HEARTS

IN THE AMERICAS

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HEARTS IN THE AMERICAS

Standardized Treatment Protocol
The Kaiser Permanente Perspective

Jeff Brettler, MD
Regional Physician Lead
Kaiser SCAL Hypertension Program

Mexico City, February 19, 2020

Pan American Health Organization
World Health Organization
Regional Office for the Americas
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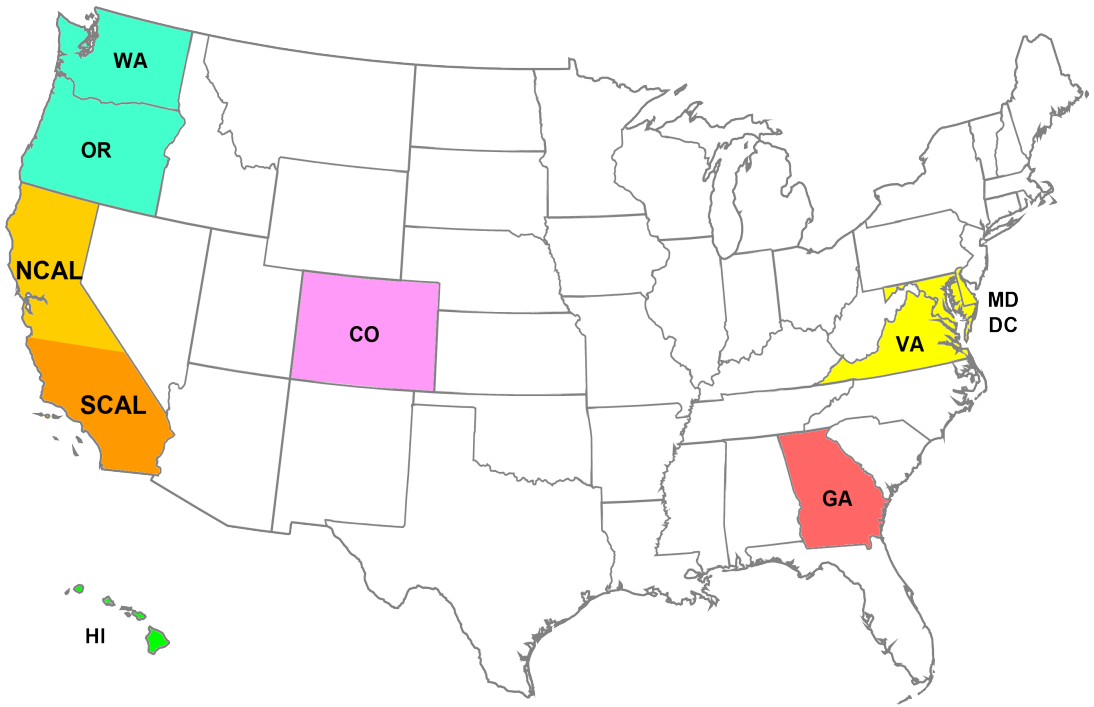
Agenda

- Snapshot of where we are today
- How did we get there, including history of our treatment protocol
- Importance of treatment intensification
- How simple combination medication algorithm facilitates treatment intensification

Kaiser Permanente – National



8 regions serving 8 states and D.C.

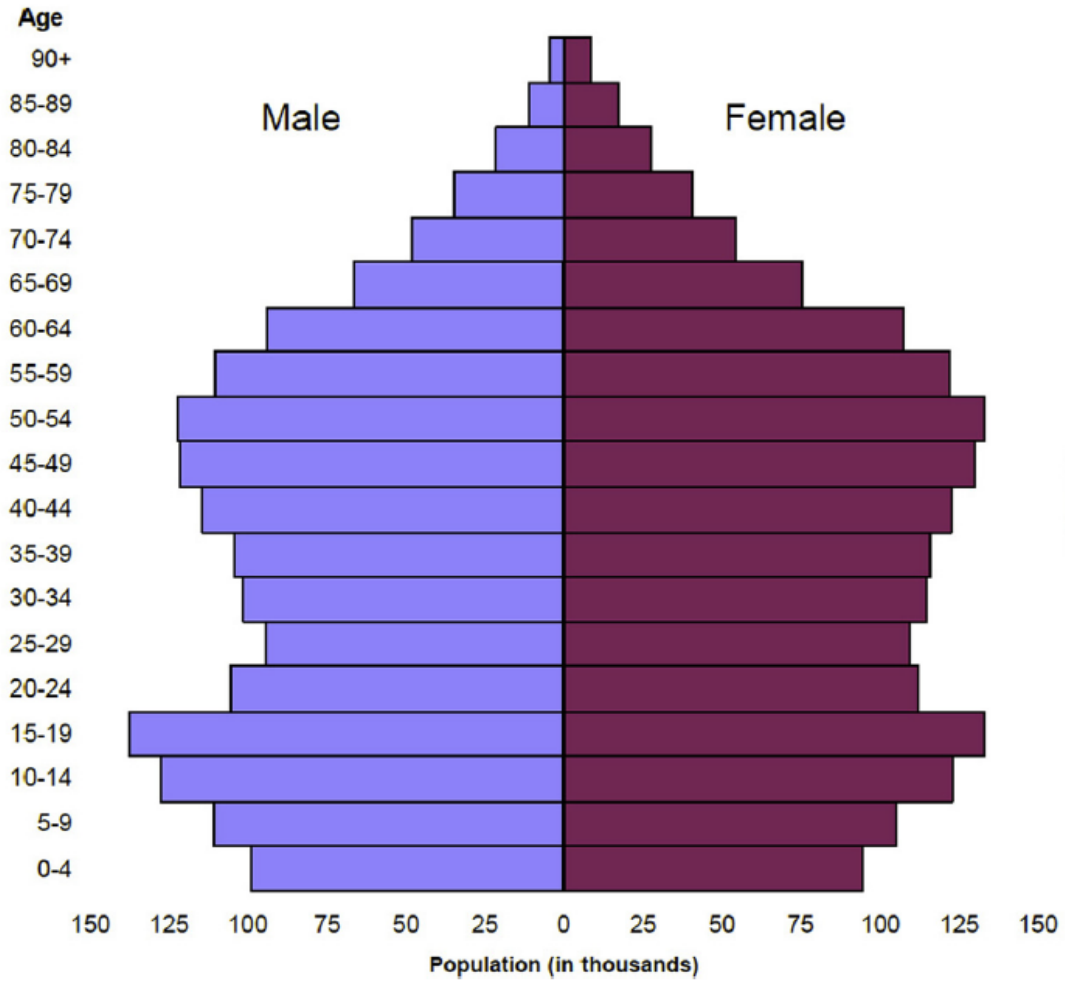
Kaiser Permanente Nationwide

- **12.3 million members**
- **22,914 physicians**
- **217,415 employees**
- **600-700 residents & fellows**
- **690 medical office buildings**
- **39 hospitals**
- **Nation's largest nonprofit health plan**

Southern California Permanente Medical Group (SCPMG)

SCPMG: Who we are in 2019

- **4.6 million members**
- **75,852 employees**
- **7,649 physicians**
- **21,167 nurses**
- **15 hospitals**
- **231 medical offices**
- 319,000 hospital discharges
- 42,500 babies delivered
- 23.2 million outpatient visits
- 29 million prescriptions filled
- **2.3 million BP checks/month**
- **872,078 members with HTN**



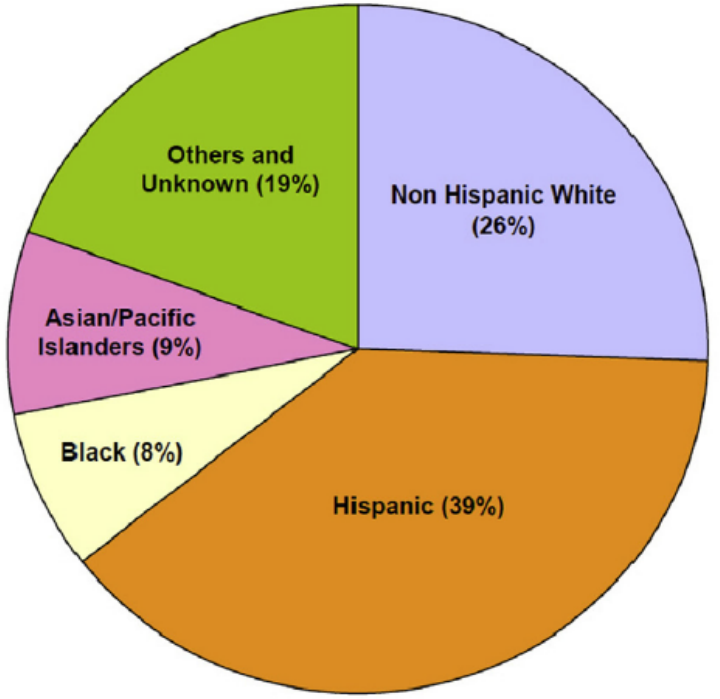
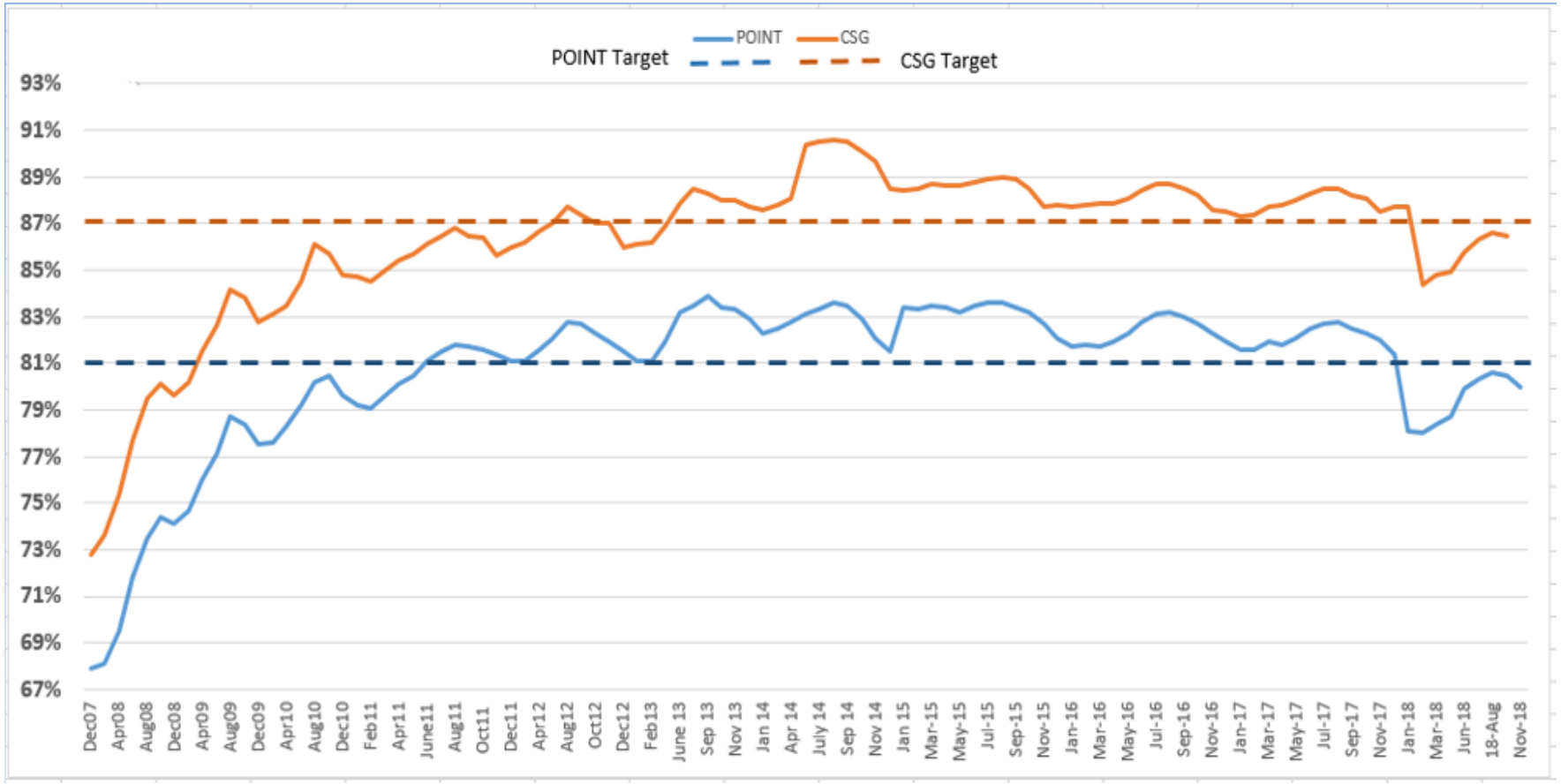


Figure 2. Kaiser Permanente Southern California population overview.

