

Physician Decisions to Discontinue Long-Term Medications Using a Two-Stage Framework

The Case of Growth Hormone Therapy

Leona Cuttler, MD,* J. B. Silvers, PhD,† Jagdip Singh, PhD,† Alexander C. Tsai, PhD,‡ and Deborah Radcliffe, PhD*

Background: Physician decisions to discontinue prescription medications for chronic conditions are fundamental determinants of drug use but have been inadequately studied. The decision to stop growth hormone (GH) therapy is an important example because of high cost (approximately \$26,000/y for a 48-kg child), complexity of treatment options, and expansion of patient populations.

Aim: The aim of this study was to identify the factors that influence physician recommendations in the process of discontinuing therapy.

Design: A random sample of half of U.S. pediatric endocrinologists ($n = 265$) was mailed a survey that included case scenarios of GH-deficient adolescents. Decision options involved a 2-stage framework to 1) initiate change in ongoing GH therapy (by discussing discontinuing GH with the family but not yet stopping treatment), and 2) take action to discontinue ongoing GH therapy (by terminating GH or reducing the dose to adult maintenance level).

Main Outcome Measure: Physician recommendations.

Results: The response rate was 83.8%. Physiological indices of growth potential (growth velocity, bone age) significantly influenced discontinuation decisions (both $P < 0.001$). However, family preference, child's height, and physician attitudes exerted independent effects (each $P < 0.05$). Treatment price had little influence. Together, these variables accounted for 60% to 70% of the variation in recommendations. Their relative influence differed by stage in the discontinuation process.

Conclusion: The variables in our framework substantially explain discontinuation decisions. The data demonstrate the importance of both physiological and nonphysiological factors. The results suggest that physicians value even small gains as final height approaches, although an additional 20% expenditure may be needed to gain the last 1% to 3% of adult height.

From the *Department of Pediatrics, the †Weatherhead School of Management, and the ‡Department of Epidemiology and Biostatistics, Case Western Reserve University, Cleveland, Ohio.

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Reprints: Leona Cuttler, MD, Division of Pediatric Endocrinology, Rainbow Babies and Children's Hospital, Room 737, Case Western Reserve University, 11100 Euclid Avenue, Cleveland, OH 44106. E-mail: lcutl5@po.cwr.edu.

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Most previous studies of physician decisions about prescription medicines have focused on recommendations to initiate therapy^{1–6} with little attention to the issue of decisions to discontinue medications. Yet, physician recommendations to discontinue medications are fundamental determinants of overall prescription drug utilization and costs, the most influential driver of national healthcare inflation.⁷ Chronic medical conditions^{8,9} are the fastest growing segment of health disorders, accounting for over three fourths of U.S. health expenditures and 88% of prescription medications filled.⁹ Decisions to stop chronic drug treatments are especially critical for medications with clear *initial* indications but unclear *termination* criteria and those that primarily address quality rather than quantity of life.

The literature in psychology and management has addressed decisions that involve some form of discontinuation (eg, changing service, downgrading, or demarketing). This literature suggests that discontinuation decisions involve a process with multiple stages of increasing withdrawal.^{10–13} Although it is likely that discontinuation of medical treatments would similarly involve a process of multiple interrelated decisions, these phenomena have not been systematically studied. This article focuses on physician decisions to discontinue growth hormone (GH) therapy as one such process.

GH therapy is well suited to the study of discontinuation decisions.^{14–18} Concern about GH use and its impact on U.S. children is widespread.^{19–23} Approximately 1 of 3500 U.S. children has classic GH deficiency.²⁴ Controversies in diagnostic criteria, together with recent changes in U.S. Food and Drug Administration (FDA) guidelines for GH use, have expanded the population of potential GH recipients and make 400,000 to 900,000 U.S. children potentially eligible for GH at annual costs exceeding \$8 billion.²⁵

Most previous work on GH has focused on identifying appropriate candidates to begin treatment.^{20,21,26} Yet, overall GH utilization and cost will be determined by decisions about when to stop therapy, because these define the duration of