Blueprint Medicines

Driving growth and innovation with operational excellence

First quarter 2025 financial and operating results

May 1, 2025

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INTRODUCTION

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AYVAKIT PERFORMANCE

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CLINICAL PROGRESS

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Chief Medical Officer

FINANCIAL RESULTS

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Forward-looking statements

This presentation contains forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995, as amended, including, without limitation, statements regarding its plans, strategies, timelines and expectations for the company's operations, including plans to advance enrollment of HARBOR trial of elenestinib and initiate proof of concept studies of BLU-808 in allergic asthma and MCAS; its anticipated 2025 revenue and the peak revenue potential for AYVAKYT/AYVAKIT and the SM franchise; its multiple future data catalysts; its planned capital allocation; the breadth and depth of prescribers and the trends in patient and prescriber acceptance; expectations related to the markets for the company's current or future approved drugs and drug candidates; statements regarding the benefits plans and expectations for the company's current or future approved drugs and drug candidates, including AYVAKIT's safety and efficacy; statements related to the company's liquidity and capital position, including expectations that it could reach a self-sustainable financial profile; and the company's product revenues, financial performance, strategy, goals and anticipated milestones, business plans and focus.

The words "aim," "may," "will," "could," "would," "should," "expect," "plan," "anticipate," "intend," "believe," "estimate," "predict," "project," "potential," "continue," "target" and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. Any forward-looking statements in this presentation are based on management's current expectations and beliefs and are subject to a number of risks, uncertainties and important factors that may cause actual events or results to differ materially from those expressed or implied by any forward-looking statements contained in this presentation, including, without limitation: the risk that the marketing and sale of AYVAKIT/ AYVAKYT or any future approved drugs may be unsuccessful or less successful than anticipated, or that AYVAKIT/ AYVAKYT may not gain market acceptance by physicians, patients, third-party payors and others in the medical community; the risk that the market opportunities for AYVAKIT/ AYVAKYT or the company's drug candidates are smaller than it estimates or that any approval it obtains may be based on a narrower definition of the patient population that it anticipates; the risk of delay of any current or planned clinical trials or the development of the company's current or future drug candidates; risks related to the company's ability to successfully demonstrate the safety and efficacy of its drug candidates and gain approval of its drug candidates on a timely basis, if at all; the risk that preclinical and clinical results for the company's drug candidates may not support further development of such drug candidates or may impact the anticipated timing of data or regulatory submissions; the risk that the timing of the initiation of clinical trials and trial cohorts at clinical trial sites and patient enrollment rates may be delayed or slower than anticipated; the risk that actions of regulatory agencies may affect the company's approved drugs or its current or future drug candidates, including affecting the initiation, timing and progress of clinical trials; risks related to the company's ability to obtain, maintain and enforce patent and other intellectual property protection for its products and current or future drug candidates it is developing; risks related to the success of the company's current and future collaborations, financing arrangements, partnerships, licensing and other arrangements; risks related to the company's liquidity and financial position, including the risk that it may be unable to generate sufficient future product revenues to achieve and maintain a self-sustainable financial profile; and risks related to the accuracy of the company's estimates of revenues, expenses and capital requirements. These and other risks and uncertainties are described in greater detail in the section entitled "Risk Factors" in the company's filings with the Securities and Exchange Commission (SEC), including the company's most recent Annual Report on Form 10-K, as supplemented by its most recent Quarterly Report on Form 10-Q and any other filings that the company has made or may make with the SEC in the future. The forward-looking statements in this presentation are made only as of the date hereof, and except as required by law, the company undertakes no obligation to update any forward-looking statements contained in this presentation as a result of new information, future events or otherwise. Accordingly, readers are cautioned not to place undue reliance on these forward-looking statements.

This presentation also contains estimates, projections and other statistical data made by independent parties and by the company relating to market size and growth and other data about the company's industry. These data involve a number of assumptions and limitations, and you are cautioned not to give undue weight to such estimates. In addition, projections, assumptions and estimates of the company's future performance and the future performance of the markets in which the company operates are necessarily subject to a high degree of uncertainty and risk.

