# bluebird bio Company Presentation

August 2023

**NASDAQ: BLUE**

# forward-looking statements

This presentation contains certain statements that are forward-looking within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended, and that involve risks and uncertainties, including, without limitation, statements regarding the Company's financial condition, results of operations, commercial revenue and key metrics, including the expected number of patient starts, and anticipated reporting and timing thereof; anticipated cash runway, including restricted cash; and anticipated cash burn for 2023 as well as statements regarding the Company's plans and expectations for operations, including expected timing relating to its regulatory approvals, plans to expand manufacturing capacity, anticipated growth of its QTC network and timing thereof, plans for future regulatory submissions, the expected timing for the potential PDUFA acceptance and regulatory approval of lovo-cel by FDA, and the timing of commercial launch of lovo-cel, if approved. Statements using words such as "expect", "anticipate", "believe", "may", "will" and similar terms are also forward-looking statements. Such statements are subject to numerous risks and uncertainties, including but not limited to, delays and challenges in the Company's commercialization and manufacturing of its products; the Company may encounter additional delays in the development of its programs, including the imposition of new clinical holds, which may impact the Company's ability to meet its expected timelines and increase its costs; the internal and external costs required for ongoing and planned activities, and the resulting impact on expense and use of cash, has been, and may in the future be, higher than expected which has caused the Company, and may in the future cause it, to use cash more quickly than expected or change or curtail some of its plans or both; substantial doubt exists regarding the Company's ability to continue as a going concern; the Company's expectations as to expenses, cash usage and cash needs may prove not to be correct for other reasons such as changes in plans or actual events being different than its assumptions; the risk that the efficacy and safety results from the Company's prior and ongoing clinical trials will not continue or be seen in additional patients treated with its product candidates; the risk of insertional oncogenic or other reportable events associated with lentiviral vector, drug product, or myeloablation; the risk that any one or more of the Company's products or product candidates, including Skysona, Zynteglo or lovo-cel, will not be successfully developed, approved or commercialized, as applicable, and other risks as may be detailed from time to time in the Company's Annual Reports on Form 10-K and Quarterly Reports on Form 10-Q and other reports filed with the Securities and Exchange Commission. Except as required by law, the Company undertakes no obligations to make any revisions to the forward-looking statements contained in this presentation or to update them to reflect events or circumstances occurring after the date of this presentation, whether as a result of new information, future developments or otherwise.

bluebirdbio®

*pursuing curative gene therapies ...*

**TO GIVE PATIENTS AND THEIR FAMILIES MORE BLUEBIRD DAYS**

# bluebird occupies a unique strategic position as a standalone gene therapy company

- 10+ years of gene therapy research
  - 180+ patients treated
    - 8 clinical trials

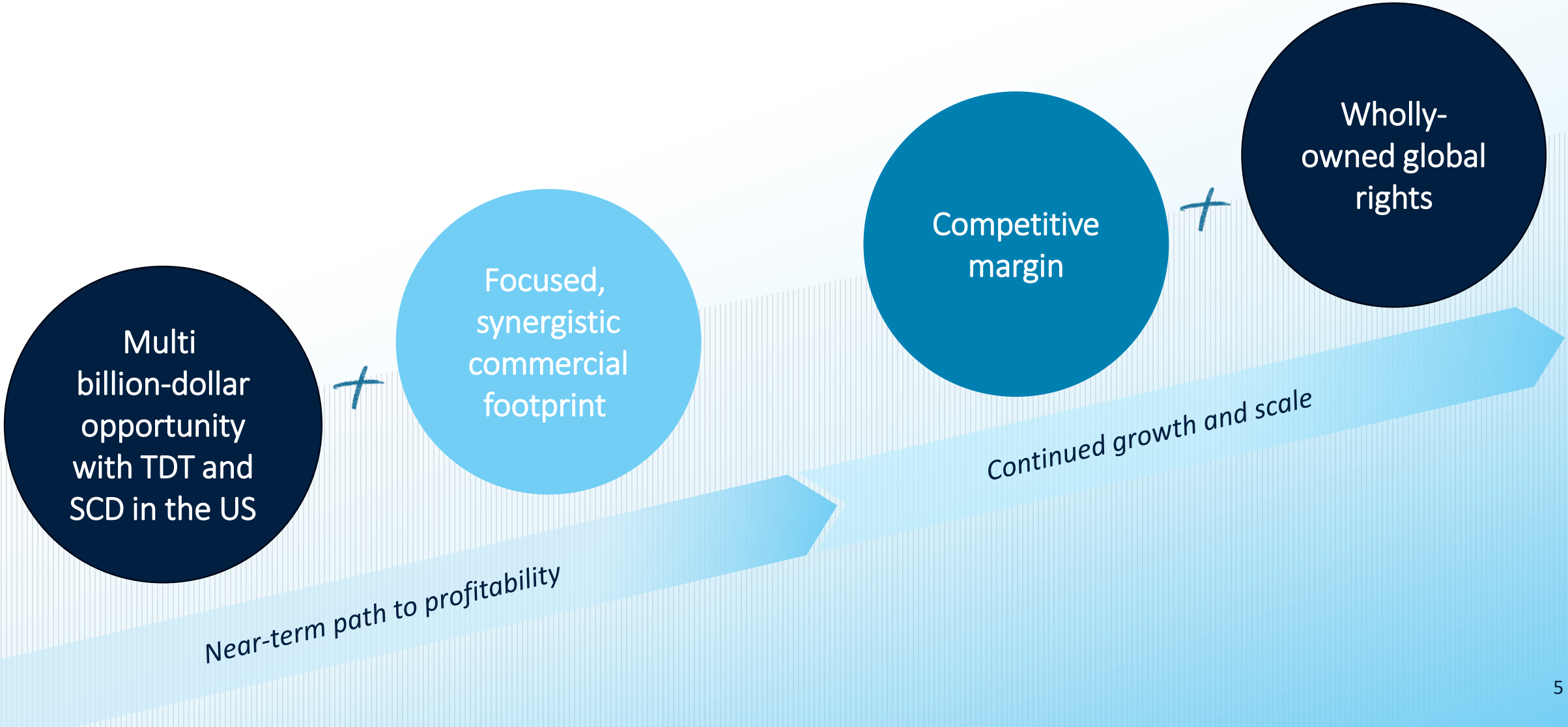
*Clinical & pre-clinical companies*

- Established track record for LVV platform
- 2 FDA approvals
- 3rd BLA under priority review


