UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 8-K

CURRENT REPORT

Pursuant to Section 13 or 15(d) of The Securities Exchange Act of 1934

Date of Report (Date of Earliest Event Reported): December 10, 2014

bluebird bio, Inc.
(Exact name of registrant as specified in its charter)

DELAWARE	**001-35966**	**13-3680878**
(State or other jurisdiction of incorporation)	(Commission File Number)	(I.R.S. Employer Identification No.)

150 Second Street Cambridge, MA	**02141**
(Address of principal executive offices)	(Zip Code)

Registrant's telephone number, including area code **(339) 499-9300**

Not Applicable
(Former name or former address, if changed since last report)

Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligation of the registrant under any of the following provisions:

☐ Written communications pursuant to Rule 425 under the Securities Act (17 CFR 230.425)

☐ Soliciting material pursuant to Rule 14a-12 under the Exchange Act (17 CFR 240.14a-12)

☐ Pre-commencement communications pursuant to Rule 14d-2(b) under the Exchange Act (17 CFR 240.14d-2(b))

☐ Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c))

Item 7.01 Regulation FD Disclosure

On December 10, 2014, bluebird bio, Inc. ("bluebird") conducted an investor webcast summarizing clinical data from its Northstar (HGB-204) and HGB-205 clinical trials of its LentiGlobin product candidate presented at the 56th Annual Meeting of the American Society of Hematology in San Francisco, CA on December 8, 2014. A copy of the presentation is being furnished as Exhibit 99.1 to this Report on Form 8-K.

The information in Item 7.01 of this Report on Form 8-K and Exhibit 99.1 attached hereto is intended to be furnished and shall not be deemed "filed" for purposes of Section 18 of the Securities Exchange Act of 1934 (the "Exchange Act") or otherwise subject to the liabilities of that section, nor shall it be deemed incorporated by reference in any filing under the Securities Act of 1933 or the Exchange Act, except as expressly set forth by specific reference in such filing

Report on Form 8-K and is incorporated herein by reference.

Item 9.01 Financial Statements and Exhibits.

(d) Exhibits

Exhibit No.	Description
99.1	Investor presentation provided by bluebird bio, Inc. on December 10, 2014.

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned hereunto duly authorized.

Date: December 10, 2014

bluebird bio, Inc.

By: /s/ Jason F. Cole
Jason Cole
Senior Vice President, General Counsel

EXHIBIT INDEX

Exhibit No.	Description
99.1	Investor presentation provided by bluebird bio, Inc. on December 10, 2014.

Exhibit 99.1

bluebirdbio™

Transforming the Lives of Patients
WITH SEVERE GENETIC DISORDERS

Making Hope A Reality

December 10, 2014

Nasdaq : BLUE

Forward Looking Statement

These slides and the accompanying oral presentation contain forward-looking statements and information. The use of words such as "may," "might," "will," "should," "expect," "plan," "anticipate," "believe," "estimate," "project," "intend," "future," "potential," or "continue," and other similar expressions are intended to identify forward looking statements. For example, all statements we make regarding the initiation, timing, progress and results of our preclinical and clinical studies and our research and development programs, our ability to advance product candidates into, and successfully complete, clinical studies, and the timing or likelihood of regulatory filings and approvals are forward looking. All forward-looking statements are based on estimates and assumptions by our management that, although we believe to be reasonable, are inherently uncertain. All forward-looking statements are subject to risks and uncertainties that may cause actual results to differ materially from those that we expected. These statements are also subject to a number of material risks and uncertainties that are described in our most recent quarterly report on Form 10-Q, as well as our subsequent filings with the Securities and Exchange Commission. Any forward-looking statement speaks only as of the date on which it was made. We undertake no obligation to publicly update or revise any forward-looking statement, whether as a result of new information, future events or otherwise, except as required by law.

Overview – bluebird bio

- Potential for **one-time transformative** treatments for **severe genetic and orphan diseases**
- Encouraging **clinical efficacy and safety data** in beta thalassemia and CCALD with an emerging pipeline, including a clinical program in sickle cell disease
- **Industrialized gene delivery platform** across people, production, development and deployment
- **Disruptive gene addition and gene editing technologies** with broad product and deal potential
- **Industry leading team** and **culture** funded for success

bluebird Pipeline

Products	Program Area	Preclinical	Phase I/II	Phase II/III	Rights
	CNS Diseases				
Lenti-D	Childhood Cerebral ALD – Starbeam Study*				Worldwide
	Hematologic Diseases				
LentiGlobin™	β-thalassemia/SCD (France) – HGB-205 Study**				Worldwide
	β-thalassemia (U.S.) – Northstar Study**				
	Sickle Cell Disease (U.S.) – HGB-206 Study				
	Oncology				
CAR-T Cells	Hematologic/Solid Tumors				Global Celgene Collaboration
	Research				
Early Pipeline	Undisclosed + Gene Editing				Worldwide

* The Phase II/III Starbeam Study is our first clinical study of our current Lenti-D viral vector and product candidate.
** The Phase I/II HGB-205 and Northstar Studies are our first clinical studies of our current LentiGlobin viral vector and product candidate.

