PULMATRIX
Corporate Overview

PULMATRIX

NASDAQ: PULM

Safe Harbor

This presentation contains forward-looking statements. All statements other than statements of historical fact contained herein, including statements regarding our business plans or strategies, projected or anticipated benefits or other consequences of our plans or strategies, projected or anticipated benefits from acquisitions to be made by us, or projections involving anticipated revenues, earnings or other aspects of our operating results, are forward-looking statements. Words such as “anticipates,” “assumes,” “believes,” “can,” “could,” “estimates,” “expects,” “forecasts,” “guides,” “intends,” “is confident that,” “may,” “plans,” “seeks,” “projects,” “targets,” and “would,” and their opposites and similar expressions, as well as statements in future tense, are intended to identify forward-looking statements. Forward-looking statements should not be read as a guarantee of future performance or results and may not be accurate indications of when such performance or results will actually be achieved. Forward-looking statements are based on information we have when those statements are made or our management’s good faith belief as of that time with respect to future events and are subject to risks and uncertainties that could cause actual performance or results to differ materially from those expressed in or suggested by the forward-looking statements. A discussion of these and other factors, including risks and uncertainties with respect to Pulmatrix, Inc. (the “Company”), as set forth in the Company’s filings with the Securities and Exchange Commission (“SEC”), including the Company’s most recently filed Annual Report on Form 10-K, as may be supplemented or amended by the company’s Quarterly Reports on Form-10Q. Investors and security holders are urged to read these documents free of charge on the SEC’s website at http://www.sec.gov. Forward-looking statements contained in this presentation are made as of this date, and the Company undertakes no obligation to publicly update any forward-looking statement, whether as a result of new information, future events, or otherwise.

This presentation contains statistical and market data that we obtained from industry publications, reports generated by third parties, third-party studies and public filings. Although we believe that the publications, reports, studies and filings are reliable as of the date of this presentation, we have not independently verified such statistical or market data.

CAUTION: We have not received approval from the FDA, or any other regulatory entity, to market our therapeutic candidates in the United States or in any other jurisdictions. Our therapeutic candidates, including PUR1900, PUR1800, and PUR3100 are classified by the FDA as investigational drugs and are limited by Federal (or United States) law to investigational use only and will require additional studies to make definitive conclusions and claims about such candidates’ safety or efficacy.

PULMATRIX

Our Mission

PULMATRiX is committed to the development and commercialization of novel and transformational medicines for patients all over the world, using our proprietary iSPERSE™ technology to optimally deliver both respiratory and non-respiratory therapies via the respiratory system.

PULM (NASDAQ) Pursuing Strategic Alternatives that Leverage the Company's Pipeline, iSPERSE Technology and Cash on Hand

Enabling iSPERSE™ Technology

- Proprietary iSPERSE™ platform technology that seeks to optimize pharmacokinetics and pharmacology in respiratory and non-respiratory therapeutics.
- A scalable platform with applicability across drug classes and dry-powder delivery devices to support pipeline development.

Innovative Therapies

Powered by iSPERSE™

- **PUR3100**: Orally inhaled DHE for acute migraine represents ~$575M U.S. peak net revenue potential[1]. The Ph1 data demonstrated differentiating pharmacokinetic and tolerability profiles. An IND to initiate a Ph2 trial of PUR3100 for treatment of acute migraine was submitted to the FDA and accepted.
- **PUR1800**: Inhaled kinase inhibitor treatment for acute exacerbations in COPD (AECOPD) represents ~$2.4B in U.S. peak net revenue potential[1]. PUR1800 met Ph1b objectives of safety and pharmacokinetics[2]. Long-term toxicology studies indicate potential for chronic dosing and opportunity to expand into chronic indications such as severe asthma, COPD and IPF.
- **PUR1900:** Cipla has rights for development and commercialization, outside of the United States, in exchange for 2% royalty on net sales payable to Pulmatrix. Both Pulmatrix and Cipla are seeking to monetize or license PUR1900 in the United States.

Strong Financial Position

- Approximately $19M cash on hand as on 12/31/2023 with cash runway into Q1 2026 and no debt.
- Track record of funding operations through both public capital markets and business development.

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1. Physician Interviews and Payer Interviews; ClearView Health Partners Analysis; net revenues at loss of exclusivity
2. Detailed study results are pending further analysis and being withheld for potential presentation at a relevant medical conference
3. Excludes Cipla Territory ((India, South Africa, Sri Lanka, Nepal, Iran, Yemen, Myanmar and Algeria), where Cipla will bear full cost of development and commercialization. Pulmatrix will earn 2% royalty on Cipla Territory net revenues after successful tech transfer of Cipla territory manufacturing to Cipla.

- PUR1900, PUR3100 and PUR1800 are investigational drugs, the safety and efficacy of which have not been established.

Management Team

Deep expertise in respiratory diseases & drug delivery technology across all stages of development

Ted Raad – *CEO & Director*

- Previously Chief Business Officer of Pulmatrix
- 20 years of commercial healthcare and life sciences leadership experience
- Former Chief Commercial Officer at Option Care

Margaret Wasilewski, MD – *Chief Medical Officer*

- 25 years in pharmaceutical drug development
- Development experience in infectious disease, sepsis, neurology and rare disease
- Trained in Internal Medicine and Infectious Diseases with active board certification in Internal Medicine.

Peter Ludlum – *Interim Chief Financial Officer*

- Currently Senior Director at Danforth Advisors
- Extensive finance and accounting leadership experience with 17 years as a C-level executive in public, private, international, manufacturing, clean tech and life science companies

Jason Perry – *CMC & Pharmaceutical Development*

- 15 years of experience developing pharmaceutical products
- Prior formulation and process development roles at Alkermes advancing oral and inhaled dosage products

Steven Kramer – *Quality*

- 11+ years with Pulmatrix holding numerous roles
- Previously held positions at Alkermes and AMAG Pharmaceutical
- 15+ years experience in quality assurance & control

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Credentialed Board of Directors

Board of directors with extensive experience in public and private life sciences companies

Michael J. Higgins – *Chairman*
- Entrepreneur-in-residence at Polaris Partners and Board Member of Voyager, Kindex, Madauder and Sea Pharmaceuticals
- Former SVP, COO, and CFO at Ironwood

Ted Raad – *CEO & Director*
- Previously Chief Business Officer of Pulmatrix
- 20 years of commercial healthcare and life sciences leadership experience
- Former Chief Commercial Officer at Option Care

Chris Cabell, MD, MHS, FACC – *Director*
- Current Chief Medical Officer at Zura Bio Limited
- Former SVP and Head of Clinical Development at Emergent BioSolutions and former head of R&D at Arena Pharmaceuticals

Todd Bazemore – *Director*
- COO of Kala Pharmaceuticals
- Former EVP and COO of Santhera Pharmaceuticals and EVP and CCO of Dyax Corp.

