

RECOMBINANT HUMAN GROWTH HORMONE UTILIZATION

BACKGROUND

Recombinant human growth hormone (somatropin) is a protein designed to mimic naturally occurring growth hormone. Somatropin promotes tissue and linear growth along with stimulating the metabolism of carbohydrates, lipids, and minerals. Somatropin is a subcutaneous injection routinely administered daily. It is most commonly used to treat short stature due to growth hormone deficiency, Turner syndrome, Noonan syndrome, Prader-Willi syndrome, short stature homeobox-containing gene (SHOX) deficiency, chronic renal insufficiency, idiopathic short stature and children small for gestational age.^{1,2}

The Division of Medicaid’s Universal Preferred Drug List coverage for growth hormone is provided in Figure 1. Current Smart PA guidelines require diagnosis criteria for individuals ≥ 18 years.

Figure 1: Universal Preferred Drug List (01/01 2021)³

THERAPEUTIC DRUG CLASS	PREFERRED AGENTS	NON-PREFERRED AGENTS	PA CRITERIA
GROWTH HORMONE <small>SmartPA</small>	NORDITROPIN (somatropin) NUTROPIN AQ (somatropin)	GENOTROPIN (somatropin) HUMATROPE (somatropin) OMNITROPE (somatropin) SAIZEN (somatropin) SEROSTIM (somatropin) ZOMACTON (somatropin) ZORBITIVE (somatropin)	<p>All Agents for Age ≥ 18 years</p> <ul style="list-style-type: none"> • Documented diagnosis of craniopharyngioma, panhypopituitarism, Prader-Willi Syndrome, Turner Syndrome or an approvable indication OR • Documented procedure of cranial irradiation <p>Non-Preferred Criteria</p> <ul style="list-style-type: none"> • Have tried 1 preferred agent in the past 6 months OR • 84 consecutive days on the requested agent in the past 105 days

MS-DUR conducted a class review of growth hormone utilization within the Division of Medicaid to assess prescribing trends, associated diagnoses, and provider characteristics.

METHODS

A retrospective analysis of Medicaid point of sale (POS) pharmacy claims and medical claims data from fee-for-service (FFS) and the three coordinated care organizations (CCOs) was conducted for the measurement period January 1, 2018 – December 31, 2020. Beneficiaries were included in the analysis if they had at least one fill for any growth hormone agent during the study period. The date of the first prescription was identified as the index date. Medicaid’s SmartPA criteria for growth hormones was used as a guide for this analysis. Beneficiaries were categorized by age as being either ≤ 17 years or 18+ years based on the SmartPA criteria. Beneficiaries were assigned to the respective age group and plan they were enrolled in as of the index date. The period from January 2017 - December 2020 was used to identify relevant diagnoses for beneficiaries. Current SmartPA guidelines do not require a diagnosis check for beneficiaries less than 18 years.

RESULTS

Table 1 provides demographic characteristics for beneficiaries prescribed growth hormone agents January 2018 - December 2020.

- 340 total beneficiaries were prescribed growth hormone agents during that period.
- 97.6% (332/340) were ≤ 17 years.
- 62.4% (212/340) were male.
- 55.6% (189/340) were Caucasian.

Table 1: Demographics of Beneficiaries Prescribed Growth Hormone Agents in Mississippi Medicaid January 2018 - December 2020					
Characteristic	Number of beneficiaries by plan at index fill				Total
	FFS	UHC	Mag	Mol	
Age Group					
≤ 17 years	103	112	113	4	332
18+ years	4	2	2	0	8
Gender					
Female	38	39	49	2	128
Male	69	75	66	2	212
Race					
African American	24	37	35	0	96
Caucasian	62	62	61	4	189
Other	21	15	19	0	55
Total	107	114	115	4	340
<p>Note: Beneficiaries were included in the analysis if they had at least one fill for any growth hormone agent in January 2018 - December 2020. The date of the first prescription was identified as the index date. Beneficiaries were assigned to the respective age group and plan they were enrolled in as of the index date.</p>					

Table 2 displays a monthly trend analysis of number of prescription claims and costs associated with growth hormone utilization.

