Long-term safety and efficacy in patients with DMD 4 years post-treatment with delandistrogene moxeparvovec: A Phase 1/2a study

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***Presenting on behalf of the authors (email address: medinfo@sarepta.com)**

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- Study 101 is sponsored and funded by Sarepta Therapeutics, Inc., Cambridge, MA, USA
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- Trial registration: NCT03375164
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- These data are an encore of data first presented by JR Mendell at the 17th International Congress on Neuromuscular Diseases 2 022

Disclosures

- JRM has received study funding from Sarepta Therapeutics and has a service agreement with Sarepta Therapeutics to provide tra ining on ongoing studies. JRM is a co-inventor of AAVrh74.MHCK7.SRP-9001-dys technology
- ZS has received grant support from Sarepta Therapeutics and the Parent Project Muscular Dystrophy
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- LPL reports receiving salary support from Sarepta Therapeutics through Nationwide Children's Hospital to support training and quality control activities for their ongoing clinical trials and licensing fees for natural history data
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- MAI, KC, RS and MJH have nothing to disclose
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- SL, RAP, DAG, SW, SM, ED and LRRK are employees of Sarepta Therapeutics and may own stocks or have stock options
- LRRK is an employee of Sarepta Therapeutics, has received grant support from Sarepta Therapeutics and the Parent Project Musc ular Dystrophy, and financial consideration from Sarepta Therapeutics and Myonexus Therapeutics (now acquired by Sarepta Therapeutics); in addition, she is a co-inventor of AAVrh74.MHCK7.SRP-9001-dys technology

FDA, Food and Drug Administration.

Objectives and overview

- This Phase 1/2a, single-dose, open-label clinical trial (Study 101; SRP-9001-101; NCT03375164)[1] evaluated the safety of systemic delivery of delandistrogene moxeparvovec (SRP-9001) in patients with DMD (≥4 to <8 years old)
  - We provide a 4-year update on long-term safety and functional data from four patients treated with delandistrogene moxeparvovec
  - To put the results into context, a post hoc analysis was conducted to compare the 4-year data from Study 101 with data from a propensity-score-weighted EC cohort

What does this study mean for the DMD community?

The single-dose gene transfer therapy delandistrogene moxeparvovec **generally led to improvements** in functional measures over 4 years in patients with DMD and had a **long-term acceptable safety profile**

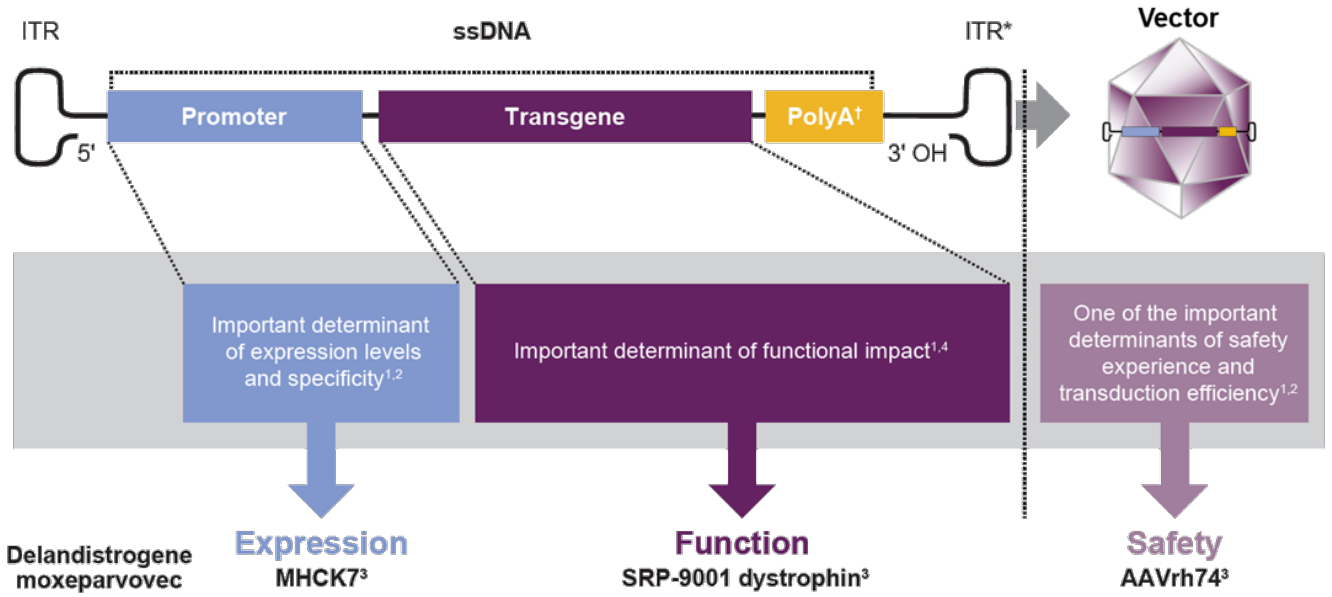
Results provide proof-of-concept support for the continuation of clinical trials to assess the safety and efficacy of the SRP-9001 transgene in patients with DMD