Anand Varadan – *Director*
- Current President at Ignition Insights LLC
- Former Chief Commercial Officer at Chiasma and former Chief Commercial Officer at Karyopharm Therapeutics, Inc.

Rick Batycky – *Director*
- CEO of Nocion Therapeutics
- Former Chief Scientific Officer and founder of Civitas Therapeutics

iSPERSE Enabled Pipeline

Product Pipeline	Indication	Phase 1	Phase 2	Status
PUR3100 *DHE*	Acute Migraine			**Ph2 Ready (IND Accepted)** ***Pursuing Partnership to Advance***
PUR1800 *Kinase Inhibitor (NSKI)*	Acute Exacerbations in Chronic Obstructive Pulmonary Disease (AECOPD)			**Ph2 Ready** ***Pursuing Partnership to Advance***
PUR1900 *Anti-fungal (Cipla Partnership)*	Allergic Bronchopulmonary Aspergillosis (ABPA) in Patients with Asthma	**Closing Ph2b at 8 subjects with CSR estimated 07/2024** **Cipla developing PUR1900 outside the United States**		

- **PUR3100 Potential Opportunities** – post traumatic brain injury headache disorder, status migrainosis, cluster headache
- **PUR1800 Potential Opportunities** – IPF, severe asthma, non-small cell lung cancer
- **PUR1900 Potential Opportunities** – ABPA cystic fibrosis, fungal pneumonia, non-small cell lung cancer, lung transplant fungal infections

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iSPERSE

Small Dense and Dispersible
Engineered Dry Powder Proprietary Technology

iSPERSE Platform

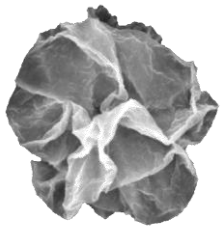
Small, dense and dispersible particles designed for highly efficient respiratory delivery

iSPERSE Enables Sick Patients to Get More Effective Doses

Potential iSPERSE Advantages

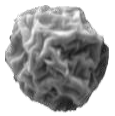
- **Can be used with a broad range of drugs,** small molecule to biologic
- **Can be used with almost any device** (e.g., metered-dose, reservoir, capsule or blister-based inhalers)
- **Requires low inspiratory flow** for penetration deep into lung, based on high dispersibility
- **Can deliver large doses into lungs (tens of milligrams)** with high delivery efficiency
- **Avoids first-pass effect and systemic side-effects** with improved pharmacokinetics profile compared to oral delivery
- **Broad IP** portfolio into 2030s

Evolution of Engineered Dry Powder Drug Delivery



Large
Porous Particle
(ARCUS®)

Small
Porous Particle
(PulmoSphere™)



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1µm
iSPERSE

Small Molecule APIs with Challenging Physical/ Chemical Attributes
Amorphous or Crystalline API

APIs Limited by Predicted Efficacious Dose
Inhaled Antibiotics > 30mg; Small Molecules > 1mg

Control of Pulmonary and Systemic Exposure
Manipulation of PK Through Changes in Solid State

Dry Powder Formulation of Biologics and Macromolecules
Proteins, Peptides and Nucleic Acids for Lung Delivery

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Sources: D Singh et al., *Br J Clin. Pharmacol.* 2018, 84(9):2097-2105; Perry, J, et al., *Br J Clin Pharmacol*. 2019, 85(3):580-589; Hava, D. L., et al. 2020, *Br J Clin Pharmacol*: 86(4): 723-733

PUR3100

Inhaled Dihydroergotamine (DHE) for Treatment of Acute Migraine

- ~$575M U.S. peak net revenue, **a 1% total Rx share**, is a conservative forecast[1]
- iSPERSE mitigates the manufacturing / device issues resulting in the MAP0004 FDA complete response
- **Ph1 results:** Safe, well tolerated, 5-minute T_{max} and C_{max} within the targeted therapeutic range[2] at all doses tested
- IND application accepted by FDA to initiate a Phase 2 trial of PUR3100 to treat acute migraine

PUR3100 is an investigational drug, the safety and efficacy of which has not been established.

1. Physician Interviews and Payer Interviews; ClearView Health Partners Analysis
2. Therapeutic Window defined as the exposure between the lowest systemic concentration required for efficacy and the concentration above which more than 50% of patients experience nausea. Silberstein, S. D., et al., Headache J Head Face Pain 60, 40–57 (2019).

PUR3100: Acute Treatment of Migraine

Large underserved market

Large Market

>1 billion worldwide

>38 million U.S.

Affects 3x's more women than men

Large Unmet Medical Need

75% of patients not actively treated with Rx's due to poor efficacy

80% of patients on Rx's would try new therapies

High Pharmacoeconomic Burden

$38 billion annual cost – U.S. (healthcare & lost productivity)

~ 150 million lost workdays – U.S.

Acute Treatment

New preventative treatment options do not fully address the ongoing need for acute treatment of migraine

>50% of patients require acute care for breakthrough pain

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Source: Migraine Research Foundation

Migraine – Pulmonary Inhaled DHE Therapy Potential Advantages

What Do Patients Want?

1	2	3	4	5
Fast Acting Pain Relief (15–30 Minutes)	**Effective When Taken at Any Time During a Migraine**	**Long Lasting Relief**	**Ease of Dosing**	**Minimal Impact on Patient's Regular Activities**
Fast onset of action through early T_{max} and sustained target engagement[1,2]	Migraine upon awakening, quick to peak intensity, rescue for breakthrough	24+ hour headache relief through sustained target engagement[1,3]	Inhaled preferred over intranasal, convenient device and administration	Absence of: nausea, lethargy, medication overuse, dysgeusia[4]

Inhaled DHE ✓

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1. Aurora, S. K., et al. (2011). "MAP0004, Orally Inhaled DHE: A Randomized, Controlled Study in the Acute Treatment of Migraine." Headache: The Journal of Head and Face Pain 51(4): 507-517.
2. Tepper, S. J., et al. (2011). "MAP0004, Orally Inhaled Dihydroergotamine for Acute Treatment of Migraine: Efficacy of Early and Late Treatments." 86(10): 948-955.
3. Winner, P., et al. (1996). "A double-blind study of subcutaneous dihydroergotamine vs subcutaneous sumatriptan in the treatment of acute migraine." *Arch Neurol* 53(2): 180-184.
4. Saper, J. R., et al. (2006). "DHE in the pharmacotherapy of migraine: potential for a larger role." *Headache* 46 Suppl 4: S212-220.

