



# Peabody Pharmaceuticals Inc.

- Provides an opiate-strength, non-addictive, and tamper-proof relief from acute pain for 72 hours
- Thus, solving the DEA's question of:

*“If the pharmaceutical industry can make a safe, effective, and non-divertible opiate for animals, why not for humans”?*



# Peabody Pharmaceuticals Inc.

Seeks a joint venture partner to launch its long-acting analgesic (PBD-2021) that:

- Delivers opiate-strength, non-addictive, and tamper-proof relief from acute pain for 72 hours;
- Enhances provider control and minimizes liability by eliminating pills;
- Reduces medication costs for patients, providers, distributors, and insurers; and
- Avoids pathways to chronic pain by fast, appropriate, and safe therapy for severe injuries.



# Executive Summary

- Peabody, is a Johns Hopkins-based clinical stage developer of sustained-release drugs that offer safer delivery to patients and enhanced control for clinicians.
- The prototype product, Ethiq<sup>a</sup> XR<sup>®</sup>, is an FDA-approved, long-acting buprenorphine injectable suspension that controls pain for 72 hours in animals, including non-human primates, since 2014.
- Peabody seeks a partner to transition Ethiq<sup>a</sup> XR<sup>®</sup> to treat human pain.

# The Problem: Treatment of Acute Pain

## Prevalence of Acute Pain

80 million Americans<sup>1</sup> suffer annually from acute pain. The economic burden for patients is \$373 billion<sup>2</sup>

## Cause of Acute Pain

Acute pain arises from outpatient surgeries, dental procedures, bone fractures, sprains, trauma, and battlefield injuries

## Unmet Need For a Non-Addictive, Non-Divertible, and Effective Opiate

Opiates remain the frontline treatment for acute pain, BUT they are diverted and abused with unintended consequences. The CDC estimates that prescription opiate overdoses caused about 11,000 deaths in the United States in 2024<sup>3</sup> and 806,000 deaths between 1999-2023<sup>4</sup>



