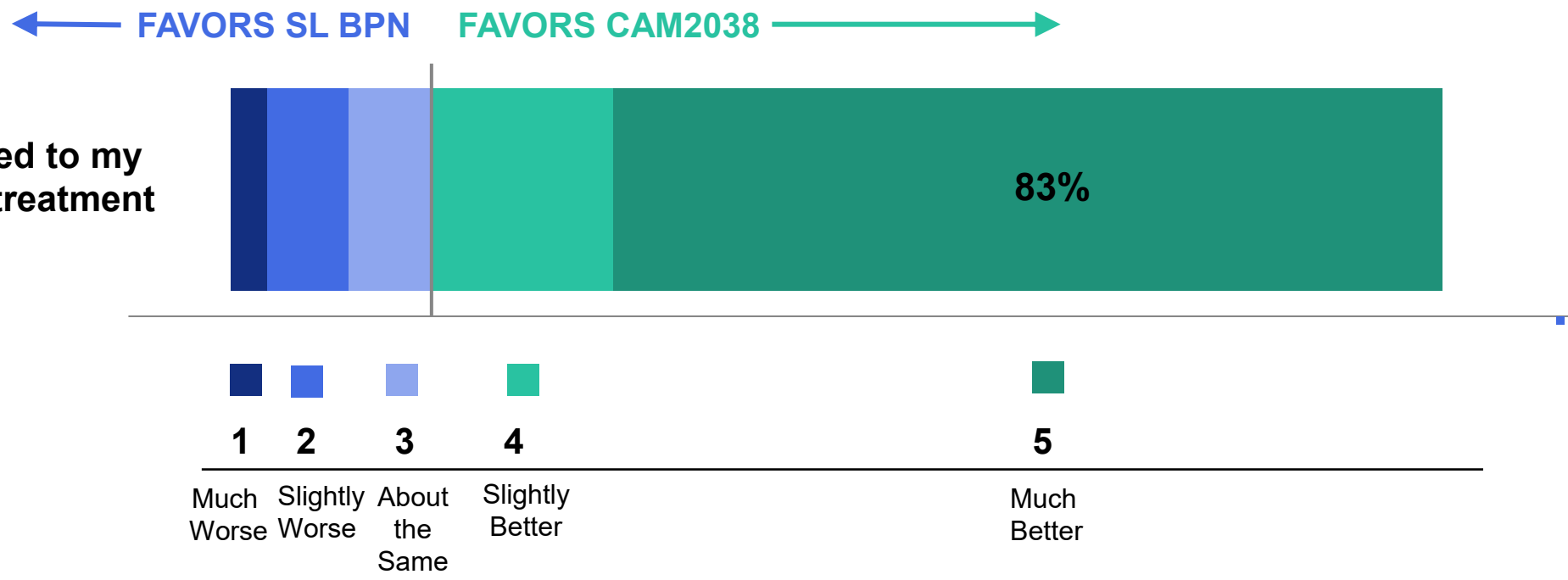



- Participants converted from SL BPN/NX maintained their levels of negative opioid assessments throughout the study

Frost, M., et al., Long-term safety of a weekly and monthly subcutaneous buprenorphine depot (CAM2038) in the treatment of adult outpatients with opioid use disorder. *Addiction*, 2019, https://doi.org/10.1111/add.14636

# STUDY 499: PATIENT SATISFACTION WITH CAM2038 COMPARED WITH PREVIOUSLY PRESCRIBED SL BPN TREATMENT (n=133)

**"The study medication compared to my previously prescribed SL BPN treatment is_____"**




Data presented is percent of participants who responded with that rating. The total percentage of patients who responded 4 or 5 is shown to the right.

Clinical Study Report (CSR) HS-14-499

# STUDY 499 SAFETY: SUMMARY OF ADVERSE EVENTS (AEs); (overall safety population)

| Category | Converted from SL BPN or BPN/NX N = 190; n(%) | New to BPN treatment N = 37; n(%) | Overall N = 227; n(%) |
|---|---|---|---|
| **≥ 1 AE** | 131 (68.9) | 12 (32.4) | 143 (63.0) |
| **≥1 drug-related AE** | 58 (30.5) | 2 (5.4) | 60 (26.4) |
| Injection site AE | 43 (22.6) | 2 (5.4) | 45 (19.8) |
| Non-injection site AE | 23 (12.1) | 1 (2.7) | 24 (10.6) |
| **≥1 severe AE** | 13 (6.8) | 2 (5.4) | 15 (6.6) |
| **Deaths** | 0 (0) | 0 (0) | 0 (0) |
| **≥1 serious AE (SAE)** | 10 (5.3) | 2 (5.4) | 12 (5.3) |
| **≥1 drug-related SAE** | 0 (0) | 0 (0) | 0 (0) |
| **Hospitalizations** | 9 (4.7) | 1 (2.7) | 10 (4.4) |
| **AEs leading to discontinuations** | 4 (2.1) | 1 (2.7) | 5 (2.2) |
| **AEs in ≥5% of participants** | | | |
| Injection site pain | 33 (17.4) | 2 (5.4) | 35 (15.4) |
| Injection site swelling | 25 (13.2) | 2 (5.4) | 27 (11.9) |
| Injection site erythema | 20 (10.5) | 1 (2.7) | 21 (9.3) |
| Headache | 18 (9.5) | 0 (0) | 18 (7.9) |
| Nasopharyngitis | 17 (8.9) | 1 (2.7) | 18 (7.9) |
| Nausea | 16 (8.4) | 0 (0) | 16 (7.0) |
| Urinary tract infection | 9 (4.7) | 3 (8.1) | 12 (5.3) |
| Vomiting | 12 (6.3) | 0 (0) | 12 (5.3) |

BPN, buprenorphine; SL BPN, sublingual buprenorphine; AE, adverse event; SAE, serious adverse event.

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# CONCLUSIONS

- Study participants generally reported high levels of satisfaction with the individualized treatment provided by weekly and monthly CAM2038 subcutaneous injections

- In both groups, participants identified ease of travel, daily adherence, privacy, lack of need for daily medication or regular trips to pharmacy, accidental pediatric exposure, and access to medication by others as important characteristics of BPN treatment

- More than 80% of patients converted from treatment with SL BPN reported that CAM2038 was slightly or much better than their previous SL BPN treatment