DMD, Duchenne muscular dystrophy; EC, external control.

1. ClinicalTrials.gov. NCT03375164 (Accessed March 2023).

Background

- Delandistrogene moxeparvovec is an investigational gene transfer therapy developed to address the underlying cause of DMD through targeted skeletal and cardiac muscle expression of SRP-9001 dystrophin, an engineered dystrophin protein that retains key functional domains of the wild-type protein[1–3]



*ITRs are required for genome replication and packaging. †PolyA signals the end of the transgene to the cellular machinery that transcribes (i.e. copies) it.

AAVrh74, adeno-associated virus rhesus isolate serotype 74; DMD, Duchenne muscular dystrophy; ITR, inverted terminal repeat; OH, hydroxide; PolyA, polyadenylation; ssDNA, single-stranded DNA.

1. Asher DR, et al. *Expert Opin Biol Ther*. 2020; 20:263–274; 2. Zheng C and Baum BJ. *Methods Mol Biol*. 2008; 434:205–219; 3. Mendell JR, et al. *JAMA Neurol*. 2020; 77:1122–1131; 4. Chandler RJ and Venditti CP. *Transl Sci Rare Dis*. 2016; 1:73–89.

Study design: Study 101

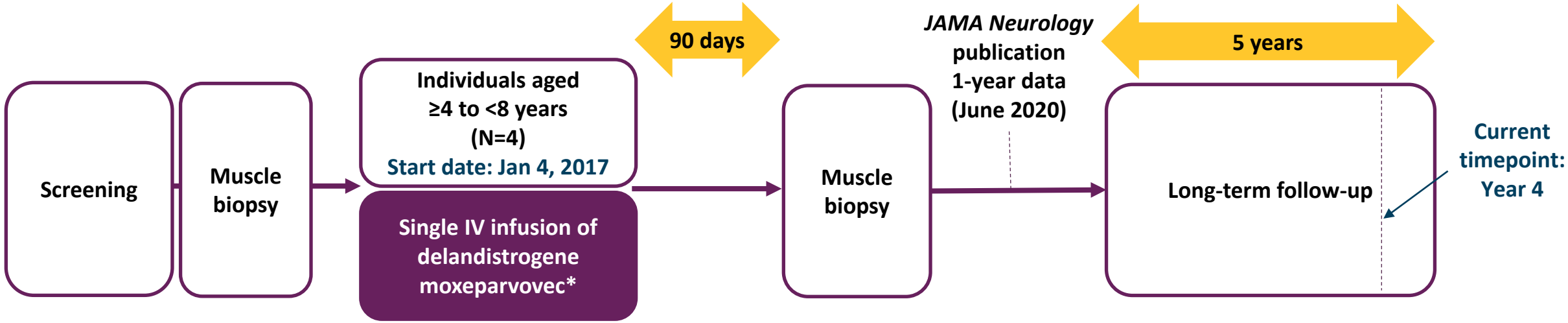
Open-label Phase 1/2a trial in patients with DMD ≥4 to <8 years old

Primary outcome measure:

- Safety based on the number of participants with AEs

Key additional outcome measures:

- SRP-9001 dystrophin expression in pre- and post-muscle biopsy at 12 weeks post-infusion (Day 90): IF and WB
- Change from baseline in NSAA and TFTs: 100MWR, 4-stair Climb, 10MWR, and Time to Rise



*All patients received one IV infusion in the peripheral limb vein at the dose 2.0×10^{14} vg/kg determined by supercoiled qPCR method (1.33×10^{14} vg/kg linear qPCR equivalent), and prednisone (1 mg/kg/day) 1 day pre- to 30 days post-gene delivery.