- Average monthly costs and average monthly number of claims by Year:
 - 2018 - \$651,385 / 154
 - 2019 - \$517,635 / 127
 - 2020 - \$538,166 / 131
- Comparing 2018 figures to 2020:
 - The average total monthly spend decreased by 17.4% in 2020.
 - The average monthly number of claims decreased by 14.9% in 2020.

Table 2: Monthly Trend in Prescription Claims and Costs Associated with Growth Hormone Agents in Mississippi Medicaid by Plan

January 2018 - December 2020

Month and Year	FFS		UHC		Mag		Mol		Total	
	# Rx	Cost	# Rx	Cost	# Rx	Cost	# Rx	Cost	# Rx	Cost
Jan-18	53	\$ 262,338.74	63	\$ 295,836.99	60	\$ 235,062.39	0	\$ -	176	\$ 793,238.12
Feb-18	52	\$ 235,923.50	61	\$ 283,987.52	57	\$ 228,305.14	0	\$ -	170	\$ 748,216.16
Mar-18	58	\$ 242,240.02	57	\$ 283,003.61	63	\$ 238,526.76	0	\$ -	178	\$ 763,770.39
Apr-18	59	\$ 280,879.96	62	\$ 293,963.71	70	\$ 271,991.20	0	\$ -	191	\$ 846,834.87
May-18	55	\$ 235,568.31	66	\$ 308,484.66	69	\$ 256,490.79	0	\$ -	190	\$ 800,543.76
Jun-18	35	\$ 144,967.03	33	\$ 140,743.44	48	\$ 169,706.93	0	\$ -	116	\$ 455,417.40
Jul-18	55	\$ 237,471.43	56	\$ 227,905.94	58	\$ 216,852.12	0	\$ -	169	\$ 682,229.49
Aug-18	45	\$ 209,063.02	49	\$ 215,254.58	55	\$ 194,723.81	0	\$ -	149	\$ 619,041.41
Sep-18	41	\$ 191,009.67	47	\$ 207,118.16	53	\$ 193,919.58	0	\$ -	141	\$ 592,047.41
Oct-18	30	\$ 116,945.42	51	\$ 232,560.80	56	\$ 180,974.04	0	\$ -	137	\$ 530,480.26
Nov-18	33	\$ 155,971.67	44	\$ 187,176.10	46	\$ 173,672.98	1	\$ 3,422.57	124	\$ 520,243.32
Dec-18	33	\$ 175,045.90	32	\$ 137,828.34	42	\$ 151,677.44	0	\$ -	107	\$ 464,551.68
Jan-19	44	\$ 187,411.31	46	\$ 199,221.59	43	\$ 167,272.75	1	\$ 3,753.19	134	\$ 557,658.84
Feb-19	44	\$ 177,495.78	33	\$ 153,615.66	40	\$ 149,495.91	1	\$ 7,495.09	118	\$ 488,102.44
Mar-19	45	\$ 172,096.78	40	\$ 171,065.33	40	\$ 134,025.28	3	\$ 15,001.47	128	\$ 492,188.86
Apr-19	46	\$ 174,472.20	33	\$ 150,118.27	51	\$ 198,618.19	3	\$ 18,743.37	133	\$ 541,952.03
May-19	41	\$ 160,177.37	35	\$ 172,794.69	45	\$ 166,525.03	1	\$ 3,753.19	122	\$ 503,250.28
Jun-19	33	\$ 127,504.67	35	\$ 148,443.63	40	\$ 140,487.43	2	\$ 14,990.18	110	\$ 431,425.91
Jul-19	42	\$ 168,991.60	37	\$ 160,919.32	61	\$ 231,997.24	5	\$ 28,794.60	145	\$ 590,702.76
Aug-19	32	\$ 129,224.64	44	\$ 188,432.00	48	\$ 181,511.58	5	\$ 26,923.65	129	\$ 526,091.87
Sep-19	34	\$ 149,125.52	27	\$ 117,817.95	46	\$ 174,535.69	4	\$ 25,041.41	111	\$ 466,520.57
Oct-19	42	\$ 171,251.07	38	\$ 150,896.93	65	\$ 230,055.37	6	\$ 38,834.54	151	\$ 591,037.91
Nov-19	35	\$ 159,114.15	35	\$ 148,575.22	46	\$ 171,559.85	3	\$ 18,743.37	119	\$ 497,992.59
Dec-19	38	\$ 183,809.45	34	\$ 126,585.62	50	\$ 191,175.58	4	\$ 23,120.21	126	\$ 524,690.86
Jan-20	43	\$ 185,464.18	43	\$ 173,188.05	53	\$ 211,226.60	3	\$ 21,647.52	142	\$ 591,526.35
Feb-20	46	\$ 181,766.96	29	\$ 120,321.86	46	\$ 180,360.88	3	\$ 18,034.77	124	\$ 500,484.47
Mar-20	51	\$ 223,508.38	40	\$ 161,276.09	46	\$ 206,642.11	0	\$ -	137	\$ 591,426.58
Apr-20	50	\$ 197,052.35	40	\$ 158,449.74	46	\$ 178,683.75	3	\$ 16,251.88	139	\$ 550,437.72
May-20	42	\$ 174,661.41	34	\$ 143,224.23	39	\$ 159,895.28	2	\$ 8,240.19	117	\$ 486,021.11
Jun-20	43	\$ 183,587.58	43	\$ 179,950.38	51	\$ 205,412.29	5	\$ 25,058.76	142	\$ 594,009.01
Jul-20	45	\$ 194,659.14	33	\$ 143,058.31	43	\$ 170,628.73	4	\$ 24,380.77	125	\$ 532,726.95
Aug-20	48	\$ 190,820.46	30	\$ 127,545.38	51	\$ 204,092.99	2	\$ 8,357.39	131	\$ 530,816.22
Sep-20	43	\$ 170,902.75	36	\$ 154,520.63	50	\$ 196,032.69	3	\$ 16,369.08	132	\$ 537,825.15
Oct-20	47	\$ 201,724.14	43	\$ 176,931.97	45	\$ 189,895.71	1	\$ 8,011.69	136	\$ 576,563.51
Nov-20	43	\$ 179,012.11	40	\$ 157,590.71	42	\$ 154,934.31	4	\$ 17,047.07	129	\$ 508,584.20
Dec-20	34	\$ 128,469.97	39	\$ 152,384.42	41	\$ 163,995.26	5	\$ 12,725.87	119	\$ 457,575.52

