Supplemental Table 1: Baseline cross-sectional analysis for BMI and height in age-stratified cohorts, univariate analyses

	Cohort			
	Pediatric (<18y)		Adult (≥18y)	
Input variables	**BMI Z-score**	**Height Z-score**	**BMI kg/m^2**	**Height Z-score**
Female sex (vs. male = reference)	-0.26 (-0.56, 0.04) 273	-0.06 (-0.31, 0.19) 280	0.14 (-0.94, 1.22) 317	-0.09 (-0.26, 0.09) 446
Age at measurement, years	0.02 (-0.03, 0.06) 273	**-0.04** **(-0.08, -0.002)*** **280**	**0.10** **(0.06, 0.15)***** **317**	0.005 (0.00, 0.01) 446
Age of FRDA symptom onset, years	0.01 (-0.03, 0.06) 268	-0.003 (-0.04, 0.04) 275	**0.09** **(0.03, 0.15)**** **308**	**0.01** **(0.00, 0.02)*** **436**
GAA repeat length, base pairs	-0.03 (-0.18, 0.12) 263	0.04 (-0.08, 0.17) 270	**-0.83** **(-1.36, -0.30)**** **309**	**-0.12** **(-0.21, -0.04)**** **438**
Comorbidities				
Diabetes (vs. no diabetes = reference)	0.98 (-0.44, 2.4) 270	0.40 (-0.65, 1.45) 277	0.89 (-1.31, 3.09) 303	-0.06 (-0.41, 0.29) 430
Scoliosis (vs. no scoliosis = reference)	-0.25 (-0.64, 0.14) 270	0.07 (-0.25, 0.40) 277	**-1.57** **(-2.78, -0.36)**** **302**	-0.004 (-0.20, 0.19) 429
Cardiomyopathy (vs. no cardiomyopathy = reference)	-0.11 (-0.42, 0.20) 269	-0.20 (-0.45, 0.06) 276	-0.62 (-1.75, 0.51) 302	-0.11 (-0.29, 0.07) 429
Disease severity (mFARS score, over cohort)	n=259	n=266	n=303	n=426
2nd quartile (vs. 1st quartile = reference)	0.11 (-0.25, 0.46)	-0.21 (-0.51, 0.09)	1.34 (-0.36, 3.04)	0.09 (-0.20, 0.38)
3rd quartile (vs. 1st quartile = reference)	-0.08 (-0.48, 0.33)	-0.23 (-0.57, 0.11)	1.28 (-0.34, 2.91)	-0.01 (-0.27, 0.25)
4th quartile (vs. 1st quartile = reference)	-0.22 (-1.08, 0.64)	**-0.70** **(-1.33, -0.07)***	0.45 (-1.04, 1.94)	-0.06 (-0.30, 0.19)

Univariate analyses were used to investigate the associations between input variables, including age at measurement, sex, age of FRDA symptom onset, clinical comorbidities (DM, scoliosis, cardiomyopathy), and clinical disease severity (mFARS score), and BMI (Z-score for age and sex in children, kg/m^2 in adults) and Height (Z-score for both children and adults) in FRDA. From the overall study cohort, individuals with available anthropometric measures at the baseline visit were included in this cross-sectional analysis. “N” values indicate the number of participants with the relevant data for each measurement. β coefficients along with the 95% confidence interval (CI) are reported for all input variables, except GAA repeat length, where standardized β coefficient is reported. Statistical significance is indicated by *p<0.05; **p<0.01; ***p<0.001.

Supplemental Table 2. Sensitivity analyses, baseline visit comparison of individuals with and without reported anthropometric measures.

Pediatric Cohort (age <18y)					
	Age at measurement in y, median (IQI)	Age of FRDA symptom onset in y, median (IQI)	mFARS score, median (IQI)	Ambulatory status	
				Ambulatory	Non-ambulatory
Weight and height reported	12 (10, 15)	7 (5, 10)	39 (31, 47)	71% (256/302)	39% (13/33)
Weight and height not reported	13 (10, 15.5)	7 (5, 10)	42 (33, 53)	29% (106/302)	61% (20/33)
p-value	NS	NS	0.003	0.0004	
Adult Cohort (age ≥18y)					
	Age at measurement in y, median (IQI)	Age of FRDA symptom onset in y, median (IQI)	mFARS score, median (IQI)	Ambulatory status	
				Ambulatory	Non-ambulatory
Weight and height reported	30 (23, 39)	15 (11, 20)	51 (35, 69)	62% (183/296)	51% (131/255)
Weight and height not reported	31 (23, 45)	15 (10, 20)	58 (45, 72)	38% (113/296)	49% (124/255)
p-value	NS	NS	0.003	0.02	

Anthropometric measures were not recorded at all participants' baseline visits. Sensitivity analyses were performed to compare demographic, clinical, and neurological characteristics between participants with and without recorded height and weight measurements. Participants with Ataxia Stage scores of 5-6 were classified as non-ambulatory. Shapiro-Wilk tests were initially completed to test for normality of distribution in these characteristics. The Wilcoxon rank sum test was used to make non-parametric comparisons between individuals with (vs. without) measurements: age at the time of the measurement, age of FRDA symptom onset, and mFARS scores. Chi-Squared tests were used to compare the difference in proportions of individuals with (vs. without) measurements b\ased on ambulatory status. The percentage and the number of participants in each category are provided in the table. Overall number of participants with available data varies given limited collected data at some participants' baseline visits.

Supplemental Table 3. Longitudinal growth analyses using Superimposition by Translation and Rotation (SITAR) in FRDA as compared to a healthy reference cohort, the Bone Mineral Density in Childhood Study (BMDCS).

SITAR growth parameter	FRDA, difference from BMDCS (95% CI)	
	Girls (n=102)	Boys (n=104)
Size = height ("a" parameter), cm	**-3.4 (-4.2, -2.7)*** **	**5.6 (4.4, 6.9)*** **
Tempo = timing of the pubertal growth spurt ("b" parameter), years	-0.12 (-0.4, 0.2)	**1.2 (0.8,1.5)*** **
Velocity = magnitude of the pubertal growth spurt ("c" parameter"), cm/year	**-0.2 (-0.2, -0.1)*** **	0.0 (-0.1, 0.1)

Linear growth trajectories were summarized using SITAR modeling in FRDA and individuals in BMDCS of similar population ancestry (n=789 girls and n=746 boys). The impact of disease status (FRDA) was assessed for each SITAR parameters. Statistical significance for the difference between FRDA and BMDCS is indicated by *p<0.05; **p<0.01; ***p<0.001.