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AMGA Plank 2

Hypertension Guidelines and Adherence

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Disclosures

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- I have no financial disclosures.
- No personal financial interests, stock, ownership interests, or industry relationships

Overview

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- Background
- Definitions
- Treatment Guidelines (JNC 7)
  - Non-pharmacologic
  - Pharmacologic
  - Resistant Hypertension
- Recent Clinical Data and Recommendations
- Optimizing Adherence to Therapy
- Case Study – Kaiser Permanente (Mid-Atlantic)

Importance

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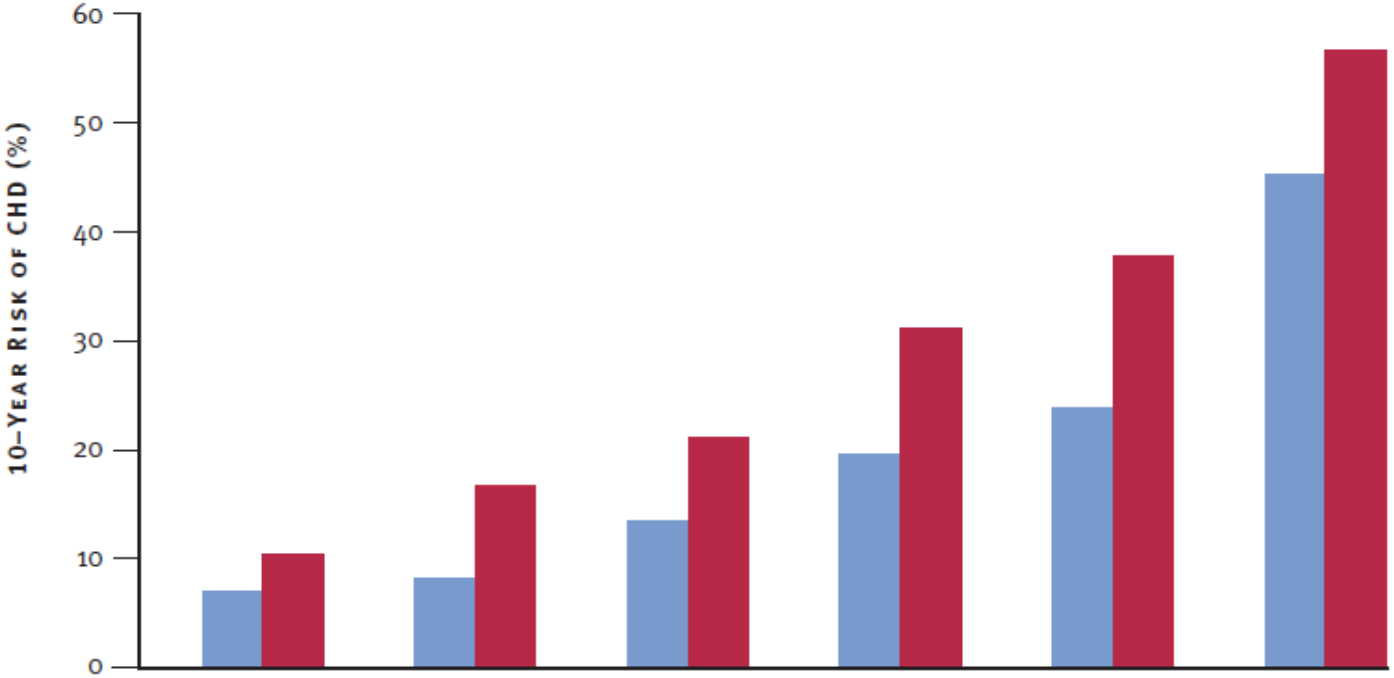
- High blood pressure is ubiquitous
  - 1 out of 3 US adults (68 million adults) have high blood pressure
    - 36 million adults still have uncontrolled BP
    - 30% of people with hypertension in US are unaware of it
  - Lifetime risk of HTN is approximately 85-90% (by age 80-85)
    - 75% of adults older than 75yrs have HTN
- High blood pressure is deadly
  - Lowering SBP by 12mmHg over 10yrs in patient with CV risk factors – can prevent 1 death for every 11 patients
- High blood pressure is costly
  - Costs the nation almost **$131 billion** annually in direct medical expenses, and **$25 billion** in lost productivity

CDC 2011, NHANES

Figure 12. Ten-year risk for coronary heart disease by systolic blood pressure and presence of other risk factors



Cholesterol	180	240	240	240	240	240
HDL	50	50	35	35	35	35
Smoking	No	No	No	Yes	Yes	Yes
Diabetes	No	No	No	No	Yes	Yes
LVH	No	No	No	No	No	Yes

SBP 120 SBP 180

CHD, coronary heart disease; HDL, high-density lipoprotein; LVH, left ventricular hypertrophy; SBP, systolic blood pressure

Source: Derived from Anderson KM, Wilson PWF, Odell PM, Kannel WB. An updated coronary risk profile. A statement for health professionals. Circulation *1991;83:356–62.*

JNC 7

Blood Pressure: Definitions

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- Definition
  - Average of two or more properly measured, seated, BP readings on each of two or more office visits
- Goals of Therapy (JNC7)
  - BP goal <140/90
  - For patients with diabetes / renal disease: goal <130/80
- JNC8 still to be released
  - JNC7 was released 2003, now 10 years old
  - JNC8 will be based on rigorous clinical evidence review
  - Guidelines to be released on HTN, Hyperlipidemia, Obesity

Hypertension: JNC7 Classification

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Table 3. Classification of blood pressure for adults

Blood Pressure Classification	SBP mmHg	DBP mmHg
Normal	<120	and <80
Prehypertension	120–139	or 80–89
Stage 1 Hypertension	140–159	or 90–99
Stage 2 Hypertension	≥160	or ≥100

SBP, systolic blood pressure; DBP, diastolic blood pressure

JNC 7

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Table 9. Lifestyle modifications to prevent and manage hypertension*

Modification	Recommendation	Approximate SBP Reduction (Range)†
Weight reduction	Maintain normal body weight (body mass index 18.5–24.9 kg/m²).	5–20 mmHg/10kg[92,93]
Adopt DASH eating plan	Consume a diet rich in fruits, vegetables, and lowfat dairy products with a reduced content of saturated and total fat.	8–14 mmHg[94,95]
Dietary sodium reduction	Reduce dietary sodium intake to no more than 100 mmol per day (2.4 g sodium or 6 g sodium chloride).	2–8 mmHg[94-96]
Physical activity	Engage in regular aerobic physical activity such as brisk walking (at least 30 min per day, most days of the week).	4–9 mmHg[97-98]
Moderation of alcohol consumption	Limit consumption to no more than 2 drinks (e.g., 24 oz beer, 10 oz wine, or 3 oz 80-proof whiskey) per day in most men, and to no more than 1 drink per day in women and lighter weight persons.	2–4 mmHg[99]