Note: Plan was calculated as of the fill date for the prescription. Cost was calculated as the total amount paid towards growth hormone prescriptions in a particular month.

Diagnoses associated with the use of growth hormone agents are detailed in Table 3:

- By far the most common associated diagnoses present in claims data were **growth hormone deficiency** and **short stature**.
- Of the 332 beneficiaries ≤ 17 years of age prescribed growth hormones, **only 3.3% (11) did not have an associated diagnosis present in medical claims data.**

Table 3: Diagnoses Associated with Growth Hormone Agent Use in Mississippi Medicaid January 2018 - December 2020								
Diagnosis	Number of beneficiaries by Age group and Plan at index fill							
	≤ 17 years				18+ years			
	FFS	UHC	Mag	Mol	FFS	UHC	Mag	Mol
Growth hormone deficiency	75	83	83	3	3	2	1	0
Iatrogenic growth hormone deficiency	0	0	0	0	0	0	1	0
Small for gestational age at birth	4	10	4	0	0	0	0	0
Growth failure associated with renal insufficiency or chronic kidney disease	0	0	1	0	0	0	0	0
Turner syndrome	8	9	13	1	0	0	0	0
Prader-Willi syndrome	5	4	2	0	1	1	0	0
Noonan syndrome	3	4	6	0	0	0	0	0
Short-stature homeobox gene deficiency	13	16	14	0	0	1	0	0
Blind loop syndrome	0	0	0	0	0	0	0	0
Short bowel syndrome	4	1	2	0	0	0	0	0
HIV-associated cachexia (or wasting)	1	0	1	0	0	0	0	0
Short stature (child)	67	95	96	3	1	0	0	0
No associated diagnoses	10	0	1	0	1	0	1	0