BP Trended Performance



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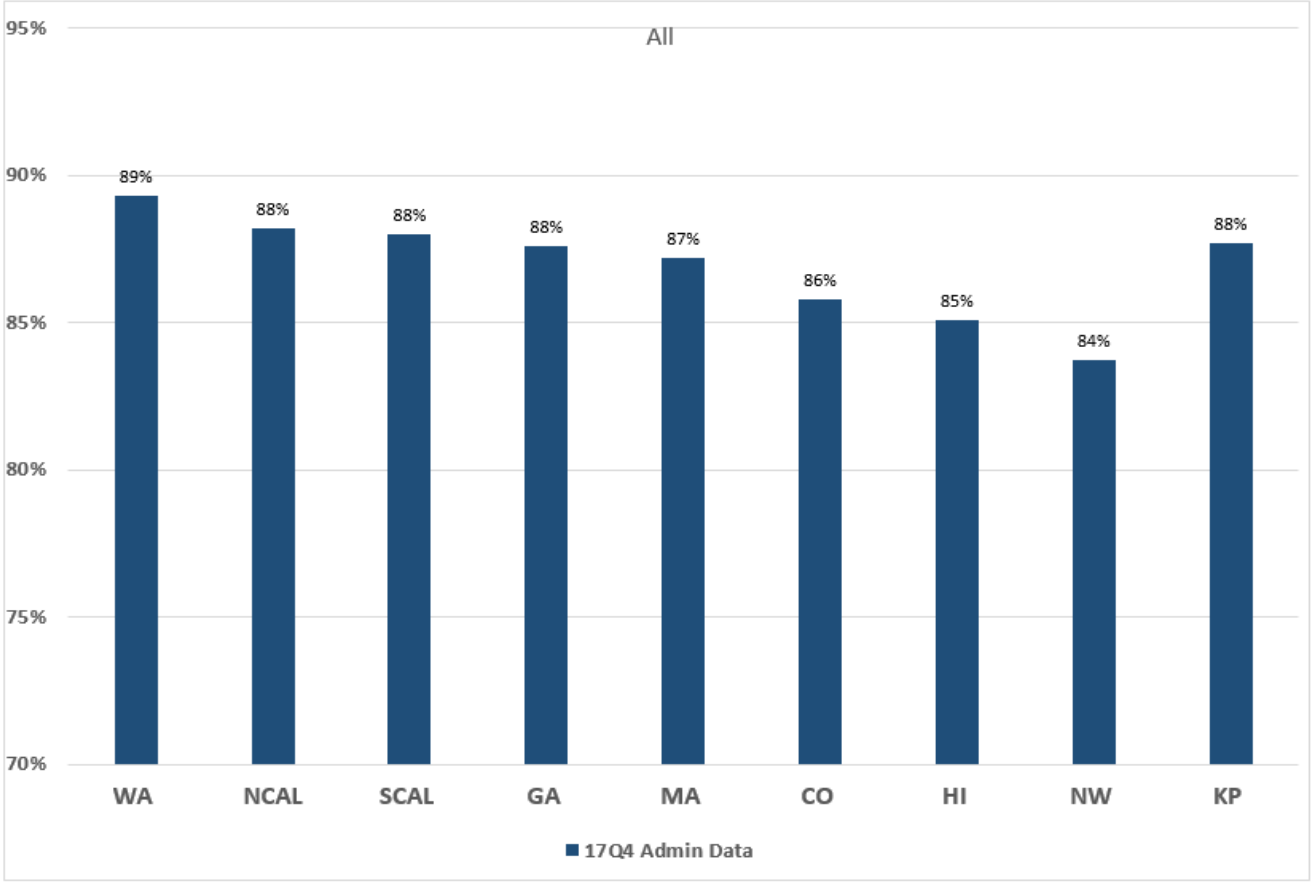
HEDIS 2018 Controlling BP Results
All – Administrative Data



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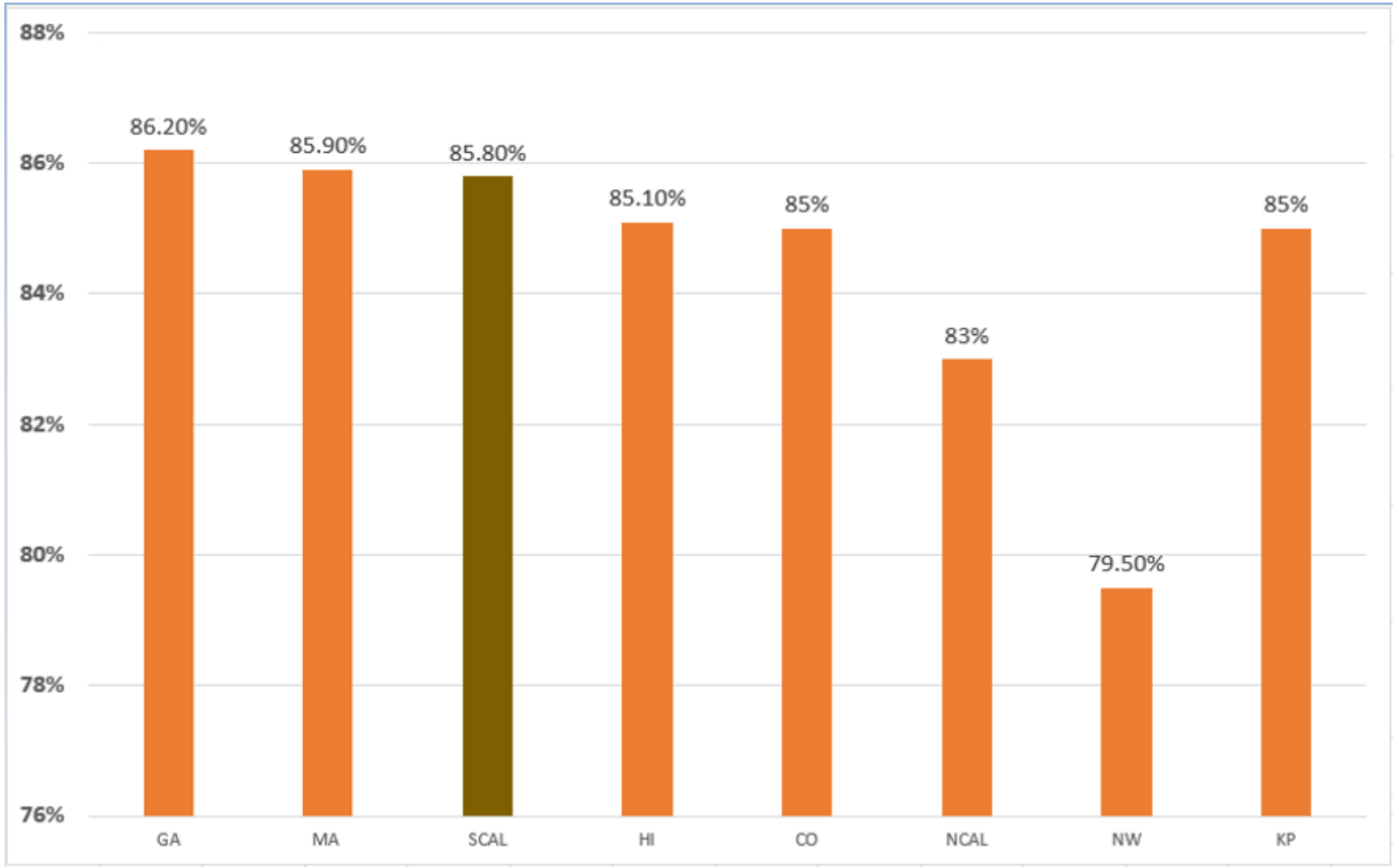
Black/African American HTN Control



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The NEW ENGLAND JOURNAL of MEDICINE

SPECIAL ARTICLE

Racial and Ethnic Disparities among Enrollees in Medicare Advantage Plans

John Z. Ayanian, M.D., M.P.P., Bruce E. Landon, M.D., M.B.A., Joseph P. Newhouse, Ph.D., and Alan M. Zaslavsky, Ph.D.

ABSTRACT

BACKGROUND

Differences in the control of blood pressure, cholesterol, and glucose among the various racial and ethnic groups of Medicare enrollees may contribute to persistent disparities in health outcomes.

In stratified analyses of Kaiser and other health plans in the West, significant disparities between black enrollees and white enrollees in the frequency of blood-pressure control were not evident in Kaiser health plans in 2006 (67% vs. 73%, P=0.18) or 2011 (89% vs. 85%, P=0.41), but there were significant disparities between the two groups in other health plans in 2006 (52% vs. 57%, P=0.04) and in 2011 (58% vs. 66%, P<0.001).

Ayanian J. NEJM 2014; 371:2288-2297

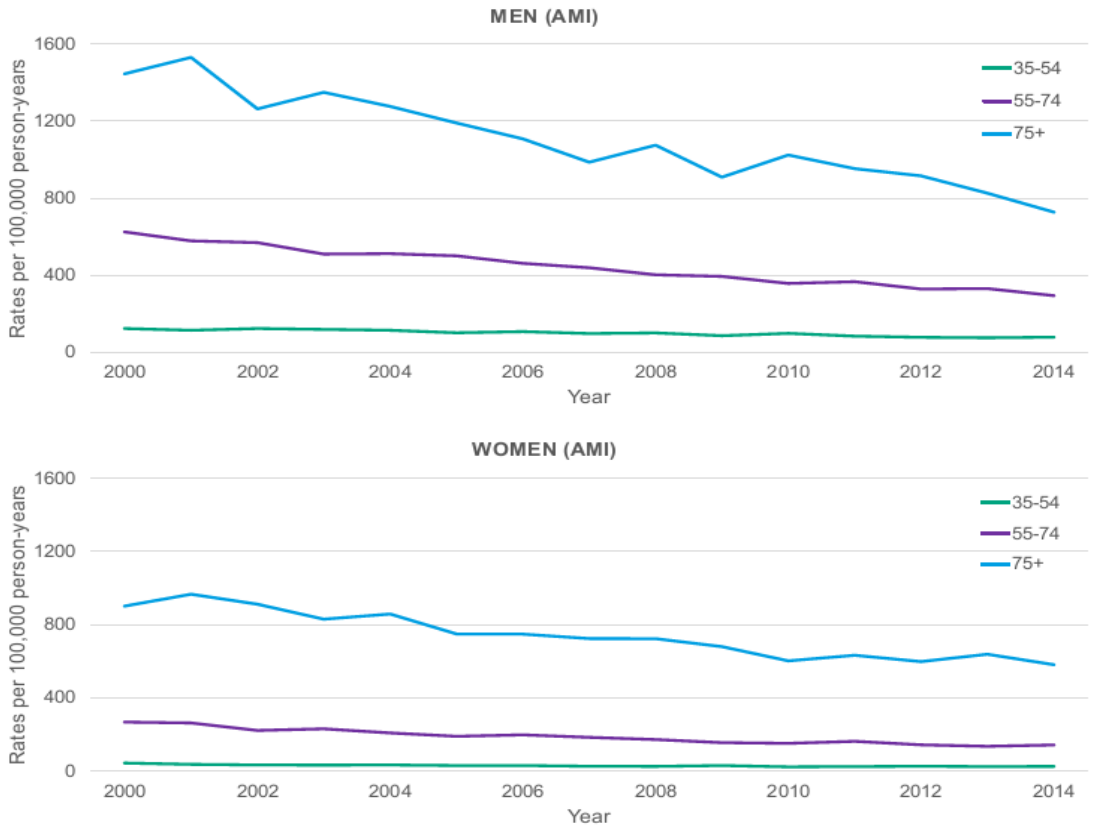
HEARTS

IN THE AMERICAS

Sex-Specific Trends in Acute Myocardial Infarction Hospitalization, 2000 to 2014

Stephanie R. Reading, PhD, MPH; Kristi Reynolds, PhD, MPH; Bonnie H. Li, MS; Lei X. Qian, PhD; Denison S. Ryan, MPH; Teresa N. Harrison, SM; Ronald D. Scott, MD; Jeffrey J. Cavendish, MD; Steven J. Jacobsen, MD, PhD; Michael H. Kanter, MD

