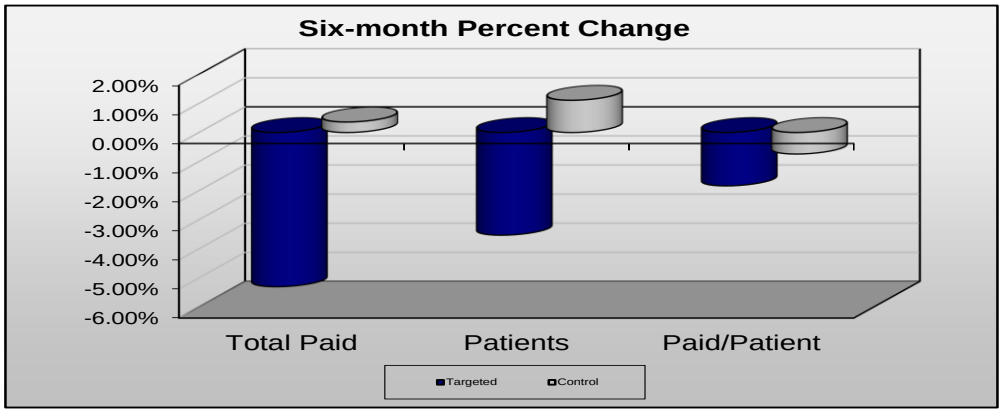
Hypertension Management

Prepared for Texas Medicaid in November 2022

EXECUTIVE SUMMARY

Purpose of Intervention	To determine opportunities for improving the safety and efficacy of drug therapy for patients with hypertension, following the 2017 Hypertension Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines[1] and the Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents.[2] Where evidence is in agreement with the previous guidance, the 2020 International Society of Hypertension Global Hypertension Practice Guidelines will also be utilized.[3]

Intervention	Intervention Type	Population-based mailing
	Intervention Mailing Date	12/21/2021
	Pre-intervention Period (Baseline)	July 2021 – December 2021
	Post-intervention Period (Post)	February 2022 – July 2022
	Number of Letters Mailed	1,218
	Number of Targeted Physicians	1,248



Savings Calculation

State Cost Savings Calculation:	
Targeted Group: Actual Hypertension Management Drugs Average Cost Per Patient Per Month (Pre)	$14.20
% Change in Control Group from Pre to Post	-0.77%
Estimated Hypertension Management Drugs Paid Amount Per Targeted Patient Per Month if No Intervention	$14.09
Targeted Group: Hypertension Management Drugs Cost Per Patient Per Month (Post)	$13.94
Estimated Cost Savings Per Patient Per Month	$0.15
Total Number of Targeted Panel Patients Served in Post Period	46,316
6-Month Total Savings	$6,947.40
6-Month State General Revenue Funds Savings	$2,779.65
12-Month Total State Savings	$5,559.30

BACKGROUND

According to the American Heart Association (AHA), almost 50% of adults in the United States, equating to over 121.5 million people, have high blood pressure or hypertension, and almost 40% of these adults are unaware of their condition.[1,4] Data indicates an increase in the prevalence of high blood pressure in childhood and this correlates with higher blood pressure in adulthood and earlier onset of hypertension.[2] Hypertension is associated with significant morbidity and mortality if not detected early and treated appropriately.[1-4] Globally, elevated blood pressure remains the leading cause of death and accounts for over 10 million deaths per year.[3]

Indicator #1: Underutilization of recommended first-line therapies: thiazide diuretic, calcium channel blocker (CCB), angiotension converting enzyme inhibitor (ACEI), or angiotensin receptor blocker (ARB)

Initial antihypertensive drug choice should be based on the patient's age, ethnicity, and other clinical characteristics. In past guidelines, thiazide diuretics have been the basis of antihypertensive therapy in outcomes trials and have been virtually unsurpassed in preventing cardiovascular complications of hypertension. However, CCBs and ACEIs or ARBs, yield comparable effects on overall mortality and cardiovascular, cerebrovascular, and kidney outcomes. For this reason, recommendations for initial therapy now include use of either a thiazide diuretic, CCB, ACEI or ARB.[1-3]

Candidates (denominator):	Patients with a history of hypertension (submitted ICD-10 codes) in the last 2 years receiving antihypertensive drug therapy in the last 45 days.
Exception Criteria (numerator):	Candidates who do not have drug therapy with a thiazide-containing product, CCB, ACEI or ARB in the last year. Exclusions: Patients who are currently pregnant or have a history of severe renal impairment or dialysis in the last 2 years.