- 2 ongoing US launches
- Transplant and cell therapy infrastructure
- Proven reimbursement

*Large cap pharma*

# bluebird's five-year vision

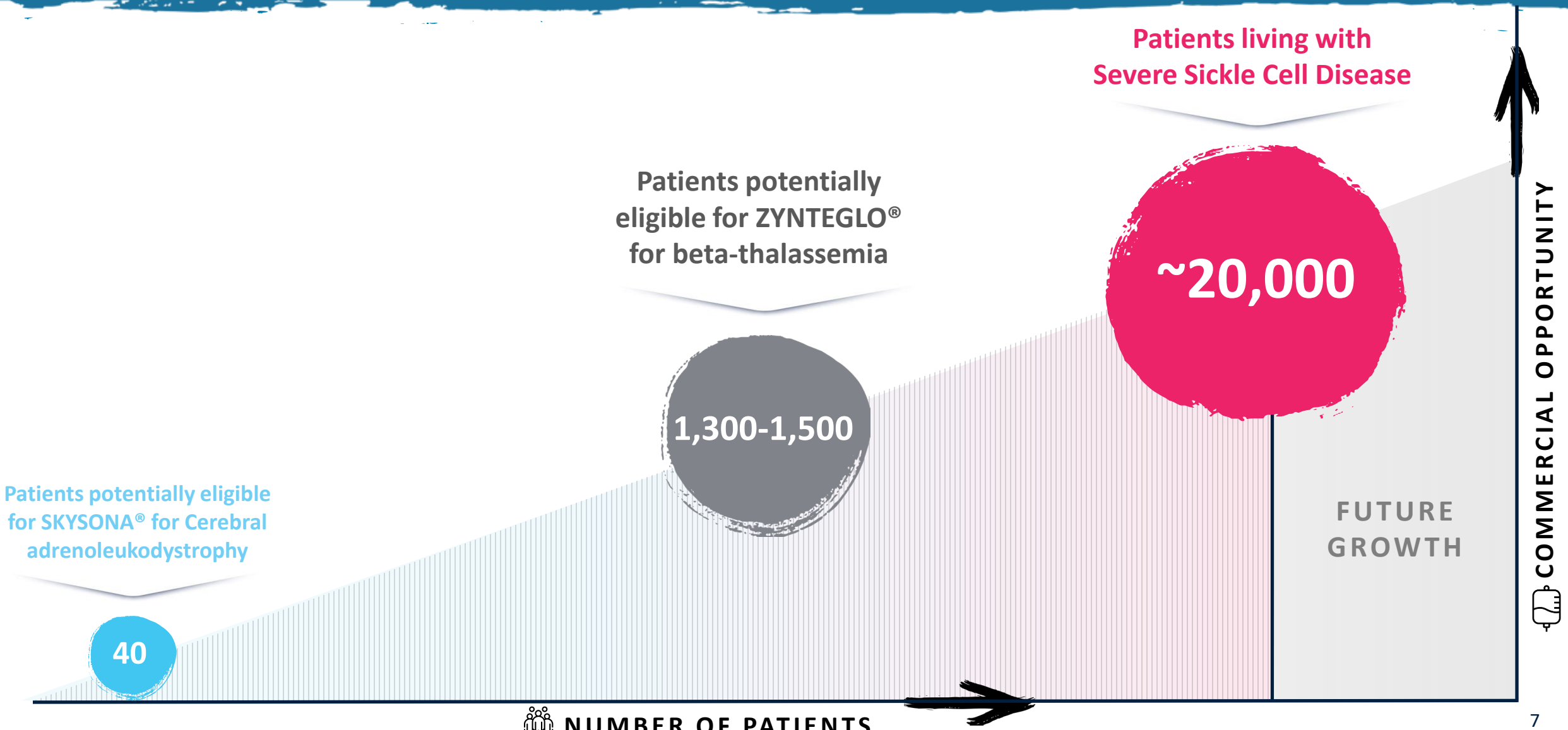


# Three established gene therapy programs

| | ZYNTEGLO® for beta-thalassemia | SKYSONA® for cerebral adrenoleukodystrophy | lovo-cel for sickle cell disease |
|---|---|---|---|
| **Regulatory** | FDA approved on August 17, 2022 | FDA approved on September 16, 2022 | PDUFA date set for December 20, 2023 |
| **Clinical** | • **63 patients treated** across all clinical trials<br>• **8 years of follow-up** (n = 3)<br>• In Phase 3 studies (n=41), **90% of patients achieved transfusion independence**<br>• Safety profile **generally consistent** with that seen with cell collection and myeloablative conditioning | • **67 patients treated** across all clinical trials<br>• **Accelerated approval** based on post-hoc analysis of 11 patients; estimated **72% likelihood of major functional disability free survival** at 24 months<br>• Five boys treated in clinical trials developed hematologic malignancy; **label** includes boxed warning* | • **50 patients treated** across all clinical trials<br>• 6 patients with **≥ 6 years of follow up**<br>• In pivotal cohort (HGB-206 Group C, n=32), **96% experienced complete resolution of severe VOEs** through 24 months of follow-up<br>• Safety profile **generally consistent** with that seen with cell collection, myeloablative conditioning and SCD |
| **Commercial** | • **1,300–1,500 potentially eligible patients**<br>• **11 patient starts** since launch**<br>• **15 QTCs activated****; on track to scale to **40–50 QTCs** by the end of 2023 | • **40 potentially eligible patients**<br>• **5 patient starts** since launch**; anticipate 5–10 patient starts in 2023<br>• **4 QTCs activated**** | • **~20,000 potentially eligible patients**<br>• Commercial launch expected in **early 2024**<br>• Estimated **65% of SCD patients within 50 miles** of a planned QTC; (95% within 200 miles) |

*SKYSONA is indicated to slow the progression of neurologic dysfunction in boys 4-17 years of age with early, active cerebral adrenoleukodystrophy (CALD). bluebird closely monitors potential and diagnosed cases of hematologic malignancy in patients treated with SKYSONA and additional cases are expected to arise over time. bluebird is communicating regularly with treating physicians and regulatory authorities. **As of August 8, 2023; Patient starts is defined as a cell collection (apheresis); Activated QTC defined as Qualified Treatment Center with a signed MSA. Lovo-cel is investigational and has not been approved by any regulatory authorities. The safety and efficacy of lovo-cel have not been established.