10MWR, 10-meter Walk/Run; 100MWR, 100-meter Walk/Run; AE, adverse event; DMD, Duchenne muscular dystrophy; IF, immunofluorescence; IV, intravenous; NSAA, North Star Ambulatory Assessment; qPCR, quantitative polymerase chain reaction; TFT, timed function test; vg, vector genomes; WB, western blot.

1. ClinicalTrials.gov. NCT03375164 (Accessed March 2023).

Baseline demographics[1]

	Patient 1	Patient 2	Patient 3	Patient 4
Age at screening, years	5.7	4.8	6.0	4.0
Height, cm	109.9	104.3	110.0	95.7
Weight, kg	18.4	18.9	21.4	13.7
BMI (<18.5)	15.2	17.4	17.7	15.0
NSAA	18.0	19.0	26.0	19.0

BMI, body mass index; NSAA, North Star Ambulatory Assessment.

1. Mendell JR, et al. *JAMA Neurol*. 2020; 77:1122–1131.

Study 101: 4-year data
*Primary endpoint: Safety**

There were no SAEs or discontinuations from the study

TRAEs were mild or moderate and all resolved

- TRAEs occurred mostly within the first 70 days of treatment
- The most common TRAE was vomiting (9 of 18 TRAEs)
  - Patients had transient vomiting generally within the first week post-infusion
  - TRAEs of vomiting did not correlate with liver enzyme elevations or any other abnormalities

There were no serious abnormalities observed in hematologic and chemistry panels

- Three patients had elevated GGT in the first 3 months post-treatment, which resolved with oral steroid treatment
  - These changes were asymptomatic, and no patients were hospitalized

None of the AEs were associated with complement activation

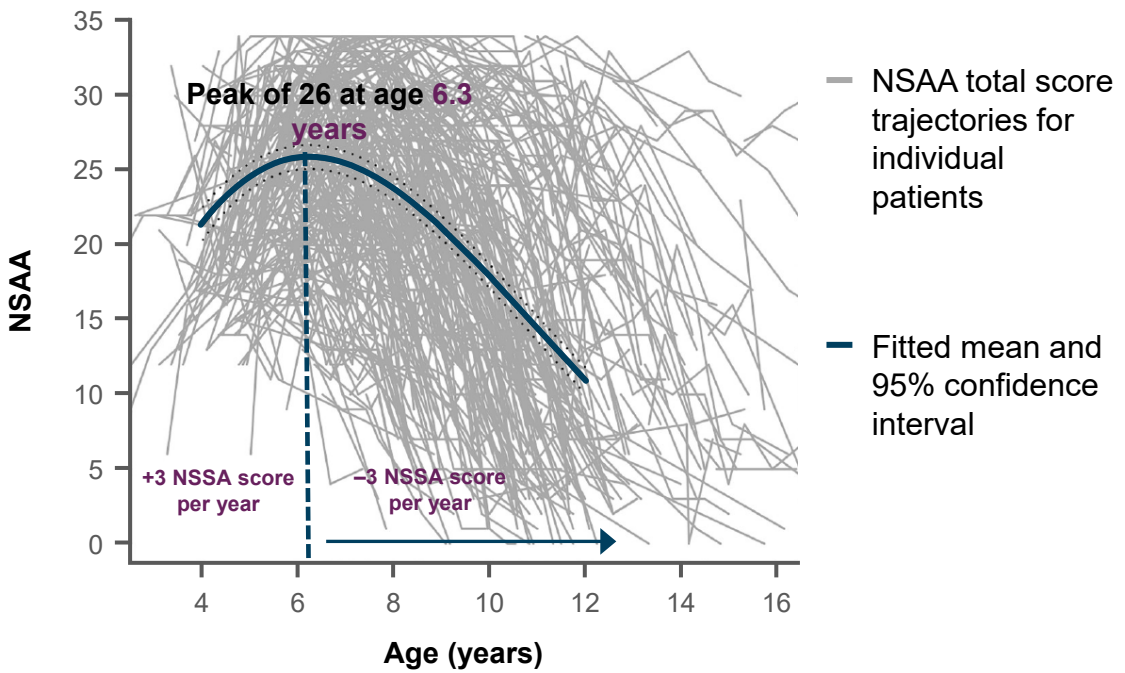
No other clinically significant laboratory findings were reported

*Up to data cut-off: 26 Apr 2022.

