



Outcomes Assessment

Hypertension Management

Prepared for Kansas Medical Assistance Program in July, 2009

EXECUTIVE SUMMARY

Purpose of Intervention	To determine opportunities for improving the safety and efficacy of drug therapy for patients with hypertension, following the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC-7).	
Intervention	Intervention Type	Population-based mailing
	Intervention Mailing Date	March 2008
	Pre-intervention Period (Baseline)	October 2007 – March 2008
	Post-intervention Period (Post)	May 2008 – October 2008
	Number of Letters Mailed	446
	Number of Targeted Physicians	446
	Number of Targeted Patients	1,260
	Adjusted Targeted Patients	468

Changes in Clinical Indicators

Clinical Indicators	Target		
	Baseline	Oct-08	% Change
Underutilization	171	11	-93.6%
Medication Non-Compliance	297	142	-52.2%
Total	468	153	-67.3%

Savings Calculation

Intervention-Related Pharmacy Savings	
Target Group: Actual Average Paid Amount Per Patient Per Month (Baseline)	\$29.79
Target Group: Actual Average Paid Amount Per Patient Per Month (Post)	\$28.46
% Change in Target Group from Baseline to Post	-4.49%
Estimated Savings Per Patient Per Month	\$1.34
Total Number of Target Patients	468
6-Month Total Savings	\$3,757.19

Intervention-Related Medical Savings	
Target Group: Actual Average Paid Amount Per Patient Per Month (Baseline)	\$106.61
Target Group: Actual Average Paid Amount Per Patient Per Month (Post)	\$86.84
% Change in Target Group from Baseline to Post	-18.55%
Estimated Savings Per Patient Per Month	\$19.77
Total Number of Target Patients	468
6-Month Total Savings	\$55,525.05



BACKGROUND

Hypertension affects approximately 50 million individuals in the United States and approximately 1 billion persons worldwide.¹ Data from the Framingham Heart Study suggests that individuals who are normotensive at age 55 have a 90% life-time risk for developing hypertension.¹ Current control rates are still significantly below the Healthy People 2010 goal of 50%, and experts predict 30% of affected patients are still unaware they have hypertension. As the population ages, the prevalence of hypertension will increase even further unless broad and effective preventive measures are implemented.

The diagnosis of hypertension is based on the average of two or more properly measured blood pressure readings. Blood pressure at levels consistently higher than 140/90mmHg is considered stage 1 hypertension. JNC-7 instituted a new category of high blood pressure referred to as prehypertension (blood pressure greater than 120/80mmHg).¹ Patients with prehypertension are at increased risk for progression to hypertension and those with blood pressures of 130-139/80-89mmHg are at twice the risk to develop hypertension as those with lower values. While the committee didn't indicate drug therapy for patients with prehypertension who have no compelling indications, they did recommend initiation of drug therapy for prehypertensive patients with compelling indications such as diabetes or renal disease. As a result, use of antihypertensive therapy is recommended at earlier stages of the disease and should be accompanied by more aggressive monitoring and target blood pressure lowering. With this in mind, appropriate and safe use of antihypertensive medications is integral in the management of hypertension and in the prevention of its cardiovascular morbidity and mortality.

Evaluation of hypertension should include: 1) assessment of lifestyle and identification of cardiovascular risk factors or concomitant disorders that may affect the prognosis and treatment, 2) identification of causes or contributors to hypertension, and 3) assessment for the presence or absence of target organ damage and cardiovascular disease. Patients with hypertension and certain other conditions may be at increased risk for cardiovascular disease. Those with two or more of the following, in addition to hypertension, meet the criteria for Metabolic Syndrome: diabetes, obesity, or dyslipidemia. Although many patients may have only hypertension, hypertension along or with other comorbidities can be a serious health risk. Table 1 lists the cardiovascular risk factors and which of these are also components of Metabolic Syndrome.

Table 1.

