Peabody Pharmaceuticals Inc.

- Features a patented therapeutic drug and delivery system that offers opiate-strength, non-addictive, and tamper-proof relief from acute pain for 72 hours

- Thus, answering 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



Executive Summary

Peabody seeks a co-venturer to launch its long-acting analgesic (PBD-2021) that:

- Delivers powerful, yet safe and non-divertible, relief from acute pain for 72 hours;
- Restores providers' control and minimizes liability for distributors and insurers; and
- Avoids pathways to chronic pain by providing fast, appropriate, and safe therapy for severe injuries.

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An Introduction to Peabody

- Peabody is a Johns Hopkins-based, clinical-stage developer of sustained-release drugs that offer safer delivery to patients and enhanced control for clinicians.

- Peabody's prototype, Ethiqa XR®, is an FDA-approved, long-acting buprenorphine injectable suspension. The drug has controlled pain for 72 hours in animals, including non-human primates, since 2014.

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The Problem:

Treatment of Acute Pain



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Prevalence of Acute Pain

80 million Americans[1] suffer annually from acute pain. The economic burden for patients is $373 billion.[2]

Cause of Acute Pain

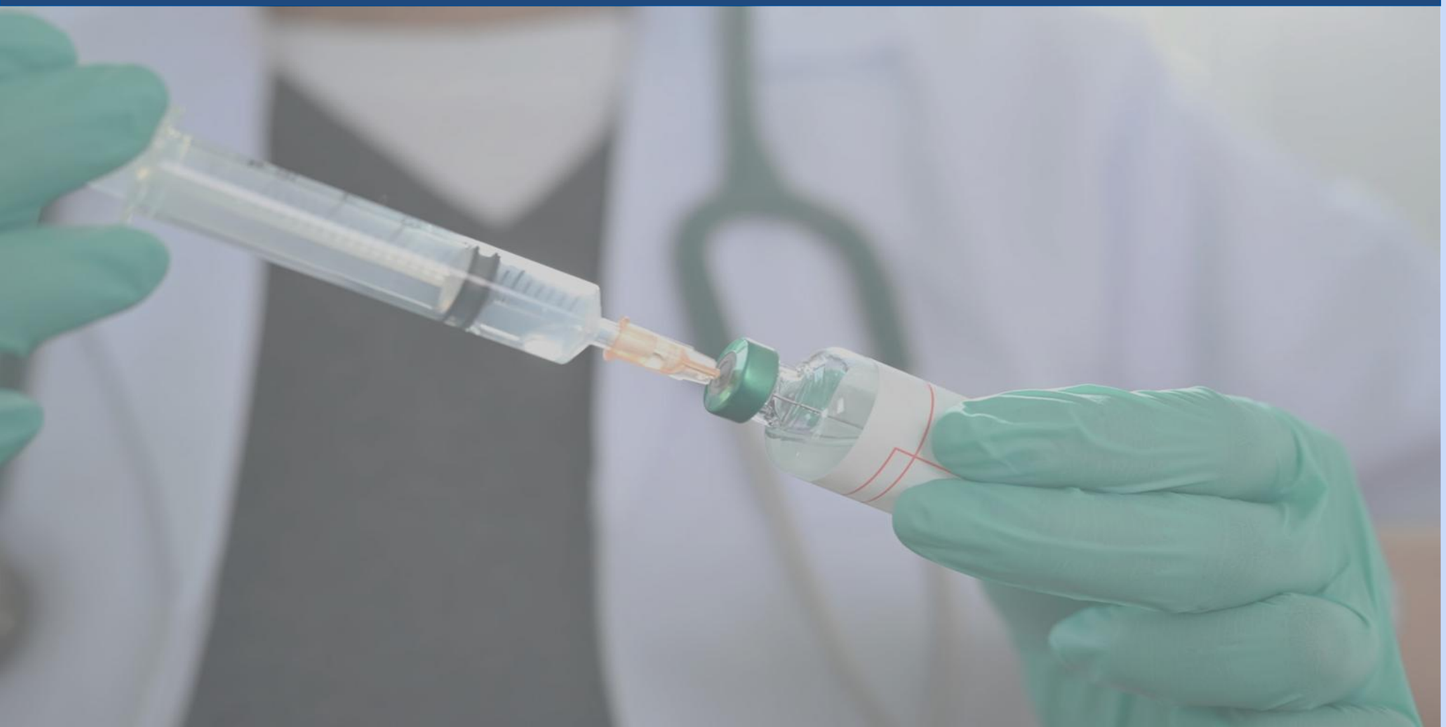
Acute pain arises from outpatient surgeries, dental procedures, bone fractures, sprains, trauma, and battlefield injuries.