Age-Specific Incidence Rates of Acute Myocardial Infarction



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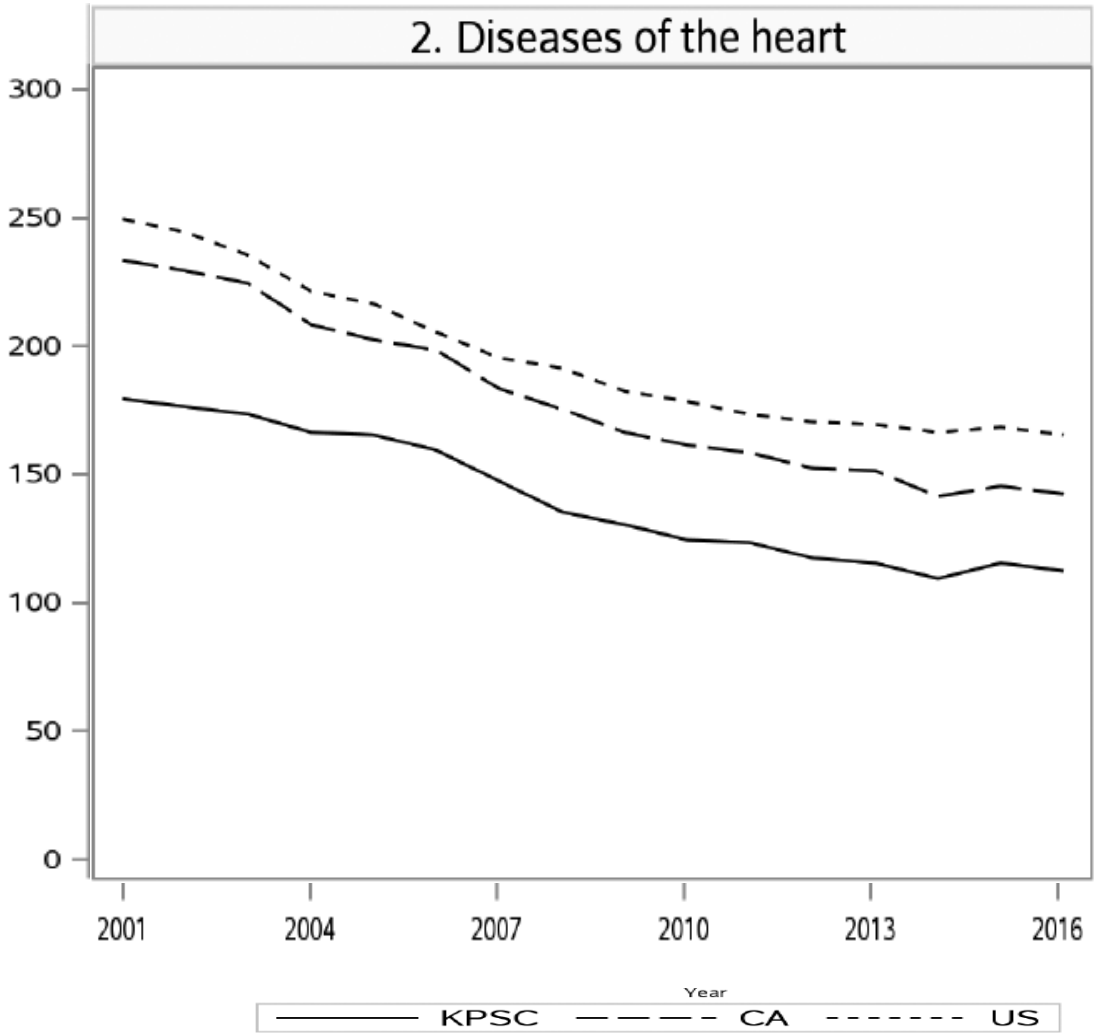
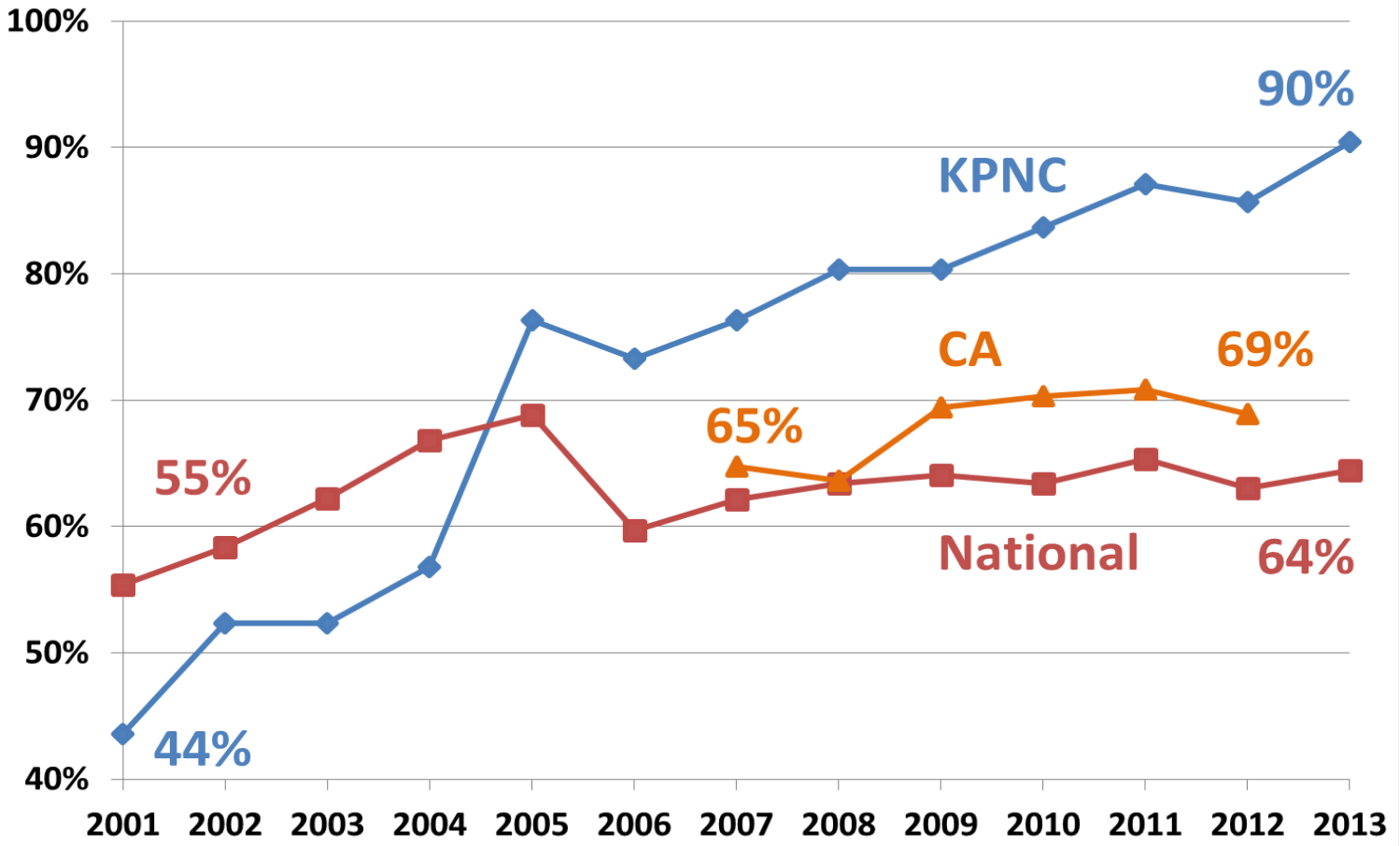


Figure 2. Age-adjusted mortality rates for each of the top 6 causes of death in Kaiser Permanente Southern California (KPSC), the US, and CA, 2001-2016.

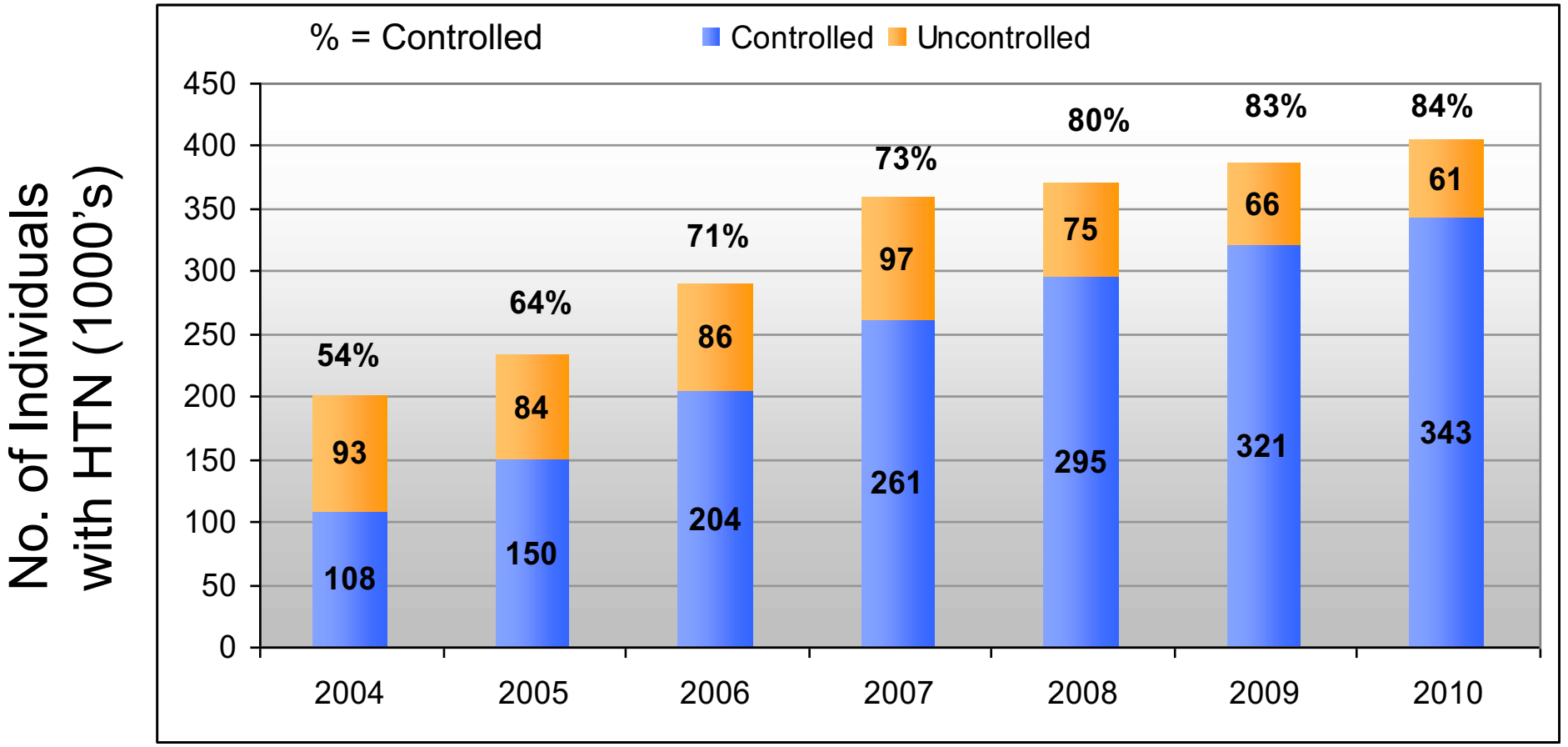
Key Elements of a Successful HTN Program