Cardiovascular – Risk Factors	
• Hypertension*	• Physical inactivity
• Obesity*	• Microalbuminuria, estimated glomerular filtration rate <60 ml/min
• Dyslipidemia*	• Family history of premature CVD (men age <55, women age<65)
• Diabetes Mellitus*	• Age (>55 for men, >65 for women)

*Components of Metabolic Syndrome

In clinical trials, antihypertensive drug therapy has been associated with reductions in stroke incidence of 35%-40%, myocardial infarction of 20%-25%, and heart failure more than 50%.¹ It has been estimated that in patients with stage I hypertension with other cardiovascular risk factors, lowering systolic blood pressure by 12mmHg and keeping it down (reduction in systolic blood pressure) over ten years will prevent one death for every eleven patients treated. In patients with

¹ The Seventh Report of the Joint National Committee on prevention, detection, evaluation, and treatment of high blood pressure. U.S. Department of Health and Human Services, National Institutes of Health, National Heart, lung, and Blood Institute. JAMA 2003 May 21:289(19):2560-72.



cardiovascular disease or target organ damage, only nine patients would require blood pressure reductions to prevent one death.

Excellent outcome data is available for ACE inhibitors, angiotensin receptor blockers (ARBs), beta-blockers, calcium channel blockers, and thiazide diuretics, which proves these classes of drugs reduce the complications of hypertension.^{1,2,3,4} Thiazide diuretics have been the basis of antihypertensive therapy in most outcome trials. They should be used as initial therapy for most patient with hypertension, either alone or in combination with another antihypertensive agent.⁵ Diuretics enhance the antihypertensive efficacy of multidrug regimens and can be useful in achieving blood pressure control. Patients with comorbid conditions should be treated according to the recommendations for each specific condition in Table 2. Addition of a second antihypertensive agent from a different class should be initiated when use of a single agent in adequate doses fails to achieve goal blood pressure. When more than one antihypertensive agent is required, JNC-7 recommends consideration for combination antihypertensive products to reduce cost and increase medication adherence. Appropriate antihypertensive selection will help patients reach goal blood pressure and prevent complications of the disease.

Table 2.

Compelling Indications for Antihypertensives	
Indication	Initial Therapy Options
Heart Failure	Thiazide, BB, ACE inhibitor, ARB, aldosterone antagonist
Post Myocardial Infarction	BB, ACE inhibitor, aldosterone antagonist
Diabetes	Thiazide, BB, ACE inhibitor, ARB, CCB
Chronic Kidney Disease	ACE inhibitor, ARB
Recurrent Stroke Prevention	Thiazide, ACE inhibitor

Key: BB=beta-blocker, ARB=angiotensin receptor blocker, CCB=calcium channel blocker

² Bender SR, Fong MW, Heitz S, et al. Characteristics and management of patients presenting to the emergency department with hypertensive urgency. *J Clin Hypertens* 2005 Jan;8(1):12-8.

³ Krakoff LR. Cost-effectiveness of ambulatory blood pressure: a reanalysis. *Hypertension* 2006 Jan;47(1):29-34.

⁴ Fischer MA, Avorn J. Economic implications of evidence-based prescribing for hypertension: can better care cost less? *JAMA* 2004 Apr 21;291(15):1850-6.

⁵ Fretheim A, Aaserud M, Oxman AD. The potential savings of using thiazides as the first choice antihypertensive drug: cost-minimization analysis. *BMC Health Serv Res* 2003 Sep 8;3(1):18.

METHODOLOGY

Changes in intervention-related pharmacy dollars paid, pharmacy dollars paid per patient per month (PPPM), and number of pharmacy claims were examined. This intervention identified providers whose patients were affected by medication non-compliance and underutilization. To assess the impact of the intervention, pharmacy drug claims were reviewed from May 2008 through October 2008.

Clinical Criteria: Criteria, rationale, and text message(s) to providers are listed below. All physicians with recipients “hitting” on criteria received letters.