AE, adverse event; GGT, γ-glutamyl transpeptidase; SAE, serious AE; TRAE, treatment-related AE.

Roche/Sarepta data on file (2023).

Functional outcomes
NSAA total scores over 4 years post-treatment



Mean change in NSAA total score from baseline to Year 4: +7

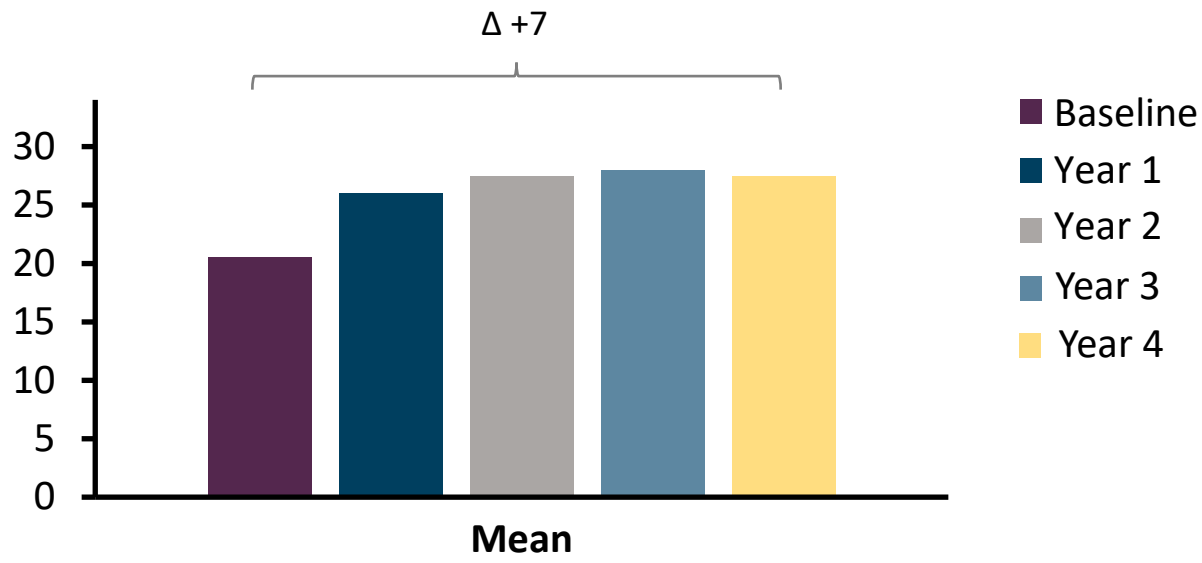


Figure adapted from Muntoni F, et al 2019[1]

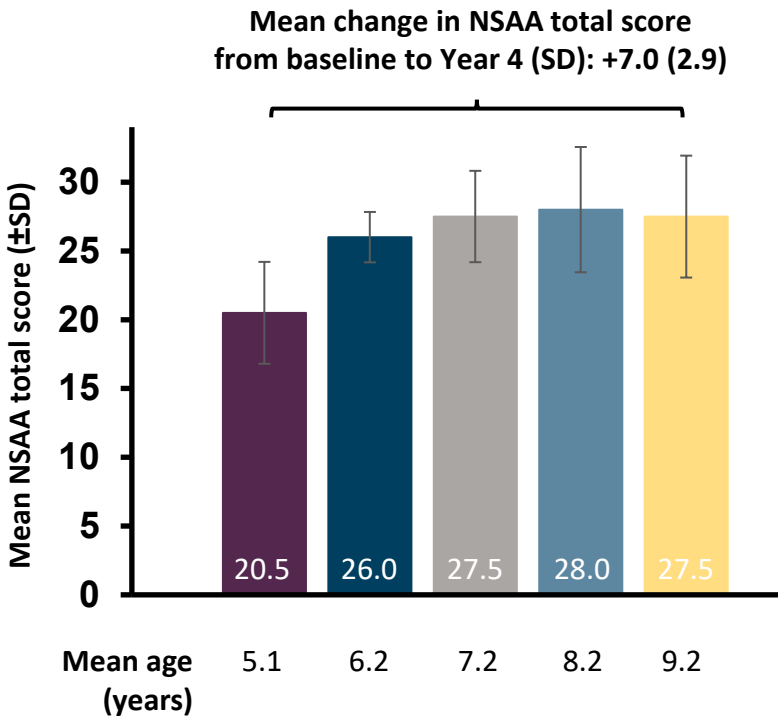
Mean total NSAA score declines after the age of 6 years in patients with DMD[1]