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PUR3100 Phase 1 Clinical Study to Evaluate Safety, Tolerability and Pharmacokinetics

Objective to demonstrate safety and comparative bioavailability of PUR3100 (pulmonary inhaled) relative to IV DHE

Randomized Double-blind, Double-dummy Single Dose Study in 24 Healthy Volunteers

Healthy Volunteers

24 subjects

Randomized to dose group

- **Inhaled Placebo + 1mg IV DHE** (n=6)
- **Inhaled PUR3100 500µg + IV Placebo** (n=6)
- **Inhaled PUR3100 1000 µg + IV Placebo** (n=6)
- **Inhaled PUR3100 1500 µg + IV Placebo** (n=6)

Initial Phase 1 Study

- IV DHE or 1 of 3 doses of PUR3100 with matching placebo
- Assessment of safety, tolerability, and PK after administration of single dose
- PK data from IV DHE allows for preliminary assessment of comparable bioavailability between IV DHE and PUR3100

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PUR3100 Achieved All Phase 1 Study Objectives and Goals Related to the Target Product Profile (TPP)

Objectives & Target Product Profile	Results
Objective: To determine the safety and tolerability of single doses of inhaled PUR3100 in healthy adult subjects	• No vomiting was observed in the PUR3100 dose groups compared to IV DHE. • Lower incidence of nausea in all of the PUR3100 dose groups and than that of IV DHE
Objective: To characterize the systemic pharmacokinetics (PK) of single doses of inhaled PUR3100 in healthy adult subject	• PUR3100 demonstrated C_{max} in the therapeutic window, and similar Tmax and similar AUC to that of IV DHE
TPP: C_{max} therapeutic window between ~1,000 pg/mL and ~13,500 pg/mL	• All three doses achieved 'therapeutic' exposure levels (>1000 pg/mL)
TPP: T_{max} <15 minutes, optimistically looking for <10 minutes based on animal data comparison and MAP0004 T_{max} of 12 min	• All PUR3100 doses had T_{max} within 5 min after dose
TPP: To explore the comparative PK of inhaled PUR3100 versus IV D.H.E. 45. Overall AUC not to exceed that of IV DHE while maintaining a lower C_{max} for safety.	• Kinetics showed C_{max} in therapeutic window with similar AUC relative to IV DHE and similar T_{max}

PUR3100 is an investigational drug, the safety and efficacy of which has not been established
Data on file.

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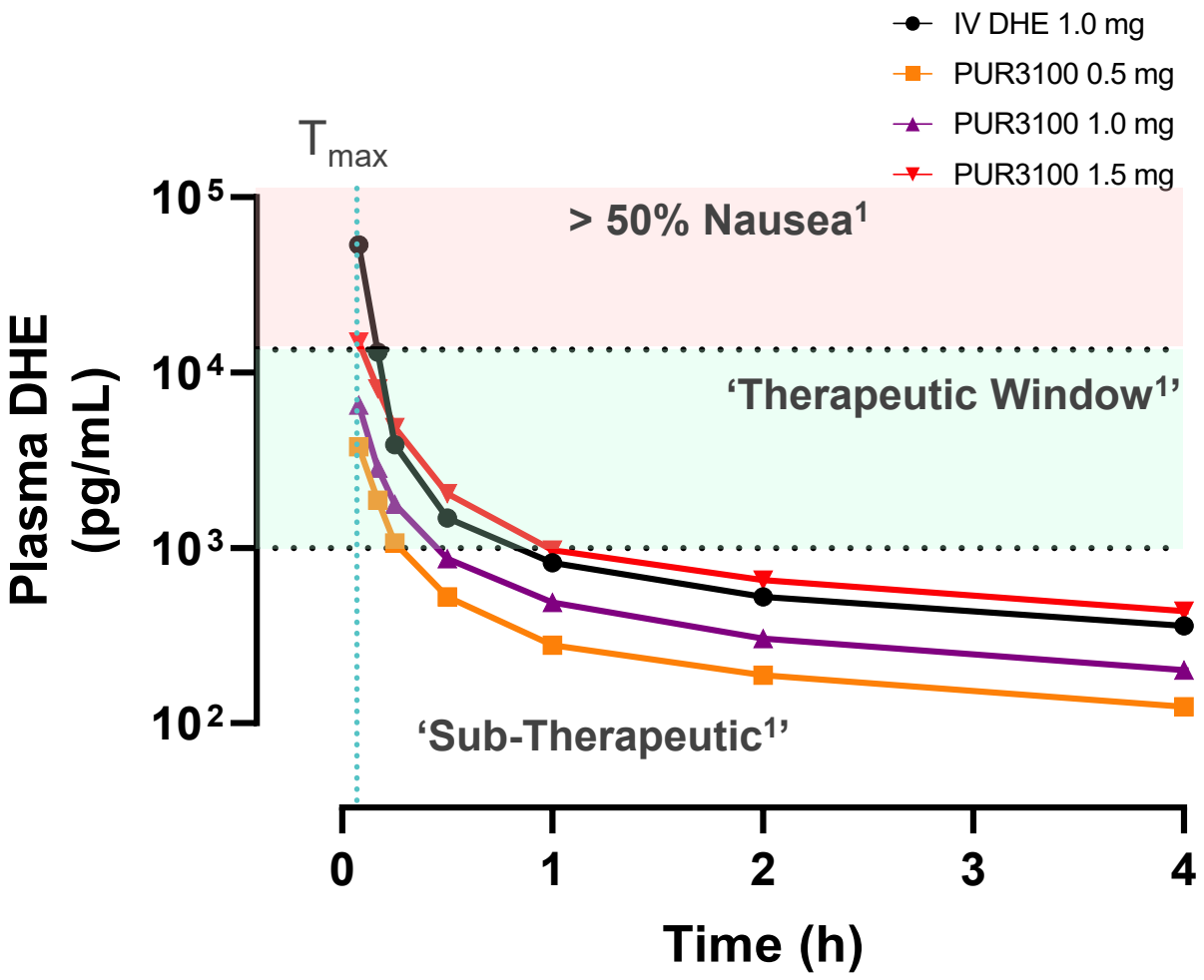
PUR3100 Four Hour Exposure Profile is Similar to IV DHE

Equivalent T_{max} with C_{max} below the range typically associated with elevated nausea risk

- T_{max} is at the first time point (5 min) for all subjects at all PUR3100 doses
- Geometric mean C_{max} at every dose is in the 'therapeutic window[1]'
- The kinetic profile is comparable to that of IV and differs from published data from all other routes of DHE administration, including MAP0004
- PK profile of primary metabolite is also similar to that of IV DHE 45



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Data on file

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Published Non-Sub-Q Pain Freedom Data Earlier Than Two Hours

Drug/Route	Class	Dose	Pain Freedom above Placebo (%)				24h Rescue%[8]
			0.5 hour	1 hour	2 hour	24 hour	
Risatriptan Tablet/Wafer[1, 2]	Triptan	5mg	0	7	22	13	60[4]
		10mg	1	9	31	18	55[4]
Sumatriptan Nasal Spray[3]		20mg	-	10	21	-	62[4]
Sumatriptan Tablet[3]		50mg	-	3	17	10	50[4]
		100mg	-	5	21	16	44[4]
MAP0004 Inhaled[6, 7]	DHE	1mg	12[6]	15[6]	28[6]	15[6]	43[7]
Ubrelvy Oral tablet[5]	CGRP	50mg	0	0	7	4	-
		100mg	0	0	9	7	-

PUR3100 is an investigational drug, the safety and efficacy of which has not been established.