# Momentum building with commercial launches; opportunity to deliver significant value for patients and shareholders



# Inherited hemoglobin disorders

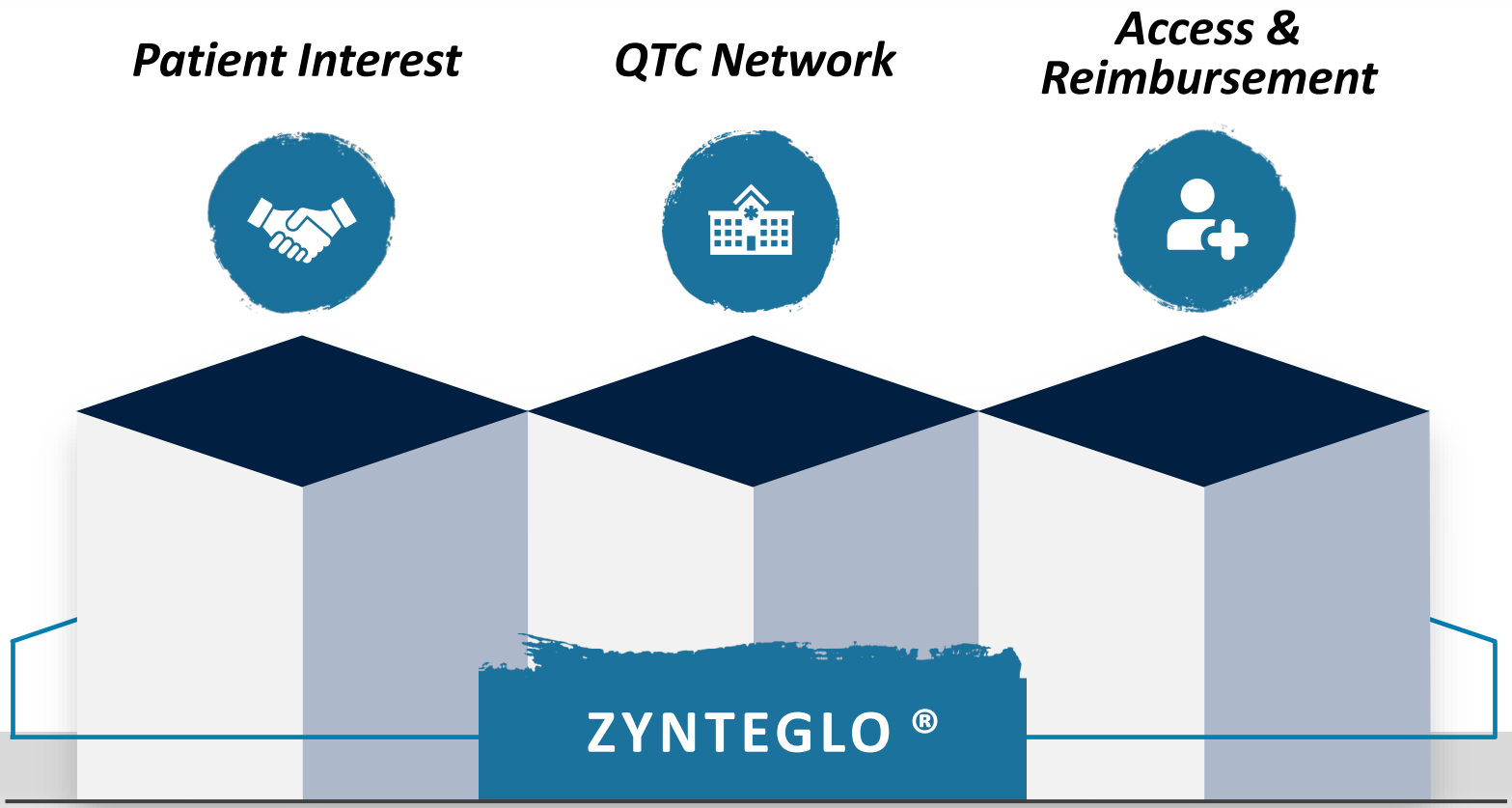
bluebirdbio®

# Launching now

zynteglo®
(betibeglogene autotemcel)
suspension for IV infusion

# ZYNTEGLO commercial launch off to a strong start

## Launch built on three key pillars



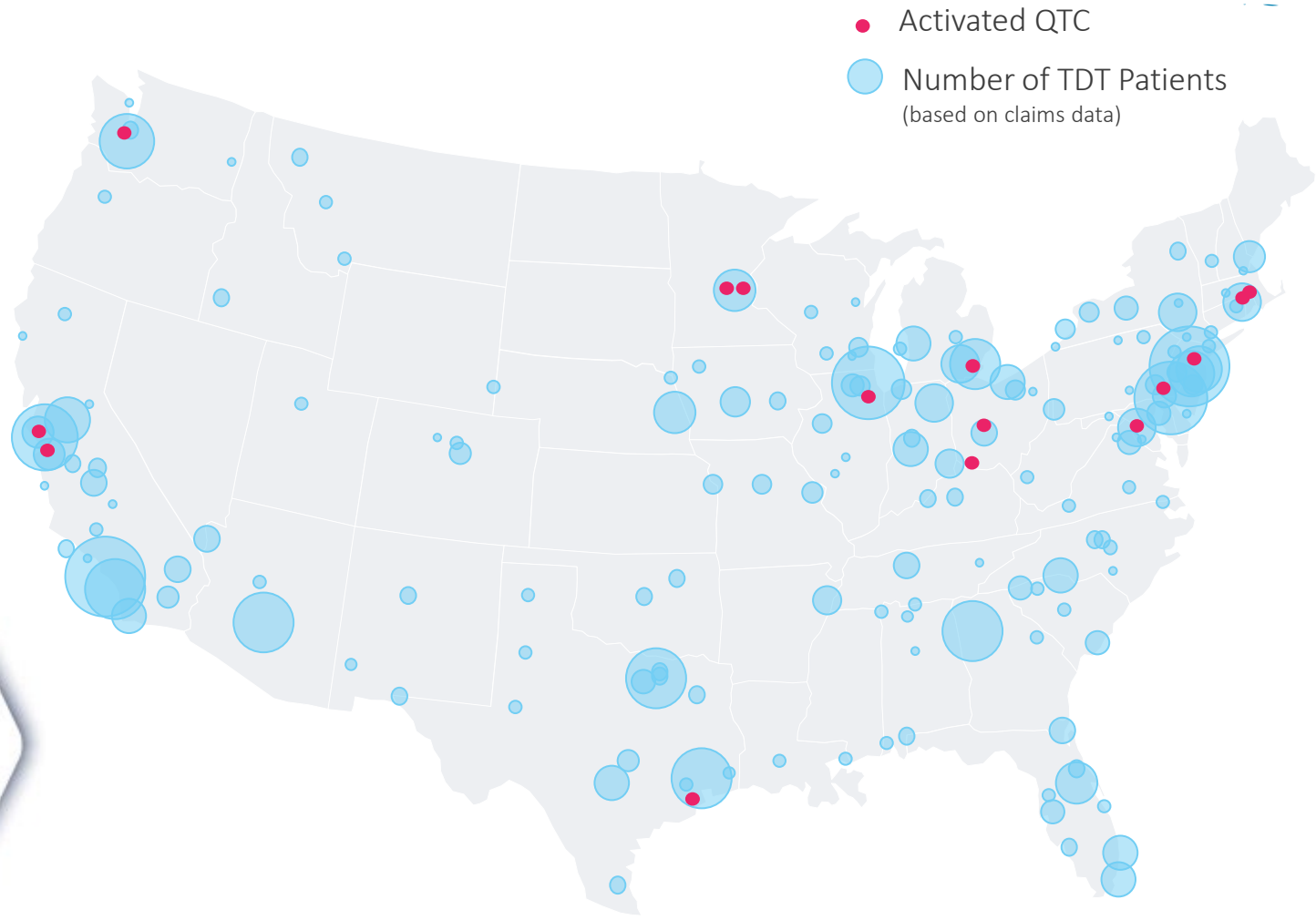
# Fit-for-purpose Qualified Treatment Center (QTC) network being activated in waves

## Targeted QTC selection

- Focused on high prevalence states