Indicator #2: Underutilization of Angiotensin-Modulating Agents (e.g. ACEIs, ARBs) with Presence of Compelling Indication

ACEIs and ARBs have demonstrated favorable effects on the progression of diabetic and non-diabetic kidney disease. Additionally, they have been proven beneficial in diabetic nephropathy and in reducing albuminuria. Studies in patients with stroke indicate angiotensin- modulating therapy lowers recurrent stroke rates when given in combination with a thiazide diuretic.[1-3]

Candidates (denominator):	Patients with a history of hypertension (submitted ICD-10 codes) in the last 2 years receiving antihypertensive drug therapy in the last 45 days.
Exception Criteria (numerator):	1. Candidates with a diagnosis of chronic kidney disease (submitted ICD-10 codes) in the last 2 years who have not received angiotensin-modulating therapy in the last year. 2. Candidates with a diagnosis of diabetic nephropathy and/or diabetes (submitted ICD-10 codes) in the last 2

years who have not received angiotensin-modulating therapy in the last year.
3. Candidates 18 years of age or older with a diagnosis of heart failure (submitted ICD-10 codes) in the last 2 years who have not received angiotensin-modulating therapy in the last year.
4. Candidates 18 years of age or older with a diagnosis of stroke (submitted ICD-10 codes) in the last 2 years who have not received angiotensin-modulating therapy in the last year.

Exclusions: Patients who are currently pregnant, have a history of acute renal failure in the last 90 days, or have a history of renal artery stenosis, end stage renal failure, renal dialysis, or angioneurotic edema in the last 2 years.

Indicator #3: Underutilization of Beta-blockers (BBs) with Presence of Compelling Indication

Beta-blockers reduce cardiac output and decrease the release of renin from the kidney and have been shown to be beneficial in adult patients with history of myocardial infarction, ischemic heart disease and heart failure. Patients with hypertension and comorbidities such as myocardial infarction, angina, or heart failure can benefit from the use of BBs.[1,3]

Candidates (denominator):	Patients with a history of hypertension (submitted ICD-10 codes) in the last 2 years receiving antihypertensive drug therapy in the last 45 days.
Exception Criteria (numerator):	Candidates 18 years of age or older with a history of myocardial infarction, ischemic heart disease/ angina or heart failure (submitted ICD-10 codes) in the last 2 years who are on at least one antihypertensive agent but not on beta-blocker therapy in the last year. Exclusions: Patients who are currently pregnant or have a relative or absolute contraindication to beta-blocker therapy (i.e. asthma, COPD, or 2nd or 3rd degree AV heart block) in the last 2 years.

Indicator #4: Nonadherence with Antihypertensive Drug Therapy

Up to 25% of patients do not fill their initial prescription for antihypertensive therapy. During the first year of treatment, the average patient has possession of antihypertensive medications only 50% of the time, and only 1 in 5 patients has sufficiently high adherence to achieve the benefits observed in clinical trials.[1] Nonadherence with antihypertensives is an indicator of poor prognosis and can lead to perceived treatment failure and increased risk of adverse events due to escalating doses of antihypertensives.[1,3]

Candidates (denominator):	Patients with a history of hypertension (submitted ICD-10 codes) in the last 2 years receiving antihypertensive drug therapy the most recent 45 days and 90 to 135 days ago (identifies chronic therapy).

Exception Criteria (numerator): Candidates who received less than a 60-day supply of antihypertensive medication in the last 90-day period.

Exclusion: Patients who are currently pregnant.