- Comprehensive and accurate registry
- Simple and clear guidelines
- **Treatment algorithm using combination pill**
- Performance feedback
- **Team based care**
- Treatment intensification and medication adherence
- BP measurement competency
- EMR/decision support
- Patient education and engagement
- Data integrity

KPNC vs. National and California HTN Control



SCAL HTN Control 2004 - 2010



CSG Performance & CSG Population

Treatment Intensification over Time in US

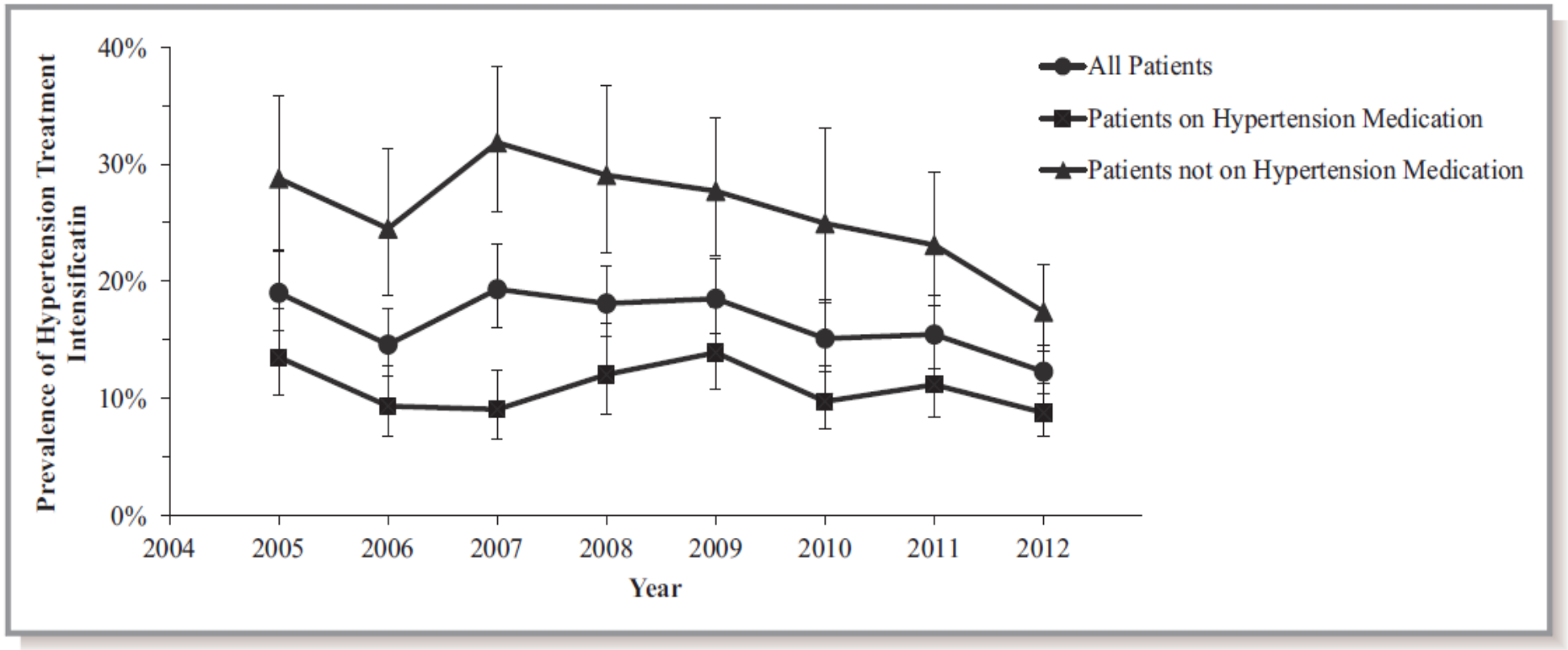


Figure 1. Prevalence of hypertension treatment intensification in the United States 2005–2012.

Lu, Min J Am Heart Assoc. 2016;5

HEARTS IN THE AMERICAS

Circulation: Cardiovascular Quality and Outcomes

ORIGINAL ARTICLE

Clinic-Based Strategies to Reach United States Million Hearts 2022 Blood Pressure Control Goals

A Simulation Study

Bellows, Moran, Fontil. June 2019

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Table 1. Comparison of Key Hypertension Process Inputs Across Simulated Interventions.

Variable	Usual Care	Best Observed Values	Perfect Care
Probability of Adhering to Last Antihypertensive Medication at One Year	57.0%[17-22]	75.6%[22]	100.0%
Probability of Intensifying Antihypertensive Medication When:			
Adding/titrating first antihypertensive medication during simulation			
Systolic blood pressure ≥160 mm Hg or blood pressure ≥140/90 mm Hg with diabetes or chronic kidney disease	33.3%[13-15]	44.0%[14]	100%
Systolic blood pressure is uncontrolled but <160 mm Hg or blood pressure is uncontrolled but <140/90 mm Hg with diabetes or chronic kidney disease	20.8%[11, 12]	31.0%[11]	100%
Adding/titrating additional antihypertensive medications	13.0%[16]	19.5%[16]	100%
Return Visit Interval When Blood Pressure Uncontrolled	~13.8 weeks[12]	1 week[12]	1 week

Notes: The table shows the model inputs for the key hypertension management processes, best observed values were preferentially derived from the highest reported mean or calculated using sample size or variance estimates as available. Perfect care values were based on the best input possible for each parameter.

Figure 3. Return Visit Interval Needed to Achieve Million Hearts 2022 Goal of 80% Blood Pressure Control at Different Antihypertensive Intensification and Adherence Rates.

Average Antihypertensive Intensification Rate After Uncontrolled Blood Pressure	Average Antihypertensive Adherence Rate						
	100%	90%	80%	70%	60%	50%	40%
70%	16.0	16.0	16.0	16.0	16.0	16.0	12.0
60%	16.0	16.0	16.0	16.0	15.2	11.9	8.0
50%	16.0	16.0	14.7	12.2	10.5	8.2	4.0
40%	13.1	11.7	9.3	8.1	5.8	4.0	2.0
30%	7.6	6.3	5.0	3.3	1.4	-	-
20%	2.0	1.1	-	-	**Usual Care***	-	-
10%	-	-	-	-	-	-	-

Maximum Average Return Visit Interval Achieving 80% Blood Pressure Control

Average Return Visit Interval After Uncontrolled Blood Pressure
≤16 weeks
≤12 weeks
≤8 weeks
≤4 weeks
Will not reach 80% control

*Usual care input for adherence was 57.0%, return visit interval was ~13.8 weeks, and mean simulated usual care intensification rate over 4 years was 18.7%.

Notes: The figure shows the 4-year results when varying key hypertension management process parameters and the combination needed to achieve ≥80% blood pressure control. The columns are the average antihypertensive adherence rate (i.e., proportion of patients continuing antihypertensive medication for at least one year). The rows are the average antihypertensive intensification rate (i.e., proportion of clinic visits with an uncontrolled blood pressure where antihypertensive medication was intensified). The boxes, are the maximum average return visit interval (in weeks) after an uncontrolled blood pressure.

Model Findings

Only 46% of patients who present with uncontrolled BP at the beginning of 2018 would achieve BP control by the end of 2021 under usual care.

80% control rate within 4 years possible with the following: 70% medication adherence, 30% probability of treatment intensification, and having follow-up visits within 4 weeks after an uncontrolled office BP.

Increasing treatment intensification had the most significant impact on achieving 80% BP control.

When the probability of intensification was 62% (usual care 13.0%-33.3%), ≥ 80% of patients achieved BP control, even when patient medication adherence and the return visit interval were kept at usual care.

So What Happened in 2005?

- Combination therapy with lisinopril-hydrochlorothiazide became 1st step of national KP algorithm
- Widespread implementation of 2-4 week MA/LVN follow-up BP checks.

Table 1. Summary of Evidence-Based Clinical Practice Guideline for Initial Therapy and Treatment Intensification for the Kaiser Permanente Northern California Hypertension Program, by Year

Step	2001	2003	2005	2007	2009
1	Thiazide diuretic or β-blocker	Thiazide diuretic	Thiazide diuretic or thiazide diuretic + ACE inhibitor	Thiazide diuretic or thiazide diuretic + ACE inhibitor	Thiazide diuretic or thiazide diuretic + ACE inhibitor
2	Thiazide diuretic + β-blocker	Thiazide diuretic + ACE inhibitor or thiazide diuretic + β-blocker	Thiazide diuretic + ACE inhibitor	Thiazide diuretic + ACE inhibitor	Thiazide diuretic + ACE inhibitor
3	Thiazide diuretic + β-blocker + ACE inhibitor	Thiazide diuretic + β-blocker + ACE inhibitor	Thiazide diuretic + β-blocker + ACE inhibitor	Thiazide diuretic + β-blocker + ACE inhibitor	Thiazide diuretic + ACE inhibitor + DCCB
4	Thiazide diuretic + β-blocker + ACE inhibitor + DCCB	Thiazide diuretic + β-blocker + ACE inhibitor + DCCB	Thiazide diuretic + β-blocker + ACE inhibitor + DCCB	Thiazide diuretic + β-blocker + ACE inhibitor + DCCB	Thiazide diuretic + ACE inhibitor + DCCB + β-blocker or spironolactone