Blueprint Medicines Q1 2025 highlights

Growing Revenue

Achieved $149.4 M in AYVAKIT revenue, representing 61% YoY growth

Raising AYVAKIT revenue guidance to **$700 - $720M** for 2025

On track for **$2B in AYVAKIT revenue by 2030, $4B peak SM franchise** revenue

Advancing Our Pipeline

Addressing numerous mast cell-driven diseases that leverage **expertise and infrastructure**

Initiated BLU-808 proof-of-concept studies in ARC and CU

Advancing enrollment in registration-enabling **HARBOR study of elenestinib** in ISM

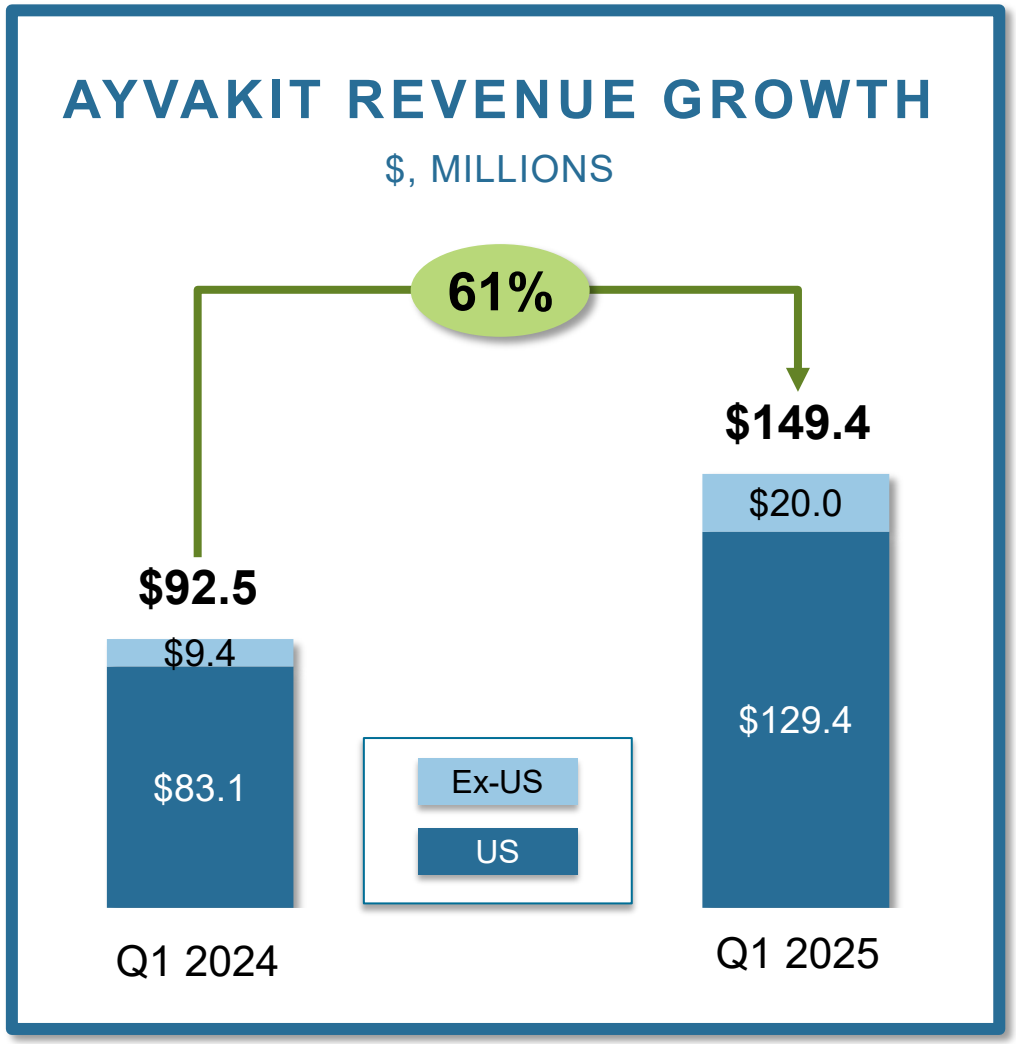
Maintaining Financial Strength

Durable and **growing commercial revenue**

Disciplined capital allocation and strong **~$900M cash position**

Well-positioned to navigate broader macroeconomic environment

AYVAKIT commercial performance highlights



- Continued **growth in patients on therapy** globally
- Trend toward **multi-year duration of therapy** in SM
- Retained **free goods favorability**
- ~75% of SM patients started at 25 mg