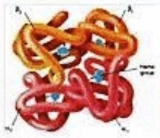
ASH Data Demonstrates First Four Patients Treated with β-thalassemia Major are Transfusion-Free

Clinical data to-date from both Northstar and HGB-205 studies continue to be very promising:

- First four patients with at least three months of follow-up are transfusion-free
- Early, robust and steadily rising βA-T87Q-globin levels
- First subject with SCD underwent successful transplantation and achieved neutrophil engraftment
- Enrollment in both studies on track to be completed in 2015

Team focused on treating more patients to refine understanding of treatment and patient variables to inform our development path and pivotal trials

B-thalassemia Major: Disease Overview



Disease

- Our focus is β-thalassemia major (e.g. transfusion-dependent)
  - Most severe form
- Monogenic, severe anemia
- Loss of or reduced β-globin production
- Poor quality of life & shortened lifespan

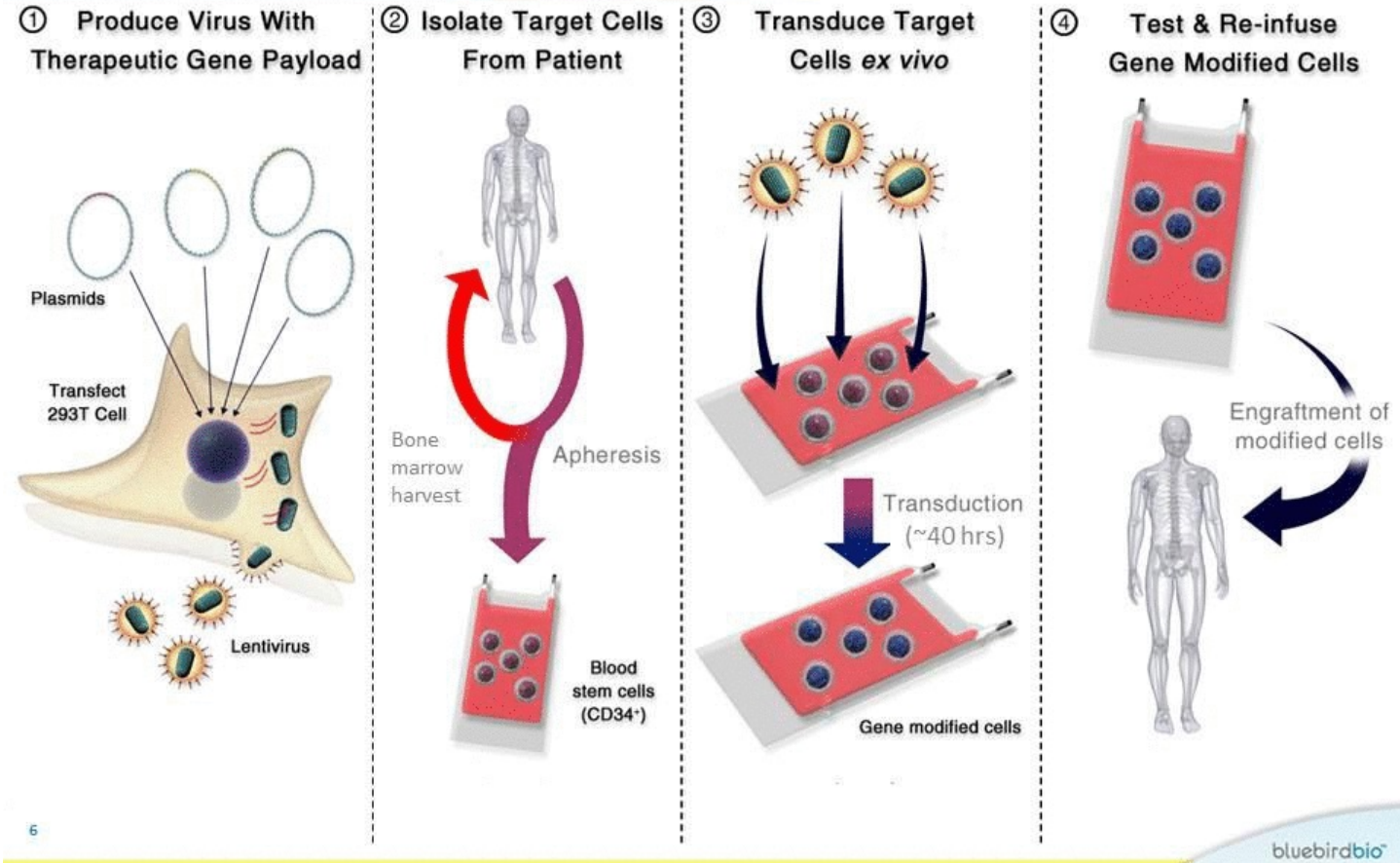
Current Treatments

- Frequent, chronic blood transfusions
  - Iron overload leads to organ failure
- Ongoing iron chelation
  - Frequently suboptimal
- Allogeneic transplant (rarely)
  - Difficulty finding a suitable match
  - Morbidity and mortality due to graft rejection, GVHD and immunosuppression

Epidemiology

- Global β-thalassemia prevalence ~288K; incidence ~60K
- US/Europe β-thalassemia prevalence (treated) ~15K; incidence ~1.5K
  - 60-80% severe/major
- Affects people of Mediterranean, Middle Eastern, South Asian and SE Asian descent