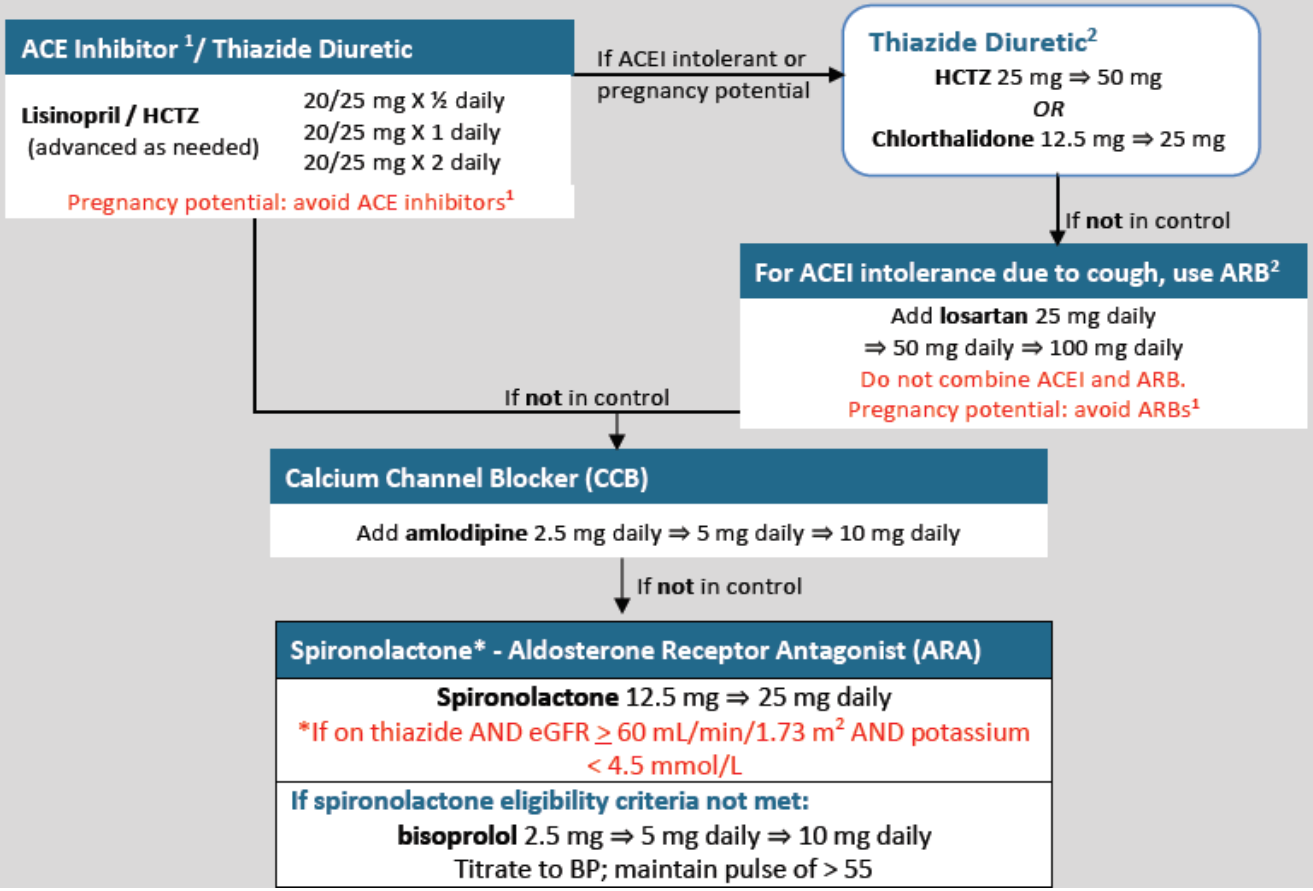
Abbreviations: ACE, angiotensin-converting enzyme; DCCB, dihydropyridine calcium channel blocker.

Jaffe, et al. JAMA Aug 2013

FIGURE 1: MANAGEMENT OF ADULT BLOOD PRESSURE (BP)

BP GOALS

- Treat adults with confirmed hypertension to a goal BP < 140/90 mm Hg.
- In adults with ASCVD, CKD, age ≥ 75 years, or 10-year ASCVD risk[3] ≥ 10%, consider treating to a goal SBP < 130 mm Hg. (Exclude adults with eGFR<20 from this lower target.)



Step 1 of Current KP Algorithm

ACE Inhibitor [1] / Thiazide Diuretic	
Lisinopril / HCTZ (advanced as needed)	20/25 mg X ½ daily 20/25 mg X 1 daily 20/25 mg X 2 daily

Pregnancy potential: avoid ACE inhibitors[1]

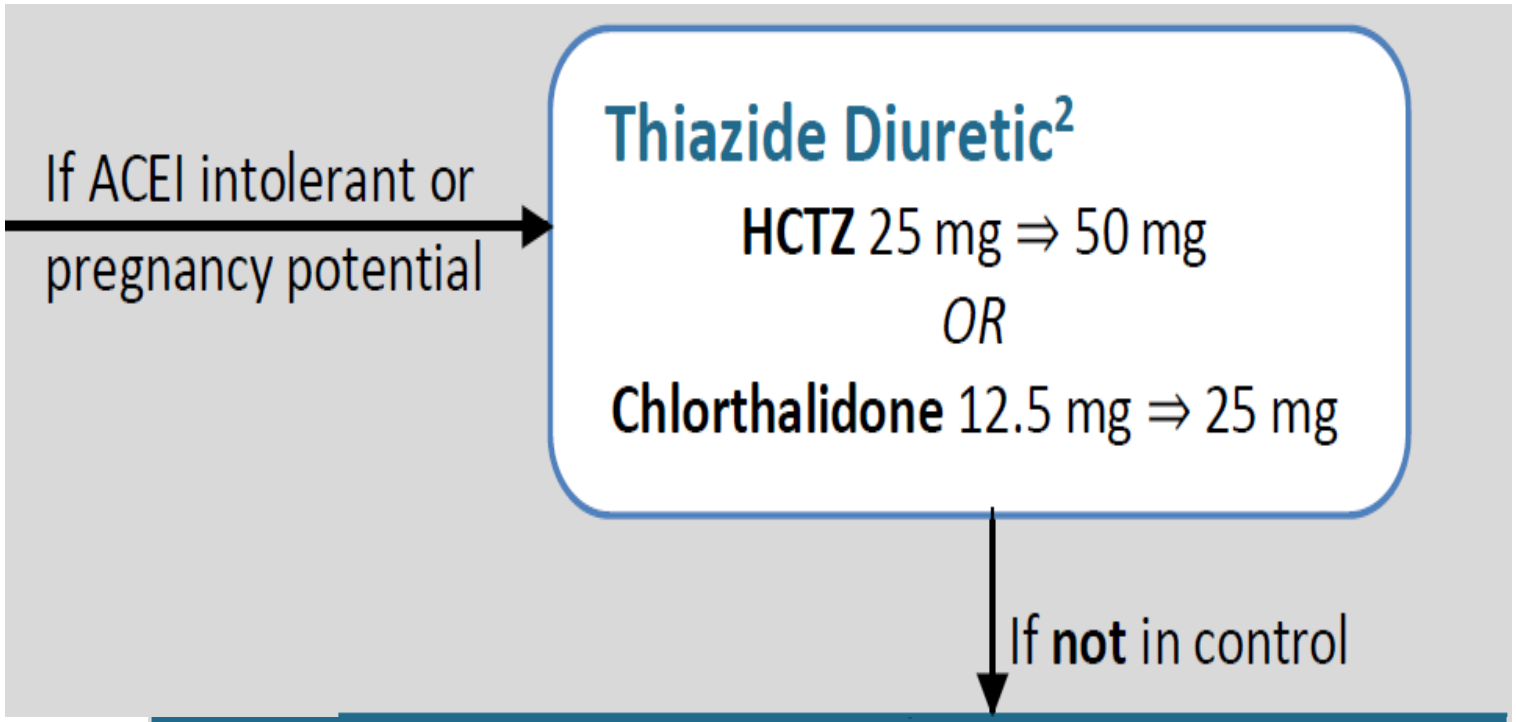
Step 2 of KP Algorithm

Calcium Channel Blocker (CCB)

Add **amlodipine** 2.5 mg daily ⇒ 5 mg daily ⇒ 10 mg daily

Step 3 of KP Algorithm

Spironolactone* - Aldosterone Receptor Antagonist (ARA)
Spironolactone 12.5 mg ⇒ 25 mg daily *If on thiazide AND eGFR ≥ 60 mL/min/1.73 m^2 AND potassium < 4.5 mmol/L
If spironolactone eligibility criteria not met: **bisoprolol** 2.5 mg ⇒ 5 mg daily ⇒ 10 mg daily Titrate to BP; maintain pulse of > 55


If ACEI intolerant or pregnancy potential
Thiazide Diuretic[2]
HCTZ 25 mg ⇒ 50 mg
OR
Chlorthalidone 12.5 mg ⇒ 25 mg
If not in control
For ACEI intolerance due to cough, use ARB[2]
Add losartan 25 mg daily
⇒ 50 mg daily ⇒ 100 mg daily
Do not combine ACEI and ARB.
Pregnancy potential: avoid ARBs[1]

Ideal Algorithm
adapted from Marc Jaffe

- Less guidelines, more protocols
- Less protocols with arrows, more with lines
- Less options, more direction
- Less classes, more specific drugs
- Less ranges, more specific doses
- Less single pills, more combination pills in fixed doses

Benefits of KP Algorithm

- 2 pills – max of 3 medications.
- Only requires 2 trips to pharmacy.
- ½ to 1 to 2 tabs for both
- ½ tab – effective for overcoming inertia, but still using combination pill
- Long acting, once daily medications

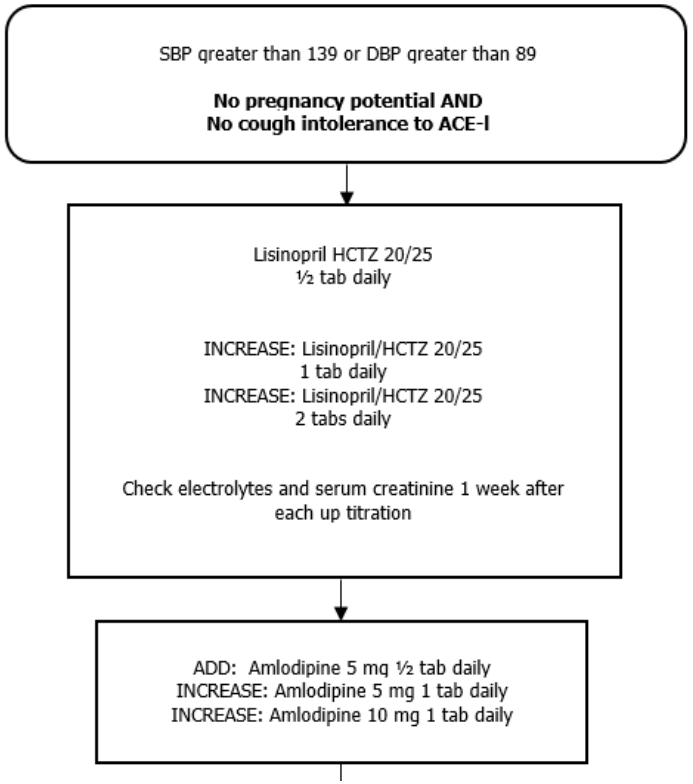
Benefits of KP Algorithm

- Works for all ages, race/ethnicity, comorbidities: ACEI for CKD, diuretic/CCB for older patients/African American, etc.
- Synergy of ACEI with thiazide
- Built in safety: Spironolactone criteria: GFR $\geq$ 60, K < 4.5
- Max dose of thiazide
- Cost: $3.55/month for Lisinopril-HCTZ, $2.73/month for amlodipine

The other major benefit of a simplified combination pill algorithm

- Facilitates team based care
- Provider other than MD

Algorithm for Uncomplicated HTN:
No pregnancy potential, No cough intolerance to ACE-I
(excludes HF, Stage 4 or greater CKD [GFR < 30] or CAD)



Dealing with Combination Pill Resistance 2005

- Our slogan at the time was: "**we have an epidemic of undertreatment rather than overtreatment**."
- Concerns: overtreatment and how to deal with reactions/side effects.
- Keep education regarding side effects simple: if hyponatremia or rash, it's HCTZ, if cough, it's lisinopril.
- Acceptance easier over time (we now have almost 15 years of experience).