Indicator #5: Discontinuation of Antihypertensive Drug Therapy

There is a close relationship between blood pressure levels and the risk of cardiovascular events, strokes, and kidney disease. Patients may discontinue therapy for many reasons, both intentional and non-intentional.

Candidates (denominator): Patients with a history of hypertension (submitted ICD-10 codes) in the last 2 years who received antihypertensive drug therapy in the last year.

Exception Criteria (numerator): Candidates who have not received antihypertensive drug therapy in the last 90 days.

Exclusion: Patients who are currently pregnant.

Indicator #6: Increased Risk of Adverse Drug Events (ADE): Antihypertensive Therapy Drug – Disease Interactions

Certain medical conditions may predispose patients receiving oral antihypertensive drug therapies to adverse drug events.[5]

Candidates (denominator): Patients with a history of hypertension (submitted ICD-10 codes) in the last 2 years who received antihypertensive drug therapy in the last 45 days.

Exception Criteria (numerator): Candidates with a history of a comorbid condition (submitted ICD-10 codes) in the last 2 years that places them at an increased risk of a serious adverse event (Appendix, defined as a level 1 severity drug-disease interaction by First Databank). Pregnancy and delivery codes will be considered in the past year to identify current pregnancy.

Indicator #7: Monitoring Antihypertensive Drug Therapy

Hypertension is associated with target organ damage (affecting the brain, heart, kidneys, arteries and/or eyes) and certain antihypertensive therapies, such as diuretics and angiotensin-modulating agents can impact renal function and electrolytes. Current treatment guidelines recommend routine assessment and follow-up to help achieve goals of therapy, prevent adverse events and monitor for target organ damage.[1-3]

Candidates (denominator): Patients with a history of hypertension (submitted ICD-10 codes) in the last 2 years receiving antihypertensive drug therapy in the last 45 days.

Exception Criteria (numerator):
1. Candidates receiving diuretic or angiotensin-modulating drug therapies without documentation of renal function

labs or electrolytes (submitted CPT codes) in the past year.
2. Candidates receiving other antihypertensive drug therapies without documentation of renal function labs (submitted CPT codes) in the past 2 years.

METHODOLOGY

In December 2021, all physicians treating patients with any of the aforementioned drug-related problems were identified. Based on the distribution of patients/physician, the minimum patient/month threshold was set at greater than zero patients (i.e., physicians with one or more patients having a drug-related problem received the mailing). Providers were mailed the intervention materials on December 21, 2021.

Operational definitions:

Targeted Group – physicians treating one or more patients with any of the aforementioned hypertensive drug-related problem(s) and who received mailed intervention materials *(Section 1.e.1.A Exhibit A of the Agreed Modifications to the RFP and Contractor Proposal).*

Control Group - physicians treating patients taking an antihypertensive drug but did not receive mailed intervention materials *(Section 1.e.1.A Exhibit A of the Agreed Modifications to the RFP and Contractor Proposal).*

Intervention Drugs – Antihypertensive drugs

Pre Intervention Time Period – July 2021 through December 2021

Post Intervention Time Period – February 2022 through July 2022

6-month Total Paid – total drug costs can be defined as the total amount of paid antihypertensive therapy claims for the above time periods for the prescribers in the control and target groups. The target group consisted of those prescribers who had prescribed antihypertensive drug therapy to Medicaid patients and received intervention materials. The control group consisted of all other prescribers who prescribed antihypertensive drug therapy agents in the designated time periods *(Sections 1.e.1. and 1.e.2 Exhibit A of the Agreed Modifications to the RFP and Contractor Proposal).*

Average Number of Panel Patients per Month - during the 6-month pre and post time periods, the number of unique Medicaid patients with a drug claim submitted using a respective provider number was captured each month. Medicaid patients that did not have a drug claim were not counted in the prescriber's panel. The monthly numbers were summed then divided by six to calculate the monthly average. For example, in Table 1, the physician (with provider number AB123456) had an average of 12 patients with at least one drug claim per month. If a patient had two different claims in June, they would be counted as one patient. By evaluating all patients seen by a specific physician, changes in prescribing patterns can be evaluated on existing and new patients *(Sections 1.e.1. and 1.e.2 Exhibit A of the Agreed Modifications to the RFP and Contractor Proposal).*

