

# ASSOCIATION OF DAILY GROWTH HORMONE INJECTION ADHERENCE AND HEIGHT AMONG CHILDREN WITH GROWTH HORMONE DEFICIENCY

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## INTRODUCTION

- Recombinant human growth hormone (somatropin) is recommended for children with growth hormone deficiency (GHD) to normalize adult height.<sup>1</sup> Suboptimal adherence or non-adherence to daily somatropin injections has been widely documented.<sup>2,3</sup>
- Prior research has indicated an association between adherence to somatropin and clinical outcomes, including height velocity.<sup>4</sup>
- There is need for further research using real-world data (RWD) to establish and quantify a definitive link between adherence to somatropin and height.

## AIM

To investigate the association between adherence to somatropin and change in height among children with GHD.

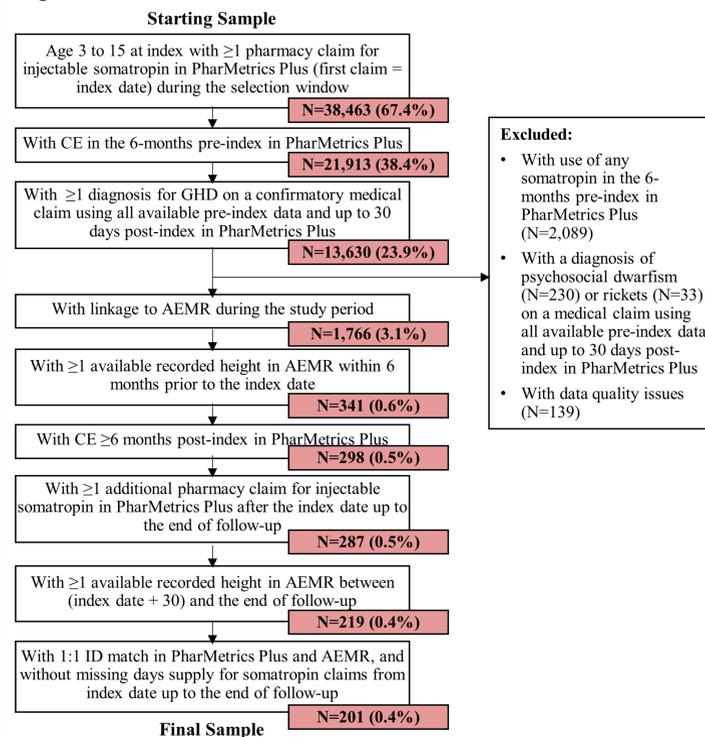
## METHODS

- Retrospective cohort study of patients in the IQVIA PharMetrics® Plus (containing claims for 190+ million patients) and Ambulatory Electronic Medical Records databases (AEMR).
- Cohort patients were aged 3-15 years, with ≥6 months continuous enrollment (PharMetrics® Plus) pre- and post- somatropin initiation (index date) between January 1, 2007 and November 30, 2019, and ≥1 GHD diagnosis code claim.
- Primary outcome measure was change in height from baseline to follow-up (AEMR).
- Adherence was measured using the medication possession ratio (MPR); patients were classified as adherent (MPR ≥0.8) or non-adherent (MPR <0.8).
- Mean patient growth trajectories for each adherence group were modeled pre- and post-treatment initiation using a mixed model for repeated measures (MMRM), controlling for age, gender, and weight.

## RESULTS

- Sample attrition and study cohort identification is shown below in Figure 1.

**Figure 1. Sample Attrition and Study Cohort Identification Algorithm.**



AEMR, Ambulatory Electronic Medical Records; CE, continuous enrollment; GHD, growth hormone deficiency.

- Patient characteristics and baseline height are shown in Table 1.
- Baseline height and baseline height standard deviation score (SDS) were similar for adherent and non-adherent patients.
- Baseline use of concomitant medications and comorbidities were generally similar between adherent and non-adherent patients.
- No significant differences were found for comorbidities except for attention deficit conduct and disruptive behavior disorders (p=0.0048).

