

SEDARE™ — Clinical Evidence Reference

Intranasal Sufentanil + Ketamine | 503B Compounded Formulation | Prehospital & Acute Pain Evidence Summary

Prepared for review by stakeholders of Operational Medical Systems, Warfighter Protection and Acute Care PMO

SECTION 1 — Sedare™ (CT001): Pivotal Clinical Data | PDC 01-0202 Study

88%

Patients Achieved Pain Score ≤ 4 at 30 min

54%

Responded by 15 Minutes

75%

Median Pain Reduction at 30 Minutes

85.7%

Median Pain Reduction at 60 Minutes

Study Design

Open-label, prospective, multicenter pivotal trial. **155 pediatric patients** aged 1 to <18 years with moderate-to-severe acute pain (baseline median pain score 8/10) in an emergency department setting.

PDC 01-0202; part of PDCO-approved development program

Formulation & Dose

CT001 administered at **0.5 mcg/kg sufentanil + 0.5 mg/kg ketamine** intranasal, with optional second dose at 10–15 minutes. Dosing regimen established by PK/PD modeling & simulation (PDC 01-0208) bridging adult-to-pediatric data.

Modeling predicted 84% responder rate; 86.2% observed — within 2%

Primary Endpoint Met

88% of patients (134/152) reached pain score ≤ 4 within 30 minutes. 54% (82/152) met this threshold by 15 minutes — demonstrating rapid onset consistent with the intranasal route.

Source: Martin Juhl et al., Society of Pediatric Pain Management, 2024

Safety Profile

Zero IMP-related Serious Adverse Events reported. All adverse events mild or moderate. Most common: vomiting and dizziness. Treatment was well-tolerated and highly accepted across pediatric age range 1–17 years.

Program includes 6 clinical trials + 2 modeling & simulation studies; 8 studies total

SECTION 2 — Intranasal Fentanyl: Prehospital Evidence (Component 1)

2–7 min

Onset of Action vs. IV Opioid

89.5%

Achieved $\geq 30\%$ Pain Reduction (n=3,312)

0.6%

Adverse Vital Sign Events (n=2,129 EMS)

Strong

AHRQ/NAEMSP Grade Recommendation

Guideline Endorsement (AHRQ/NAEMSP)

Strong recommendation for IN fentanyl over IM/IV opioids in patients without IV access, using GRADE methodology. Endorsed for prehospital use across EMS systems nationally.

Source: Prehospital Emergency Care, 2023

Pain Score Reduction

NRS scores decreased **–1.8 at 5 min / –2.4 at 10 min / –2.9 at 15 min** ($p < 0.0001$). Zero adverse events in prospective EMS study.

Source: J Wilderness Medicine, 2022

Non-Inferiority to IV Morphine

Retrospective study of 3,312 pediatric patients: IN fentanyl matched IV morphine with no statistical difference (OR 1.22; 95% CI 0.74–2.01). 89.5% achieved effective analgesia.

Source: Prehospital Emergency Care, multi-site retrospective

EMS Safety (n=2,129)

Retrospective chart review: only 0.6% vital sign abnormality potentially attributable to fentanyl. No hospital admissions or patient deaths attributed to its prehospital use.

Source: Prehospital Emergency Care, 2006

SECTION 3 — Intranasal Ketamine: Prehospital Evidence (Component 2)

76% vs 41% PAIN-K RCT: Ketamine vs Placebo	2 min Time to Detectable Blood Level IN	3 hrs Demonstrated Duration of Analgesia	76 pts Combat Trauma Cases (French Military)
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PAIN-K RCT — Annals of Emergency Medicine (2019)

Randomized, double-blind, n=120. **76% of IN ketamine patients vs. 41% placebo** achieved ≥2-point VNRS pain reduction at 30 min (95% CI 17–51%). All AEs minor; no vital sign changes requiring intervention.

Source: Andolfatto et al., *Ann Emerg Med* 2019;74:241–250

Hemodynamic Safety Profile

Preserves cardiorespiratory function — uniquely suited for austere prehospital environments. Doses <0.5 mg/kg showed no significant side effects across 21 prehospital and 43 ED studies.

Source: *Low-Dose Ketamine Narrative Review, ScienceDirect* 2024

Combat Trauma Validation — French Armed Forces (2017–2019)

IN ketamine 50 mg used in **76 combat trauma patients** across Middle East and Sahel deployments. Safe and effective alone or as adjunct; minimal side effects; reduced IV opioid doses required.

Source: *French Military Medical Service, PubMed* 2023

NMDA Mechanism — Opioid-Sparing Potential

Ketamine’s NMDA antagonism prevents opioid-induced hyperalgesia and reduces total opioid burden. Meta-analysis (4 RCTs, n=276): IN ketamine as efficacious as IN fentanyl with no serious adverse events.

Source: *Systematic Review & Meta-analysis, PMC* 2020

Summary: Sedare™ (CT001) has completed a pivotal multicenter clinical trial demonstrating 88% efficacy at 30 minutes with zero serious adverse events in 155 patients. The published prehospital literature on each active component — intranasal fentanyl and intranasal ketamine — independently establishes the nasal route as guideline-supported, fast-onset, and safe in EMS and combat settings. Sedare combines both in a standardized, pre-dosed 503B formulation, addressing the route access limitations and dosing variability that exist with current field analgesic options.

CT001 data: Juhl M, Schoemaker R, Hartshorn S. Society of Pediatric Pain Management, 2024. Prehospital component data: peer-reviewed publications as cited. Prepared by Ventis Pharma.