Note: Beneficiaries were included in the analysis if they had at least one fill for any growth hormone agent in January 2018 - December 2020. The date of the first prescription was identified as the index date. Beneficiaries were assigned to the respective age group and plan they were enrolled in as of the index date. The period from January 2017 - December 2020 was used to identify relevant diagnoses for beneficiaries (please see below for list of ICD-10 codes included).

Beneficiaries may have had more than one diagnosis.

Growth hormone deficiency - E23.0

Iatrogenic growth hormone deficiency - E23.1, E89.3

Small for gestational age at birth - P05.1

Growth failure associated with renal insufficiency or chronic kidney disease - N25.0

Turner syndrome - Q96

Prader-Willi syndrome - Q87.11

Noonan syndrome - Q87.19

Short-stature homeobox gene deficiency - E34.3

Blind loop syndrome - K90.2

Short bowel syndrome - K91.2

HIV-associated cachexia (or wasting) - R64

Short stature (child) - R62.52

From Table 4 it can be determined that pediatric endocrinologists and pediatricians are responsible for the overwhelming majority of growth hormone prescriptions.

Table 4: Prescribers of Growth Hormone Agents in Mississippi Medicaid January 2018 - December 2020																
Specialty	Prescriptions and beneficiaries by age group and plan at fill															
	≤17 years								18+ years							
	FFS		UHC		Mag		Mol		FFS		UHC		Mag		Mol	
	Rx	Bene	Rx	Bene	Rx	Bene	Rx	Bene	Rx	Bene	Rx	Bene	Rx	Bene	Rx	Bene
Specialty not specified	54	8	83	9	11	4	14	2	0	0	0	0	0	0	0	0
Endocrinology, Diabetes & Metabolism	50	5	0	0	0	0	0	0	21	3	8	1	0	0	0	0
Pediatric Endocrinology	997	93	1223	98	1379	97	18	5	3	1	2	1	0	0	0	0
Family Medicine	23	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Internal Medicine	0	0	0	0	0	0	0	0	4	1	0	0	0	0	0	0
Pediatric Nephrology	3	2	9	2	49	4	0	0	0	0	0	0	0	0	0	0
Pediatrics - MD	396	37	171	26	312	31	42	6	0	0	4	1	0	0	0	0
Pediatrics - NP	1	1	4	1	1	1	0	0	0	0	0	0	0	0	0	0
Provider - Other	2	1	2	1	65	3	0	0	0	0	0	0	17	2	0	0
Total	1526	149	1492	137	1817	140	74	13	28	5	14	3	17	2	0	0

Note: All claims related to growth hormone agents and their respective prescribers were identified between January 2018 - December 2020. Plan at fill was identified for each prescription as of the fill date.

CONCLUSIONS

Although a small number of beneficiaries receive treatment with growth hormone agents, this group of medications contributes to a significant amount of monthly spend. After conducting an analysis of utilization, the vast majority of growth hormones are being prescribed for beneficiaries under the age of 18 years (97.6%). Although SmartPA criteria does not require a diagnosis edit for beneficiaries under 18 years, analysis showed that only 3.3% of beneficiaries under 18 years did not have an associated diagnosis present in medical claims data. Most beneficiaries receiving these agents had an associated diagnosis of growth hormone deficiency or short stature present in claims data. There does not appear to be any significant inconsistencies in the prescribing of growth hormone agents with regards to appropriate diagnoses.

RECOMMENDATIONS

1. MS-DUR recommends extending Smart PA diagnosis requirements to all beneficiaries prescribed growth hormone agents.

REFERENCES

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