DASH, Dietary Approaches to Stop Hypertension; SBP, systolic blood pressure

JNC 7

JNC 7: Pharmacologic choices

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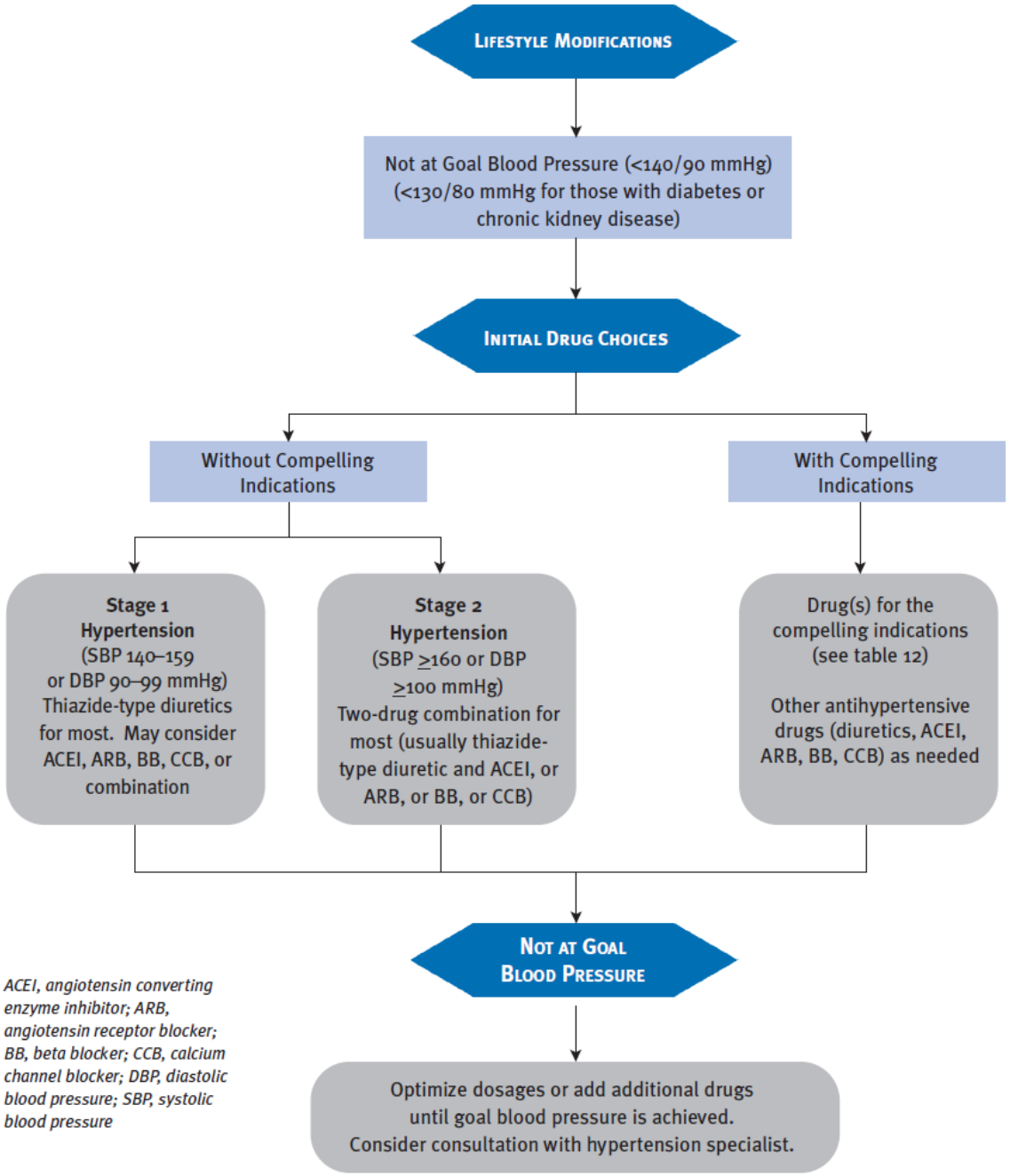
- Pharmacologic recommendations from JNC 7
  - First-line – diuretic therapy preferred
    - HCTZ (25-50mg) or Chlorthalidone (12.5-25mg)
  - Combination therapy
    - >2/3 of patients cannot be controlled on one drug

Figure 16. Algorithm for treatment of hypertension



ACEI, angiotensin converting enzyme inhibitor; ARB, angiotensin receptor blocker; BB, beta blocker; CCB, calcium channel blocker; DBP, diastolic blood pressure; SBP, systolic blood pressure

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JNC 7

Table 12. Clinical trial and guideline basis for compelling indications for individual drug classes

Compelling Indication*	Recommended Drugs						Clinical Trial Basis†
	Diuretic	BB	ACEI	ARB	CCB	Aldo ANT	
Heart failure	●	●	●	●		●	ACC/AHA Heart Failure Guideline,[132] MERIT-HF,[133] COPERNICUS,[134] CIBIS,[135] SOLVD,[136] AIRE,[137] TRACE,[138] ValHEFT,[139] RALES,[140] CHARM[141]
Postmyocardial infarction		●	●			●	ACC/AHA Post-MI Guideline,[142] BHAT,[143] SAVE,[144] Capricorn,[145] EPHESUS[146]
High coronary disease risk	●	●	●		●		ALLHAT,[109] HOPE,[110] ANBP2,[112] LIFE,[102] CONVINCE,[101] EUROPA,[114] INVEST[147]
Diabetes	●	●	●	●	●		NKF-ADA Guideline,[88,89] UKPDS,[148] ALLHAT[109]
Chronic kidney disease			●	●			NKF Guideline,[89] Captopril Trial,[149] RENAAL,[150] IDNT,[151] REIN,[152] AASK[153]
Recurrent stroke prevention	●		●				PROGRESS[111]

JNC 7

Resistant Hypertension

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- Resistant HTN
  - Defined as adherence to 3 drug regimen (including diuretic)
  - Causes
    - Improper BP measurement
    - White Coat Hypertension
    - Heavily calcified brachial arteries
    - Inadequate diuretic dose (CKD, CHF)
    - NSAIDS, OTC cold products (pseudoephedrine)