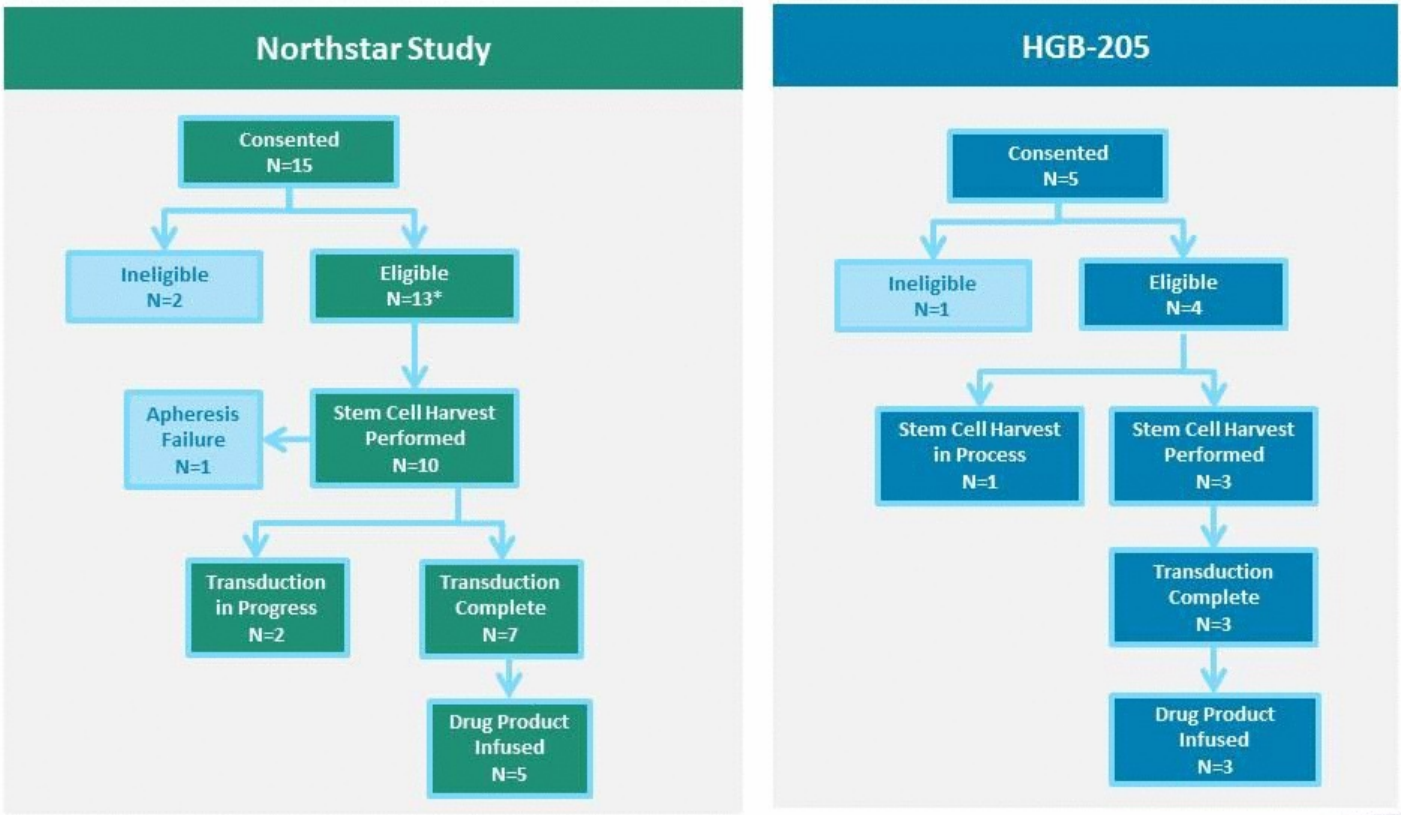
Our Manufacturing Platform – How it Works



B-thalassemia: Clinical Trial Summary
Second Generation BB305 Vector

	Northstar Study	HGB-205
Trial Location(s)	US, Australia, Thailand	France
Phase	I/II	I/II
N	15	7
Indication	β-thalassemia major	β-thalassemia major & severe sickle cell disease
Sites	Multi-center	1
Status	Enrollment ongoing	Enrollment ongoing

Study Enrollment Disposition



Both charts as of December 1, 2014; *3 patients in active screening in Northstar Study

Demographics and Baseline Characteristics for Treated Subjects with β-thalassemia

TRIAL	Northstar*					HGB-205	
Subject	**1102**	**1104**	**1106**	**1107**	**1108**	**1201**	**1202**
Age/Sex	18/F	21/F	20/F	26/F	18/F	18/F	16/M
Country of birth	USA	Thailand	Pakistan	Australia	USA	Syria	France
Genotype	β0/βE	β0/βE	β0/β0	β0/β0	β0/β+	β0/βE	β0/βE
Transfusion requirement (mls/kg/year)	137	153	197	223	144	139	188
CD34+ VCN (pre-infusion)	1.0/1.1**	0.7/0.7**	1.5	1.0	0.9	1.5	2.1
CD34+ cell count ($x10^6$/kg)	6.5	5.4	13.5	15.0	7.9	8.9	13.6
Follow-up (months)* **	**6**	2****	**3**	1	<1	**12**	**9**

* Drug products for untreated Subjects 1109 and 1110 have been produced resulting in VCNs of 0.6/0.6 and 0.7 respectively
** If more than one drug product was manufactured the VCN of each product lot is quantified
*** Data as of December 1, 2014 from an open database and is subject to change
**** Efficacy data only available for 1 month follow-up post-transplant