# Our Solution (PBD-2021): Patented Therapeutic Use & Delivery System

## Established Analgesic

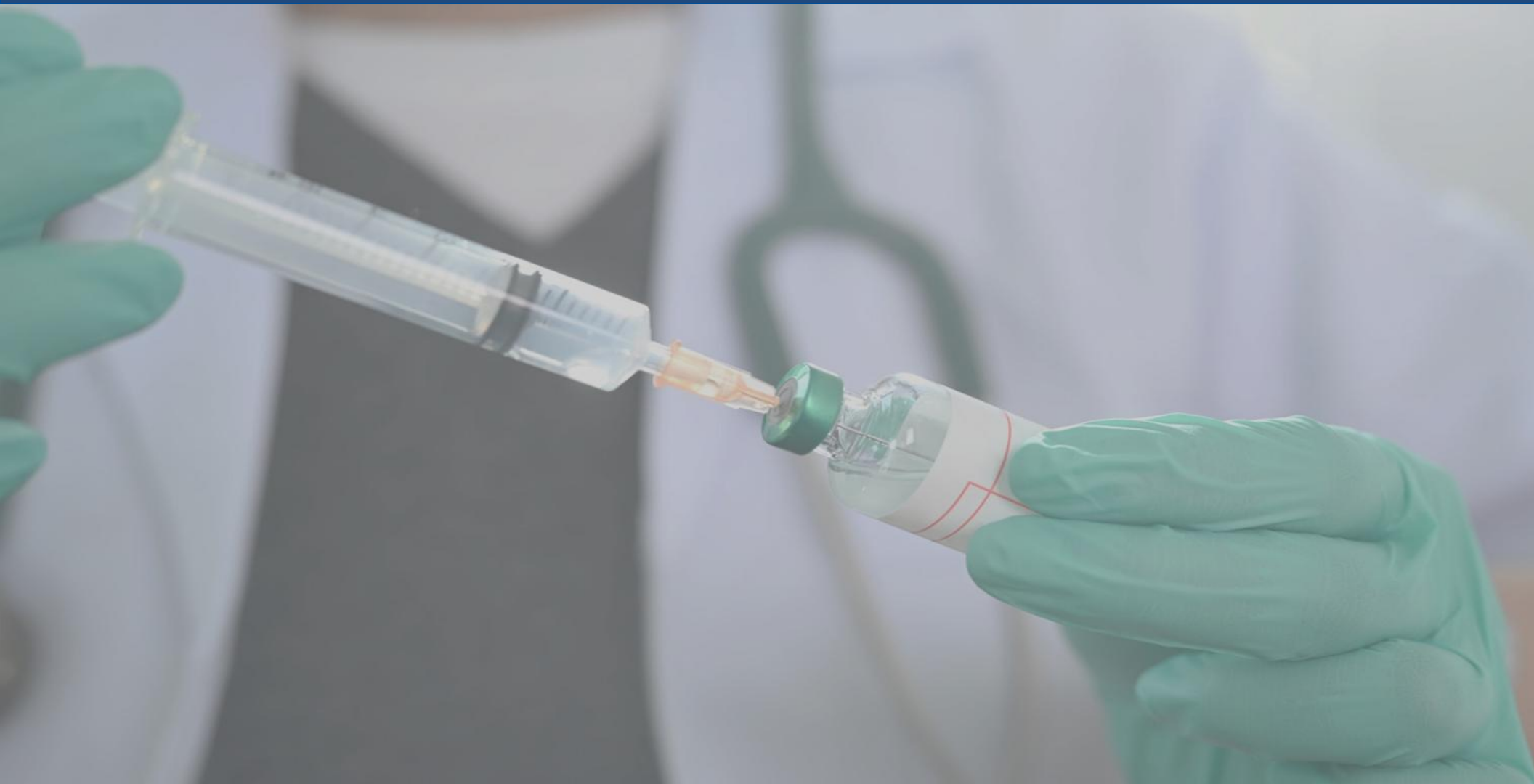
Transition an FDA-approved veterinary opioid analgesic, Ethiqia XR®, to treat human pain with a much lower risk of abuse than other opioids

## Delivery Method

Combine the non-addictive opioid, buprenorphine, with a lipid carrier system to produce a clinician-controlled injectable, which eliminates pills and limits the potential for abuse

## Strength, Safety, and Diversion Prevention

Buprenorphine is 50x stronger<sup>5</sup> than morphine AND has a 50-year human safety record. The lipid carrier system protects the opioid from diversion



# Proof of Concept and Data Snapshots

## Pharmacokinetics

Pharmacokinetics data (PK) confirm a three-day therapeutic blood concentration in every species tested<sup>6</sup>

- Kappa and delta antagonist: “ceiling effect” that greatly increases safety owing to partial antagonism, which allows analgesia peaks and decreases adverse respiratory effects
- Mu selective agonist: less euphoric than other opiates owing to unique agonism, which minimizes abuse potential

## Patent Protection

Current patents: 11+ years of protection for drug development, distribution, and profits