- Indicates no reliable data available

[1]Ferrari, M. D., et al. (2001). . "Meta-analysis of rizatriptan efficacy in randomized controlled clinical trials." Cephalalgia **21**(2): 129-136

[2]Ferarri demonstrated no difference in efficacy between tablet and wafer.

[3]Derry, C. J., et al. (2014). "Sumatriptan (all routes of administration) for acute migraine attacks in adults - overview of Cochrane reviews." Cochrane Database of Systematic Reviews(5).(moderate to severe pain)

[4]Data taken from product package insert separate from literature data and so may not be fully in agreement (likelihood of rescue needed estimated based on Kaplan-Meier plots)

[5]Dodick, D. W., et al. (2019). "Ubrogepant for the Treatment of Migraine." New England Journal of Medicine **381**(23): 2230-2241.

[6]Aurora, S. K., et al. (2009). "A Randomized, Double Blind, Placebo-Controlled Study of MAP0004 in Adult Patients With Migraine." Headache: The Journal of Head and Face Pain **49**(6): 826-837.

[7]Aurora, S. K., et al. (2011). "MAP0004, Orally Inhaled DHE: A Randomized, Controlled Study in the Acute Treatment of Migraine." Headache: The Journal of Head and Face Pain **51**(4): 507-517.

[8]Rescue medication defined as addition dose of drug or other rescue agent

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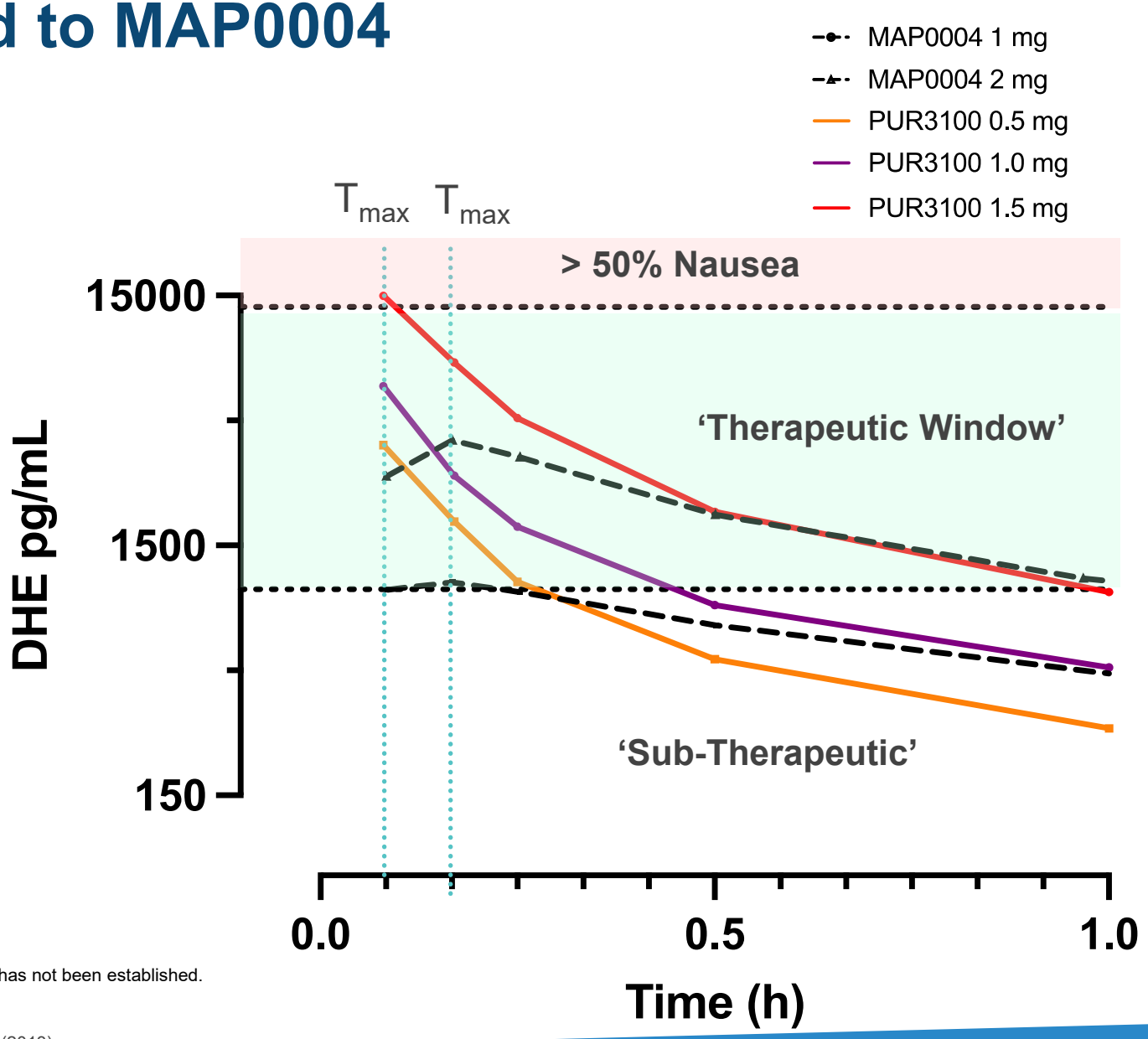
PUR3100 Kinetics Compared to MAP0004

- T_{max} at 5 min for all PUR3100 doses versus 12 minutes in MAP Phase 1 study[1]
- A higher C_{max} was achieved with PUR3100
- Published third-party studies suggest:
  - Higher and faster exposure may drive faster receptor binding[2]
  - DHE binds slowly but tightly, resulting in longer duration of effect[3]



PUR3100 is an investigational drug, the safety and efficacy of which has not been established.

1. Shrewsbury, S. B., et al., *Headache* **48**, 355–67 (2008).
2. Sykes, D. A., et al.,. *Mol Cell Endocrinol* **485**, 9–19 (2019).
3. Kori, S., et al., *The Journal of Headache and Pain* **14**, P75–P75 (2013).