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[3] and 806,000 deaths between 1999-2023.[4]

Our Solution (PBD-2021):

Patented Therapeutic Use & Delivery System



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Established Analgesic

Adapts an FDA-approved veterinary opioid analgesic, Ethiqa XR®, to treat human pain with a much lower risk of opioid abuse

Delivery Method

Combines 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

Binds to the morphine receptor 50x stronger[5] than morphine, **AND buprenorphine offers a better 50-year human safety**

Proof of Concept and Data Snapshots

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Pharmacokinetics

Pharmacokinetics data (PK) confirm a three-day therapeutic blood concentration in every species tested[6]

- 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 given unique agonism, which minimizes abuse potential

Patent Protection

Current patents provide at least 11 years of protection for drug development, distribution, and profits

Continued Research

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

Patient Acceptance of Injectable Therapy

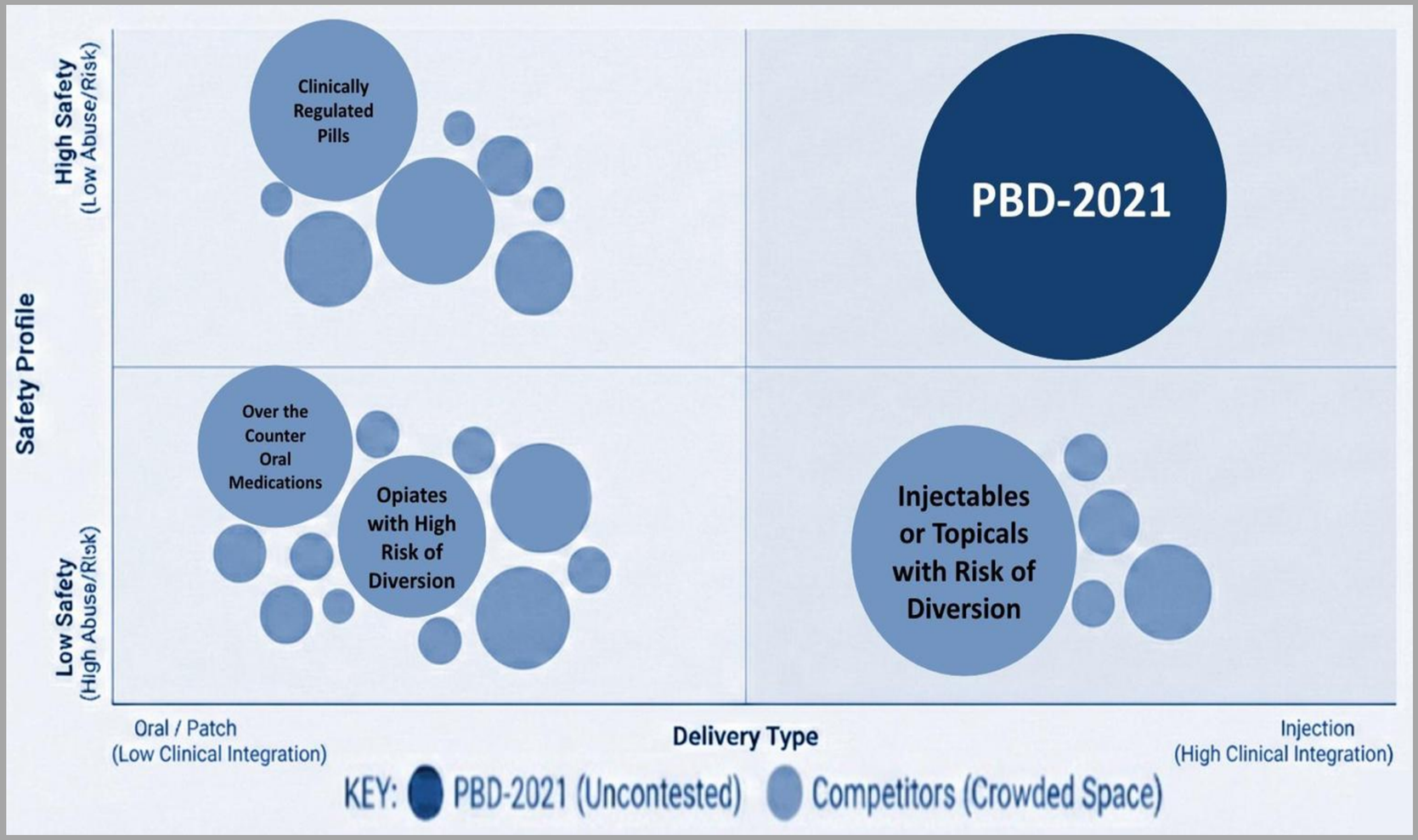
Explosive growth of GLP-1 drugs



Competition

- **Opiates** remain subject to abuse and can lead to addiction
- **Non-opioid pain drugs** carry higher risks from potential side effects, including stomach bleeding, kidney failure, and 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, and users frequently need opiate rescue for pain therapy
- **Local anesthetics**, such as lidocaine and bupivacaine, stop 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 prescribed to treat opioid use disorder ("OUD") that could be reengineered

PBD-2021's Unique Profile



No Respiratory Depression or Dermal Lesions

Standard opioids risk lethal respiratory depression.

- Buprenorphine does not affect the brain stem's breathing centers, a top concern for post-op recovery in elderly or obese patients
- The biologically inert lipid solution avoids dermal lesions that plague patients receiving competing long-acting injections

The "Anti-Diversion" Breakthrough

By receiving an injection in a clinical setting, a user cannot "extract" the buprenorphine to get high or sell it on the secondary market

Reduced Regulatory Burden

Being a Schedule 3 drug, unlike morphine, OxyContin, and other Schedule 2 narcotics, means lower regulatory overhead, including simplified recordkeeping and no specialized safes

Comparison Grid

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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: Administering PBD-2021 via injection eliminates "take-home" pills that allow 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 PBD-2021 uses a biologically inert lipid delivery system