Data as Presented at ASH 2014

Clinical Safety for Infused Subjects with β-thalassemia

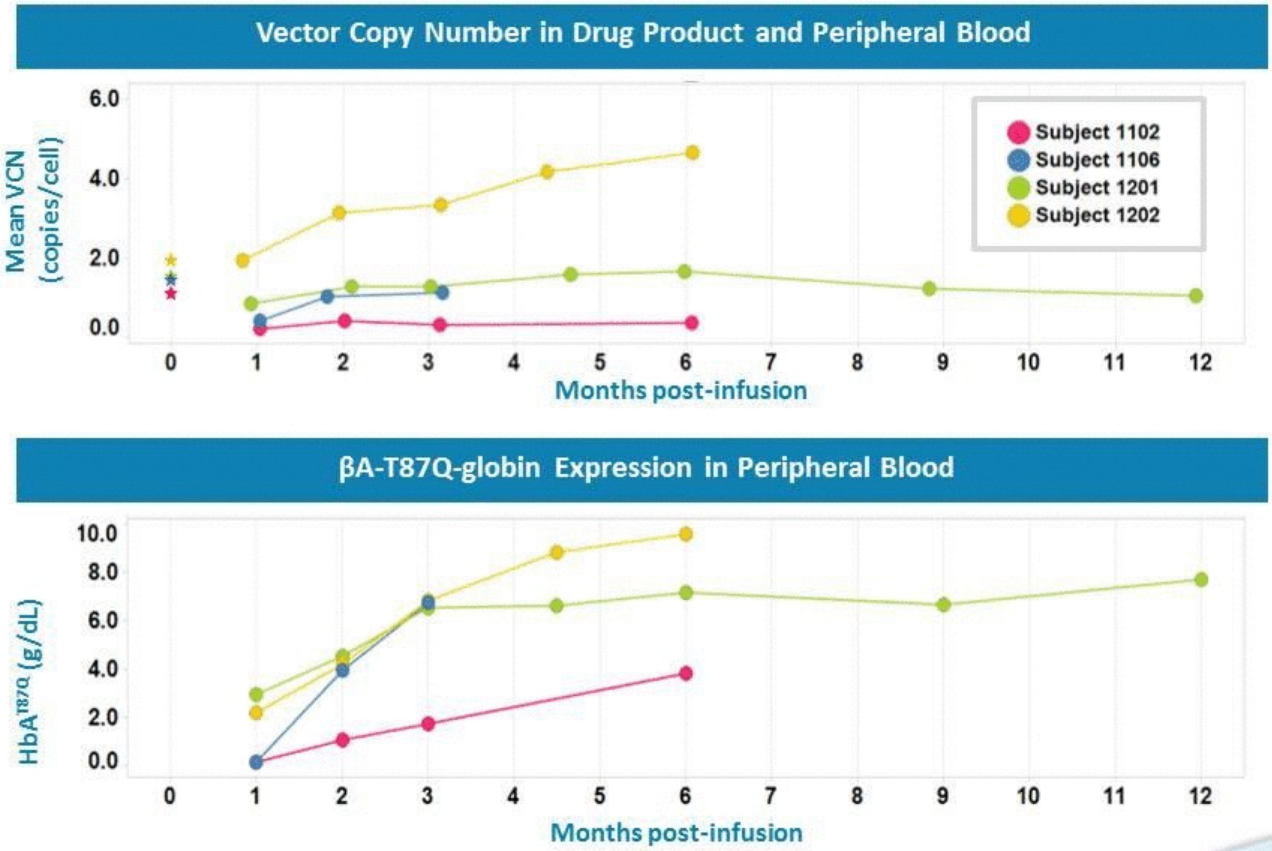
	Subject 1102	Subject 1104	Subject 1106	Subject 1107	Subject 1201	Subject 1202
Neutrophil engraftment ANC > 500/μL	Day +17	Day +18	Day +29	Day +14	Day +13	Day +15
Platelet engraftment Unsupported platelet count > 20,000/μL	Day +28	Day +31	Day +30	Day +27	Day +17	Day +24
Non-laboratory ≥Grade 3 AEs post-infusion	• Mucositis • Bacteremia • Febrile neutropenia	• Mucositis	• Mucositis • Epistaxis • Febrile neutropenia	• Mucositis • Infection • Headache	• Premature menopause • Mucositis	• Mucositis *
SAEs post-infusion	None	Catheter Thrombosis	None	None	None	None

Data from Northstar as of 21 November 2014; Data from HGB 205 as of 27 October 2014
Subject 1108 was infused in November 2014 and no data is available
Subject 1201 had an asymptomatic Grade 3 AST and ALT elevation from Day 23 to Day 90
* Mucositis on Subject # 1202 started 1 day before infusion