Causes of Resistant Hypertension

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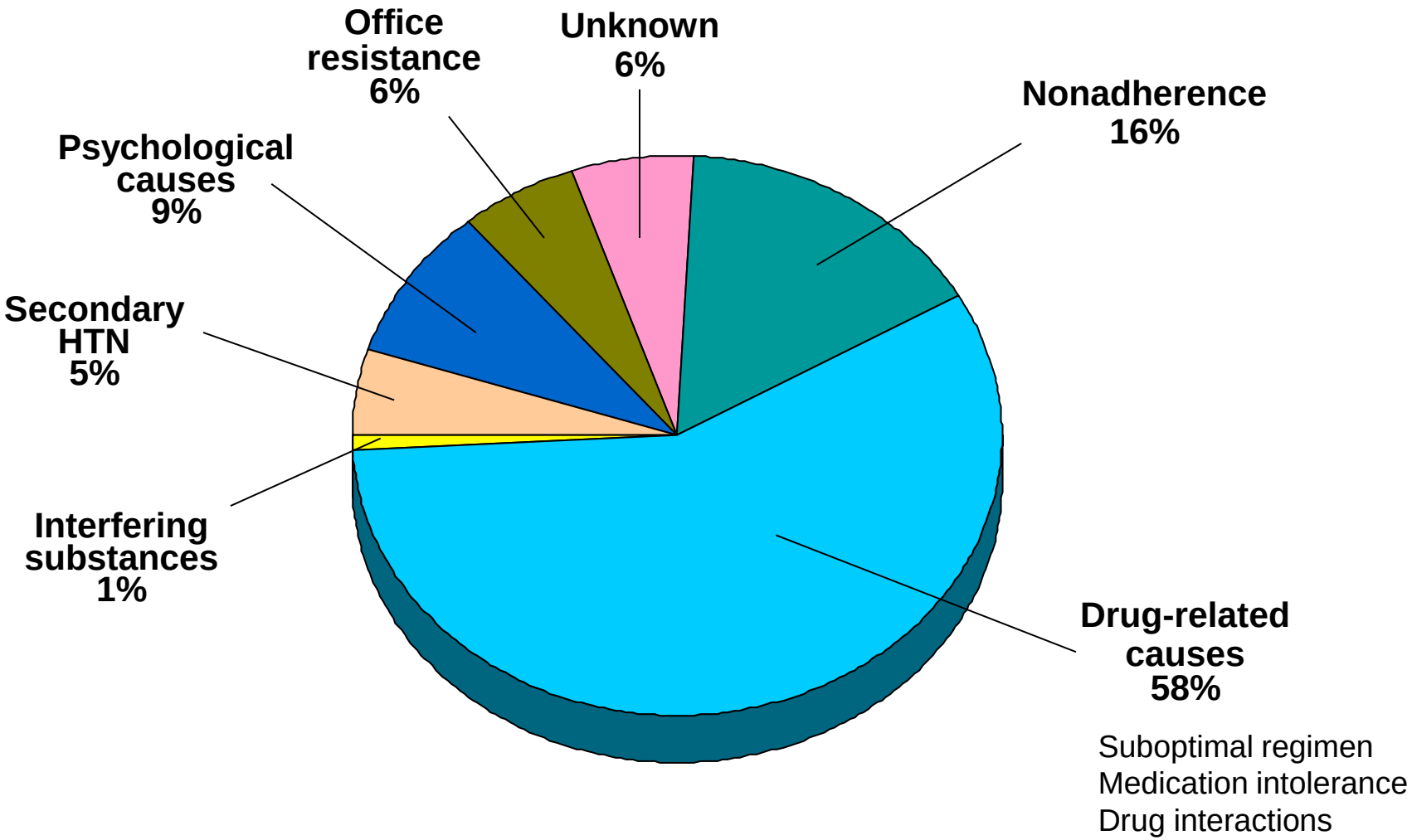

Primary cause of resistant hypertension

Garg JP, et al. Am J Hypertens 2003;16:925-930

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Recent Clinical Evidence

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- ACCORD-BP (NEJM 2010)
  - 4733 pts DM2 x 4.7yrs – goal BP<120 vs. <140
    - Mean BP attained 119.3 vs. 133.5 (vs. 139/76 baseline)
  - No diff MI/CVA/death (1.87% vs 2.09%)
  - No difference in all cause mortality (1.28% vs 1.19%)
    - Reduction in stroke (0.32% vs 0.53%)
    - Side effects (ie. syncope/dizziness) (3.3% vs 1.3%)
- HYVET (NEJM '08)
  - 3800pt x 1.8yrs, >80yrs, goal SBP<150 with diuretic+/- ACE
  - Decreased CVA (30%), CHF (64%), all cause mortality (21%)

Recent Statements

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- Diabetics: Blood Pressure Treatment Goals
  - ADA (2013) – BP <140/80
  - NICE (2011) – BP<140/90 (DM,CKD,CVD)
  - ESH (2009) / ESC (2012) – BP<140/90
- Elderly: Blood Pressure Treatment Goals
  - ACCF/AHA (2011) >80 yrs – SBP <150
  - NICE (2011) – >80 yrs - BP<150/90

Speculations for JNC 8

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- Changes in BP goals (DM, CKD, elderly)
- Expanding first line preferred agents
  - Thiazide diuretic is currently the preferred agent, may expand to CCB/ACE/ARB in future
- Ambulatory BPs vs. In-office readings
- Combination therapy
  - Two drugs are better than doubling dose
- Chlorthalidone vs. HCTZ
  - Differences between agents may be dose related (HCTZ 50 is similar efficacy to Chlorthalidone 25)
- Aldactone as add-on agent for resistant HTN
- Sodium dietary targets

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Challenges to Adherence

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- Obesity
  - 68% of US adults are overweight or obese (35% obese)
  - 32% of US children are overweight or obese (17% obese)
- Diet:
  - Less than 1% of US adults meet the definition of "Ideal Healthy Diet"
  - Essentially no children meet the goal.
- Exercise:
  - 32% of adults report no aerobic activity at all
  - Only 21% of adults meet guidelines for physical activity
- Medications:
  - Studies indicate up to 50% of patients do not take their medications as prescribed

AHA: Circ 2013

Improving Adherence

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- Patient factors
  - Patient education / developing insight into condition
    - Patients usually feel well
    - Perceived side effects to medications
  - Depression
  - Family members / social support
- Physician factors
  - Truly believing in importance of goals
    - Nonadherence is 19% higher in patients whose physician communicates poorly
  - Conveying empathy / concern
  - Correctly identifying patient barriers
  - Including patient into decision making
  - Acknowledging patient successes / adherence

Improving Adherence

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- Simplifying Medical Regimen
  - Low cost medications
  - Once daily meds
    - 8% greater adherence with once a day dosing*
  - Recognize Nonadherence

- Follow-up
  - Make next appointment before patient leaves office
  - Use appointment reminders
  - Follow-up on patients who miss appointments
  - Collaboration with dieticians, nurses, NPs, PAs, pharmacists

* Clin Ther 2002; 24:302

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The Kaiser Experience
Implementing Blood Pressure Control

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KP: Initial challenges

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- In 2001, Kaiser Permanente ranked below the 25th percentile for HEDIS BP measures by NCQA
  - <50% of KP members had BP under control
- Blood Pressure control became a top priority by KP Leadership
  - Implementation assisted by subsequent adoption of electronic medical records system (Epic, implemented in 2005)

Blood Pressure – Implementation

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- Benchmarking
  - Sharing and comparing performance other Kaiser regions and other organizations across the US
- Transparency
  - Sharing performance monthly to region, center, provider
  - 2010 – Electronic panel management tool
    - Providers can search and directly link to patients with uncontrolled BP
    - All MDs can view data, not password protected

Transparency: Performance Reporting / Panel Mgmt

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By Center / Individual Physicians

Record 2 of 2

Performance Reporting

REGION MA
AREA BALTIMORE
PHYSICIAN SYKORA, WILLIAM S (M.D.)
MOB ANNAPOLIS
DEPARTMENT Family Practice

	Jan-10	Feb-10	Mar-10	CURRENT	Regional Rank	Local Rank	Target	Total pts not at target	# of pts to get to target
Hypertension: Blood Pressure Control	49.3%	53.4%	58.0%	58.5%	139 of 228	2 of 2	78%	66	31
Current # of eligible HTN patients : 159									
Dept Avg	60.6%	60.3%	60.0%	60.8%					