Raising FY 2025 AYVAKIT revenue guidance to $700 - $720M
On path to $2B in global revenue by 2030

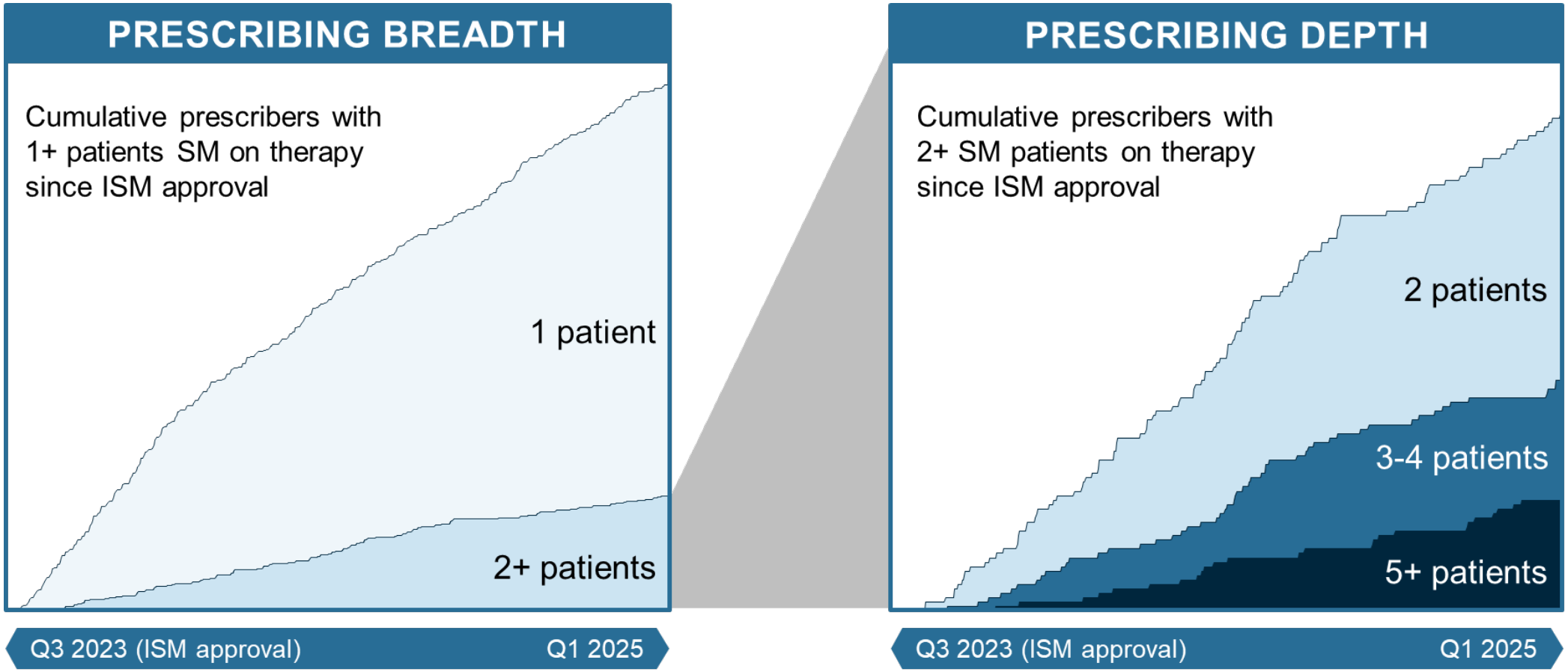
All statistics reference Q1 2025.

SM market is primed for long-term growth in AYVAKIT treatment

- AYVAKIT is the **only approved disease-modifying therapy** to treat the broad spectrum of SM
- A **consistent safety and efficacy profile** out to three-plus years
- A **growing rare disease market**, with ~60K SM patients in U.S.[1] and ~25K diagnosed[2]
- **Significant opportunity for further market penetration,** majority of patients today on symptomatic therapy, only
- **Educated prescribers, engaged patients, expanded field force**