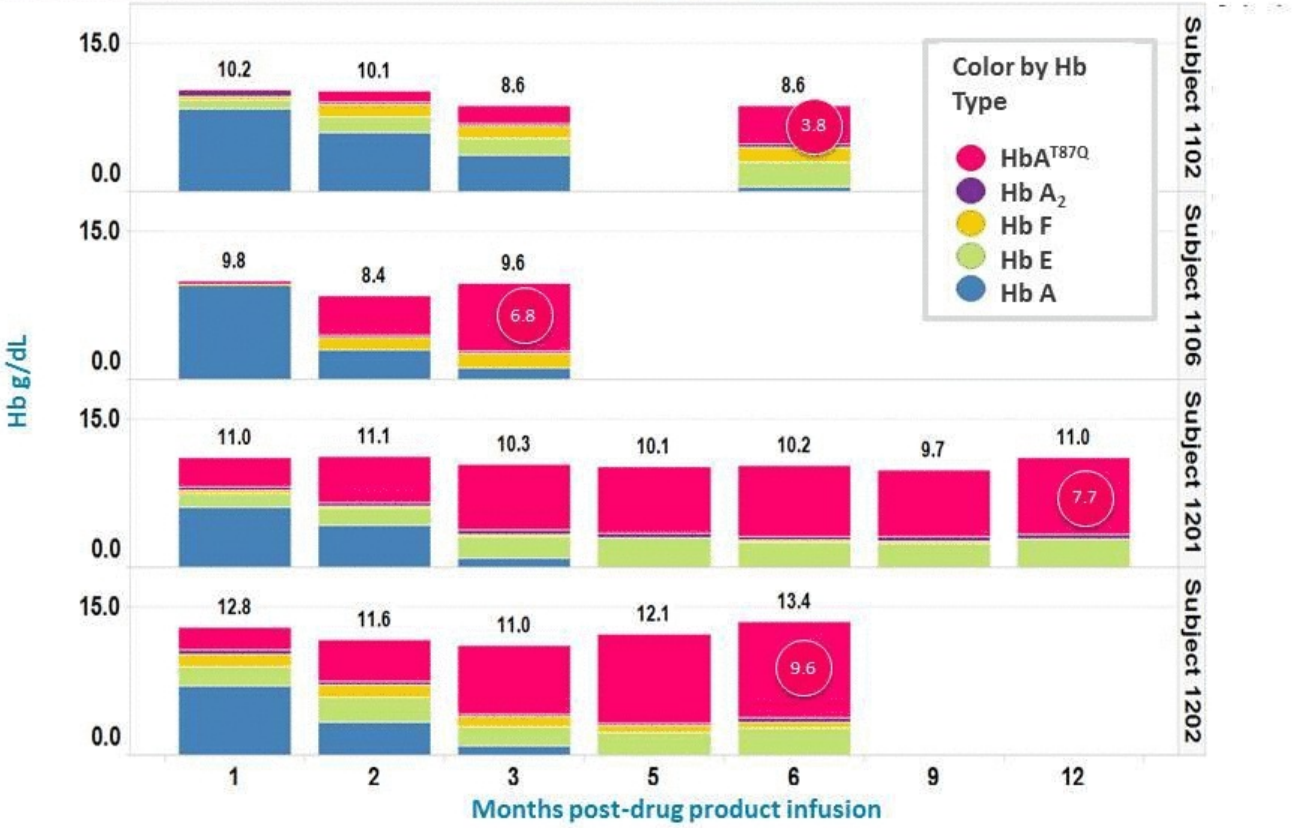
Data as Presented at ASH 2014

- All AEs consistent with myeloablative conditioning
- No ≥Grade 3 AEs related to drug product, no RCL at 3 and 6 months
- Integration site analysis on 3 subjects to-date, reveals highly polyclonal (>1000 clones) reconstitution at 3 and 6 months, without clonal dominance

Vector Copy Number (VCN) and βA-T87Q- globin Expression for Subjects with β-thalassemia Over Time



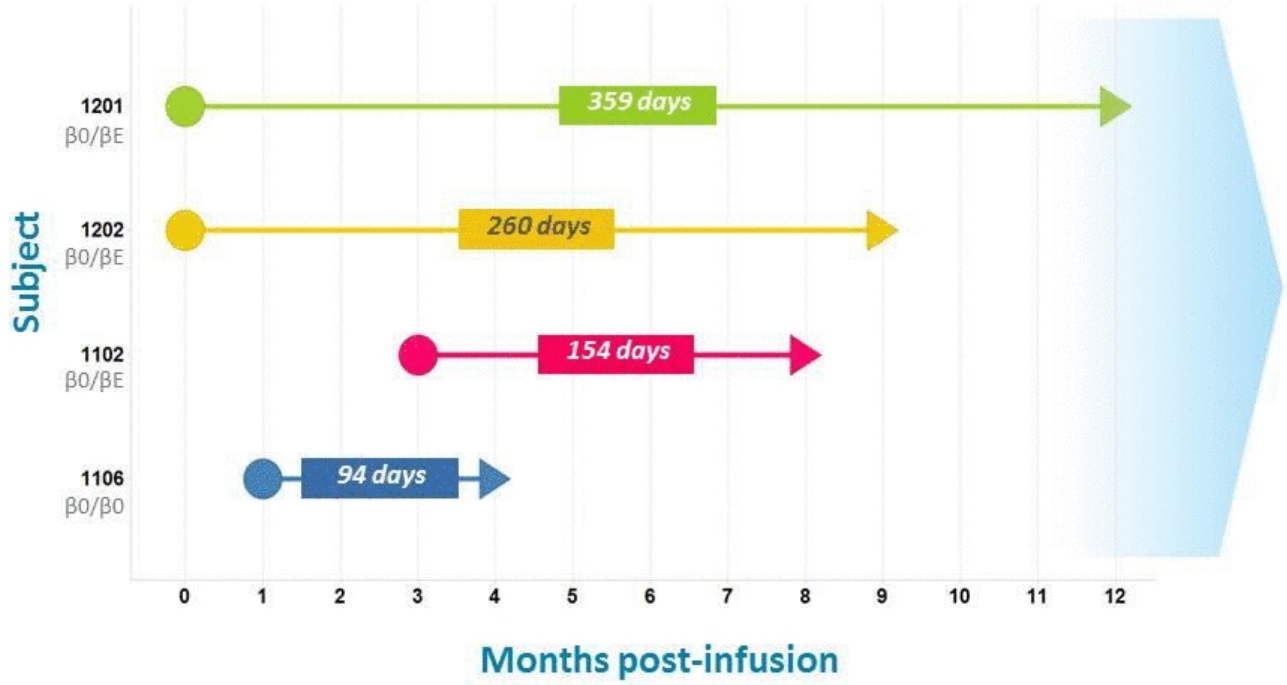
Consistently Robust βA-T87Q-globin Levels