## Safety Data

50-year safety record of using buprenorphine as a human analgesic

## Continued Research

More than 6,000 publications about buprenorphine’s safety since 2015

## Patient Acceptance of Injectable Therapy

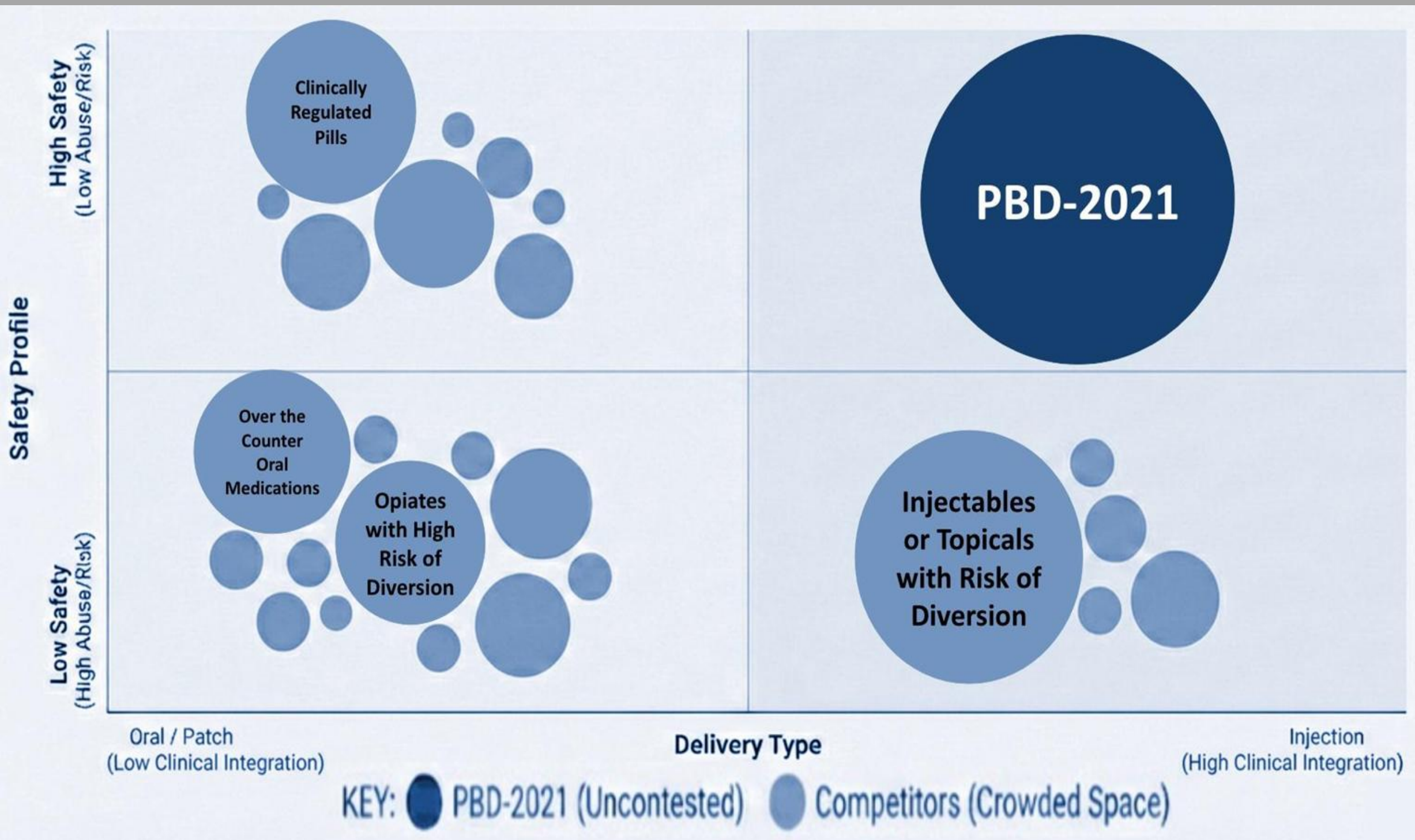
Explosive growth of GLP-1 drugs



# Competition

- **Opiates** and their abuse
- **Non-opioid pain drugs** carry higher risks from potential side effects, including stomach bleeding, kidney failure, heart problems, and often require opiate rescue for pain therapy
  - **Nonsteroidal Anti-Inflammatory Drugs (“NSAIDs”)**, such as ibuprofen (Advil and Motrin), naproxen (Aleve), and diclofenac (Voltaren gel)
  - **Super-NSAIDs**, such as celecoxib (Celebrex), diclofenac (oral Voltaren), and meloxicam (Mobic)
- **Sodium channel inhibitors**, including NaV 1.8 inhibitors, such as Journavx (suzetrigine), provide less pain relief than opioids. Users frequently need opiate rescue for pain therapy
- **Local anesthetics**, such as lidocaine and bupivacaine, slow pain signals in local nerve cells, but do not provide relief to the central nervous system. **Extended-release local anesthetics**, such as bupivacaine liposome (Exparel) that uses an injection in a surgical site to induce analgesia by anesthesia, also often require opiate rescue for pain therapy
- **Other extended-release buprenorphine suspensions**, such as Brixadi and Sublocade, currently used to treat opioid use disorder (“OUD”), that potentially could be reengineered

# Uncontested Space



## The “Anti-Addictive” Safety

Standard opioids risk lethal respiratory depression. Buprenorphine studies document an order of magnitude higher safety profile by not affecting the brain stem's breathing centers, a top concern for post-op recovery in elderly or obese patients

## The "Anti-Diversion" Breakthrough

The product is a complex lipid solution injected in a clinic. A potential user cannot "extract" the buprenorphine to get high or sell it on the secondary market

## The Delivery

While competitors use complex delivery systems, the novel "Butter" delivery system (cholesterol/triglycerides) is biologically inert and avoids dermal lesions (skin problems) that plague patients using competing long-acting injections