Table 1: Average Number of Panel Patients per Month

Provider Number	Month #	Number of Unique Patients with a Drug Claim
AB123456	1	10
	2	10
	3	10
	4	12
	5	13
	6	17
Total		72
Average Number of Panel Patients per Month		12

Average Cost/Patient per Month – this was calculated by dividing the total dollars paid for drug claims during the analysis time period by the total number of Medicaid panel patients during the respective time period. For example, in the targeted group post analysis; there were 46,316 patients who had a drug claim during the six-month review period. The total amount of dollars paid for drug claims for these patients during the post analysis was $645,679. Dividing these two numbers (645,679/46,316) yields an average cost per patient of $13.94 *(Sections 1.e.1. and 1.e.2 Exhibit A of the Agreed Modifications to the RFP and Contractor Proposal).*

$$\text{Average Cost/Patient/per Month} = \frac{\text{6-month Total Amount Paid for Intervention Drugs}}{\text{Average number of Panel Patients per Month}} / \text{(\# Months)}$$

Total State Savings *(Sections 1.e.3 and 1.e.4 Exhibit A of the Agreed Modifications to the RFP and Contractor Proposal)***:**

- Intervention Average Cost Savings per Month - the percent change seen in the control group was applied to the intervention group baseline Average Cost per Patient per Month. This amount represents the estimated Amount Paid per Targeted Physician per Patient in the absence of the intervention (i.e., Estimated Paid Amount). The Estimated Paid Amount per Patient per Month was then subtracted from the actual Intervention Target Group Average Cost per Patient per Month to estimate the Average Cost Savings per Patient per Month.
- 6-Month Total Savings - the Intervention Average Cost Savings per Patient per Month was multiplied by the total number of targeted patients served over the 6-month time frame.
- 6-Month State General Revenue Funds Savings= 6-Month Total State Savings X 0.4001.
- Total State Savings = 6-Month State General Revenue Funds Savings X 2.

RESULTS

Population-based intervention

A total of 1,248 physicians were targeted, and 30 letters were removed due to incomplete addresses. A total of 1,218 physicians received intervention materials. Table 2 compares the 6-month total amount paid for antihypertensive drugs, the total number of patients in each physician's panel per month, and the average cost per patient for the targeted and control groups during the six-month pre and post periods. When comparing the pre-Average Cost per Patient per Month between the targeted and control groups, the cost was approximately $1 lower for the targeted group. This difference may be due to such factors as the control group having more patients prescribed antihypertensive drugs per physician or that associated average antihypertensive drug costs are inherently higher in the control group.

The target group saw an 5.30% decrease in the amount paid for intervention-related drugs while the control group saw a 0.36% increase. Additionally, the average number of monthly patients for the physician's panel decreased 3.54% for the target group and increased 1.11% for the control group. To control for changes in case load variance (i.e., the change in the number of panel patients) between the two groups, the average cost per patient was also calculated. Total amount paid and number of panel patient trends led to a 1.83% decrease in average cost per patient per month in the targeted group and a 0.77% decrease for the control group.

Table 2: Six-Month Trends for Overall Targeted vs Control Group

Group	Hypertension Management Drugs -- Six Months Total Paid Pre/Post			Average Number of Panel Patients per Month			Hypertension Management Drugs Average Cost per Patient per Month		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
Targeted	$681,823	$645,679	-5.30%	8,002	7,719	-3.54%	$14.20	$13.94	-1.83%
Control	$3,823,309	$3,837,086	0.36%	40,904	41,357	1.11%	$15.58	$15.46	-0.77%

Table 3 shows the Intervention Average Cost Savings per Patient per Month and the savings calculations. Had the intervention not been mailed, the targeted pre average cost per patient per month would have decreased 0.77% from $14.20 to $14.09. The net difference between the actual and estimated average cost/patient for the targeted group was $0.15. Based on 46,316 targeted patients served during the six-month post period, the six-month Total Savings and Total State Savings are $6,947.40 and $2,779.65, respectively. Over a twelve-month period, the Total State Savings are $5,559.30.