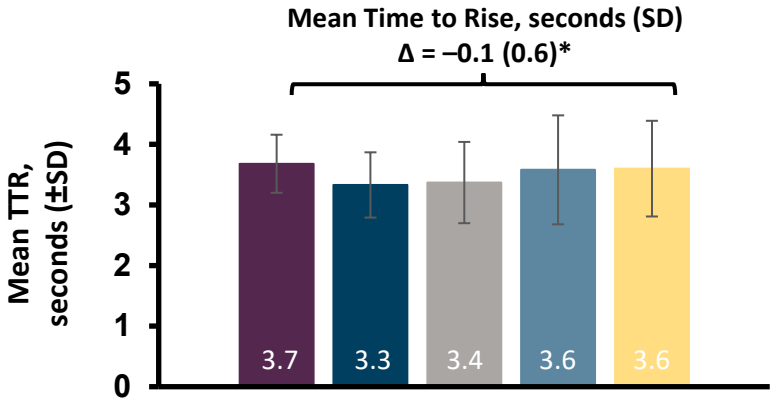
Mean age was 5.1 years at baseline and 9.2 years at Year 4

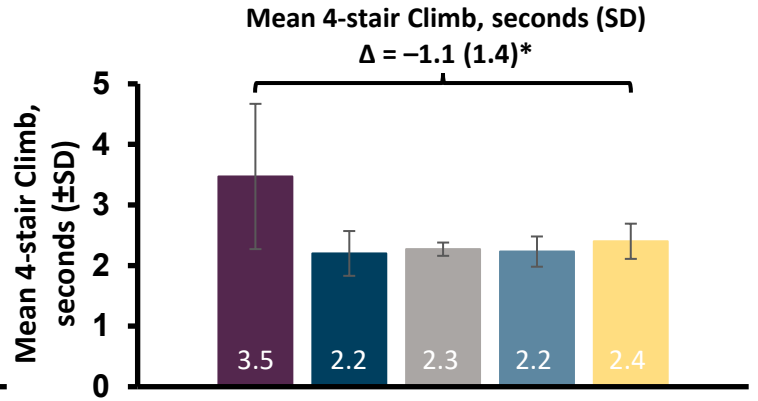
*Three-year NSAA value (Patient 2) and 2-year NSAA value (Patient 4) were from a remote assessment due to COVID-19-related restrictions at the site. †Age at baseline NSAA assessment.
NSAA, North Star Ambulatory Assessment.

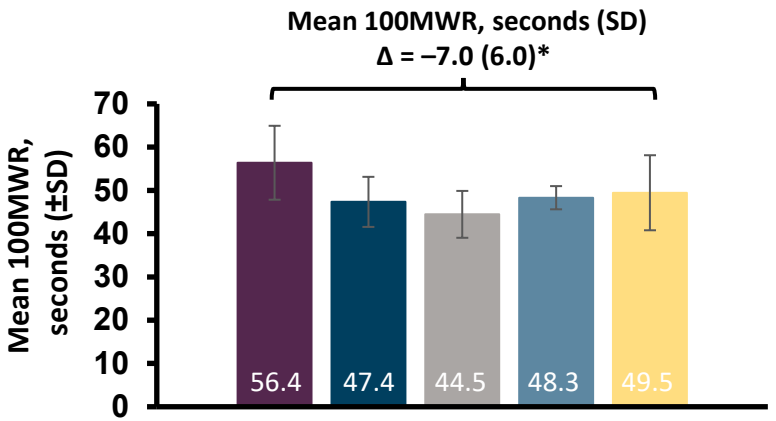
1. Muntoni F, et al. PLoS One. 2019; 14:e0221097.