- Centers actively treating beta-thalassemia today
- Deep experience with commercial cell and gene therapies

## QTC growth aligned with demand

- Anticipated expansion to ~40-50 QTCs by YE 2023 to maximize opportunity for ZYNTEGLO and in anticipation of lovo-cel launch

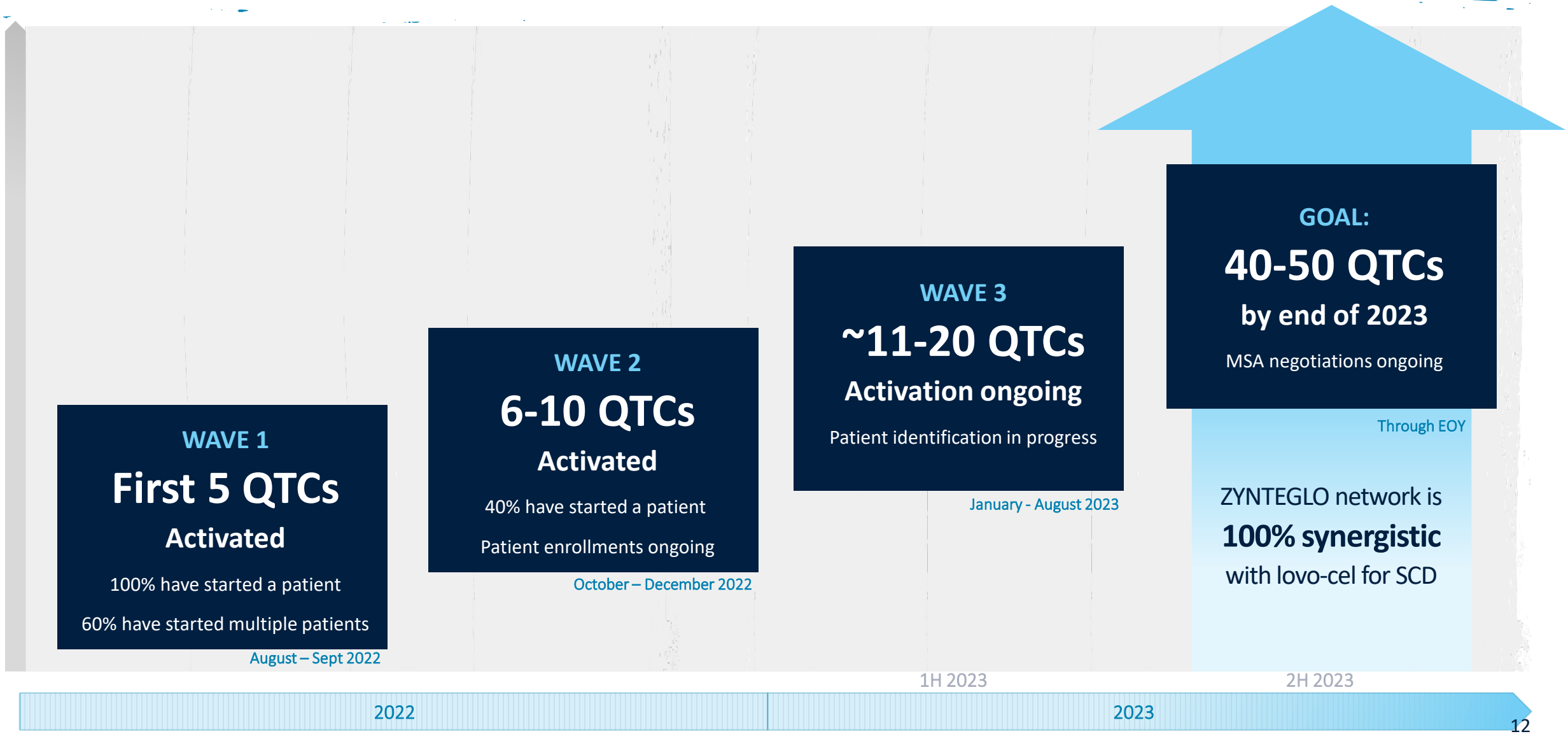



*Graphic is illustrative and subject to change as final QTC network is determined; Activated QTC defined as Qualified Treatment Center with a signed MSA; Activated QTCs as of August 8, 2023