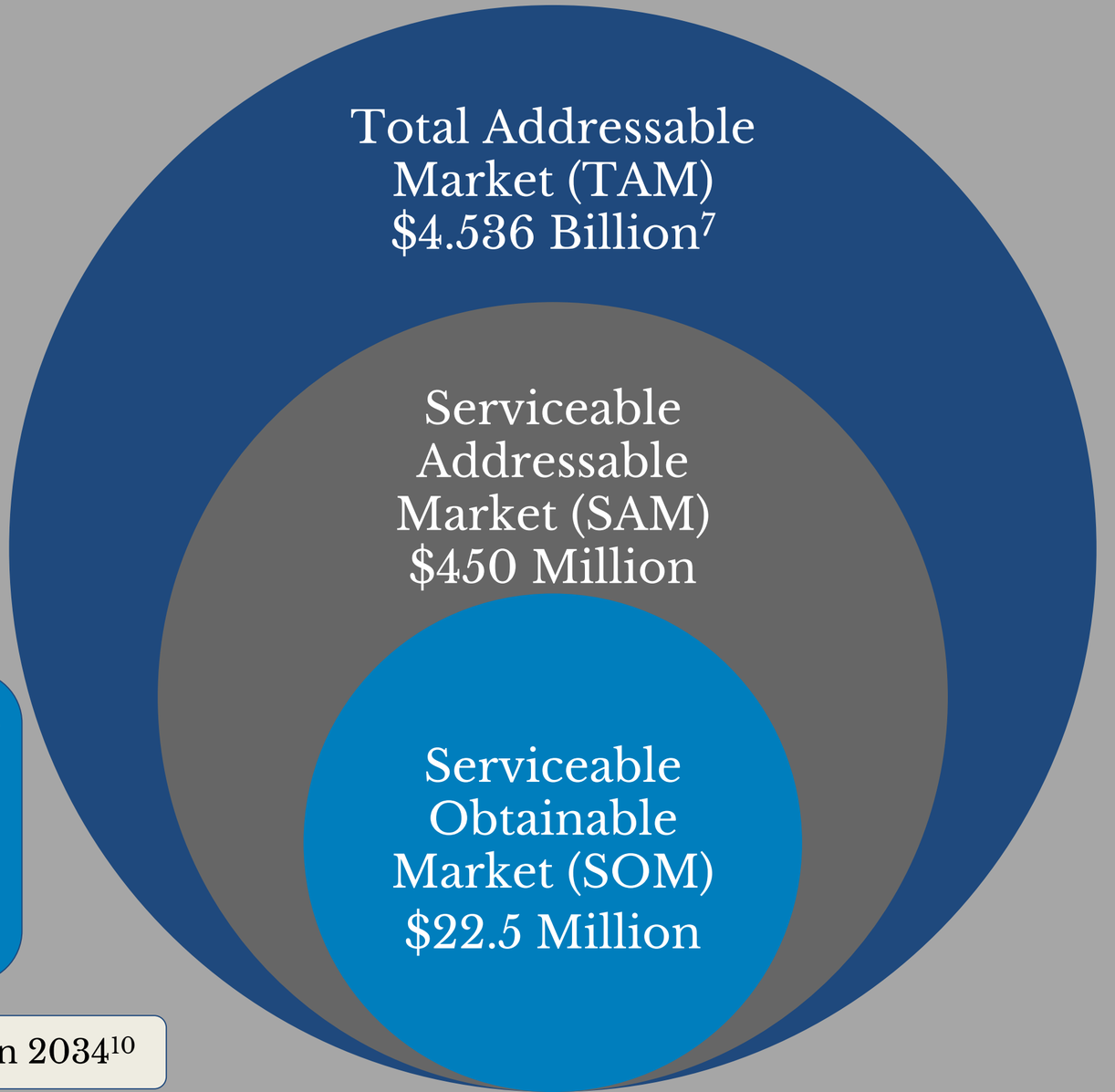
	High Potency (Opiate Strength)	No Respiratory Depression	Clinician Control (No Pills)	Low Reg Burden (Schedule III or Otherwise)	72-Hour Duration	Absence of Dermal Lesions
Peabody (PBD-2021)	✓	✓	✓	✓	✓	✓
Morphine (Standard of Care)	✓					✓
Ibuprofen (Advil)		✓		✓		✓
Suzetrigine (Journavx)		✓		✓		✓
Exparel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

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[8] in the US during 