1. Bergstrom et al (2024). 2. Based upon U.S. claims data at the end of 2024.

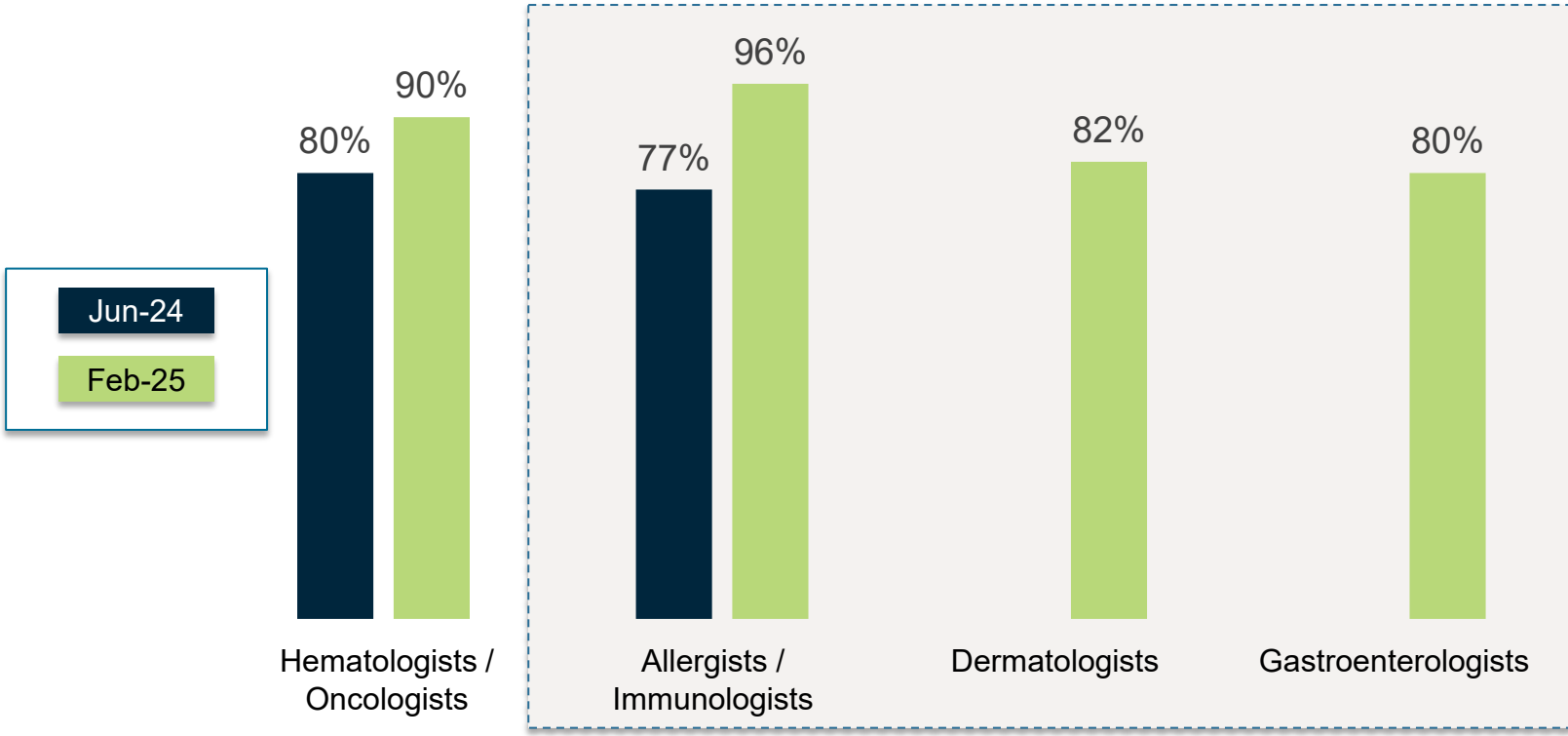
Driving breadth and depth with significant headroom for continued growth



Blueprint Medicines data on file. Cumulative SM AYVAKIT prescribers since ISM approval in May 2023. SM new patient starts since ISM launch are included. Data based upon SP/HUB prescriptions which represent ~70% of total AYVAKIT volume in U.S.