By Area

Record 2 of 5

Performance Reporting

REGION MA
AREA DC-SM

	Jan-10	Feb-10	Mar-10	CURRENT	Regional Rank	Target	Total pts not at target	# of pts to get to target
Hypertension: Blood Pressure Control	55.8%	55.7%	56.9%	57.6%	2 of 5	78%	25027	12041
Current # of eligible HTN patients : 59028								

Blood Pressure – Implementation

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- Education
  - Training staff annually for BP measurement competency
  - Quarterly Webinars, Quality Newsletters
  - Member education – pamphlets, classes, online education
  - Sharing best practices from local, regional, and national high performers
    - Disseminating best practices across Kaiser regions throughout country

- Reliability – creating effective and simple workflows
  - Standardized Treatment Algorithm
  - Non-MD BP clinic
  - Pharmacy / RN support

Effective workflows

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- Standardized treatment algorithm
  - Simple
    - one BP target for all patients (<140/90) – DM/CKD/etc
  - Fewer steps – easier for providers and patients
    - (1) ACE/HCTZ, (2) CCB, (3) Aldactone or BB
  - Faster control → patient satisfaction
  - Fewer pills → improved patient compliance
  - Fewer visits to providers → improved access for patients

  - Available on KP website from any Kaiser computer

CMI HTN Treatment Algorithm

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ACE-Inhibitor[2] / Thiazide Diuretic

Lisinopril / HCTZ
(Advance 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[2]

If ACEI intolerant or pregnancy potential →

Thiazide Diuretic

Chlorthalidone 12.5 mg → 25 mg
OR
HCTZ 25 mg → 50 mg

If not in control ↓

If not in control ↓

Calcium Channel Blocker

Add amlodipine 5 mg X ½ daily → 5 mg X 1 daily → 10 mg daily

If not in control ↓

Beta-Blocker OR Spironolactone

Add atenolol 25 mg daily → 50 mg daily (Keep heart rate > 55)
OR
IF on thiazide AND eGFR ≥ 60 ml/min AND K < 4.5
Add spironolactone 12.5 mg daily → 25 mg daily

If not in control ↓

Begin with Lisinopril/HCTZ

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ACE-Inhibitor[2] / Thiazide Diuretic

Lisinopril / HCTZ
(Advance 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[2]

If not in control

SBP Reduction: Monotherapy ACEI Vs Combination therapy with HCTZ

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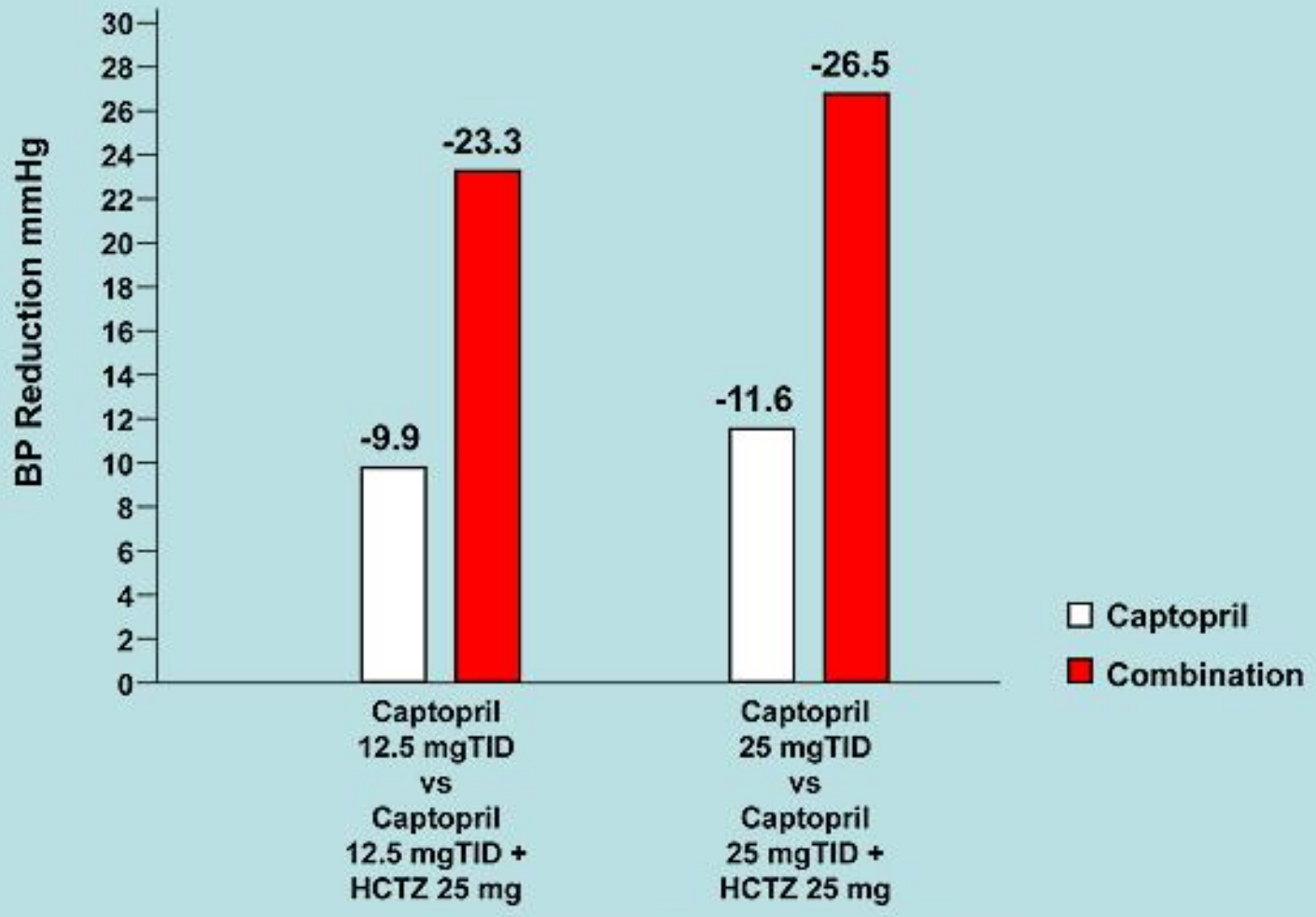