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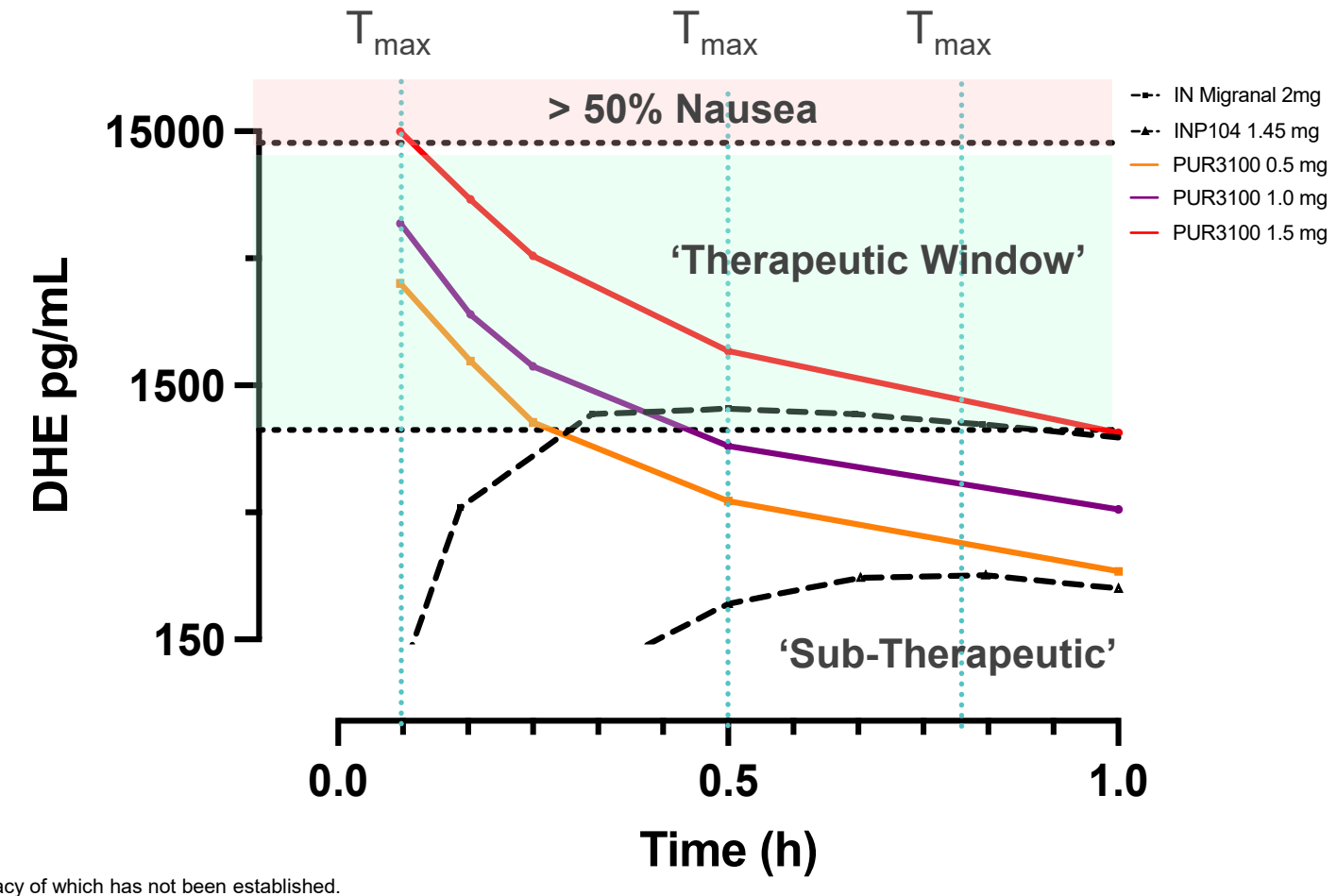
PUR3100 Kinetics vs. Marketed DHE Therapies

- T_{max} at 5 min for all PUR3100 doses versus 30 minutes for in INP104[1] and 47 minutes for Migranal[1]
- Higher C_{max} than published intranasal (IN) formulations' C_{max}
- T_{max} and C_{max} data could improve receptor binding kinetics and potentially translate into better treatment effects [2, 3]



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1. Shrewsbury, S. B., Jet al., *Headache J Head Face Pain* **59**, 394–409 (2019).
2. Hoare, S.. https://www.ncbi.nlm.nih.gov/books/NBK569501/.
3. Kori, S., et al., *The Journal of Headache and Pain* **14**, P75–P75 (2013).

PUR3100: No Vomiting and Less Nausea Than IV DHE

Subject number	Active medication	C_{max} (pg/mL)	Duration of Dose (min)	Time to Nausea after dose (min)		
120	IV D.H.E. 45 1 mg	SNR	4	6	Nausea	chest tightness
109	IV D.H.E. 45 1 mg	112000	3	5	Nausea	suprapubic pain
105	IV D.H.E. 45 1 mg	100000	3	30	Nausea Vomit	
103	IV D.H.E. 45 1 mg	50800	4	4	Nausea	
123	IV D.H.E. 45 1 mg	49100	4	7	Nausea	
114	IV D.H.E. 45 1 mg	25300	5	12	Nausea Vomit	
220	IV D.H.E. 45 1 mg	11700	4			
115	PUR3100 1.5 mg	19300	5			
108	PUR3100 1.5 mg	18800	4			
101	PUR3100 1.5 mg	17700	6	37	Nausea	
111	PUR3100 1.5 mg	14500	4			
117	PUR3100 1.5 mg	10500	4			
122	PUR3100 1.5 mg	9090	5	6	Nausea	
116	PUR3100 1.0 mg	12200	4			
107	PUR3100 1.0 mg	10700	4	3	Nausea	
102	PUR3100 1.0 mg	7270	4			
110	PUR3100 1.0 mg	4130	4			
121	PUR3100 1.0 mg	3270	4			
118	PUR3100 1.0 mg	1520	7			
119	PUR3100 0.5 mg	SNR	4	9	Nausea	
106	PUR3100 0.5 mg	5150	5			
104	PUR3100 0.5 mg	4980	4			
112	PUR3100 0.5 mg	3960	5			
124	PUR3100 0.5 mg	3490	3	67	Nausea	GI upset
113	PUR3100 0.5 mg	2680	4			
219	PUR3100 0.5 mg	2370	4			

Nausea Incidence

- Of 16 subjects with C_{max} < 14,500 pg/mL, 3 experienced nausea = 19%
- Of 8 subjects with C_{max} > 14,500 pg/m, 6 experienced nausea = 75%
- Of 10 subjects with C_{max} < 9,000 pg/mL 1 experienced nausea = 10%
- Of 14 subjects with C_{max} > 9,000 pg/mL, 8 experienced nausea = 57%