Positive HCP perceptions of AYVAKIT that increase with time on market

Proportion of Specialists Who View AYVAKIT's Profile As Favorable



~70%

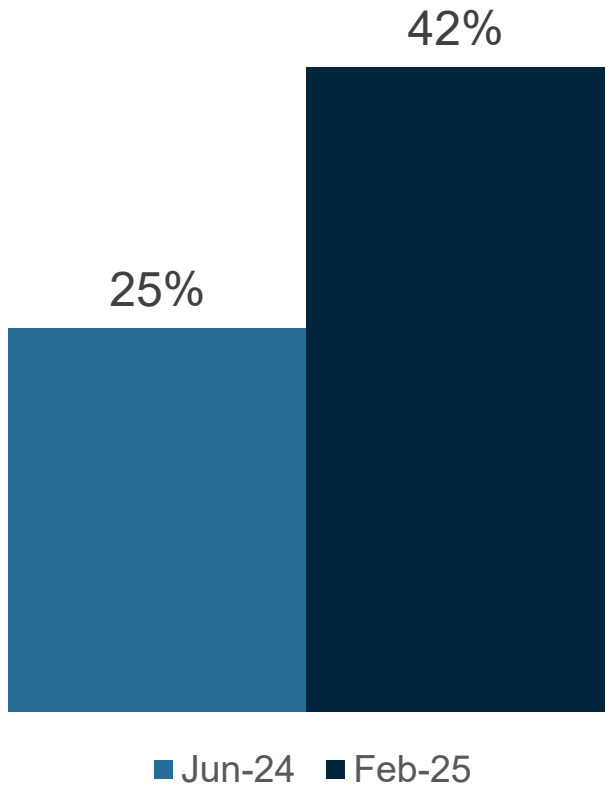
of specialists managing ≥ 3 SM patients are allergy, derm, or GI

Investing in field team expansion to drive reach and frequency

1. Blueprint Medicines market research fielded June 2024 and February 2025. Dermatologists and gastroenterologists not included in June 2024 survey. 2. Blueprint Medicines data on file. Proportion of patients being seen at allergy, derm, or GI is based upon a total pool that includes patients treated at hematology/oncology, allergy, dermatology, or gastroenterology.

Engaged patient base with growing interest and high satisfaction with AYVAKIT

HCP-Reported Proportion of ISM Patients Asking for AYVAKIT



>95%

percent of AYVAKIT patients who strongly agree that they are satisfied with AYVAKIT as a treatment for their SM

Blueprint Medicines market research fielded June 2024 and February 2025.

Consistent long-term AYVAKIT safety supporting chronic treatment

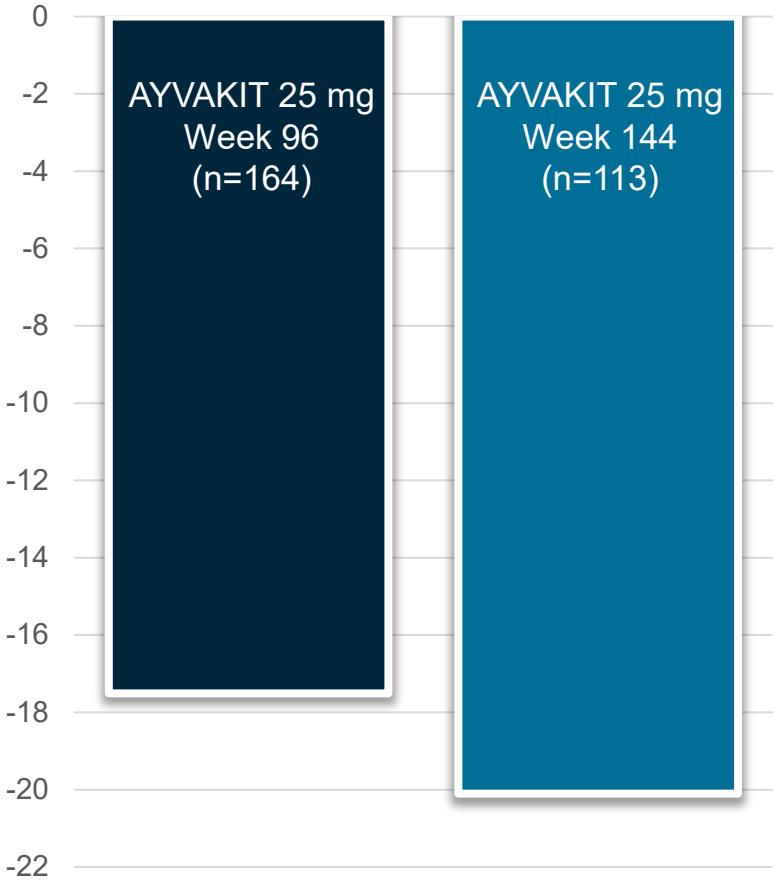
	Randomized controlled part 2[a]		Open-label extension part 3[b]	
	Avapritinib 25 mg + BSC (n=141)	Placebo + BSC (n=71)	Avapritinib 25 mg 3 year follow up (N=226)	Avapritinib 50 mg (N=57)
Median length of follow-up (months)[c]	5.5	5.5	35.3	10.6
Any AEs, n (%)	128 (91)	66 (93)	224 (99)	34 (60)
Any treatment-related AEs	77 (55)	32 (45)	168 (74)	14 (25)
Grade ≥3 AEs	30 (21)	15 (21)	103 (46)	8 (14)
Grade ≥3 treatment-related AEs	3 (2)	2 (3)	14 (6)	0 (0)
Serious adverse events (SAEs)[d]	7 (5)	8 (11)	45 (20)	5 (9)
Treatment-related SAEs[e]	0 (0)	0 (0)	3 (1)	0 (0)
TRAEs leading to discontinuation	2 (1)	1 (1)	7 (3)	0 (0)
Most common TRAEs (≥5% of patients)				
Peripheral edema	9 (6)	1 (1)	29 (13)	4 (7)
Periorbital edema	9 (6)	2 (3)	22 (10)	1 (2)
Headache	11 (8)	7 (10)	21 (9)	0 (0)
Nausea	9 (6)	6 (8)	18 (8)	1 (2)
Fatigue	6 (4)	2 (3)	16 (7)	1 (2)
Diarrhea	4 (3)	2 (3)	14 (6)	0 (0)
Alopecia	5 (4)	3 (4)	13 (6)	1 (2)
Dizziness	4 (3)	5 (7)	11 (5)	0 (0)