QTC: Qualified Treatment Center

# Launch momentum building as on-boarded QTCs gain experience and accelerate patient enrollment



# Confident in timely, quality access and reimbursement with upfront payment at $2.8M price

## PRICE TIED TO RECOGNIZED VALUE

**Beta-thalassemia requiring regular RBC transfusions is associated with:**

- $6.4 million average lifetime medical care cost per patient[1]
- 23X higher average total health care cost per patient per year vs. general population[2]
- Blood transfusions every 2-5 weeks for life[3]

## SIMPLE AND INNOVATIVE PAYMENT STRATEGY

**bluebird is offering payers:**

- One-time upfront payment
- Outcomes-based agreement with up to 80% rebate if patient does not reach transfusion independence within 2 years
- Clinically-relevant outcome, easily tracked in claims data

## ENCOURAGING PAYER INTERACTIONS

**All target payers have responded favorably to approach:**

- Estimated 70-75% of patients with beta-thalassemia have commercial insurance
- Engaging with state Medicaid agencies representing ~80% of publicly-insured beta-thalassemia patients

[1] Data on file [2] Weiss et al. 2019 [3] TIF Guidelines

# Value of ZYNTEGLO is being recognized

## Patients are achieving access

**>200M**

**lives covered by a favorable coverage policy**

**2 weeks**

**on average for prior authorization approvals for drug product**

**ZERO**

**ultimate denials to date**

# Delivering a consistent manufacturing process is essential for patients, families and providers

## ZYNTEGLO® manufacturing process

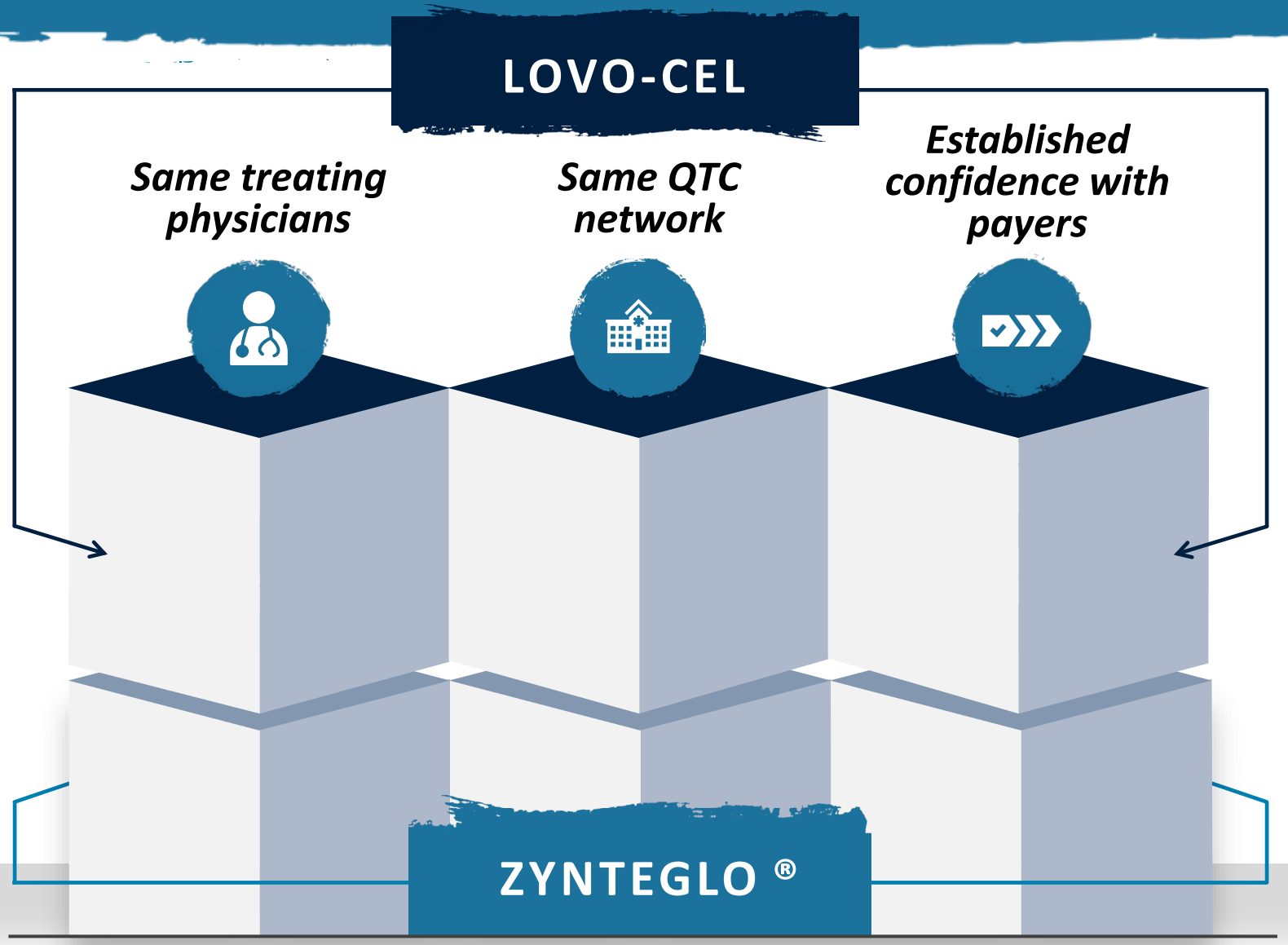

*Bulk of time spent on release testing to deliver high quality drug product*

*Revenue recognized upon infusion*

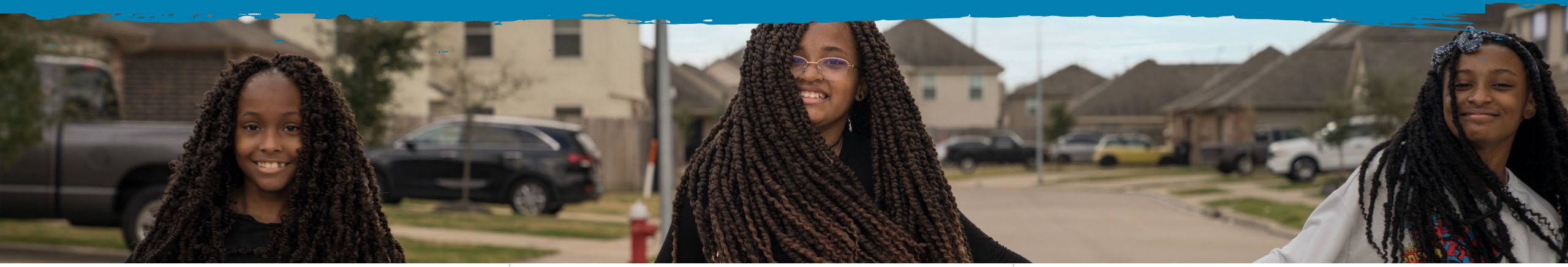
Occurs at QTC  Occurs at CMO

ZYNTEGLO is indicated for the treatment of adult and pediatric patients with β-thalassemia who require regular red blood cell (RBC) transfusions.
QTC: Qualified Treatment Center; CMO: Contract Manufacturing Organization