**Table 1. Patient Characteristics Stratified by Somatropin Adherence vs. Non-Adherence.**

Patient Characteristics	All patients (n=201)	Adherent (n=154)	Non-adherent (n=47)
Age, mean (SD)	11.4 (3.0)	11.5 (2.9)	11.0 (3.3)
Male (%)	74.6	73.4	78.7
Race/ethnicity (%)			
Caucasian	74.6	77.3	66.0
African American	1.5	0.6	4.3
Asian/Hispanic	1.5	1.9†	0.0
Other/unknown	22.4	20.1	29.8
Payer type (%)*			
Commercial (third party)	73.1	75.3	66.0
Medicaid	1.0	0.0	4.3
Self-insured	25.9	24.7	29.8
Health plan type (%)*			
HMO	11.4	7.1	25.5
POS	6.5	7.1	4.3
PPO	79.1	82.5	68.1
Consumer directed/indemnity	3.0	3.2	2.1
Baseline height (cm), mean (median)†	134.1 (138.5)	134.4 (137.6)	133.2 (139.1)
Baseline height SDS, mean (median)†	-2.3 (-2.4)	-2.3 (-2.4)	-2.0 (-2.3)
Variable follow-up period (days), mean (SD)	343.3 (43.4)	344.0 (42.9)	341.1 (44.9)

\*Indicates statistical significance at p<0.05.

†No significant differences were found for any baseline height-related measurements (all p>0.10).

- In the study cohort, 154 patients (76.6%) were adherent and 47 (23.4%) were non-adherent during the variable follow-up period.
- Mean adherence was 0.94 in adherent patients (~1 missed dose/week) and 0.65 in non-adherent patients (~2.5 missed doses/week) (Table 2).
- Growth trajectories following somatropin initiation are shown in Figure 2.
- On average, adherent patients gained an additional 1.8 cm over 1 year compared to non-adherent patients, adjusted for covariates.

**Table 2. Mean Somatropin Adherence among Adherent and Non-Adherent Patients**

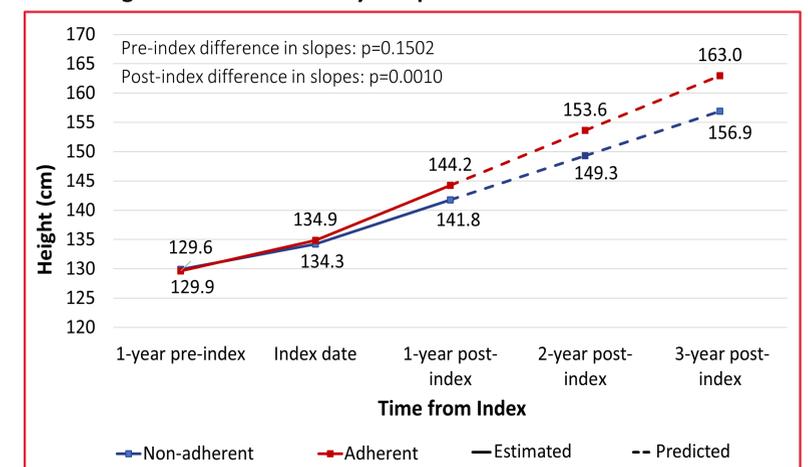
Patient Characteristics	All patients (n=201)	Adherent (n=154)	Non-adherent (n=47)
Adherence, mean (SD)	0.87 (0.14)*	0.94 (0.06)†	0.65 (0.12)‡

\*~1 missed dose per week, on average

†~2.5 or more missed doses per week, on average

‡<1 missed dose per week, on average

**Figure 2. Pre- and Post-index Growth Trajectories by Adherence Status for an Average Patient\* in the Study Sample**



\*Age = 11.45 years, Weight = 32.93 kg, Gender = 0.25 (male= 0, female= 1).

## CONCLUSIONS

- Greater adherence to somatropin therapy (i.e. patients missing less than 1 injection per week) was associated with improved height velocity.
- Given that suboptimal adherence to daily somatropin therapy has been documented among children with GHD, novel strategies to improve adherence may improve clinical height outcomes in this population.

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