- **No new safety signals** with long-term treatment at 25 mg nor dose-escalation to 50 mg
- **No monitoring** required for ISM
- **No evidence of liver toxicity** with long-term treatment at 25 mg nor dose-escalation to 50 mg[f]
- No intracranial hemorrhage reported in any ISM patient in the PIONEER study or in post-marketing surveillance

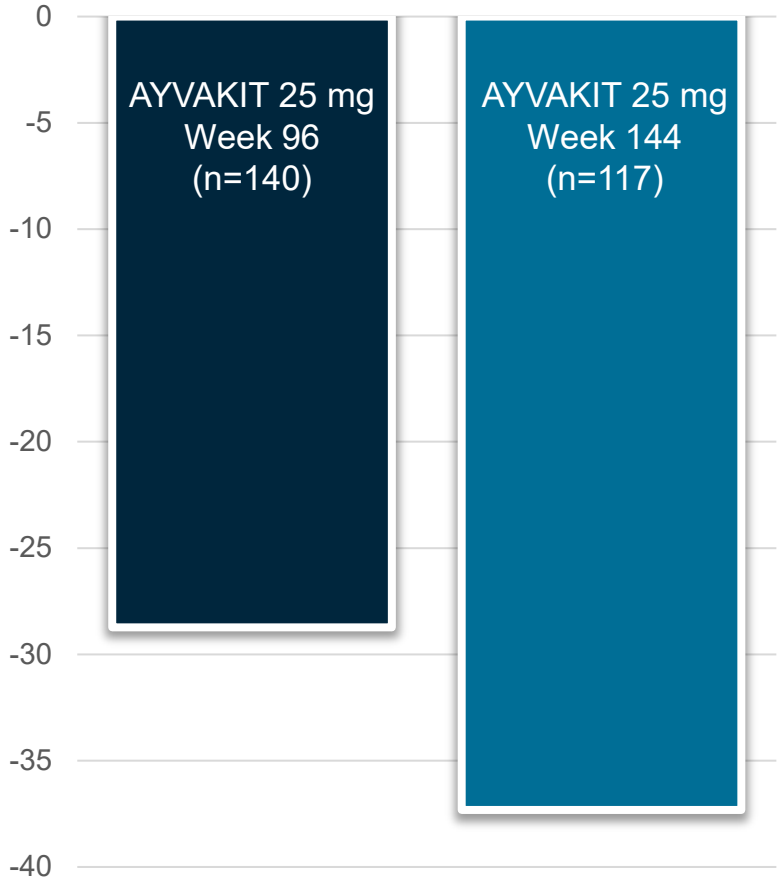
[a]Data cut: June 23, 2022. [b]Data cut: September 20, 2024. [c]Reflects median length of follow up during the indicated study period; 89% of patients receiving avapritinib and 88% of patients receiving placebo in Part 2 rolled over to Part 3. [d]One death (Grade 5 serious adverse event) occurred on study determined unrelated to treatment by investigator. The patient had a medical history of atrial fibrillation, and the event was assessed as due to anaphylaxis in the context of atrial fibrillation . [e]Serious TRAEs included diarrhea (1), gastric hemorrhage (1), and peripheral edema (1). [f]Low rates of liver transaminase increases were reported (8%) with the majority being Grade 1 (6%), few Grade 2 (2%) and no Grade 3; similar to rates of 6% for avapritinib and 3% in placebo observed in Part 2. Pooled terms include. ALT increase, AST increase, hypertransminasaemia, hepatic enzyme increase, LFT increase (reported in Part 3). Castells M et al. Presented at AAAAI 2025. Poster #534. The FDA approved recommended dosage of AYVAKIT is 25 mg orally once daily in patients with ISM.