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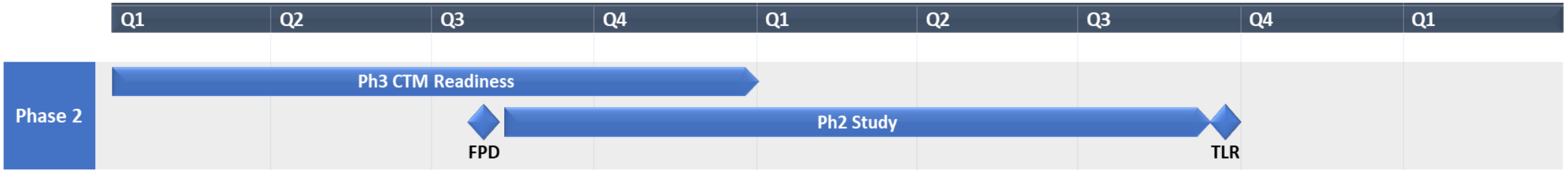
*Duration of Dose = T0 - IVend. Where T0 is the start time of first inhalation and IVend is the end time of the IV administration.
*Time to Nausea after dose = AEonset – T0. Where T0 is the start time of first inhalation and AEonset is the time of Nausea onset.
SNR = sample not received – data excluded from PK analysis

PUR3100 Potential Development Plan Through Phase 2

Phase 2 data will inform the design and likelihood of a single Phase 3 study



Plan	Phase 2 Study Design
Powered Phase 2 followed by single Phase 3 with single PUR3100 dose	Phase 2 randomized (1:1:1), double-blind, placebo-controlled proof of concept and dose setting study **(N=195)**

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PUR3100 is an investigational drug, the safety and efficacy of which has not been established.
Phase 2 design: 80% power assuming 35% (PUR3100) vs 15% (placebo) response rate for pain freedom @2hr with 2-sided alpha of 0

PUR3100: $575M Peak Net Revenue Potential at LOE in the U.S.

Physician and Patient Feedback

- 40% — % of patients on triptan experiencing a suboptimal response
- 44% — % of patients ranking *"starts to show improvement by 30 minutes"* as the #1 most important product attribute
- ~63% — % of patients responding that they would prefer PUR3100 over nasal DHE administration
- 40% — % increase in likelihood that a physician will prescribe after a patient request for PUR3100
- 40% — % of patients who may proactively request PUR3100

Payer Feedback

- 2 — generic treatment failures required
- 8 — per month quantity limit
- 60% — market access at $880 per month

$575M
Peak Net Revenue

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PUR3100 is an investigational drug, the safety and efficacy of which has not been established.

Source: Physician Interviews; Payer Interviews; Patient Research: ClearView Analysis. * Also includes discount for patient compliance, patient persistence, and gross-to-net adjustment and peak revenues expected at loss of market exclusivity, ~16 years post launch; Estimate based on ClearView Analysis, which took into account uninsured patients, patients who are unwilling to pay, and projected access restrictions placed by payers

PUR1800

Inhaled p38, Syk, Src Kinase Inhibitor with Potential for Treating AECOPD

NSKI Portfolio In-Licensed from Janssen, Including RV1162

RV1162 Reformulated Into iSPERSE Enabled PUR1800

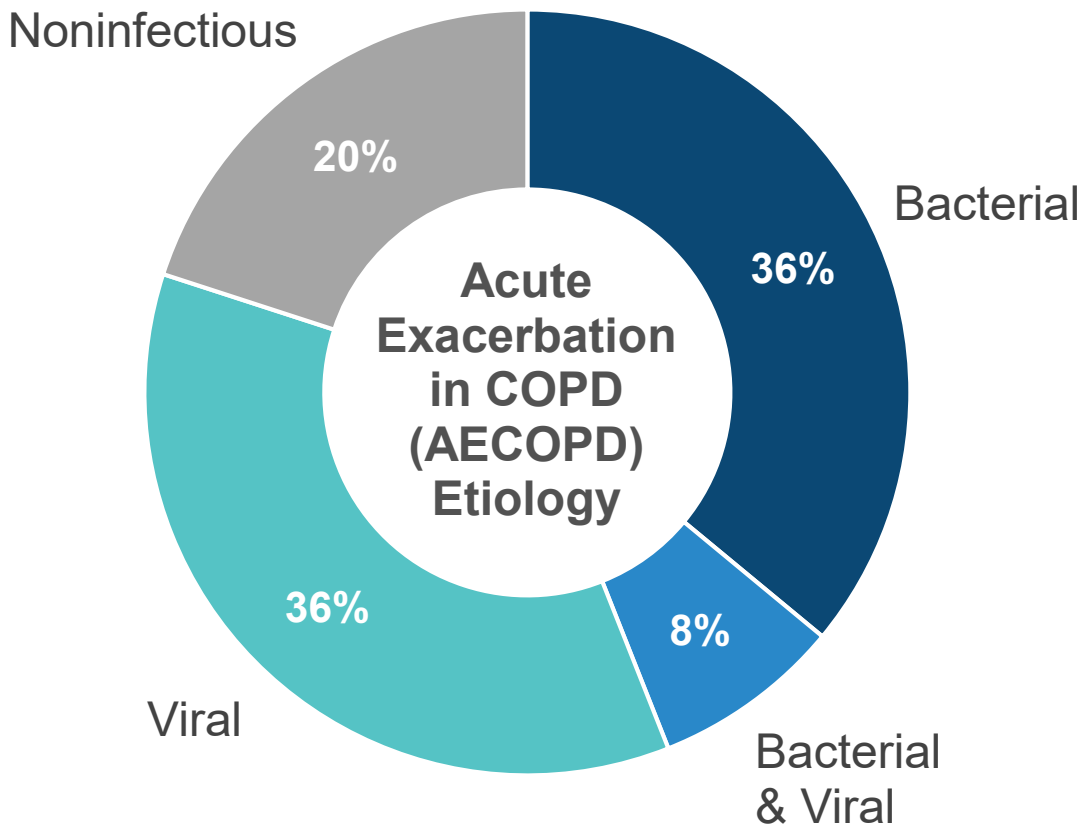
- PUR1800 represents up to ~$2.4B[1] peak net revenue opportunity in the U.S. as an inhaled non-steroidal treatment of AECOPD
- In pre-clinical studies, RV1162 demonstrated multifactorial efficacy in steroid-resistant inflammation
- In a Ph1b clinical study, PUR1800 was safe and well tolerated with no observed adverse events.

PUR1800 is an investigational drug, the safety and efficacy of which has not been established.