Ideal characteristics of antihypertensive drugs:

Characterisitic	Priority
Efficacy (from a pharmacological perspective) and safety	High
Evidence-based clinical and effectiveness outcomes	High
Tolerability (few side effects)	High
Cost/affordability	High
Availability (inclusion on the WHO Model List of Essential Medicines*)	High
Appropriate for regional considerations (e.g. diversity of population)	High
Once-a-day dosage (also including variability in dose)	Medium
Scored tablet with variety of doses available	Medium

Ideal characteristics of fixed dose combination drugs in hypertension:

Characteristic
High efficacy (blood pressure reduction)
Additive/synergistic blood pressure reduction
Supported by clinical trials
Mitigation of side-effects of either or both individual agents
Potential for wide availability and affordability
Safe and efficacious in diverse demographic settings (i.e. racial group and ethnicity, sex, geography, salt-sensitivity)
Daily dosing formulation
Scored tablet with multiple doses which permit split tablet dosing and easy titration

DiPette, D. J., Skeete, J., Ridley, E., Campbell, N. R., Lopez-Jaramillo, P., Kishore, S. P., ... & Ordunez, P. (2019). Fixed-dose combination pharmacologic therapy to improve hypertension control worldwide: Clinical perspective and policy implications. Journal of clinical hypertension (Greenwich, Conn.), 21(1), 4.

Algorithms and Guidelines Need to Evolve

- Guidelines and algorithm are updated every 2 years: national process with input from all regions; primary care + specialists.
- Spironolactone added in 2009, then became preferred # 4 agent after PATHWAY-2
- Beta blocker changed in 2018 guideline: Atenolol switched to bisoprolol – longer ½ life, less dose adjustment in CKD, cost equivalency

Spironolactone as Preferred 4th Agent – PATHWAY-2

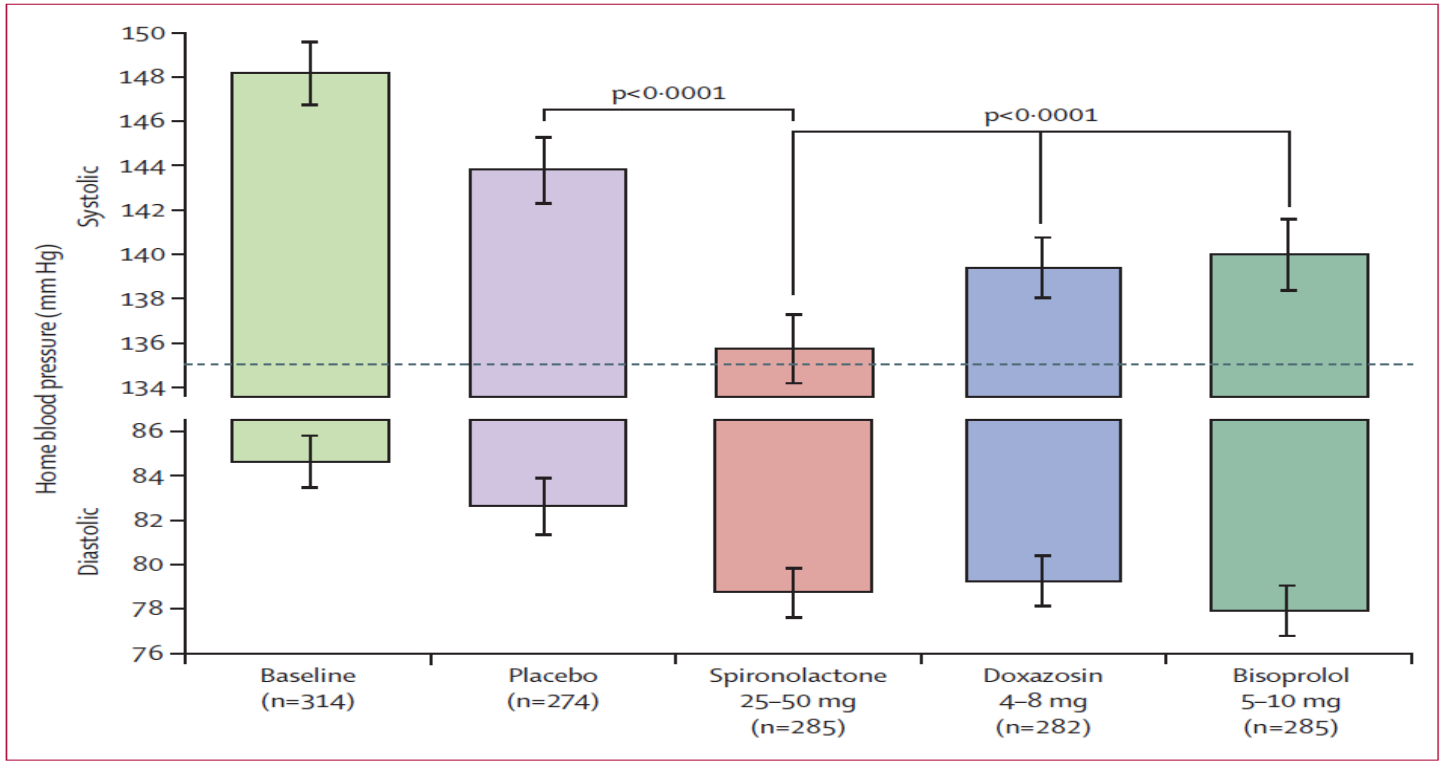


Figure 2: **Home systolic and diastolic blood pressures comparing spironolactone with each of the other cycles**
The top and bottom of each column represents the unadjusted home systolic and diastolic blood pressures, respectively, averaged across the mid-cycle (low-dose) and end-of-cycle (high-dose) visits (6 weeks and 12 weeks) in which patients received the drug. Error bars represent 95% CI. Comparisons are as described under methods for the primary endpoint.

PATHWAY-2, Lancet Sep 2015

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Guidelines

Kaiser Permanente National
CLINICAL PRACTICE GUIDELINES

Adult Blood Pressure

Clinician Guide

June 2018

Introduction This Clinician Guide is based on the 2018 KP National Blood Pressure (BP) Guidelines. It was developed to assist primary care physicians and other health care professionals in the outpatient setting with screening and treatment of elevated BP in non-pregnant adults aged ≥ 18 years. The KP National BP Guideline is revised after review of the 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults. It is not intended or designed as a substitute for the reasonable exercise of independent clinical judgment by practitioners.

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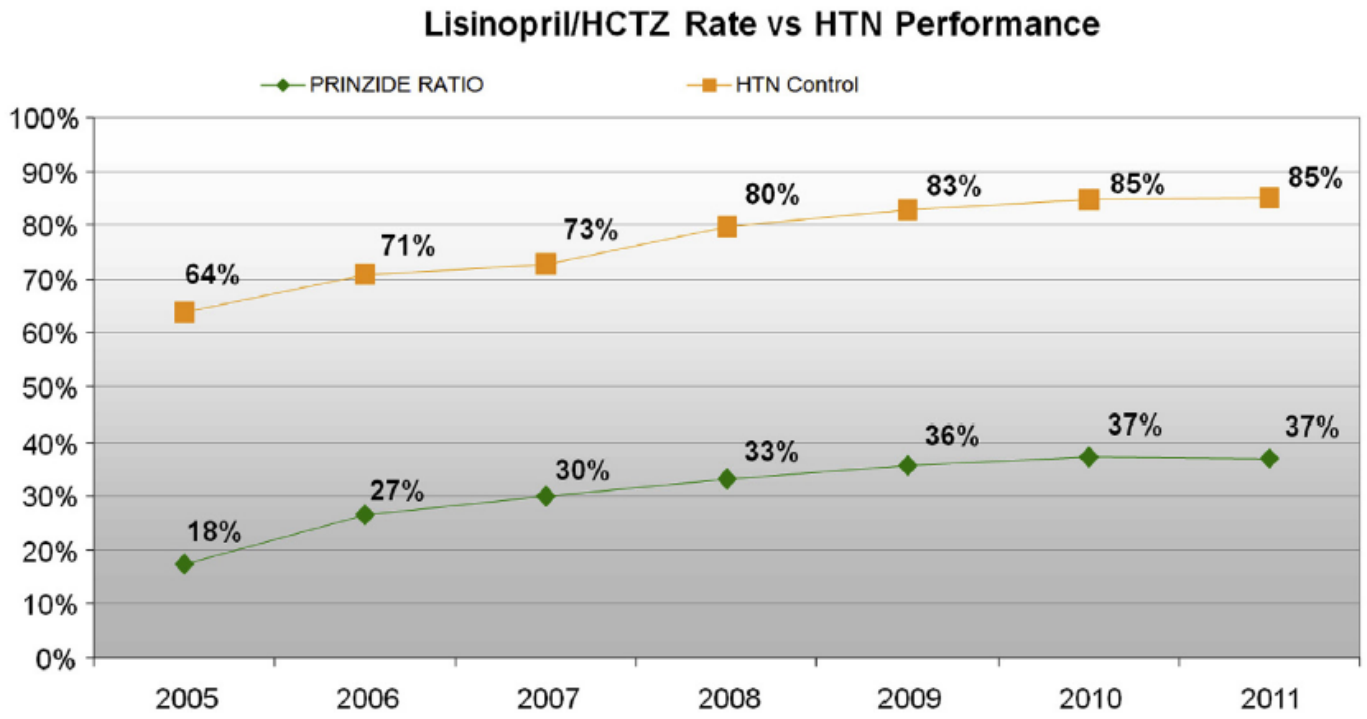
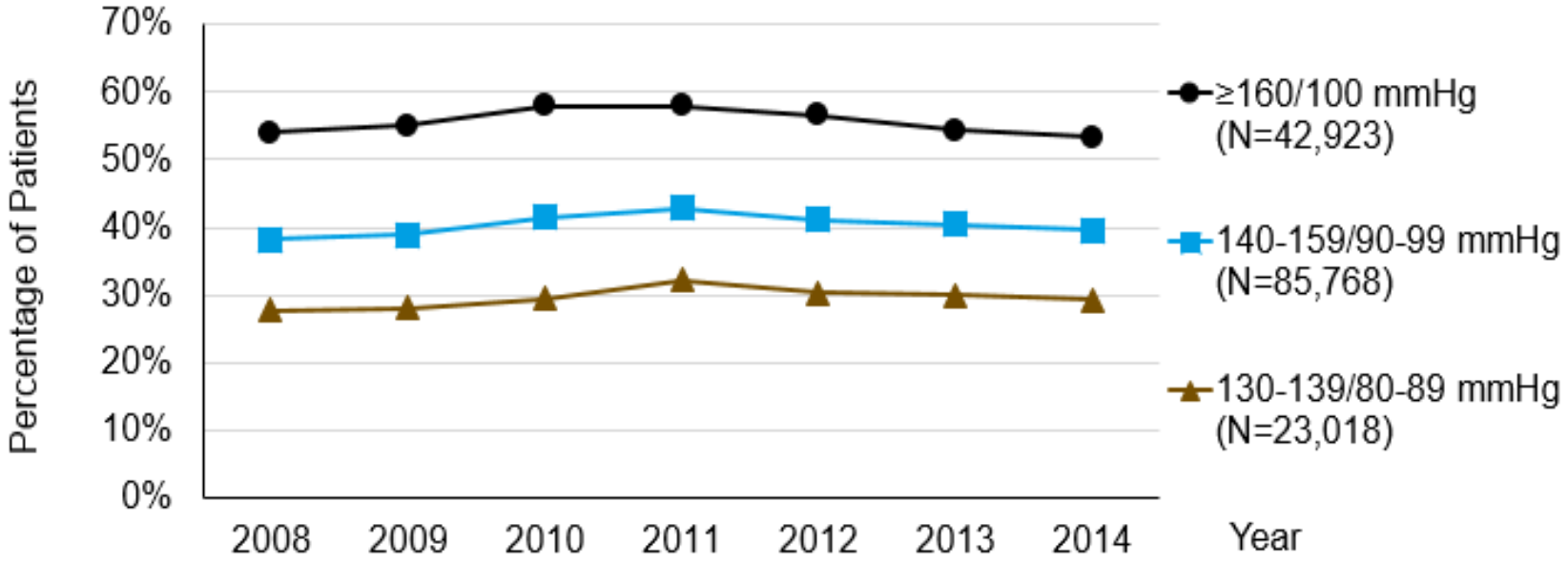


Figure 4. Combination pill use and hypertension control at Kaiser Permanente Southern California. Since 2005, when the combination of lisinopril/HCTZ was advocated, hypertension control rates have steadily increased, paralleling the proportion of those prescribed the lisinopril/HCTZ combination pill. HCTZ, hydrochlorothiazide; HTN, hypertension.