Adapted from VA study Br J Clin Pharmac 1982; 14:975 - 1015

1/4 of ACEI Rx's dispensed as Single Pill Combination Therapy

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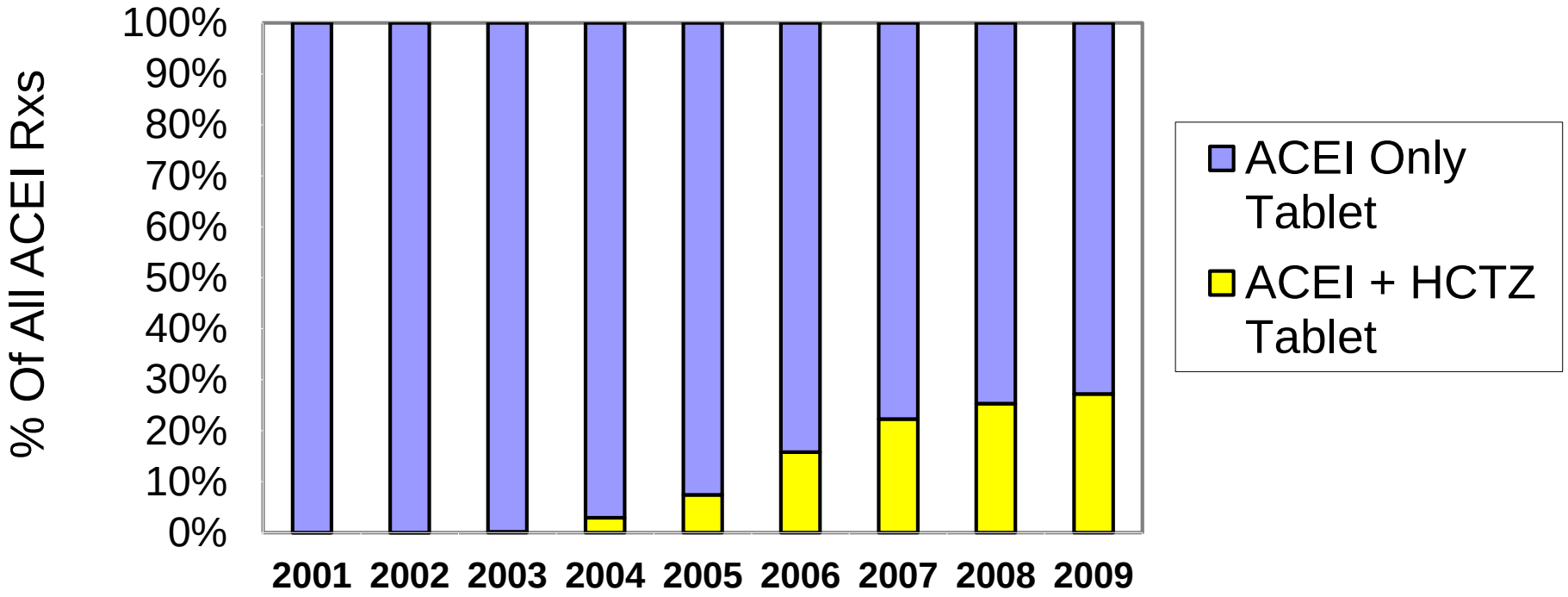

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Lisinopril/HCTZ and Hypertension Performance

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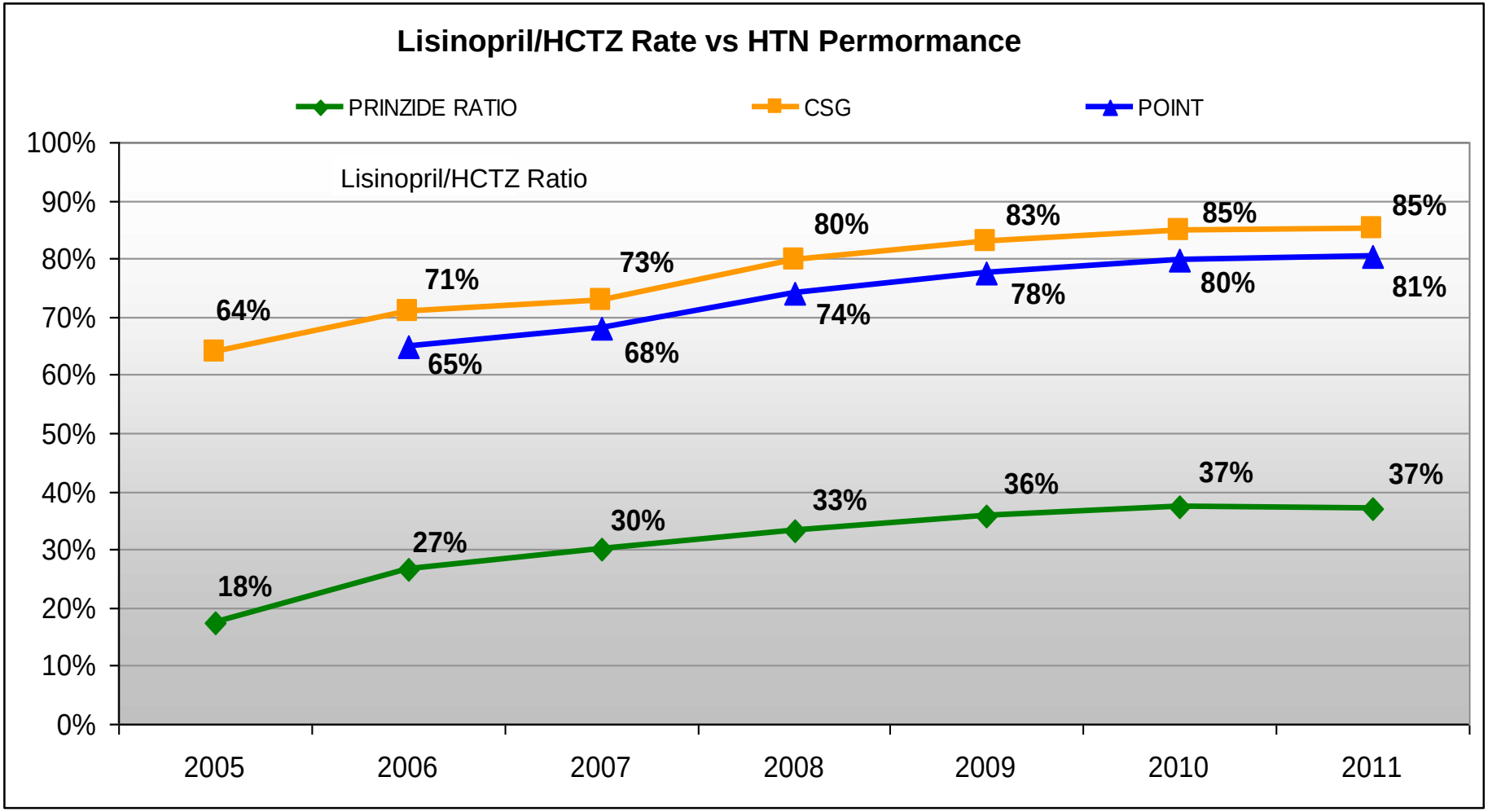

Amlodipine is Third Drug

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Calcium Channel Blocker

Add amlodipine 5 mg X ½ daily → 5 mg X 1 daily → 10 mg daily

If not in control

Spironolactone Preferred Fourth Drug

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Spironolactone or Beta-Blocker

IF on thiazide AND eGFR ≥ 60 ml/min AND K < 4.5

Add spironolactone 12.5 mg daily → 25 mg daily

OR

Add atenolol 25 mg daily → 50 mg daily (Keep heart rate > 55)

If not in control

Non-MD Blood Pressure Check

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BB OK 1st → BB OK 2nd → BB 3rd → BB still 3rd → BB OK 4th