- Underutilization

The underutilization of therapy indicator identifies patients with a history of hypertension who have been on antihypertensive products in the past year but have no claim for an antihypertensive in the most recent 90 days.

Rationale: Hypertension treatment guidelines (JNC-7) stress use of antihypertensives for stage 1 disease, or earlier with compelling indications. Clinical evidence has shown that antihypertensive therapy has been associated with reductions in the incidence of stroke averaging 35%-40%; myocardial infarction 20%-25%; and heart failure more than 50%. Patients may discontinue therapy for many reasons, both intentional and non-intentional.

Sample Provider Paragraph:

Discontinuation of Antihypertensive Therapy. According to submitted pharmacy claims data, it appears your patient is being treated for hypertension. Although your patient has received antihypertensive therapy in the past, the prescription has not been filled in the past 3 months. Hypertension treatment guidelines (JNC-7) stress use of antihypertensives for stage 1 disease, or earlier with compelling indications. Clinical evidence has shown that antihypertensive therapy has been associated with reductions in the incidence of stroke averaging 35%-40%; myocardial infarction 20%-25%; and heart failure more than 50%. If discontinuation of the medication was not intentional, please discuss the importance of antihypertensive therapy with your patient and determine the best course of action.

- Medication Compliance

The medication compliance indicator identifies patients receiving less than 60 days of antihypertensive therapy in the most recent 90 days.

Rationale: Behavioral models suggest the most effective therapy prescribed by a physician will control hypertension only if the patient is motivated to take the therapy and to establish and maintain a health-promoting lifestyle. Non-adherence with antihypertensives can lead to perceived treatment failure and increased risk of adverse events due to escalating doses of antihypertensives.

Sample Provider Paragraph:

Non-adherence with Antihypertensive Therapy. After review of submitted pharmacy claims data, it appears your patient may be non-adherent with antihypertensive therapy, based on receiving less than 60 days of therapy in the past 90 days. Behavioral models suggest the most effective therapy prescribed by a physician will control hypertension only if the patient is motivated to take the therapy and to establish and maintain a health-promoting lifestyle. Motivation improves when patients have positive experiences with and trust their physicians. Please note this finding and discuss the best course of action with your patient at the next visit.



Definitions:

Adjusted Target Patients – All patients of physicians who were included in the intervention, who had pharmacy claims and were active plan members throughout the post-intervention time period. Additionally, when outcomes are performed, these patients' pre-intervention (baseline) hits are re-evaluated to make certain that the status of clinical indicators haven't changed for each patient due to late pharmacy and medical claims.

Intervention-Related Drugs – Antihypertensives, prednisone, paramethasone, betamethasone, cortisone, dexamethasone, hydrocortisone, methylprednisolone, prednisolone, triamcinolone, amphetamines, cyclosporine, tacrolimus, oral contraceptives, NSAID products, epoetin alfa, bromocriptine, and venlafaxine.

Intervention-Related Medical – Hypertension, sleep apnea, chronic renal impairment, primary aldosteronism, renal failure associated with HTN, Cushing's syndrome, pheochromocytoma, coarction of aorta, hyperthyroidism, hyperparathyroidism, hepatic impairment, and hepatitis.

RESULTS

Characteristics

Table 1 describes the patient populations for the target group included in the population-based intervention based upon mean age, gender, number of providers, average number of prescriptions per patient per month, and total drug utilization. As can be seen from the table, the target group had a mean age of 48.8 years, was mostly female, saw 3.2 providers, and utilized 5.6 prescriptions per month in the baseline period.