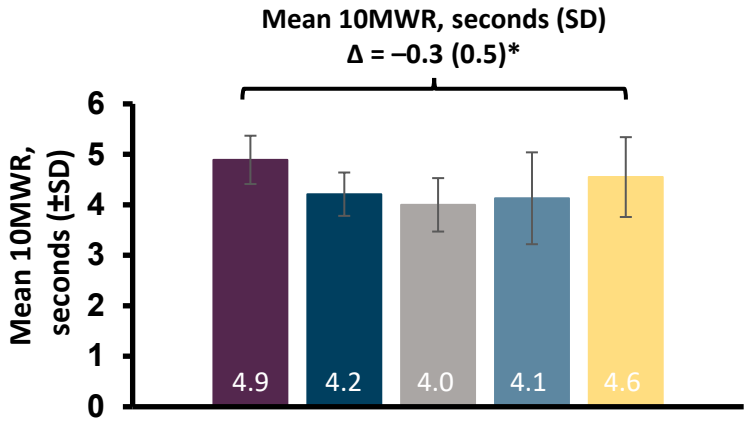
Functional outcomes
Summary of 4-year TFTs











*Negative values indicate an improvement in the time taken to achieve this endpoint.

10MWR, 10-meter Walk/Run; 100MWR, 100-meter Walk/Run; NSAA, North Star Ambulatory Assessment; TFT, timed function test, TTR, Time to Rise.

Roche/Sarepta data on file (2023).

Post hoc analysis: Study 101 4-year data versus propensity-score-weighted EC

External control comparator
- FOR-DMD (n=36)

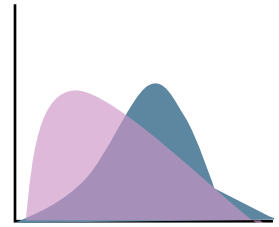
Inclusion criteria
- Age matched at baseline
- NSAA score ≥13 to ≤30
- Time to Rise ≤10.4 seconds
- 10MWR ≤9.1 seconds
- On stable dose or equivalent of oral corticosteroids for ≥12 weeks pre-baseline

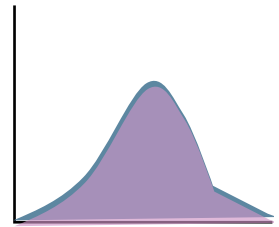
Propensity-score-weighting analysis
- Age
- NSAA
- Time to rise from the floor
- 10-meter timed test results

Prognostic factors in Duchenne that are known to impact function

Ensures maximum comparability between this external cohort and the delandistrogene moxeparvovec groups

Example: Before propensity weighting, the ranges are the same but with unequal distribution





Well-matched, natural history control cohorts and disease models can play a critical role in examining the treatment effect in clinical trials of progressive, heterogeneous, neuromuscular diseases

10MWR, 10-meter Walk/Run; DMD, Duchenne muscular dystrophy; NSAA, North Star Ambulatory Assessment.

Zaidman C, et al. Presented at: International Congress of Neuromuscular Diseases; July 5–9, 2022. Brussels, Belgium.

Baseline comparison of delandistrogene moxeparvovec-treated patients versus propensity-score-weighted EC cohort

	Delandistrogene moxeparvovec-treated patients (N=4) Mean (SD) Min–Max	EC (n=21)* Mean (SD) Min–Max
Age, years†	5.1 (0.9) 4.0–6.0	6.4 (0.3) 4.9–7.7
NSAA total score	21.0 (3.7) 18.0–26.0	22.0 (1.9) 13.0–30.0
Time to Rise, seconds	3.7 (0.5) 3.0–4.1	3.9 (0.4) 2.6–7.4
10-meter Walk/Run, seconds	4.9 (0.5) 4.3–5.4	5.0 (0.3) 3.6–6.7