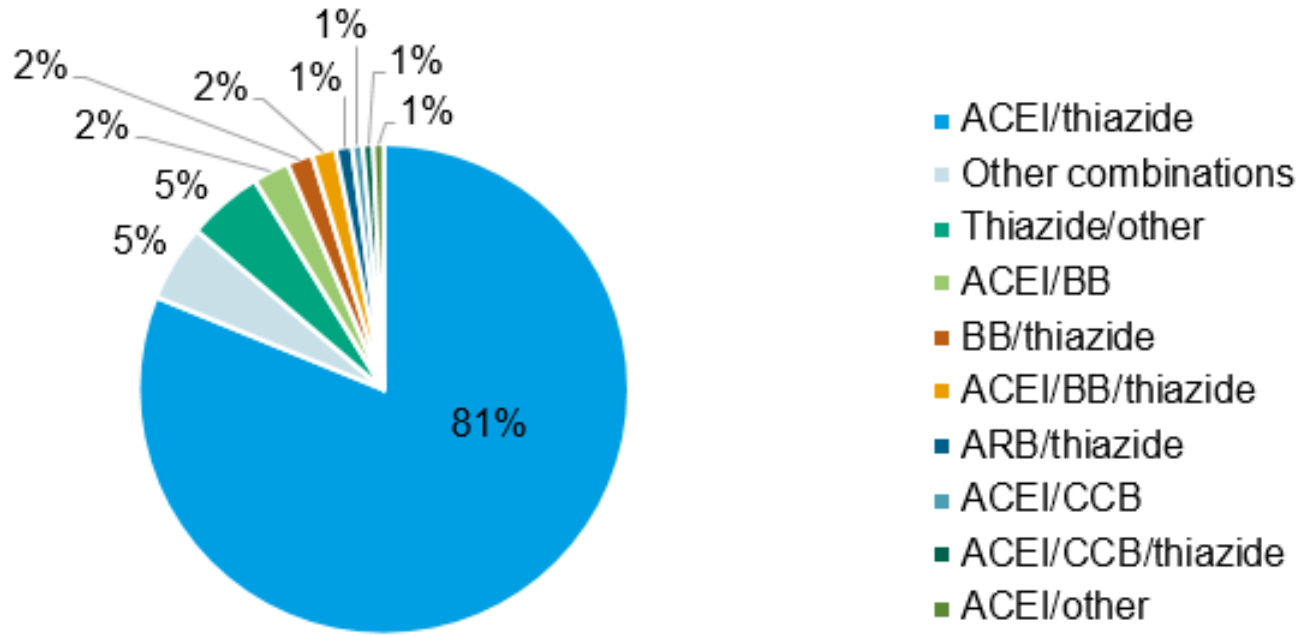
KP SCAL Use of Combination Therapy

Figure 2. Proportion of Patients Initiating Antihypertensive Medication with Combination Therapy Stratified by Pre-treatment Blood Pressure Levels



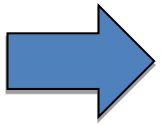
KP SCAL Use of Combination Therapy

Figure 1. The Most Frequently Used Initial Combination Therapy

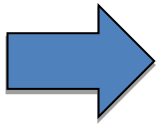


HTN Demographics and Utilization

HYPERTENSION Demographics and Utilization Report - African Americans within POINT HTN*				
	Controlled		Uncontrolled	
	Counts	% of Controlled Population	Counts	% of Controlled Population
1-2 Rx Classes	26,896	52.02%	5,831	44.53%
3-4 Rx Classes	16,868	32.63%	4,760	36.35%
>4 Rx Classes	3,150	6.09%	1,348	10.29%
Specific HTN Med or Rx Class Dispensed in the Past 12 Months				
FDC - lisinopril/HCTZ	9,043	17.49%	2,455	18.75%
ACEI (other than lisinopril/HCTZ)	16,129	31.20%	4,271	32.61%
ARB	7,562	14.63%	2,242	17.12%
Beta blocker	20,851	40.33%	5,872	44.84%
CCBs - dihydropyridine	15,680	30.33%	5,038	38.47%
CCBs - nondihydropyridine	2,938	5.68%	822	6.28%
Thiazide Diuretic (other than lisinopril/HCTZ)	20,450	39.55%	4,794	36.61%
Loop Diuretic	5,731	11.08%	1,704	13.01%
K-sparing Diuretic - spironolactone or eplerenone	1,564	3.03%	428	3.27%
K-sparing Diuretic - triamterene or amiloride	5,275	10.20%	1,031	7.87%
Central Alpha2 Adrenergic Agonist	2,264	4.38%	1,006	7.68%
Peripheral Alpha1 Adrenergic Blocker	3,844	7.43%	960	7.33%
Adrenergic blocker	9	0.02%	10	0.08%
Vasodilator	2,984	5.77%	1,451	11.08%
Renin inhibitor	7	0.01%	2	0.02%
FDC containing spironolactone	37	0.07%	7	0.05%
FDC containing triamterene or	5,243	10.14%	1,026	7.83%
FDC (other than lisinopril/HCTZ or amiloride or spironolactone)	392	0.76%	110	0.84%



3-4 Rx Classes+
36.35%
>4= **10.29%**



3.27%

Focused Interventions

African Americans with uncontrolled HTN – generally require 2 or more medications and higher dose diuretic.

- % on suboptimal Lisinopril-HCTZ
- % thiazide naïve

Monthly reports down to clinic level

HEARTS IN THE AMERICAS

Suboptimal Lisinopril-HCTZ

2019 PROACTIVE PANEL MANAGEMENT
Black / African American HTN Control

Black/African-American HTN Control	SAN BERNARDINO COUNTY		SAN DIEGO		SOUTH BAY		WEST LOS ANGELES		WOODLAND HILLS		REGION		Best Performing Area		Most Improved Area	
MEASURES PPM TARGETS FOR IMPROVEMENT BY 10/31/19	Mar 2019 (Baseline)	August 2019	Mar 2019 (Baseline)	August 2019	Mar 2019 (Baseline)	August 2019	Mar 2019 (Baseline)	August 2019	Mar 2019 (Baseline)	August 2019	Mar 2019 (Baseline)	August 2019	Area	Rate August 2019	Area	August 2019 % Improvement
Measure 1: BP Control Rate in **Black/African American** HTN Population Ages 18-64 (Target: 80%)	71.7%	73.9%	72.8%	70.5%	70.4%	70.3%	73.2%	74.6%	70.4%	69.9%	72.2%	72.8%	Orange County	76.4%	Orange County / San Bernardino County	2.2%
# Additional Pts Needed to Meet Target	769	566	374	491	912	913	700	549	120	140	4,619	4,215				
% Change from baseline	2.2%		-2.3%		-0.1%		1.4%		-1.6%		0.6%					
Measure 2: BP Control Rate in **White/Caucasian** HTN Population Ages 18-64 (No Target)	76.0%	76.5%	74.2%	73.7%	75.3%	75.9%	77.2%	77.8%	74.6%	74.4%	75.0%	75.2%	West Los Angeles	77.8%	Los Angeles	1.3%
% Change from baseline	0.5%		-0.5%		0.6%		0.6%		-0.1%		0.2%					
Measure 3: HTN Disparity Ages 18-64 - Black/African American vs White/Caucasian **(No Target)** *(Lower / Negative rate is favorable)*	4.3%	2.6%	1.5%	3.2%	4.9%	5.7%	4.0%	3.2%	4.1%	5.7%	2.8%	2.3%	Orange County	-1.2%	Orange County	-2.3%
% Change from baseline (A reduction in disparity is favorable)	-1.7%		1.8%		0.7%		-0.8%		1.5%		-0.6%					
Measure 4: No BP Test in **Black/African American** HTN Population Ages 18-64 (No Target)	7.8%	7.2%	9.5%	10.8%	8.6%	9.8%	8.7%	9.1%	10.7%	11.2%	8.4%	8.8%	San Bernardino County	7.2%	San Bernardino County	-0.6%
% Change from baseline (Lower/Negative Rate is favorable)	-0.6%		1.3%		0.2%		0.4%		0.5%		0.4%					
Measure 5a: Reducing # of Thiazide Naive Patients (No Target) *(Lower rate is favorable)*	23.0%	23.1%	23.5%	22.8%	21.4%	22.3%	20.0%	20.6%	28.6%	28.8%	21.8%	22.5%	Downey	20.2%	Kern County	-5.0%
% Change from baseline (Lower/Negative Rate is favorable)	0.1%		-0.7%		1.0%		0.6%		0.1%		0.6%					
Measure 5b: Reducing # of Suboptimal Prinzide Patients (No Target) *(Lower rate is favorable)*	20.1%	19.1%	19.1%	16.7%	19.8%	17.7%	22.1%	18.5%	15.9%	14.4%	19.5%	17.2%	Kern County	10.4%	Orange County	-3.7%
% Change from baseline (Lower/Negative Rate is favorable)	-1.0%		-2.6%		-2.1%		-3.6%		-1.8%		-2.3%					

Data Source: Regional Complete Care - Panel Management. The Black

Pan American Health Organization
World Health Organization
Americas
PAHO

HEARTS IN THE AMERICAS

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

A Cluster-Randomized Trial of Blood-Pressure Reduction in Black Barbershops

Ronald G. Victor, M.D., Kathleen Lynch, Pharm.D., Ning Li, Ph.D., Ciantel Blyler, Pharm.D., Eric Muhammad, B.A., Joel Handler, M.D., Jeffrey Brettler, M.D., Mohamad Rashid, M.B., Ch.B., Brent Hsu, B.S., Davontae Foxx-Drew, B.A., Norma Moy, B.A., Anthony E. Reid, M.D.,* and Robert M. Elashoff, Ph.D.