Year	2001*	2003	2005	2007	2009
Step 1	TD or BB	TD **BB not 1st**	TD or TD + ACEI **SPC OK 1st**	TD or TD + ACEI	TD or TD + ACEI
Step 2	TD + BB	TD + ACEI or TD + BB **ACEI or BB 2nd**	TD + ACEI **ACEI 2nd**	TD + ACEI	TD + ACEI
Step 3	TD + BB + ACEI	TD + BB + ACEI	TD + ACEI + BB **BB 3rd**	TD + ACEI + BB	TD + ACEI + DCCB **DCCB 3nd**
Step 4	TD + BB + ACEI + DCCB	TD + BB + ACEI + DCCB	TD + BB + ACEI + DCCB	TD + BB + ACEI + DCCB	TD + ACEI + DCCB + BB or Spir

BB OK 4th

TD=Thiazide Diuretic, BB=Beta Blocker, ACEI=Angiotensin Converting Enzyme Inhibitor, DCCB=Dihydropyridine Calcium Channel Blocker, Spir=Spironolactone. *1995-2001 No Significant changes after step 2

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Non-MD Blood Pressure Check

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- Blood Pressure Clinic
  - ANY BP measured in ANY primary care or specialty setting is captured and an appointment is made in BP clinic.
    - BP measurement is rechecked manually after 5 minutes on any elevated reading.
    - Captures patients in Optometry, OB-GYN, Podiatry, Derm

      Many of these patients may not see PCP regularly

  - Non-physician based clinic (BP check with medical assistant)
    - Patient seen same-day in center if BP> 139/89
    - PCP adjusts therapy before patient leaves
    - Repeat appointment every 2 weeks until BP controlled
    - No charge, Walk-ins welcome, removed all barriers for patients

Reliability: Proactive Care

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Care Management Summary Sheet (CMSS)

Print

Patient: XXX XXXXXX,XXXXX MRN: DOB: Gender: M
PCP: SYKORA, WILLIAM S (M.D.) PCP Apt: 03/17/2010 Phone Language:
Last BP: 1)03/17/10 (140/76) 2)12/31/09 (144/92) Last MAM: Last PAP:

Recommended Care

- History of uncontrolled HTN: Verify diagnosis and treat to goal < 140/90 or < 130/80 if diabetes or CKD.

Diseases / Risks

HTN							
STG 1							

All Meds (Last 20 dispenses in 12 mo)

Date	Drug	Qty	RF
04/01/10	LISINOPRIL-HYDROCHLOROTHIAZIDE 20-25 MG TABS	90	1
03/17/10	DESMOPRESSIN ACETATE SPR 0.01%	10	7
01/07/10	ACETAMINOPHEN/CODEINE #3 TAB 300-30MG	30	1
12/31/09	PREDNISONE TAB 50MG	5	1
12/31/09	CYCLOBENZAPRINE HCL TAB 10MG	30	1

Cr, K, Microalb, A1c, ALT, Theophy (Last 2 in 12 mo)

Date	Type	Result

Date	CHOL	TRG	HDL	LDL

Non-MD Blood Pressure Check

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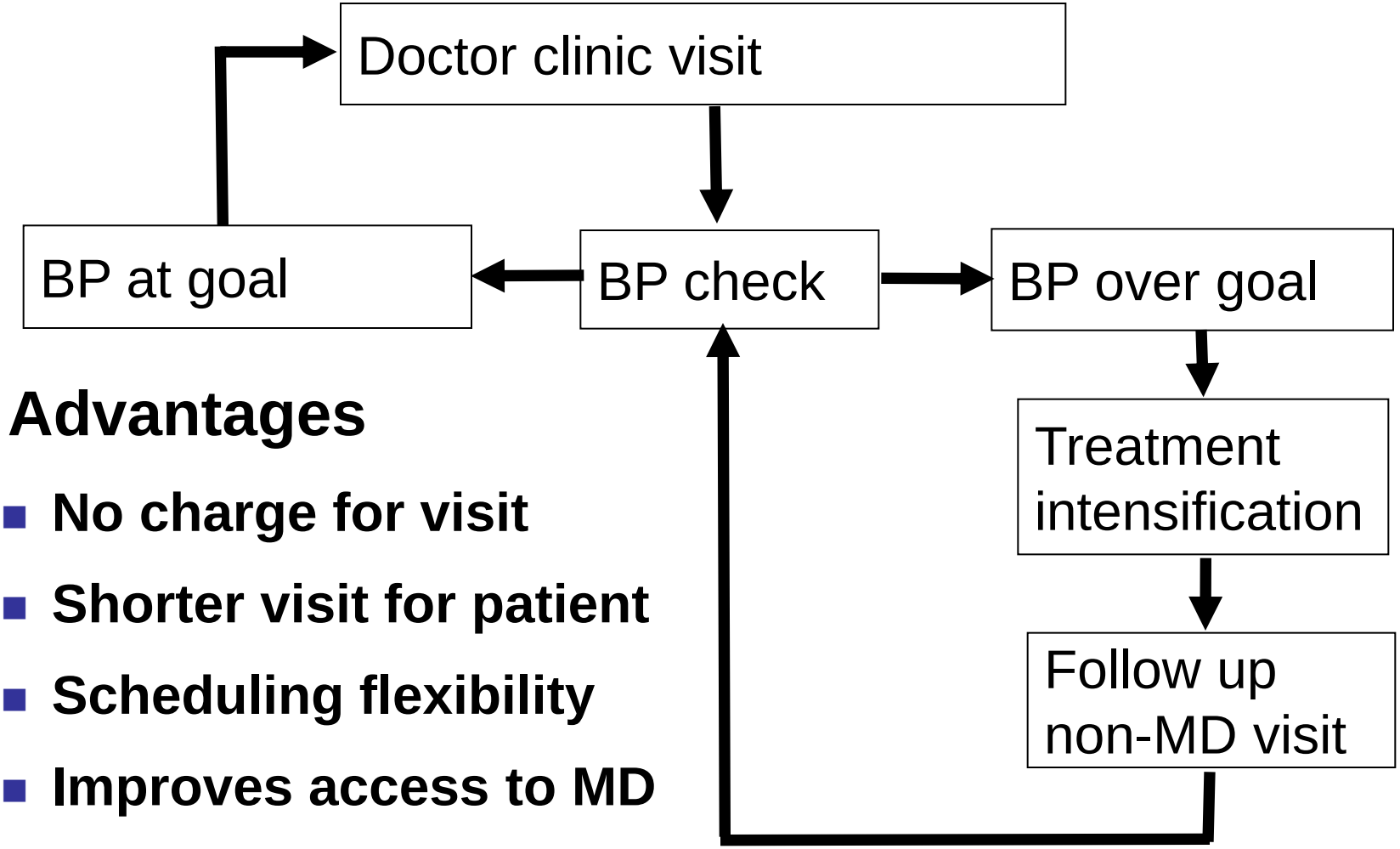

- **Advantages**
  - **No charge for visit**
  - **Shorter visit for patient**
  - **Scheduling flexibility**
  - **Improves access to MD**

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Hypertension Control Rates 2001-2009
KP Northern California