# ZYNTEGLO expected to enable seamless transition to commercializing lovo-cel for sickle cell disease



# Opportunity to address a critical unmet need for >20,000 individuals living with severe sickle cell disease in the US



## LARGE PATIENT POPULATION

- 1 in 365 Black or African American babies is born with sickle cell disease[1]
- **>20,000 SCD patients** in the US may be addressed by gene therapy[2]

## SIGNIFICANT UNMET NEED

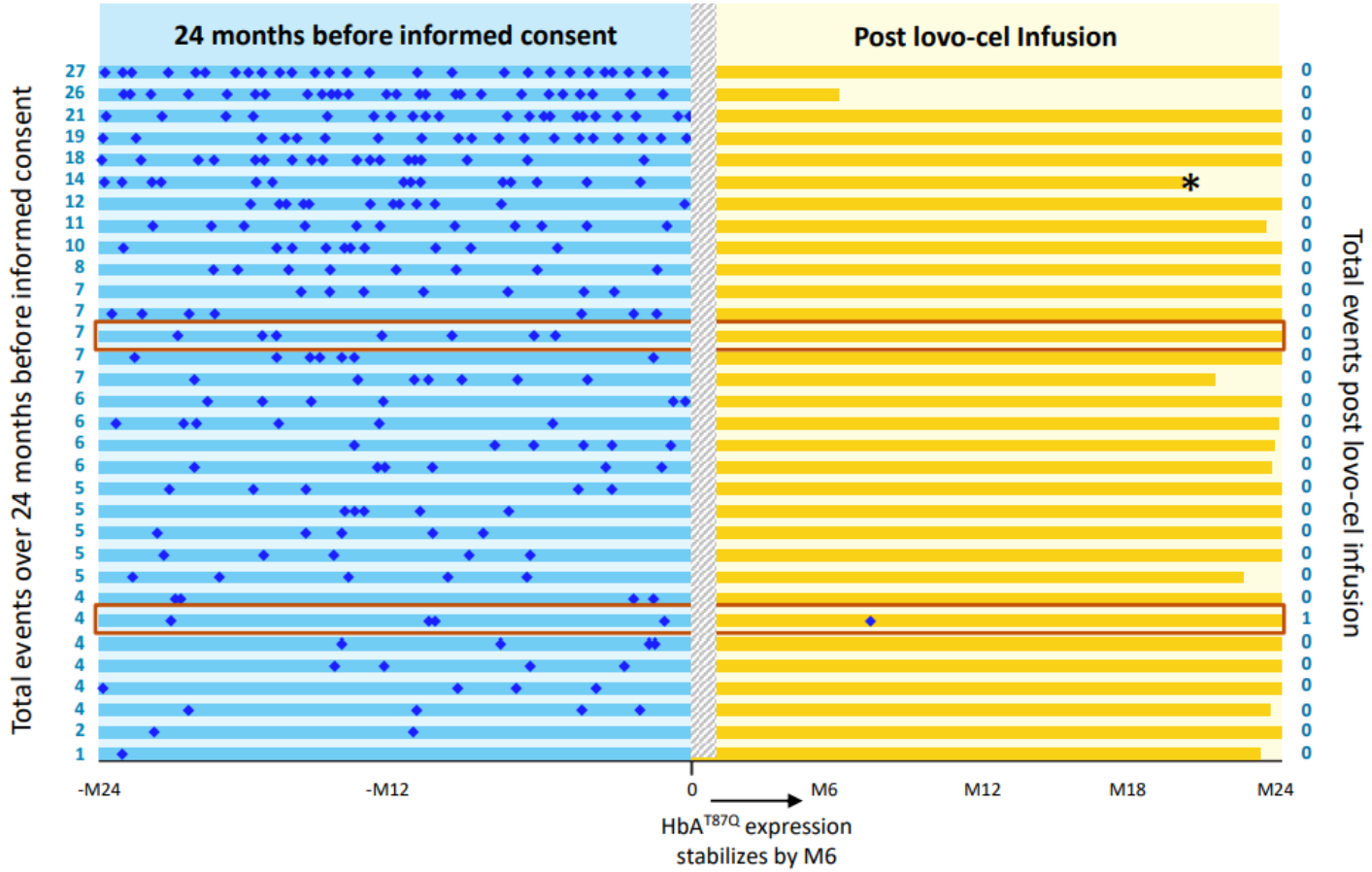
- VOEs are the hallmark of SCD, but the disease is more than just pain
- 1 in 4 patients have a stroke by age 45[3]
- Widespread risk of organ damage or organ failure[3]
- 75% report difficulty completing daily tasks[4]

## MEANINGFUL OPPORTUNITY

- Patients average $4.0 million in direct medical costs, despite a median age of death of only 45[5]
- Approximately 65% report giving up a job due to SCD[4]
- Estimates of foregone income over a lifetime up to $1.3 million[6]
- Nearly 1/3 report experiencing discrimination in a healthcare setting[7]

[1] CDC [2] Data on file[3] Mortality Rates and Age at Death from Sickle Cell Disease: U.S., 1979–2005 [3] Kato GJ, Piel FB, Reid CD, et al. Sickle cell disease. Nat Rev Dis Primers. 2018;4:18010. [4] Holdford et al 2021 [5] Gallagher ME et al, J Med Econ. 2022 Jan-Dec [6] Graf 2022 [7] Harvard Chan, RWJF Poll 2017