1. Physician Interviews and Payer Interviews; ClearView Health Partners Analysis

Limited Efficacy in Standard of Care for AECOPD Moderate-to-Severe Exacerbations

Significant unmet need exists in AECOPD with underlying infection and/or steroid resistance



AECOPD Incidence and Etiology

- **Steroids are standard of care** for moderate-to-severe acute exacerbations, which occur across all patient severity types
- ~90% of the 18M annual U.S. moderate-to-severe exacerbations are treated in outpatient setting
- **Infectious etiologies cause ~80% of acute exacerbations**
- Purulent sputum indicates management should incorporate antibiotics
- Viral exacerbations tend to last longer than bacterial exacerbations and are most often caused by rhinovirus infection
- **Steroids have limited efficacy in addressing infection induced inflammation**

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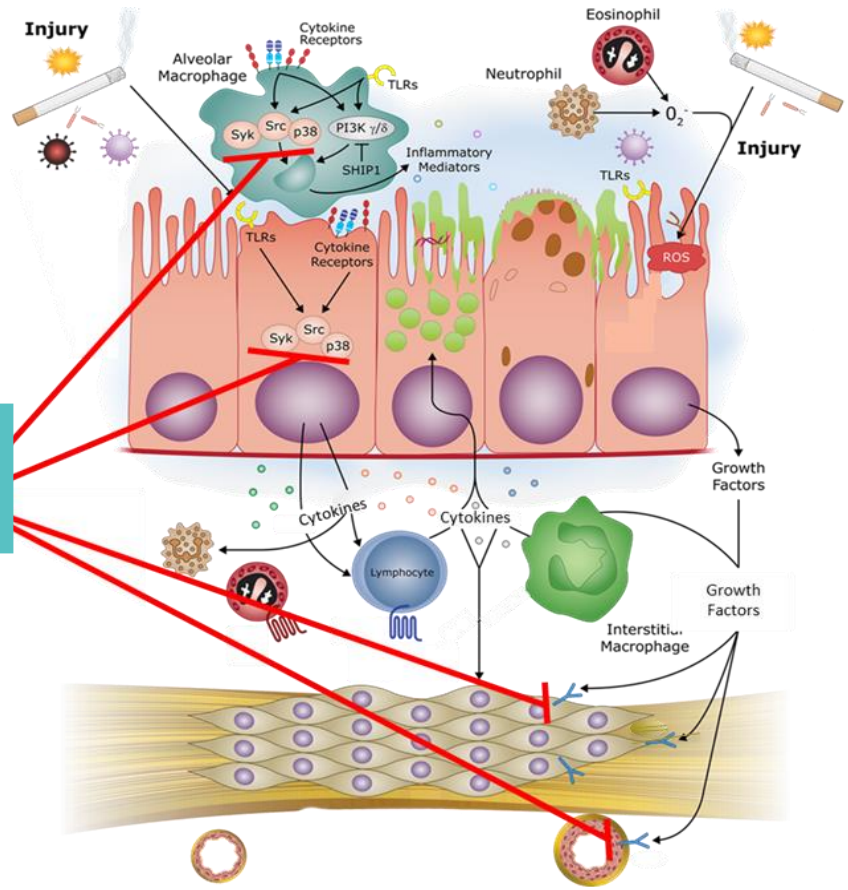
PUR1800 is an investigational drug, the safety and efficacy of which has not been established.

Source: Hurst. *N Engl J Med*. 2010; 363:1128; Anzueto. *Am J Med Sci*. 2010;340(4)309; Celli. *Eur Respir J*. 2007;30(2):401; D-C. Man. *ERJ Open Res*. 2015;1(2); Vogelmeier. *Am J Respir Crit Care Med*. 2017; 195(5)557; Pulmatrix Internal Documents; Physician Interviews; ClearView Analysis

Narrow Spectrum Kinase Inhibitors (NSKI)

Block steroid-resistant inflammation and lung remodeling processes



PUR1800
(p38/Src/Syk)

Three Primary Benefits

1 Treat Steroid-Resistant Inflammation

- Inhibit p38 MAP kinases (p38MAPK) to restore steroid sensitivity and reduce inflammation
- Block inflammatory action of Src, which promotes cytokine production in damaged airway epithelial cells

2 Treat Inflammation From Infections

- Prevent viral and bacterial p38MAPK stimulation
- Suppress Syk-promoted pro-inflammatory cytokine production from bacterial infection

3 Treat Airway Remodeling

- Block growth factor mediated activation of primary lung fibroblasts
- Potential to be disease modifying

PULMATRIX

PUR1800 is an investigational drug, the safety and efficacy of which has not been established.

Source: Barnes PJ. *Pharmacol Rev* 2016; 68:788–815, Barnes PJ. *J Allergy Clin Immunol* 2013; 131:636-45, Geraghty P et al. *Am J Respir Cell Mol Biol*. 2014; 50(3):559-70, Angata T et al. *Cell Mol Life Sci*. 2013; 70(17):3199-210

RV1162 (NSKI) Reduces Steroid-Resistant Inflammation in Preclinical Models

RV1162 reduces steroid insensitive, tobacco smoke-induced inflammation and restores steroid efficacy

Additional Preclinical Data

In vitro

- Verified kinase target engagement and inhibition with similar potency across p38, Src and Syk kinases
- Reduces steroid-sensitive cytokine release in human and animal cell lines with broadly similar potency (data has translational utility)

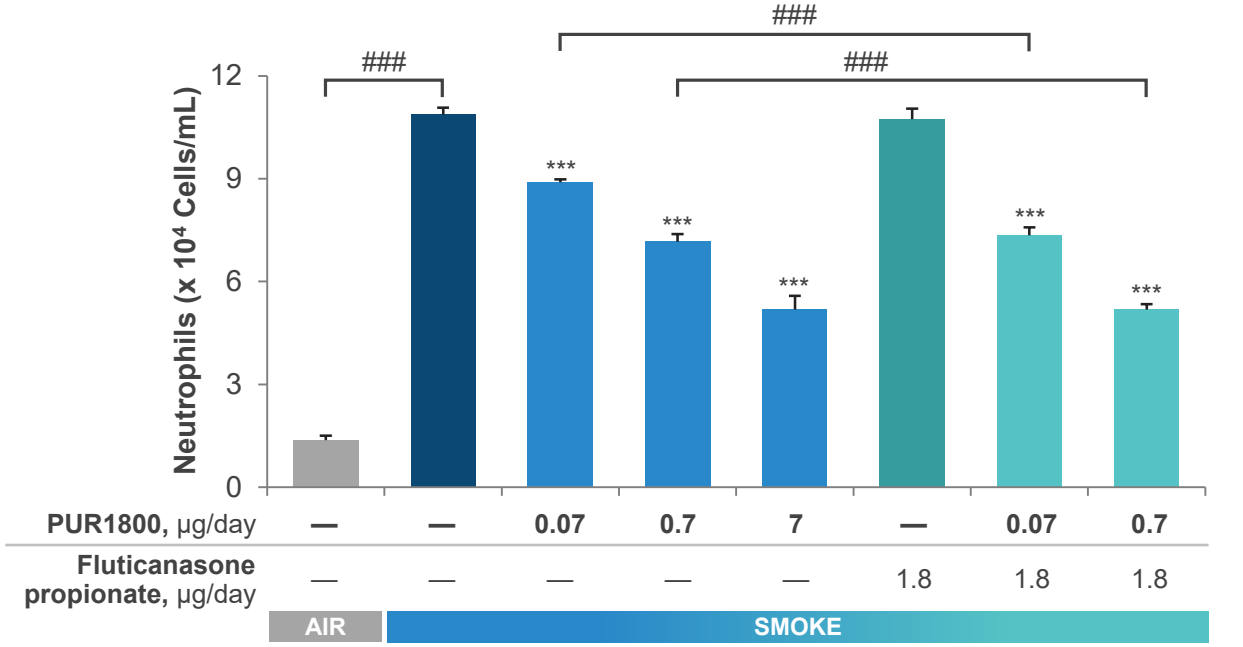
Ex vivo

- Reduces steroid-resistant inflammation in cells from COPD patients
- Reduces viral replication and infection-related inflammation in human cells