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Pan American Health Organization
World Health Organization Americas
PAHO

Medication Protocol

Study goal = barbershop systolic BP < 130

Step 1. CCB *plus* ARB

- amlodipine *plus* ACEI or ARB

Step 2. *add* thiazide-type diuretic

- indapamide

Step 3. *add* aldosterone antagonist

- spironolactone

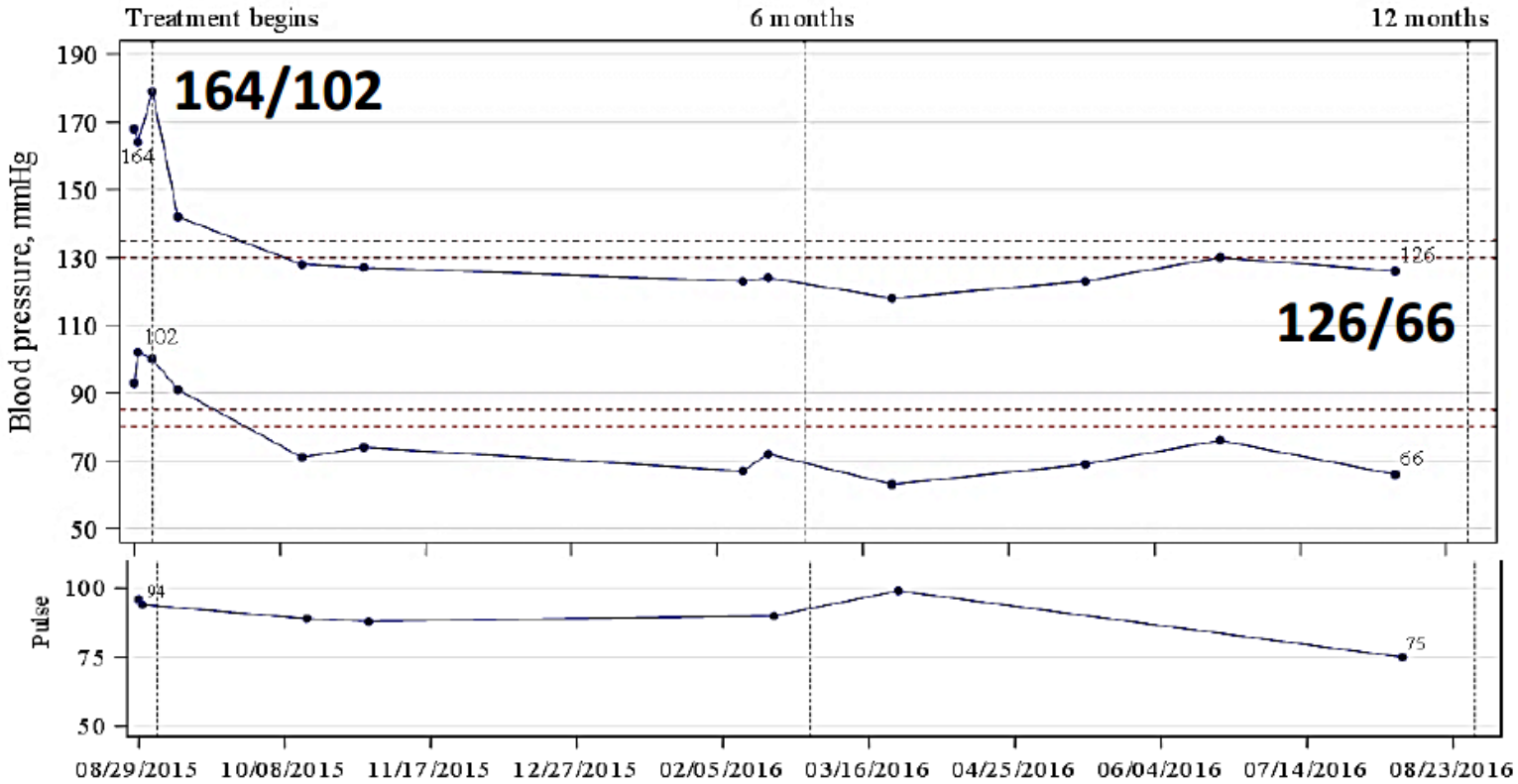
Step 4. *add* vasodilating beta blocker

- carvedilol

CUT YOUR PRESSURE TOO
The LA Barbershop Blood Pressure Study
PATIENT TREATMENT REPORT

PHARM VISIT DATE: 2016-08-09
PHARM VISIT NUM: 10

INITIAL MEDICATION /BLOOD PRESSURES	CURRENT MEDICATIONS/BLOOD PRESSURE
1.	1. Amlodipine/Telmisartan 10/80 mg once a day
2.	2. Indapamide 1.25 mg once a day



Barbershop Study

Table 2. Primary and Secondary Blood-Pressure Outcomes.*

Outcome	Intervention Group (N=132)	Control Group (N=171)	Intervention Effect	P Value†
Blood pressure				
Systolic blood pressure — mm Hg‡				
At baseline	152.8±10.3	154.6±12.0		
At 6 mo	125.8±11.0	145.4±15.2		
Change	−27.0±13.7	−9.3±16.0	−21.6 (−28.4 to −14.7)§	<0.001
Diastolic blood pressure — mm Hg				
At baseline	92.2±11.5	89.8±11.2		
At 6 mo	74.7±8.3	85.5±12.0		
Change	−17.5±11.0	−4.3±11.8	−14.9 (−19.6 to −10.3)§	<0.001
Hypertension control at 6 mo — no. (%)				
Blood pressure <140/90 mm Hg	118 (89.4)	55 (32.2)	3.4 (2.5 to 4.6)¶	<0.001
Blood pressure <135/85 mm Hg	109 (82.6)	32 (18.7)	5.5 (2.6 to 11.7)¶	<0.001
Blood pressure <130/80 mm Hg	84 (63.6)	20 (11.7)	5.7 (2.5 to 12.8)¶	<0.001

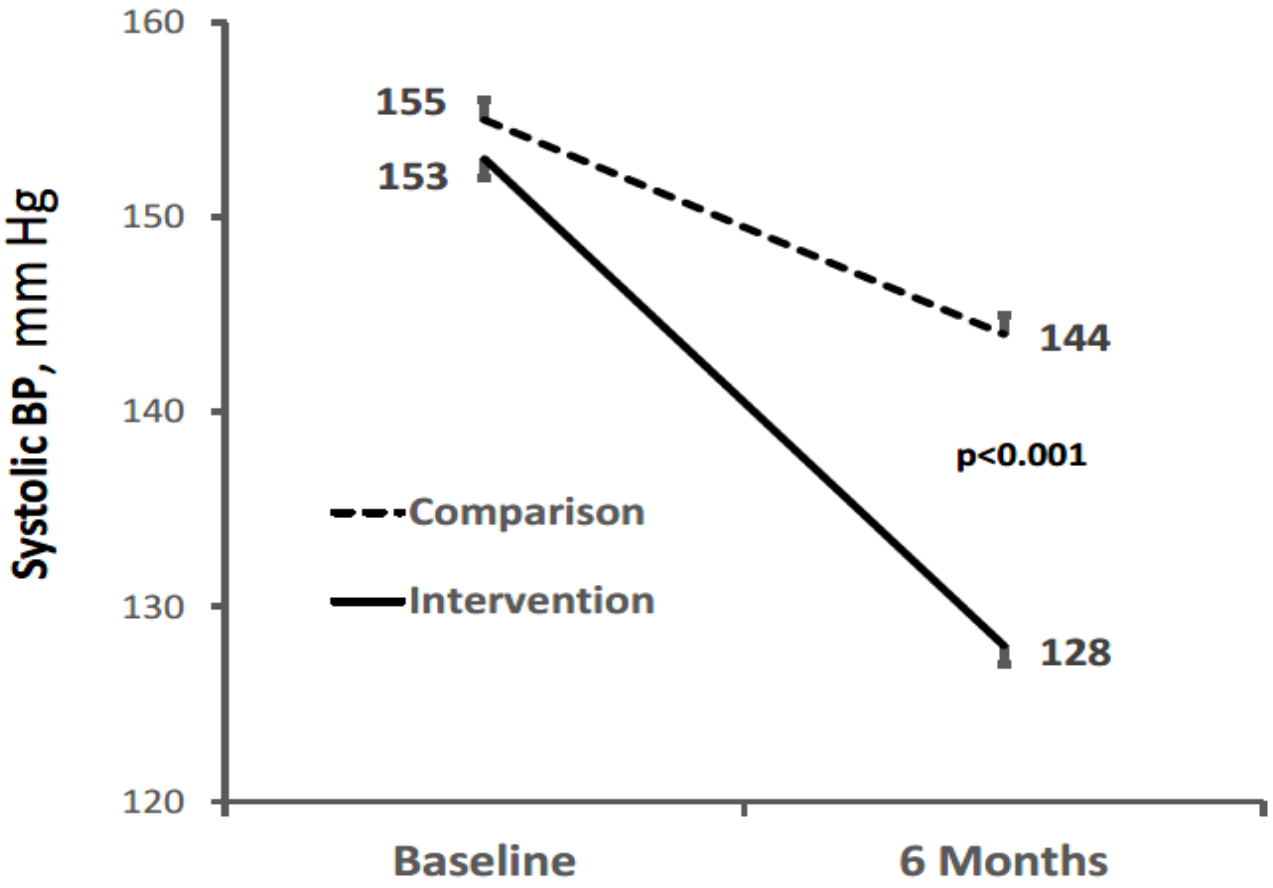
Table 3. Blood-Pressure Medications at 6 Months.*

Variable	Intervention Group (N=132)	Control Group (N=171)	Mean Difference or Relative Risk (95% CI)†	P Value‡
Mean no. of blood-pressure medications per participant	2.6±0.9	1.4±1.4	1.9 (1.3–2.4)	<0.001
Drug class				
First-line drugs — no. (%)				
ACE inhibitor or ARB	130 (98.5)	71 (41.5)	2.4 (2.0–2.8)	<0.001
Calcium-channel blocker	125 (94.7)	56 (32.7)	3.0 (2.4–3.6)	<0.001
Diuretic	61 (46.2)	49 (28.7)	1.6 (1.3–2.1)	<0.001
Add-on drugs — no. (%)				
Aldosterone antagonist	14 (10.6)	2 (1.2)	7.0 (2.5–19.2)	<0.001
Beta-blocker	14 (10.6)	33 (19.3)	0.5 (0.3–0.8)	0.008

Kaiser Permanente (KP) Members Changes in BP Medication by Class

	Intervention, N = 32		Control, N = 43	
Medication Class	**Baseline %**	**6 months %**	**Baseline %**	**6 month %**
ACEI/ARB	43%	100%	40%	56%
CCB	25%	97%	19%	26%
Thiazide type	9%	47%	21%	30%
Aldosterone Agonist	0%	19%	2%	2%
Vasodilating BB	0%	13%	2%	2%

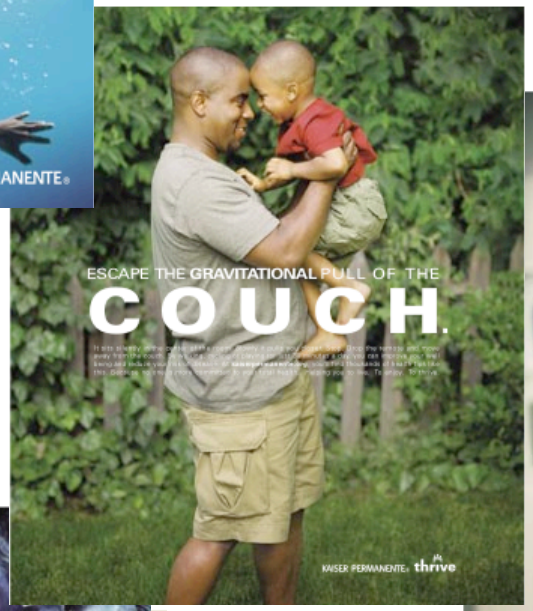
KP Members: Δ SBP after 6 months

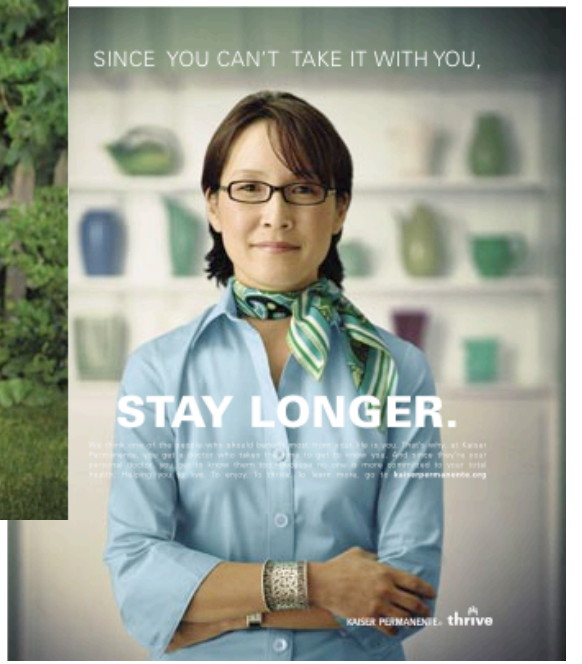


Safety Outcomes

- Intervention was safe & well tolerated with no SAEs
- 3 cases of reversible acute kidney injury in the intervention group, all related to indapamide.

Thank you!





Questions:
Jeffrey.W.Brettler@kp.org