Children with structural hypothalamic-pituitary anomalies usually have more severe GHD (1, 2) and better auxological outcomes with GH therapy compared to those with normal hypothalamic-pituitary magnetic resonance imaging (MRI) findings. However, data on adult height outcomes are limited. From the prospective, observational Genetics and Neuroendocrinology of Short Stature International Study (GeNeSiS) we aimed to characterise short-term growth and near-adult height (NAH) outcomes in GH-treated patients with:

- ectopic posterior pituitary (EPP) with or without pituitary stalk interruption syndrome
- septo-optic dysplasia (SOD)
- isolated anterior pituitary aplasia/hypoplasia (AP/HP), and
- GH-deficient patients with no reported hypothalamic-pituitary MRI findings (Other-GHD).

**CONCLUSIONS:**
- Patients with structural hypothalamic-pituitary abnormalities had more severe GHD and greater height deficit than those without such abnormalities.
- Structural pituitary anomalies are considered predictive of GHD (2).
- They appeared to have better outcomes of GH treatment, with EPP having the best first-year and NAH gain.
- But age at GH start and treatment duration varied.
- Limitations: Interpretation of significance is limited by difference in sizes of diagnostic groups.

### METHODS:

- **Study**
  - GeNeSiS was a prospective, multinational, observational study collecting data on GH-treated paediatric patients with a broad variety of growth disorders from 1999 to 2015.
  - All decisions regarding GH treatment, including whether to treat and dose, were at the discretion of the investigators.

- **Patients**
  - Patients were grouped by investigator-provided diagnoses:
    1. EPP (including interrupted pituitary stalk [Figure 1]; irrespective of any other abnormal pituitary-associated finding, except SOD)
    2. SOD (irrespective of any other abnormal pituitary associated finding)
    3. AP/HP (no other abnormal pituitary-associated finding [Figure 1])
    4. Other-GHD (not acquired GHD/no pituitary abnormality).

- **Statistics**
  - Statistical significance of diagnostic groups was assessed by non-overlap of 95% confidence limits (CI); primary comparison was EPP vs other diagnostic groups.
  - Height standard deviation score (SDS) was calculated using US age-sex-adjusted data (3).
  - Adult height (NAH) was considered as achievement of at least one of the following: closed epiphyses, height velocity <2 cm/year, bone age >14 years (girls) / >16 years (boys).

### RESULTS: Short-term (1, 2, 3, and 4 year) height gains

- **1st year height velocity (Figure 3) and 1st year and 2nd year height SDS were greatest for EPP (significantly so versus AP/HP and Other-GHD)***

### RESULTS: Near-adult height

- Patients with EPP had:
  1. The greatest height gain; significantly greater vs Other-GHD (Figure 2), albeit with earlier start/longer duration of GH treatment.
  2. But a better height outcome, than SOD (not significant).

### Summary of Methods and Results

- **Figure 1:** Mid-sagittal (a) and coronal (b) magnetic resonance images of pituitary stalk interruption syndrome in a 6-month-old girl, with ectopic posterior pituitary, hypoplastic pituitary stalk and small flattened anterior pituitary within the pituitary fossa.

- **Figure 2:** Near-adult height outcomes (mean and 95% CI) for patients with GHD associated with hypothalamic-pituitary anomalies and those without such structural defects.

- **Figure 3:** Height velocity SDS during the first 4 years of GH treatment by diagnostic group.

### References