Table 3: Overall Intervention Average Cost Savings

State Cost Savings Calculation:	
Targeted Group: Actual Hypertension Management Drugs Average Cost Per Patient Per Month (Pre)	$14.20
% Change in Control Group from Pre to Post	-0.77%
Estimated Hypertension Management Drugs Paid Amount Per Targeted Patient Per Month if No Intervention	$14.09
Targeted Group: Hypertension Management Drugs Cost Per Patient Per Month (Post)	$13.94
Estimated Cost Savings Per Patient Per Month	$0.15
Total Number of Targeted Panel Patients Served in Post Period	46,316
6-Month Total Savings	$6,947.40
6-Month State General Revenue Funds Savings	$2,779.65
12-Month Total State Savings	$5,559.30

Table 4 shows the changes in the clinical indicators based on the intervention. The overall change in indicators is a decrease of 32.0%.

Table 4: Overall Changes in Clinical Indicators

		Target	
Clinical Indicators	Baseline	Jul-22	% Change
Indicator 1: Encourage use of recommended first-line treatment of hypertension: thiazide diuretics, Angiotensin-Converting Enzyme Inhibitors (ACEIs), Angiotensin Receptor Blockers (ARBs), and Calcium Channel Blockers (CCBs)	187	142	-24.1%
Indicators 2 and 3: Encourage use of angiotensin-modulating agents (ACEIs or ARBs) and beta-blockers with the presence of a compelling indication	413	297	-28.1%
Indicators 4 and 5: Enhance adherence with antihypertensive drug therapy and recognize when therapy discontinuation may be contributing to treatment failure	641	392	-38.8%
Indicators 6 and 7: Promote safe and effective use of antihypertensive drug therapy through identification of potential adverse events and increased monitoring	407	289	-29.0%
Total	1,648	1,120	-32.0%

CONCLUSIONS

This population-based intervention was successful in encouraging appropriate use of antihypertensive drug therapy and providing prescribers with educational tools to better communicate with their patients' issues regarding appropriate treatment. This resulted in an economic impact on Texas Medicaid's pharmacy program expenditures, with calculated twelve-month overall savings of $13,894.80 and savings to the State of $5,559.30 and a decrease in clinical indicators of 32.0%.

References:

1. Whelton PK, Carey RM, Aronow WS et al. 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/ PCNA Guideline for the prevention, detection, evaluation, and management of high blood pressure in adults: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. Hypertension. 2018;71:e13-e115.
2. Flynn JT, Kaelber DC, Baker-Smith CM, et al. Clinical practice guideline for screening and management of high blood pressure in children and adolescents. Pediatrics. 2017:140(3):e20171904.
3. Unger T, Borghi C, Charchar F, et al. 2020 International Society of Hypertension global hypertension practice guidelines. J Hypertens. 2020 Jun;38(6):982-1004.
4. Virani SS, Alonso A, Aparicio HJ, et al; on behalf of the American Heart Association Council on Epidemiology and Prevention Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics—2021 update: a report from the American Heart Association. Circulation. 2021;143:e254-e743. DOI: 10.1161/CIR.0000000000000950. Accessed 6/2021.
5. Level 1 Drug-Disease Contraindications. First Databank, Inc., San Francisco, CA.

Appendix:

Hypertension Drug-Disease Interactions[5]

Antihypertensive Therapy	Medical Condition
Angiotensin-modulating therapies (ACEI, ARB, aliskiren)	• Pregnancy • Angioedema
Beta-blockers	• 2nd degree or 3rd degree/complete AV heart block (patients with a history of pacemaker per submitted ICD-10 or CPT codes in the last 2 years will be excluded)
Thiazide-containing products	• Anuria
Triamterene-containing products	• Severe hepatic disease • Severe renal impairment