Table 1: Patient Characteristics

	Target (N=468)
Mean Age	48.8
Percentage Male	36.5%
Percentage Female	63.5%
Number of Providers	3.2
Average Number of Prescriptions PPPM*	5.6
Intervention-Related Drug Utilization**	
Average Number of Drugs***	2.2
Average Number of Claims	6.9
Average Days Supply	196.3
Average Amount Paid	\$178.77

* Number of prescriptions per patient per month (PPPM) is the average for the 6 month baseline period

** Based on 6 months of baseline claims data

*** A distinct drug is defined by using a coding system similar to the Hierarchical Ingredient Code List (HICL) in that distinct drugs are identified at the ingredient level.

Medication Non-Compliance

Table 2 displays the changes in target patients who were flagged for non-compliance. Overall, this indicator decreased by 52.2% in the target group.

Table 2: Changes in Non-Compliance

Medication Non-Compliance	Target		
	Baseline	Oct-08	% Change
Antihypertensives	297	142	-52.2%
Total	297	142	-52.2%

Underutilization

The changes in the number of patients flagged for underutilization of therapy are displayed in Table 3. Overall, there was a 93.6% reduction in the number of target patients.

Table 3: Changes in Underutilization

Underutilization	Target		
	Baseline	Oct-08	% Change
Antihypertensive discontinuation	171	11	-93.6%
Total	171	11	-93.6%

BUSINESS ANALYSIS

The overall savings for the intervention are calculated in Tables 4 and 5. Per patient per month (PPPM) drug amount paid for intervention-related drugs and intervention-related medical costs were separately calculated for the target group for the six-month baseline and six-month post-intervention periods. First, the PMPM savings was calculated by finding the difference between the baseline and post-period PPPM paid amount. Then, the PPPM savings was multiplied by the number of intervention months and number of targeted patients.

Table 4 shows the intervention-related drug amount paid for target patients decreased \$1.34 PPPM in the post-intervention period. This yielded an overall estimated savings of \$3,757 in intervention-related drug expenditures during the six-month post-intervention period.

Table 4: Intervention-Related Pharmacy Savings

Savings Calculation:	
Target Group: Actual Average Paid Amount Per Patient Per Month (Baseline)	\$29.79
Target Group: Actual Average Paid Amount Per Patient Per Month (Post)	\$28.46
% Change in Target Group from Baseline to Post	-4.49%
Estimated Savings Per Patient Per Month	\$1.34
Total Number of Target Patients	468
6-Month Total Savings	\$3,757.19

Table 5 shows the intervention-related medical amount paid for target patients decreased \$19.77 PPPM in the post-intervention period. This yielded an overall estimated savings of \$55,525 in intervention-related medical expenditures during the six-month post-intervention period.

Table 5: Intervention-Related Medical Savings

Savings Calculation:	
Target Group: Actual Average Paid Amount Per Patient Per Month (Baseline)	\$106.61
Target Group: Actual Average Paid Amount Per Patient Per Month (Post)	\$86.84
% Change in Target Group from Baseline to Post	-18.55%
Estimated Savings Per Patient Per Month	\$19.77
Total Number of Target Patients	468
6-Month Total Savings	\$55,525.05

LIMITATIONS

A control group was not utilized for this intervention. This limited the comparisons that could be performed in the analysis. Therefore, instead of being able to compare an intervention group with a non-intervention group, the analysis is essentially limited to changes in the intervention group before and after intervention.

The time frame of 6 months may not capture the full extent of the impact of the intervention. Providers may be required some time before they can change their patient's drug regimens.

CONCLUSIONS

This intervention focused on improving prescribing practices and reducing the overall cost of care. Overall, the intervention was successful in reducing the total number of clinical indicators for target patients by 67.3%.

In terms of financial outcomes, the amount paid for intervention-related drugs decreased \$1.34 PPM in the post-intervention period. This yielded an overall estimated savings of \$3,757 in intervention-related drug expenditures during the six-month post-intervention period. Additionally, the amount paid for intervention-related medical decreased \$19.77 PPM in the post-intervention period, yielding an estimated \$55,525 savings during the post-intervention period. Therefore, the total estimated savings for this intervention is \$59,282.