2023 with ~30% of Surgeries are Soft Tissue[9] 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



DelveInsight projects a $13.579 billion market in those seven countries in 2034[10]

Unit Economics

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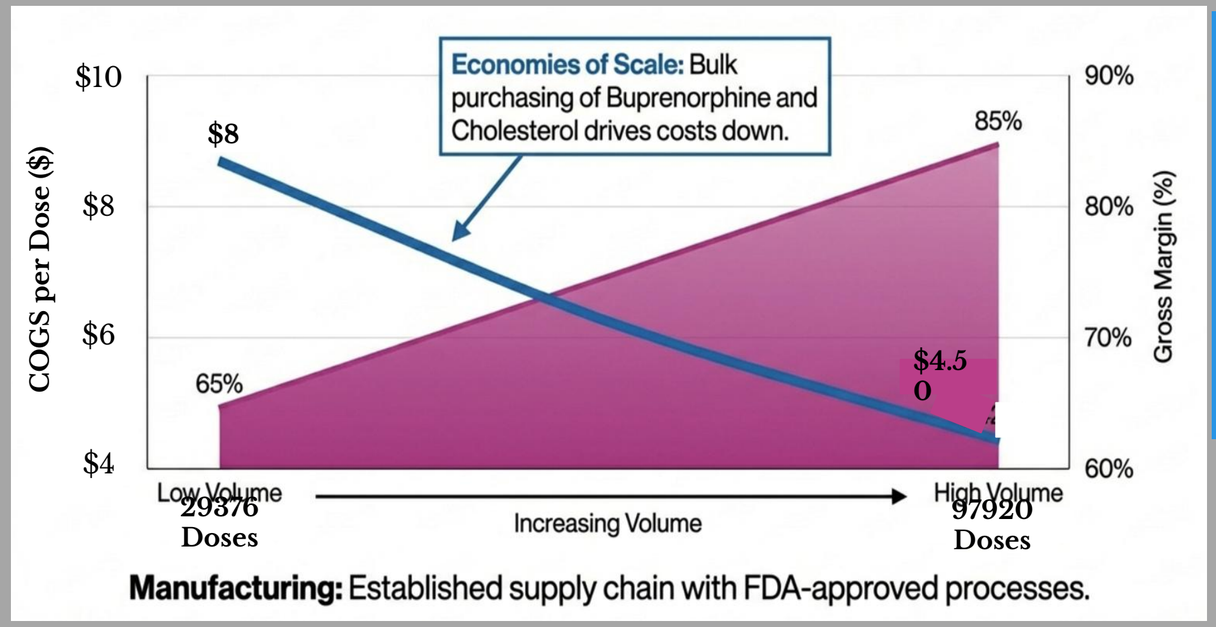
Target Gross Margin: As manufacturing scales and the supply chain (which is already FDA-approved for veterinary use) is optimized, margins are expected to reach 70% or higher