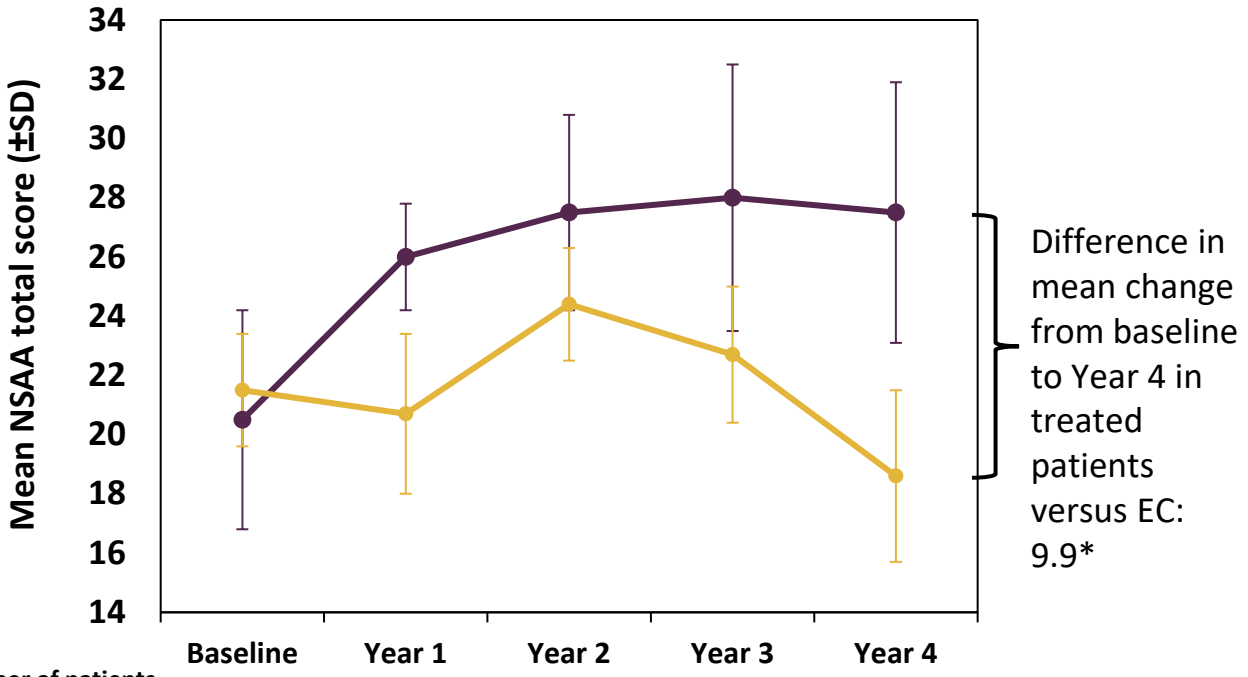
Differences between the cohort of patients treated with delandistrogene moxeparvovec and the EC cohort were not statistically significant

*N=36 before propensity score weighting. After excluding subjects with non-overlapping propensity scores, n=21. †Age at first assessment.

EC, external control; NSAA, North Star Ambulatory Assessment; SD, standard deviation.

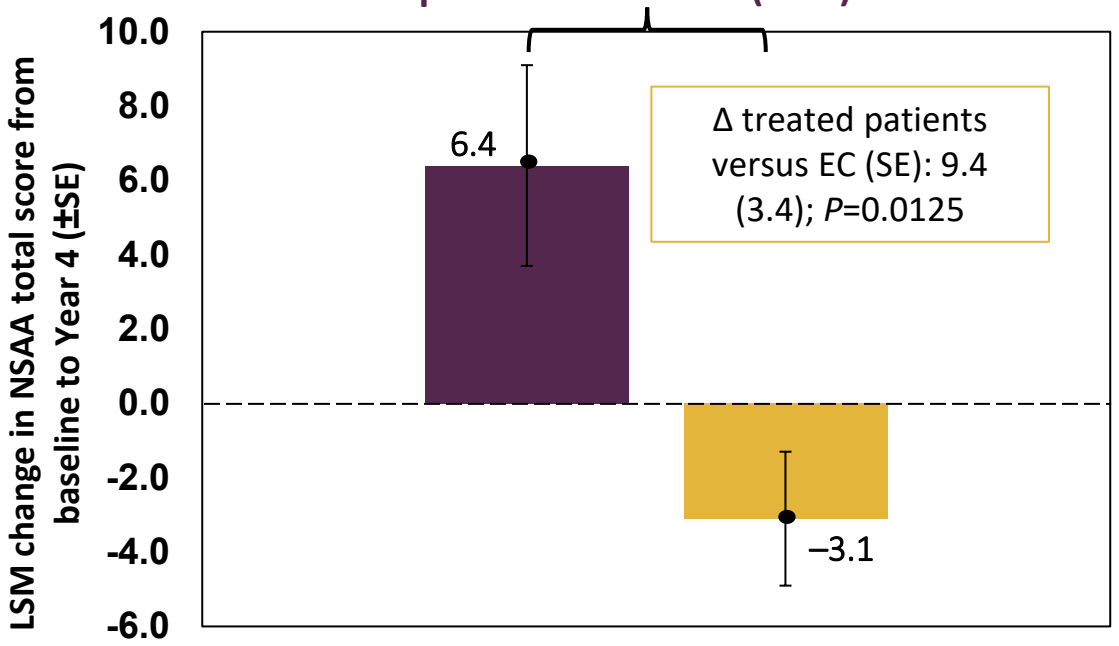
NSAA total score across 4 years post-treatment with delandistrogene moxeparvovec versus propensity-score-weighted EC cohort