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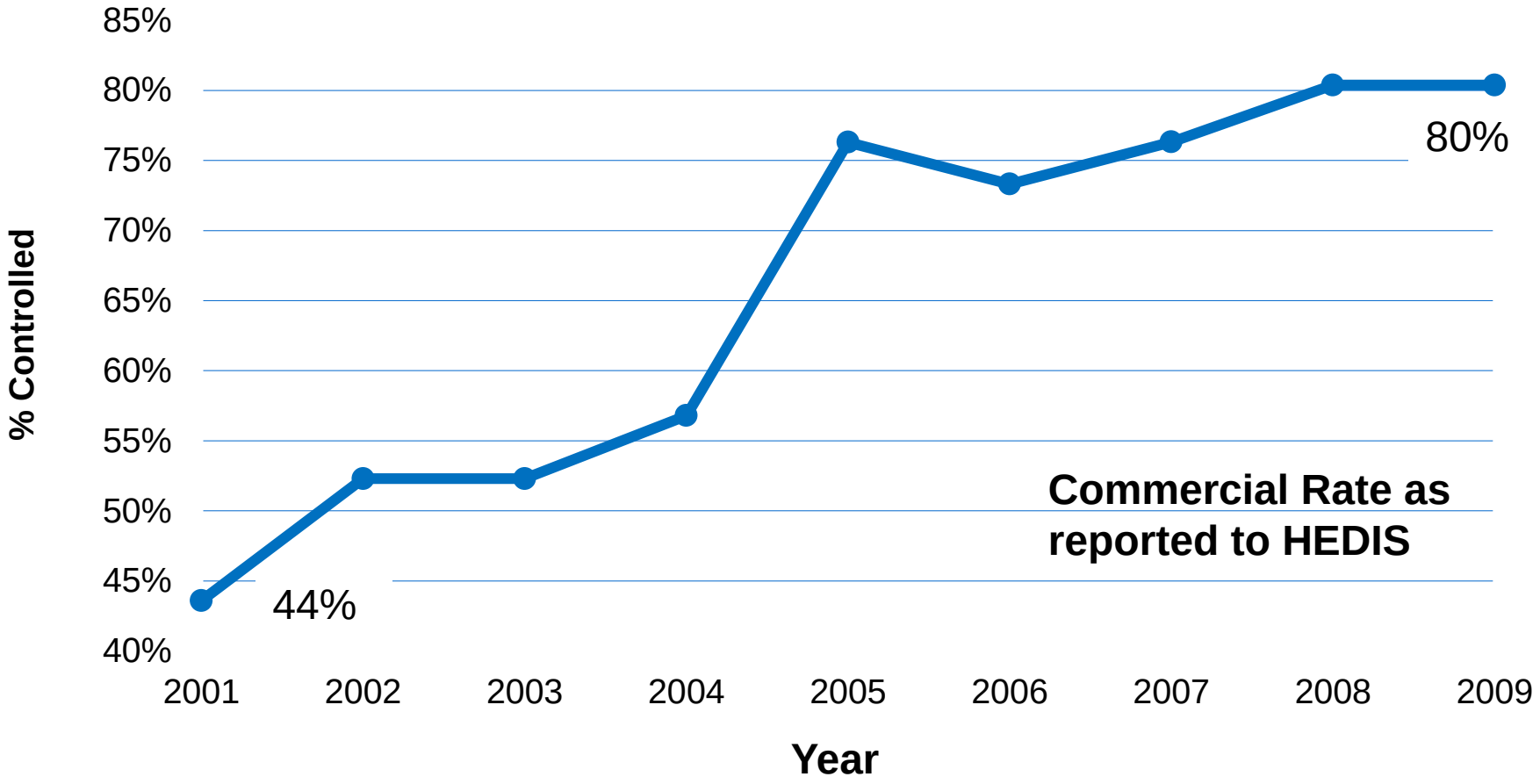

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Hypertension Control Rates 2006-2011
KP Mid-Atlantic States

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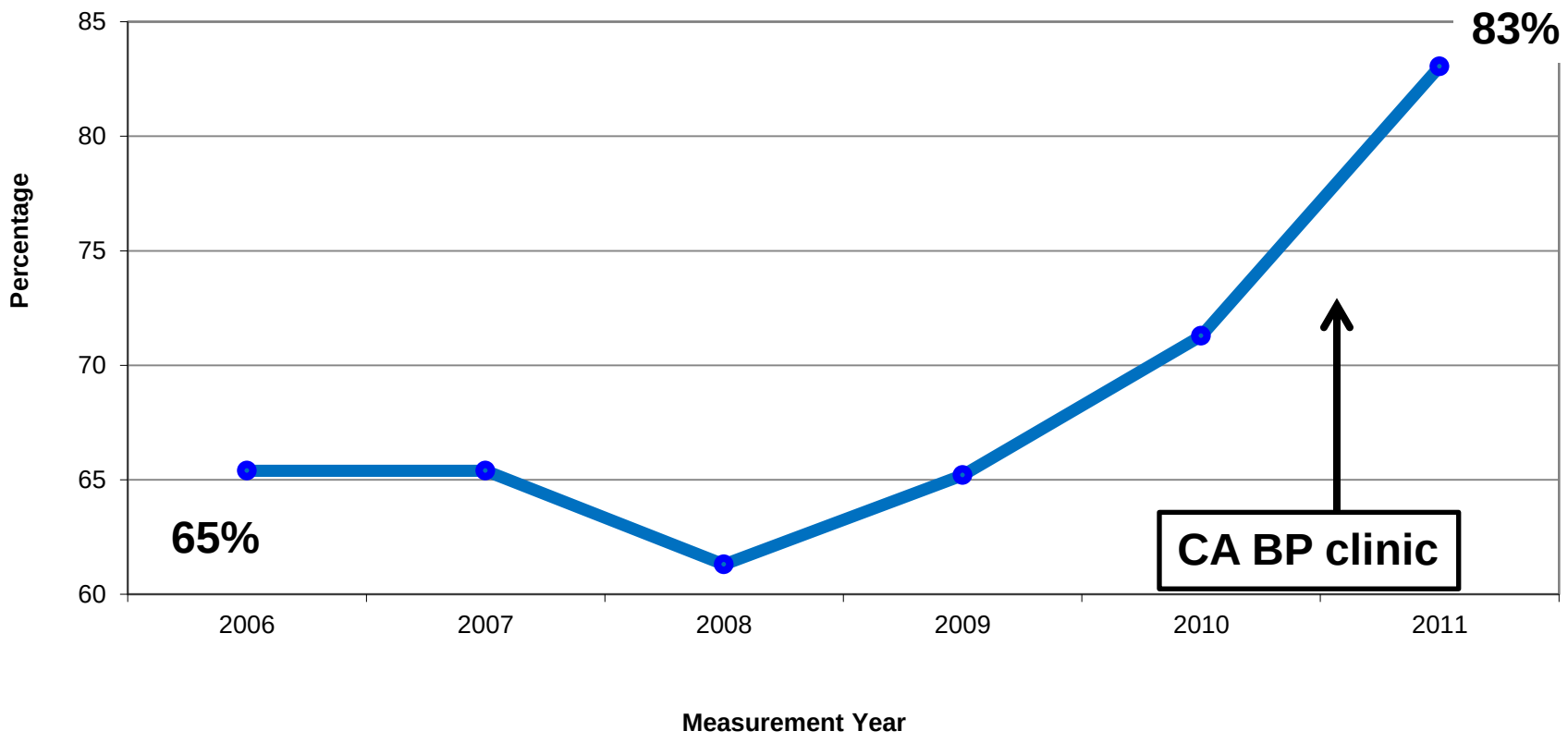