## Regulatory Burden

### (Sch 3 vs Sch 2)

Being a Schedule 3 drug (unlike morphine/OxyContin) means no specialized safes, simplified bookkeeping, and lower regulatory overhead

# Comparison Grid

## PBD-2021 Strengths:

**Physiologic Safety:** Unlike standard opioids, PBD-2021 does not affect the brain stem's breathing centers, significantly reducing overdose risk

**Clinician Control:** Removing the patient from the supply chain by eliminating "take-home" pills, which are the primary source of diversion

**Regulatory Speed:** Being Schedule III means hospitals do not need specialized containment and complex bookkeeping, making it cheaper to manage than Schedule II opioids

## Competitor Weaknesses:

**The "Opiate Rescue" Gap:** Competitors like Vertex (Suzetrigine) and Pacira (Exparel) are non-opioids, but patients using them frequently require "rescue" opioids for ongoing and breakthrough pain

**Delivery Issues:** Long-acting injections from competitors use polymer-bound platforms that can cause dermal lesions, whereas the Peabody lipid system is biologically inert

	High Potency (Opiate Strength)	No Respiratory Depression	Clinician Control (No Pills)	Low Reg Burden (Schedule III or Otherwise)	72-Hour Duration	Absence of Dermal Lesions
<b>Peabody (PBD-2021)</b>	✓	✓	✓	✓	✓	✓
<b>Morphine (Standard of Care)</b>	✓					✓
<b>Ibuprofen (Advil)</b>		✓		✓		✓
<b>Suzetrigine (Journavx)</b>		✓		✓		✓
<b>Exparel (Pacira)</b>		✓	✓	✓	✓	✓
<b>Sublocade/Brixadi</b>	✓	✓	✓	✓	✓	

# Market Sizes

Total Acute Pain Market in the US, UK, France, Germany, Italy, Spain, and Japan in 2025

Post Operative Pain Relief Following ~50 Million Surgeries<sup>8</sup> in the US during 2023 with ~30% of Surgeries are Soft Tissue<sup>9</sup> and \$50 revenue per treated surgery and 60% allocation to Peabody

~50 million total U.S. surgeries annually and ~30% are soft tissue surgery types relevant for pain management context and ~50% currently get opioids. Sizing includes a realistic capture in first year (10%) and \$50 revenue per treated surgery and 60% allocation to Peabody

Total Addressable Market (TAM)  
\$4.536 Billion<sup>7</sup>

Serviceable Addressable Market (SAM)  
\$450 Million

Serviceable Obtainable Market (SOM)  
\$22.5 Million

DelveInsight projects a \$13.579 billion market in those seven countries in 2034<sup>10</sup>