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: Established supply chain with FDA-approved processes.

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

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2014
Ethiqa XR has controlled post-procedural pain for 72 hours in animals, including non-human primates, in the US and EU[11]

2015-Current
More than 6,000 new publications on the safety of buprenorphine

IND Application
Application Filed
(ID: 142193)

2020 & 2021
United States Patents issued with patent protection at least through **2038**

2026
Projected IND Approval

2026-2027
Phase 1 and
2 Clinical Trials

2028
Phase 3
Clinical Trials

2029
FDA Approval and Launch

Financial Projections

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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.

APPROVED

2029: FDA Approval & Market Launch

Commercial & Scaling Phase

2029 2030 2031 2032 2033 2034

618%
Growth in Dose Volume:
Annual doses sold scale rapidly from 701 in 2029 to 5,033 by 2034.

Gross Revenue & Doses Sold (Thousands/Millions)

2031
Stabilization of Unit Costs

Doses Sold: 4,213
Gross Revenue: $223,840
Cost per Vial: $50.83

Cost per Vial ($)

2029
Doses Sold: 701
Gross Revenue: $37,247
Cost per Dose: $9.50

2030
Doses Sold: 2,026
Gross Revenue: $60,061
Cost per Dose: $8.06

2031
Gross Revenue: $107,609
Cost per Dose stabilizes at $6.37 due to economies of scale

2032
Doses Sold: 4,213
Gross Revenue: $223,840
Cost per Dose: $6.37

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

Social Impact of PBD-2021



- Full opiate power to effectively treat acute pain for millions of patients worldwide annually
- Minimizes, if not eliminates, abuse, addictions, overdoses, and deaths arising from prescription drugs
- Complements the *DEA's "**One pill can kill**"* initiative by providing a *"**One [shot] and done**"* injection that eliminates 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
  - Gerard Limerick, MD, PhD
- **Scientific Advisory Board**
  - Mohamed Al-Ibrahim, MD
  - Mellar P. Davis, MD
  - Kelly Dunn, PhD
  - Barry Levinson, PhD



Objective

Peabody seeks a licensing agreement, joint venture, or sale that will bring PBD-2021, its patented, clinical-stage, long-acting therapeutic drug and delivery system to tens of millions of patients annually to provide tamper-proof relief from acute pain for 72 hours. In addition, Peabody's delivery system uses a neutral lipid suspension that can administer other generic analgesics and small-molecule drugs.

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Thank You!

For more information, please:

- Visit peabodypharmaceuticals.com or
- Contact Tim Turner, President
  (713) 858-3329
  TTurner@peabodypharma.com

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Footnotes

[1] Vertex Pharmaceuticals, The state of pain in America (Mar. 12, 2025), https://www.vrtx.com/stories/state-pain-america/.

[2] 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.

[3] 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.

[4] 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.

[5] 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/.

[6] B. Tyler 7 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.

[7] DelveInsight Business Research LLP, Moderate to Severe Acute Pain Market Summary (2025), https://www.delveinsight.com/report-store/moderate-to-severe-acute-pain-market.

[8] U.S. Centers for Disease Control and Prevention, National Center for Health Statistics, Inpatient Surgery, https://www.cdc.gov/nchs/fastats/inpatient-surgery.htm.

[9] 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.

[10] See DelveInsight, *supra* note 7.

[11] Fidelis Animal Health, Ethiqa 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://ethiqaxr.com/.