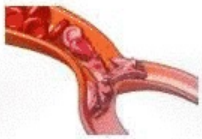
All Subjects with at Least 3 Months of Follow-up are Transfusion-Free, Regardless of Genotype

Days Transfusion-Free

as of December 1, 2014



Sickle Cell Disease: Disease Overview



Disease

- Monogenic, severe anemia
- Polymerization of β-globin chains deforms / sickles red blood cells
- Poor quality of life
  - Pain crises, stroke, splenomegaly
- Shortened lifespan

Current Treatments

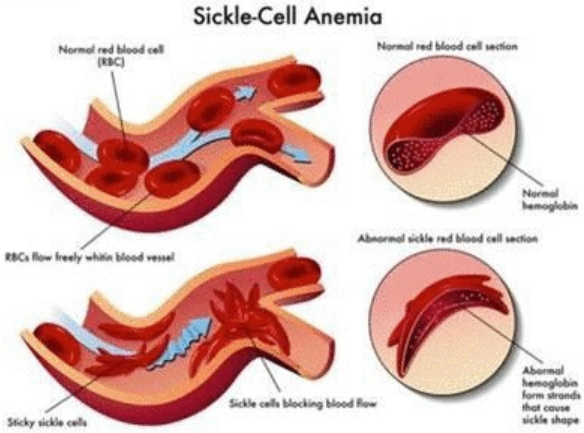
- Non curative treatments
  - Hydroxyurea
  - Blood transfusions
  - Pain management
- Allogeneic Transplant
  - Match uncommon
  - High morbidity / mortality

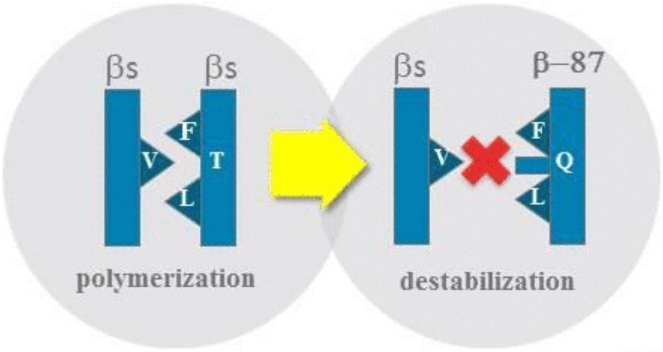
Epidemiology

- US/EU Prevalence ~150K
- US/EU incidence ~3K
- Global prevalence ~25M
- Global incidence ~300K

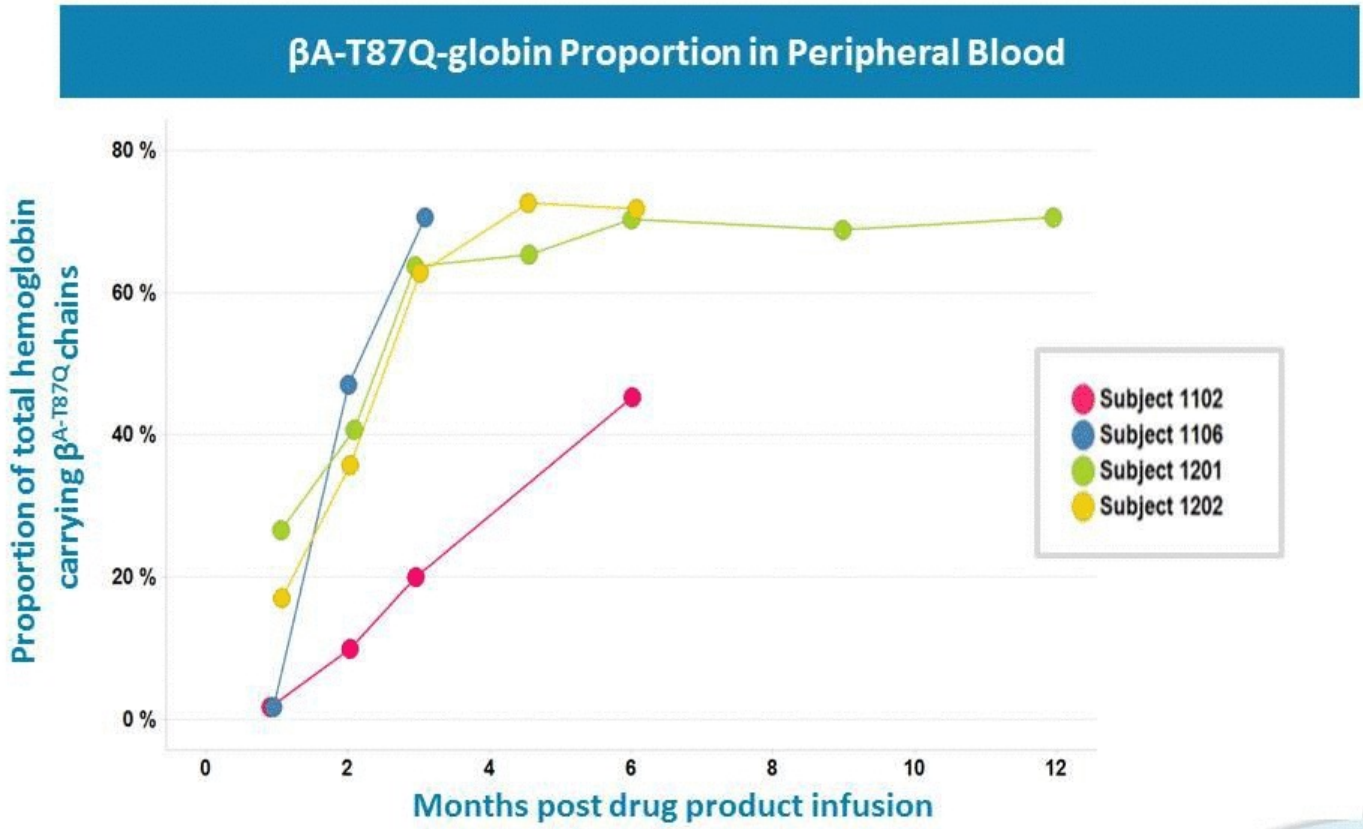
Evidence for Why BB305 globin May Work for Sickle Cell Disease (SCD)