# Unit Economics

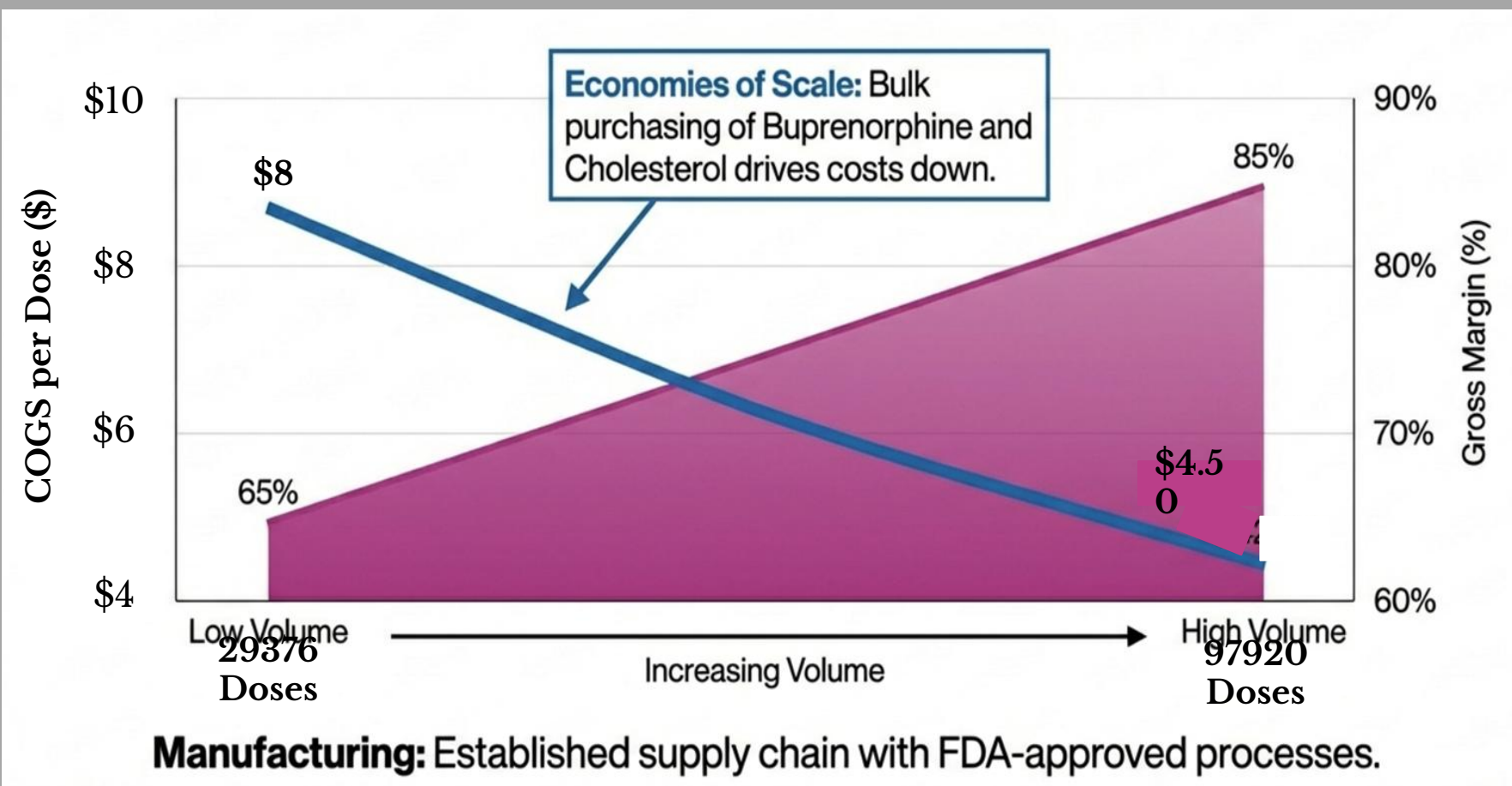
**Target Gross Margin:** As manufacturing scales and the supply chain (which is already FDA-approved for veterinary use) is optimized, margins are expected to reach 70% or higher