AYVAKIT delivers durable efficacy through three years

Total Symptom Score (TSS)
(Mean change from baseline)



Quality of Life (MC-QoL)
(Mean % change from baseline)



- **Durable improvements in TSS** and all individual domains and symptoms, **including improvement in neurocognitive symptoms** through 3 years

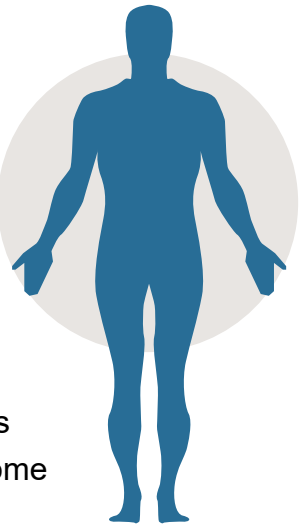
50 mg dose escalations

- Patients who dose escalated had higher mast cell burden
- 93% had stable-to-improved TSS and 77% had improved TSS at median of 10.6 months with similar improvements in MC-QoL also observed

Castells M et al. Presented at AAAAI 2025. Poster #534.

First two BLU-808 proof of concept studies initiated

UNIVERSE OF ALLERGIC & INFLAMMATORY DISEASES



Respiratory
- Allergic asthma
- **Allergic rhinoconjunctivitis**
- Nasal polyps
- COPD

Skin
- **Chronic urticaria**
- Psoriasis
- Atopic dermatitis

Gastrointestinal
- Eosinophilic disorders
- Irritable bowel syndrome
- Food allergy

Multi-system
- Mast cell activation syndrome (MCAS)

PLUS OTHERS…

BLU-808 PROOF-OF-CONCEPT STRATEGY

Move rapidly into areas where targeting KIT has been de-risked

✓ **Chronic spontaneous urticaria and chronic inducible urticaria**

Explore other biology across organ systems to unlock broader potential

✓ **Allergic rhinoconjunctivitis**

❑ Allergic asthma

❑ Mast cell activation syndrome (ISM adjacent)

A strong balance sheet driven by AYVAKIT revenue growth

Statement of Operations (unaudited)	Three Monds Ended 3/31/2025	Three Months Ended 3/31/2024
Total revenue	$149.4M	$96.1M
Net product sales	$149.4M	$92.5M
Collaboration, license and other revenue	-	$3.6M
Cost of sales	$2.8M	$3.2M
Research & development expense[1]	$91.9M	$88.2M
Selling, general & admin expense[2]	$95.8M	$83.6M
Other income, net[3]	$42.4M	$168.1M
Net income	$0.5M	$89.1M
Balance Sheet (unaudited)	**3/31/2025**	**12/31/2024**
Cash, cash equivalents, and investments	$899.8M	$863.9M

1. Includes stock-based compensation expense of $12.1M and $10.9M recorded in the three months ended 3/31/25 and 3/31/24, respectively.
2. Includes stock-based compensation expense of $16.9M and $13.4M recorded in the three months ended 3/31/25 and 3/31/24, respectively.
3. Includes equity investment gain of $50.0M and debt extinguishment gain of $173.7M recorded in the three months ended 3/31/25 and 3/31/24, respectively

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