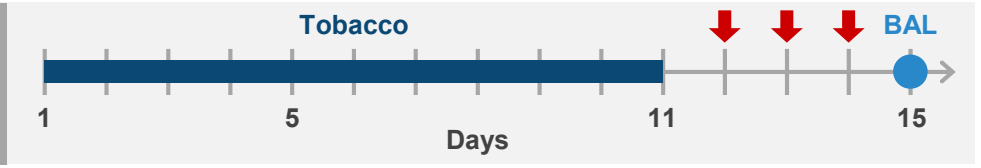
In vivo

- Reduces steroid-insensitive inflammation in LPS, ovalbumin and tobacco smoke models
- Restores steroid efficacy

Inhibition of Tobacco Smoke-induced Lung Inflammation



Therapeutic (Intranasal)



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Source: Data on File; Pulmatrix Internal Documents; ### Significant difference between each other at p<0.001; *** Significant difference from tobacco smoke control at p<0.001

PUR1800 Phase 1b Trial in Stable COPD Preliminary Results

Objectives of safety and pharmacokinetics were completed

Randomized, double-blind, 3-way crossover study; 3 Dose Groups (2 active, 1 placebo) with 15 pts. 14 days of daily dosing, with 28-day crossover and 28-day follow-up

15 Stable COPD Patients

Randomized to 1 of 3 treatment arms

	Placebo	PUR1800 (250 µg)	PUR1800 (500 µg)
	PUR1800 (250 µg)	Placebo	PUR1800 (500 µg)
	PUR1800 (250 µg)	PUR1800 (500 µg)	Placebo

225 µg iSPERSE PUR1800 ≈ 500 µg Janssen RV1162 lactose Blend
(based on predicted lung deposition)

- PUR1800 was safe and tolerable with no related serious adverse events
- Pulmonary function, pharmacokinetic and biomarker data are under evaluation to design a potential Phase 2 study in AECOPD

Endpoints

- Safety & Tolerability
- Pulmonary function (FEV_1) Days 1, 7 and 14
- Systemic pharmacokinetics Days 1, 7 and 14
- Target engagement and pharmacodynamics Days 1, 7 and 14

PULMATRIX

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PUR1800: $2.4B in U.S. Peak Revenue Potential

Large Addressable AECOPD Burden

- **~16M** COPD patients in the U.S.
- **77%** experience at least one exacerbation annually
- **~18M** moderate-to-severe AECOPD episodes annually in U.S.
- **> 20%** corticosteroid treatment failure rate in moderate-to-severe AECOPD patients
- PUR1800 potentially has efficacy across the spectrum of causes of AECOPD

Prescriber Reported PUR1800 Utilization

Treatment Option	Current Use	Expected Use
PUR1800 (+ oral corticosteroids and/or antibiotics)	**0%**	**~35%**
Oral Corticosteroids + Antibiotics	~58%	~34%
Antibiotics Alone	~13%	~10%
Oral Corticosteroids Alone	~25%	~18%
No Treatment	~4%	~3%

PUR1800 Market Opportunity

Up to 35% expected use, in addition to standard of care (oral corticosteroids plus/minus antibiotic)

Pricing Potential & Market Access

70% payer market access with minimal use restrictions and launch price of $650 per incident

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Source: Peak revenues expected at loss of market exclusivity, ~14 years post launch and also includes discount for patient compliance, patient persistence, and gross-to-net adjustment; Estimate based on ClearView Analysis, which included qualitative physician surveys and interviews; # Estimate based on ClearView Analysis, which took into account uninsured patients, patients who are unwilling to pay, and projected access restrictions placed by payers

Chronic Toxicology Pathology Results Support Potential Expansion Into Chronic Treatment of Pulmonary Disease (ex. COPD, IPF, Asthma)

Initial Indication	Long-Term Tox Data	New Potential Indications

AECOPD

18M Moderate to Severe

Acute Exacerbations per year in US[1]

- PUR1800 safe and well tolerated in 6-month rat and 9-month dog studies
- No progression of histopathological effects from 28-Day results
- NOAEL at 124 µg/kg/day in rat and 109 µg/kg/day in dog
- May support ≥500 µg chronic dosing

IPF

Rare Disease <100K in US[4]

Severe Asthma

~10M Adults in US[3]

(50% of Adult Asthma)

COPD

~16M Diagnosed & 4th leading cause of death worldwide[2]

PUR1800 is an investigational drug, the safety and efficacy of which has not been established.

1. ClearView Analysis
2. CDC NHIS 2011; BRFSS 2013; Soriano. *Chest*. 2013; 143(3):694;
3. Centers for Disease Control and Prevention. (2020). 2019 National Health Interview Survey data. U.S. Department of Health & Human Services.
4. Fernández Pérez ER, Daniels CE, Schroeder DR, et al. Incidence, prevalence, and clinical course of idiopathic pulmonary fibrosis a population-based study. *Chest* 2010; 137: 129–137.

PULMATRIX

PUR1900

Inhaled Antifungal

Cipla Worldwide Partnership

Inhaled Itraconazole to Treat Allergic Bronchopulmonary Aspergillosis (ABPA) in Patients with Asthma

iSPERSE enables itraconazole delivery to the lung, providing PUR1900 potential to address the underlying cause of disease while avoiding side effects of oral antifungal therapy and prolonged steroid treatment

PUR1900 has potential to be a first line treatment for ABPA and is being developed by Cipla for commercialization outside the United States in exchange for a 2% royalty on net sales payable to Pulmatrix

Ph2b study (NCT05667662) was terminated and the study will be closed. Cipla will continue development of PUR1900 outside the United States

In Cipla Territory (all markets outside the United States), Cipla will bear full cost of development and commercialization. Pulmatrix will earn 2% royalty on Cipla Territory net revenues after successful tech transfer for drug manufacture to Cipla.

PULMATRIX
Corporate Overview

PULMATRIX

NASDAQ: PULM