**Operational Savings:** Reduced regulatory requirements mean no specialized safes, simplified bookkeeping, and lower liability insurance costs for providers

\$50 per Dose

Replaces:

- 3 days of pill management
- Nursing administration time
- Diversion liability risk



Manufacturing  
Costs

- Low-Volume (6 kilos): Initial production costs are estimated at \$8 per dose
- Mid-Volume (10 kilos): Costs drop to \$6.60 per dose
- High-Volume (20 kilos): At scale, the cost further decreases to \$5.30 per dose

# Traction & Milestones

## 2015-Current

More than 6,000 new publications on the safety of buprenorphine

## 2020 & 2021

United States Patents issued with patent protection at least through **2038**

## 2026-2027

Phase 1 and 2 Clinical Trials

## 2029

FDA Approval and Launch

## 2014

Ethiqa XR has controlled post-procedural pain for 72 hours in animals, including non-human primates, in the US and EU<sup>11</sup>

## IND Application

Application Filed (ID: 142193)

## 2026

Projected IND Approval

## 2028

Phase 3 Clinical Trials

# Financial Projections

## R&D / Clinical Trials Phase (2026–2028)

2026



**IND Approval and Phase 1/2 Trials:**  
Assessment of human safety and pharmacokinetics.



2028



**Phase 3 Clinical Trials:**  
Final stage testing begins; U.S. Department of War expresses funding interest for battlefield pain management.



**High-Investment Stage**  
Requires approximately \$13M+ for initial trial tranches and drug manufacturing stability testing.