- BB305 globin incorporates an anti-sickling amino acid that is found in fetal hemoglobin (glutamine at position 87)
- Anti-sickling activity of $\beta^{A\text{-}T87Q}$-globin has been demonstrated in a mouse model of SCD (Science 2001)
- Elevated fetal hemoglobin from hereditary persistence of fetal hemoglobin (HPFH) has shown clinical benefit





High T87Q-globin Proportion Observed in Thalassemia Subjects is Promising for Potential SCD Outcomes



Data Summary of First Subject with SCD Treated in HGB-205

- First ever treatment of a subject with SCD using gene therapy
- Drug Product infusion in October 2014

Subject	Trial	Age/Sex	Country of birth	Genotype	Transfusion requirement (mls/kg/year)	CD34+ VCN	CD34+ cell count ($x10^6$/kg)	Follow-up (months)
1204	HGB-205	13/M	France	β^S/β^S	170	1.2/1.0*	5.6	1

* If more than one drug product was manufactured the VCN of each product lot is quantified

- Tolerated transplantation well, without serious adverse events
  - Neutrophil engraftment on Day 37; platelet engraftment pending
- Currently too early post-engraftment to assess meaningful efficacy data

HGB-206: SCD Study is Now Active

	HGB-206
Trial Location	US
Phase	I
N	8
Indication	Severe sickle cell disease
Clinical Endpoints*	Primary : safety Secondary: clinical events
Sites	Multi-Center
Status	Enrollment open

*Measure red cell function tests, hemolysis markers; frequency of clinical events secondary to SCD (e.g. severe vaso-occlusive crises, strokes, etc.)

Data will Continue to Drive β-thalassemia and SCD Programs

Promising clinical data to-date from both Northstar and HGB-205 studies:

- Early, robust and steadily rising βA-T87Q-globin levels
- First four patients transfusion-free for at least 3 months, one of whom is out 12 months
- First subject with SCD underwent successful transplantation and achieved neutrophil engraftment
- Treatment with LentiGlobin has been well tolerated to-date

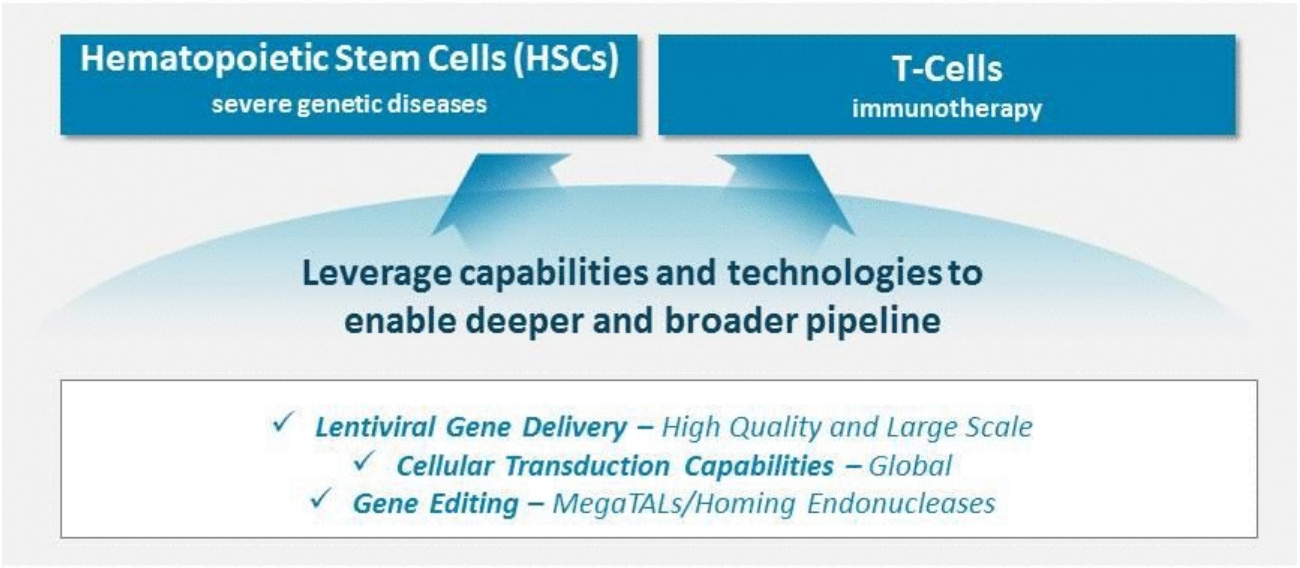
As more data become available, we expect to gain further insight into:

- Inter-subject variability
- Correlation between VCN and βA-T87Q-globin levels
- Kinetics of βA-T87Q-globin production, and the impact on transfusion reduction/elimination
- Clinical outcomes across multiple β-thalassemia major genotypes
- Early outcomes in SCD

Enrollment in both studies on track to be completed in 2015

Looking Forward: Our Strategic Intent

- Lead the gene therapy revolution
- Deliver clinically transformative data across both platforms
- Invest in global infrastructure



2014 – Substantial Progress

2014

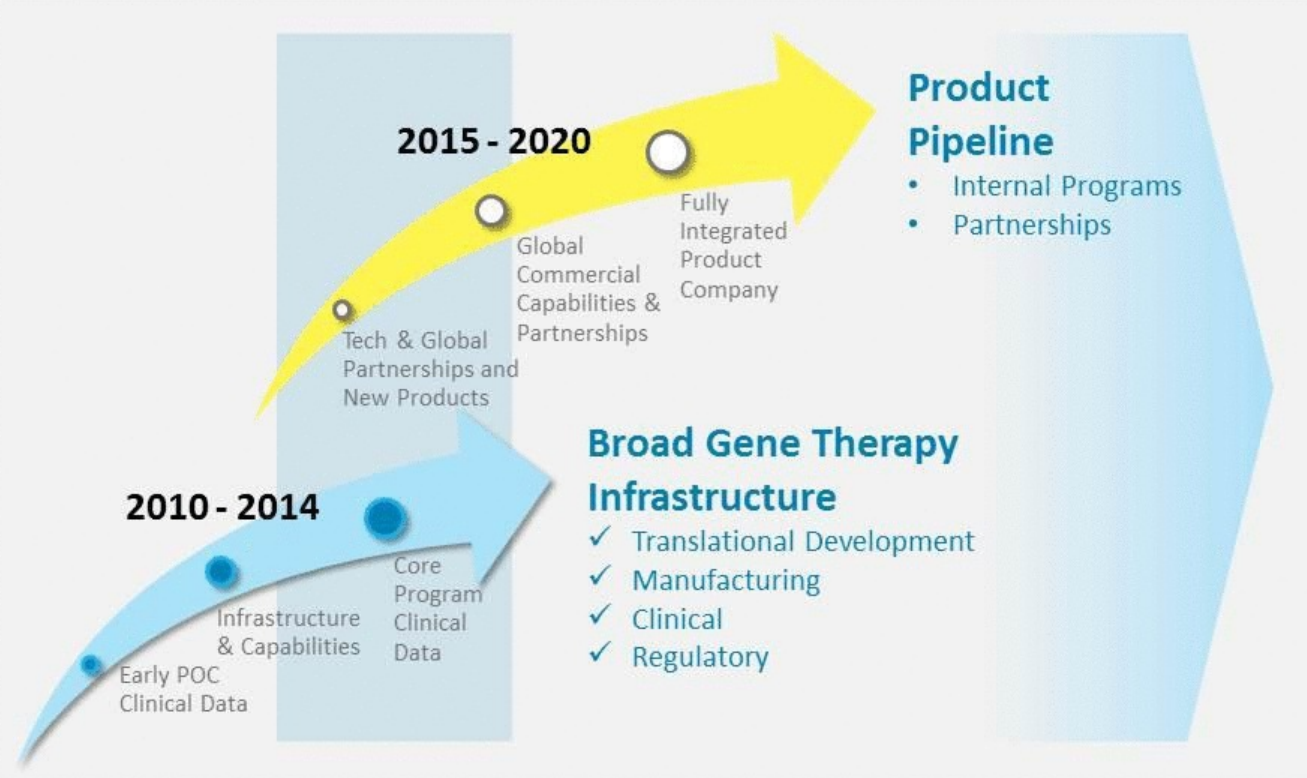
Development Milestones

- ☑ First subject transplanted in Northstar Study
- ☑ Preliminary HGB-205 data in β-Thalassemia presented at EHA
- ☑ First subject with sickle cell disease infused in HGB-205
- ☑ Launched HGB-206 sickle cell study
- ☑ Preliminary Northstar & HGB-205 data in β-thalassemia presented at ASH

Corporate Milestones

- ☑ Raised ~$110 million (net proceeds) to fund operations
- ☑ Acquired Pregenen's gene editing capabilities
  - Expertise in homing endonucleases and MegaTALs
  - Robust nuclease discovery platform and proprietary database
- ☑ Advanced Celgene/Baylor CAR T-cell Collaboration
  - Opens T-cell opportunity, builds upon existing capabilities and expands pipeline
  - Expect to enter the clinic in the next 18 months

bluebird bio 2020: The Gene Therapy Product Company



Why We Do What We Do

Ethan

Aidan

Cameron

Our Vision – Make Hope a Reality

Seeking to transform the lives of patients with severe genetic and orphan diseases through the development of innovative gene therapy products.