NSAA total score over 4 years in treated patients versus EC (descriptive means)



Number of patients	Baseline	Year 1	Year 2	Year 3	Year 4
Delandistrogene moxeparvovec	4	4	4	4	4
EC	21	21	19	20	21

Change in NSAA total score from baseline to Year 4 in treated patients versus EC (LSM)



*NSAA change from baseline to Year 4 in treated patients versus EC calculated using descriptive means, based on propensity-score weighting.

EC, external control; LSM, least squares mean; NSAA, North Star Ambulatory Assessment; SD, standard deviation; SE, standard error.

Study 101 summary

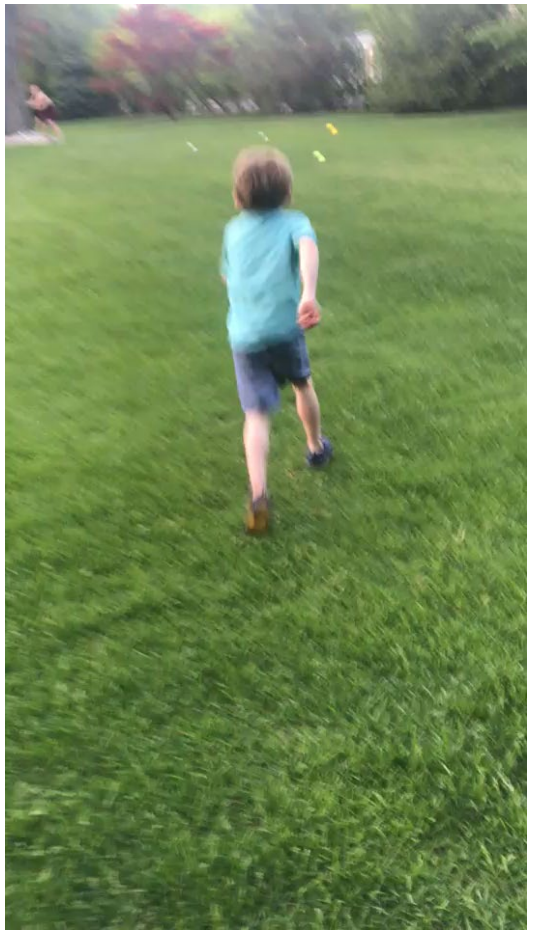
- TRAEs mostly occurred in the first 70 days post-infusion, and all resolved
- Functional assessments demonstrated long-term sustained stabilization of motor function that was clinically meaningful, and importantly, at ages when functional decline is expected based on natural history
- NSAA improvements were generally accompanied by improvement in TFTs over 4 years
- As evidenced by functional results, this study suggests durable expression of SRP-9001 dystrophin from an episomal genome in muscle cells

Four-year data from Study 101 reinforced that a single, intravenous administration of delandistrogene moxeparvovec is well tolerated, with no new safety signals identified

The safety profile and durable response provide proof-of-concept support for continued clinical trials to assess delandistrogene moxeparvovec in patients with DMD

DMD, Duchenne muscular dystrophy; NSAA, North Star Ambulatory Assessment; TFT, timed function test; TRAE, treatment-related adverse event.

Muntoni F, et al. *PLoS One*. 2019; 14:e0221097.



Acknowledgments

Thanks to the team at NCH and participating patients and parents

Data to date from trials of delandistrogene moxeparvovec in boys with DMD provide evidence of a favorable benefit/risk profile and establish learning principles for future trials

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Lindsay Alfano
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DMD, Duchenne muscular dystrophy; NCH, Nationwide Children's Hospital.