2029: FDA Approval & Market Launch



## Commercial & Scaling Phase

2029

2030

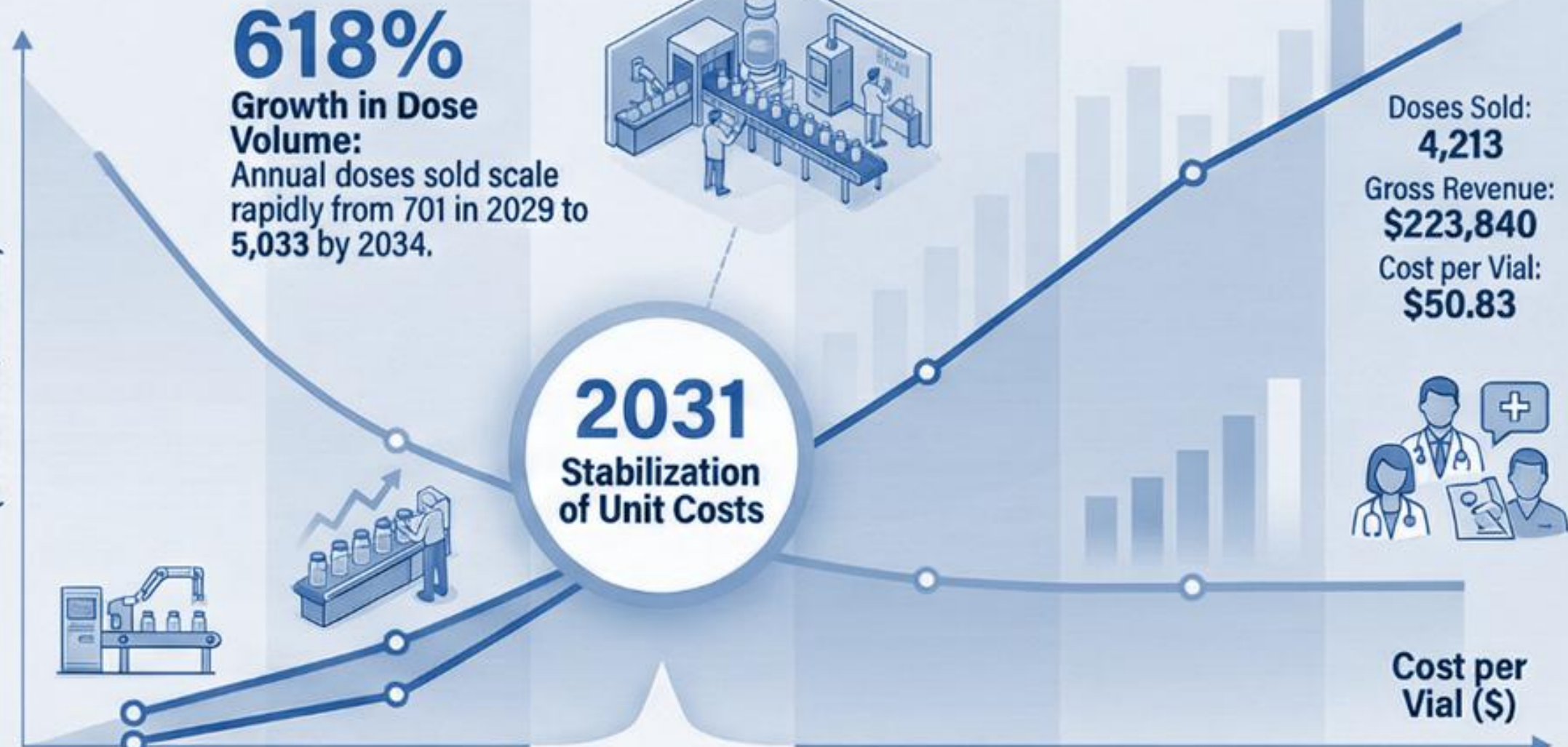
2031

2032

2033

2034

Gross Revenue & Doses Sold  
(Thousands/Millions)



2029

2030

2031

2032

85%

Doses Sold:  
701

Doses Sold:  
2,026

Gross Revenue:  
\$107,609

Doses Sold:  
4,213

Gross Revenue:  
\$37,247  
Cost per Dose:  
\$9.50

Gross Revenue:  
\$60,061  
Cost per Dose:  
\$8.06

Cost per Dose  
stabilizes at  
\$6.37 due to  
economies  
of scale

Gross Revenue:  
\$223,840  
Cost per Dose:  
\$6.37

**Gross Profit Margin:**  
High-margin commercial phase allows gross margins to climb from 65%+ at launch to 85%



# Financing

## Costs to Secure IND

- \$2 -3 Million Development Costs
  - Clinical Trial Contracting
  - Data and Regulatory Management

## Funding for Phase 1 & 2 Clinical Trials

- Phase 1 & 2 costs: \$10M total

## Partner with FDA to Determine Costs for Phase 3 Trials

- United States Department of War has expressed an interest in funding
- Cost per patient in trials: \$20-30K

# Social Impact

- The DEA has asked: “If the pharmaceutical industry can make a safe, effective, and non-divertible opiate for animals, why not for humans?”
- Address acute pain that plagues tens of millions of Americans annually
- Minimize, if not eliminate, abuse, addictions, overdoses, and deaths arising from prescription drugs
- “One [shot] and done” as a wonderful complement to the DEA’s “One pill can kill” initiative to eliminate opioid pills, which reduces potential liability for clinicians and vendors



# Leadership Team and Advisors

- **Business Development Team**

- Timothy J. Turner, President, CEO of Bocana Resources Corp. and Bocana Investments, SA
- Bridget Wood-Turner, Director, retired Dow Chemical Manufacturing Leader and current Board Vice President, United Way Galveston County Mainland
- Dave Allen, CPA, Founder & CEO, Animalgesics
- Matthew J. Barrett, Consultant, JD, CPA (inactive), Professor Emeritus, Notre Dame Law School