# lovo-cel potential approval is based on the most robust and longest follow-up of any gene therapy program for SCD




Data as of Aug 11, 2022

*50 patients treated includes patients from HGB-205, HGB-206 Group A, Group B and Group C and HGB-210

## BLA under priority review for the treatment for patients 12 and older with SCD with a history of VOEs

*PDUFA Date: December 20, 2023*

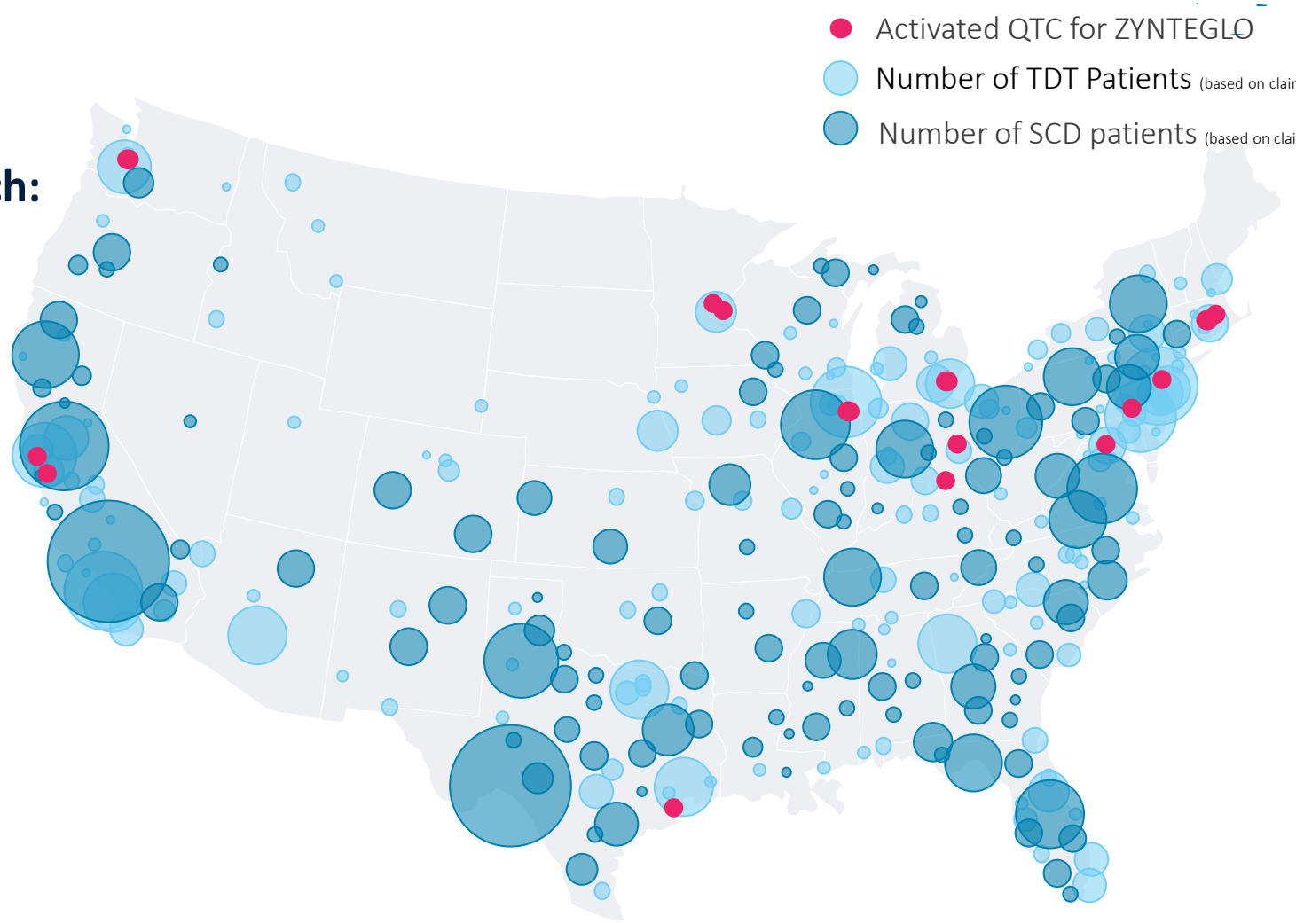
BLA submission includes:

- Efficacy data from 36 patients in HGB-206 Group C
  - Median 32 months of follow up
- Safety data from 50 patients treated across entire lovo-cel program
  - Six patients with ≥ 6 years of follow up
- August 2022 data cut demonstrating:
  - 97% complete resolution of severe VOEs through 24 mos
  - 90% resolution of VOEs through 24 mos
  - Maintenance of VOE resolution in majority of patients through long-term follow up + stable production of HbA
  - Majority of AEs attributed to underlying SCD or conditioning with busulfan

# Planned 2023 network expansion aims to have QTCs in place and ready to treat SCD patients upon FDA approval of lovo-cel

## Significant synergies in QTC network at launch:

- Expansion to ~40-50 QTCs by YE 2023 maximizes opportunity to rapidly reach patients
- Established contract allows for simplified activation process
- Estimated 65% of SCD patients within 50 miles of a planned QTC; (95% within 200 miles); anticipate continued expansion in 2024



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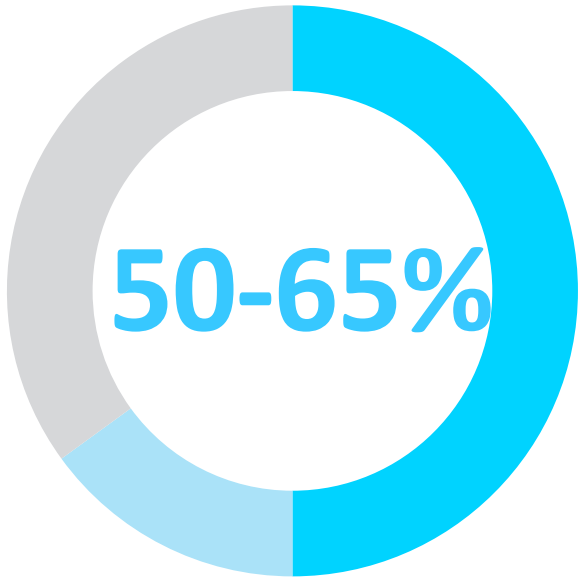
# Durability and long-term follow-up are the most important factors driving gene therapy decisions and key differentiators for lovo-cel


