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Utility and Cost Effectiveness of the Exercise Stimulation Test Compared with the Glucagon Stimulation Test in the Diagnosis of Growth Hormone Deficiency (GHD) in Childhood

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INTRODUCTION
The diagnosis of growth hormone deficiency (GHD) in children requires comprehensive auxological assessment with provocation testing of the growth hormone axis. In National University Hospital Singapore, we use Exercise Stimulation Test (EST) as a first-line test. Only those who fail will subsequently require formal testing with pharmacological agents. Objectives: To compare the utility of EST with glucagon stimulation test in the diagnosis of GHD in childhood. And, to evaluate the cost-effectiveness of using EST as a first-line screening tool for GHD.

METHODOLOGY
We conducted a retrospective database study of children with short stature who underwent EST from 1 Jan 2012 to 31 Dec 2018. Information such as anthropometry, chronological and bone age at time of evaluation, peak serum GH and insulin-like growth factor (IGF-1), and height velocity (HV) were collected.

RESULTS
A total of 202 children were identified. After exclusion, 151 were eligible for analysis. The mean age was 11.19 (±2.33) years with mean height standard deviation score (SDS) of -2.39 (±1.06) and mean HV of 4.13 (±1.79) cm/year. 115/151 (76.2%) passed EST (peak GH ≥6.7 ug/L). The majority (112/115) continued to have normal HV within 1-year follow-up, translating to a negative predictive value (NPV) of 97.4%. Of the remaining children, 19/25 (76%) who failed EST passed glucagon stimulation testing. The cost-effectiveness of EST over glucagon testing was $450 per child.

CONCLUSION
EST has practical advantages over most other stimulation tests and coupled with its high NPV, it has an important place in the outpatient screening for GHD in short children.