- **Technology Development Team**

- Michael Guarnieri, Founder, PhD, MPH, Emeritus Faculty, Johns Hopkins School of Medicine
- Barry Levinson, PhD, Founder & COO, Fidelis Animal Health
- Gerard Limerick, MD, PhD

- **Scientific Advisory Board**

- Mohamed Al-Ibrahim, MD
- Mellar P. Davis, MD
- Kelly Dunn, PhD
- Barry Levinson, PhD
- Gerard Limerick, MD, PhD
- David Saunders, MD





# Objective

Peabody aims to establish a joint venture that utilizes PBD 2021, its patented, clinical-stage long-acting delivery system. This system employs a neutral lipid suspension to administer generic analgesics, providing tamper-proof relief from acute pain for up to 72 hours.



# Thank You!

For more information, please:

- Visit [peabodypharmaceuticals.com](http://peabodypharmaceuticals.com) or
- Contact Tim Turner, President  
(713) 858-3329  
[TTurner@peabodypharma.com](mailto:TTurner@peabodypharma.com)

# Footnotes

- <sup>1</sup> Vertex Pharmaceuticals, The state of pain in America (Mar. 12, 2025), <https://www.vrtx.com/stories/state-pain-america/>.
- <sup>2</sup> International Society for Pharmacoeconomics and Outcomes Research, Inc., Economic Burden of Managing Acute and Chronic Pain in the United States: National Estimates from 2022 Data, <https://www.ispor.org/heor-resources/presentations-database/presentation/intl2024-3898/136819>.
- <sup>3</sup> M. Garnett & A. Miniño, Drug Overdose Deaths in the United States, 2023-2024 (Jan. 29, 2026), <https://www.cdc.gov/nchs/data/databriefs/db549.pdf>.
- <sup>4</sup> U.S. Centers for Disease Control and Prevention, Understanding the Opioid Overdose Epidemic (June 9, 2025), <https://www.cdc.gov/overdose-prevention/about/understanding-the-opioid-overdose-epidemic.html>.
- <sup>5</sup> R. Wolff, et al., Systematic review of efficacy and safety of buprenorphine versus fentanyl or morphine in patients with chronic moderate to severe pain (2012), <https://www.ncbi.nlm.nih.gov/books/NBK99111/>.
- <sup>6</sup> B. Tyler & M. Guarnieri, Long-Acting Opioid Analgesics for Acute Pain: Pharmacokinetic Evidence Reviewed, *Vet. Sci.* 2023, 10(6), 372, available at <https://www.mdpi.com/2306-7381/10/6/372>.
- <sup>7</sup> DelveInsight Business Research LLP, Moderate to Severe Acute Pain Market Summary (2025), <https://www.delveinsight.com/report-store/moderate-to-severe-acute-pain-market>.
- <sup>8</sup> U.S. Centers for Disease Control and Prevention, National Center for Health Statistics, Inpatient Surgery, <https://www.cdc.gov/nchs/fastats/inpatient-surgery.htm>.
- <sup>9</sup> Life Science Intelligence, Inc., U.S. Surgical Procedure Volumes: New Technologies & Aging Demographics Having Impact (Oct. 23, 2019), <https://www.lifesciencemarketresearch.com/insights/u.s.-procedure-volume-trends-driven-by-new-technologies-demographics>.
- <sup>10</sup> See DelveInsight, *supra* note 7.
- <sup>11</sup> Fidelis Animal Health, Ethiq XR. The Only FDA-Indexed, Extended-Release Buprenorphine Indicated for Control of Post-Procedure Pain in Captive Rodents, Ferrets, Laboratory Rabbits, and Non-Human Primates, <https://ethiqxr.com/>.