**…of patients** would consider gene therapy if recommended by their doctor


**… of physicians** are driven by efficacy and long-term follow-up, and not modality




**…projected market share** for lovo-cel against direct competitors

**7+ years of market research consistently underscores lovo-cel as a meaningful treatment option for patients and significant opportunity for bluebird**

*Market research conducted by external sources in 2023; Data on file

# SKYSONA®

bluebirdbio®

# SKYSONA® for cerebral adrenoleukodystrophy

skysona™
(elivaldogene autotemcel)

Commercial

- 40 potentially eligible patients; anticipate 5–10 patient starts in 2023
- 5 patient starts since launch; 4 QTCs activated; zero ultimate denials across government and commercial payers

Clinical

- 67 patients treated across all clinical trials
- Accelerated approval based on post-hoc analysis of 11 patients; estimated 72% likelihood of major functional disability free survival at 24 months
- Five boys treated in clinical trials developed myelodysplastic syndrome; label includes boxed warning*

SKYSONA is indicated to slow the progression of neurologic dysfunction in boys 4-17 years of age with early, active cerebral adrenoleukodystrophy (CALD)
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*bluebird closely monitors potential and diagnosed cases of hematologic malignancy in patients treated with SKYSONA and additional cases are expected to arise over time. bluebird is communicating regularly with treating physicians and regulatory authorities.

# Closing

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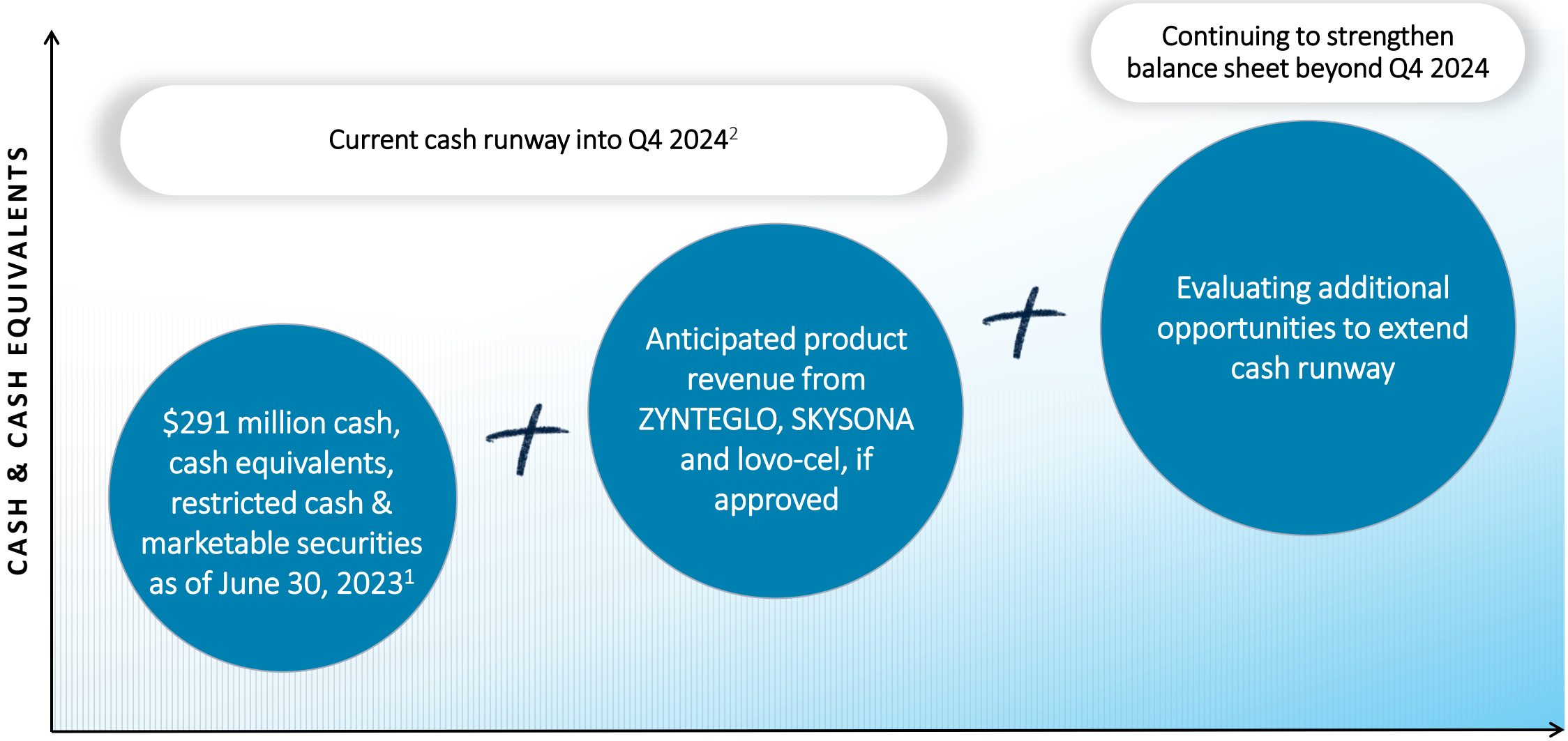
# Cash burn and runway horizon – focus on disciplined and effective deployment of capital




1. Cash balance contains $45m in restricted cash.; 2. Current cash runway calculated including restricted cash. Without the release of our restricted cash, we estimate our cash, cash equivalents and marketable securities as of June 30, 2023 will be sufficient to fund our operations into the second quarter of 2024. Cash Runway is calculated using the cash balance / net burn rate (cash from revenue less cash paid for expenses).

# Upcoming milestones

*First to market gene therapy for inherited hemoglobin disorders in the U.S.*

**SKYSONA® for cerebral adrenoleukodystrophy**

- Anticipate 5-10 patient starts in 2023
- Continued launch expansion through 2023

**ZYNTEGLO® for beta-thalassemia**

- Continued launch expansion through 2023
- 40-50 QTCs by end of 2023

**lovo-cel for sickle cell disease**

- PDUFA date Dec. 20, 2023
- Commercial launch expected early 2024, if approved

*Proving our commercial model* → *Significant value driver* →

# Potential for significant value creation in the near-term

1. Unique strategic position
2. Strong competitive advantage
3. Focus on profitability

thank you