Hypertension Control – Ethnicity
KP Mid-Atlantic States

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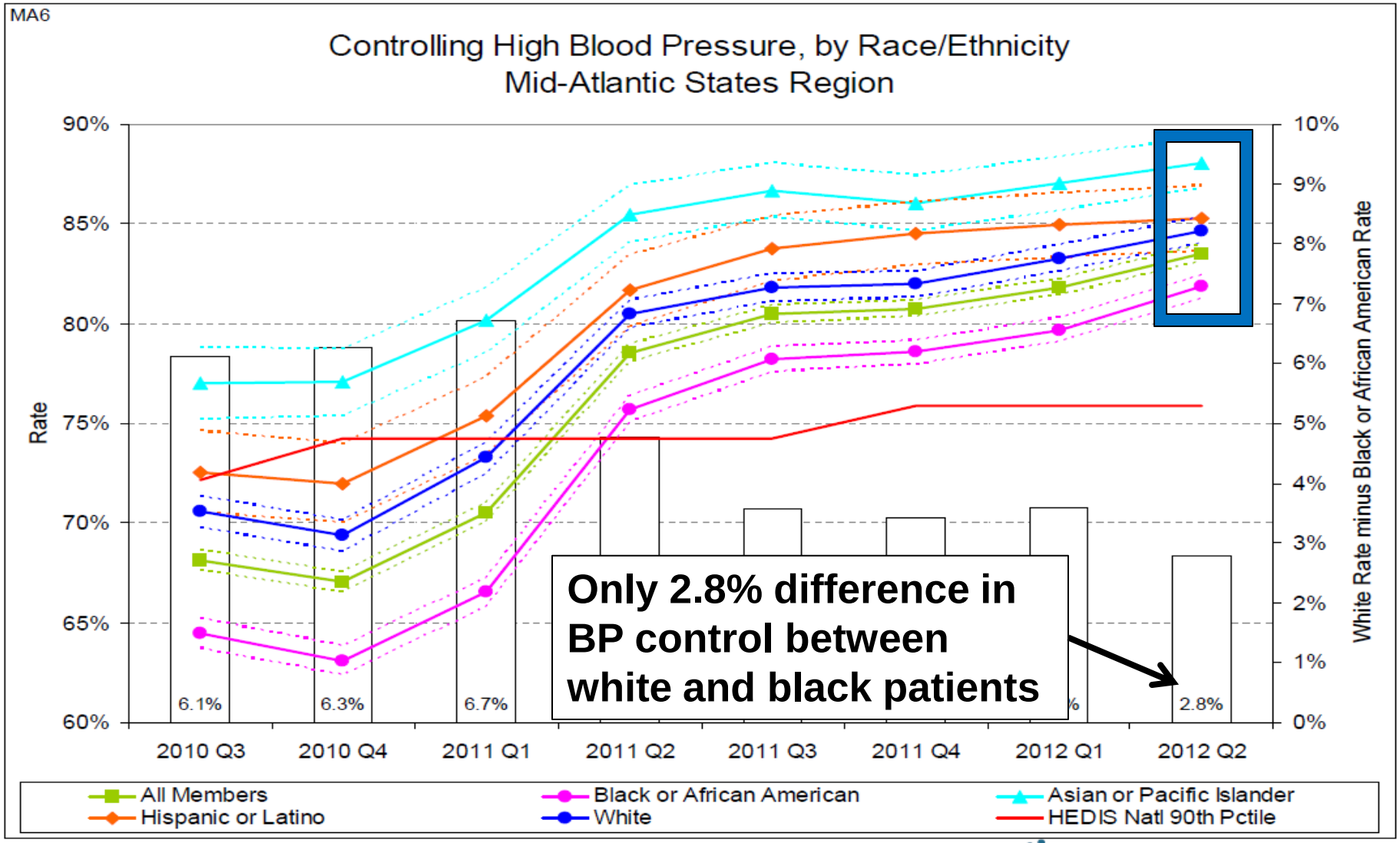

Only 2.8% difference in BP control between white and black patients

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KP: Blood pressure Control

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- Kaiser Northern California
  - 3.3 million members, 5,000 physicians, 17 medical centers
  - 2001 to 2009: HTN control nearly doubled from 44% to 80%
    - 359,000 more people had controlled HTN
- Kaiser Mid-Atlantic States
  - 500,000 members, over 900 physicians
  - 2010 – HTN was made a top priority

HEDIS 2012:
Top Ten Performance - MEDICARE

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Plan	State	Contract	Plan Type	Rate	State Rank	National Rank
Kaiser Foundation Health Plan of Ohio	OH	H6360	HMO	88.81%	1	1
Kaiser Foundation Health Plan of Colorado	CO	H0630	HMO	88.33%	1	2
Kaiser Foundation Health Plan Inc. - Southern California	CA	H0524	HMO	88.32%	1	3
Kaiser Foundation Health Plan, Inc. - Hawaii	HI	H1230	HMO	87.83%	1	4
Kaiser Foundation Health Plan of the Mid-Atlantic States, Inc.	DC,MD,VA	H2150	HMO	85.97%	1	5
Gundersen Lutheran Health Plan, Inc.	WI	H5262	HMO	85.16%		6
Kaiser Foundation Health Plan, Inc. - Northern California	CA	H0524	HMO	84.02%	2*	7
Group Health Plan, Inc.	MN	H2462	HMO	83.08%		8
Kaiser Foundation Health Plan, Inc. - Northern California	CA	H6052+	HMO	82.97%	3*	9
Chinese Community Health Plan	CA	H0571	HMO	82.47%		10

HEDIS 2012:
Top Ten Performance - COMMERCIAL

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Plan	State	Plan Type	Rate	State Rank	National Rank
Coventry Health Care of Illinois, Inc.	IL	HMO/POS	88.85		1
Cigna HealthCare Mid-Atlantic, Inc.	DC,MD,VA	HMO/POS	87.50		2
Kaiser Foundation Health Plan, Inc. - Northern California	CA	HMO	87.08	1	3
Kaiser Foundation Health Plan Inc. - Southern California	CA	HMO	85.64	2*	4
Kaiser Foundation Health Plan, Inc. - Hawaii	HI	HMO	84.43	1	5
Kaiser Foundation Health Plan of the Mid-Atlantic States, Inc.	DC,MD,VA	HMO	83.04	2	6
Kaiser Foundation Health Plan of Ohio	OH	HMO	82.73	1	7
HealthPartners, Inc.	MN	HMO/POS/PPO	80.07		8
Gundersen Lutheran Health Plan, Inc.	WI	HMO	79.08		9^
Wellmark Health Plan of Iowa, Inc.	IA	HMO/POS	79.08		9^

KP: Keys to Achieving BP control

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- Take Home Points
  - BP checks (and mgmt) at every patient care encounter
    - Including optometry, OB-GYN, etc
  - BP clinic (Non-MD clinic)
    - Free and frequent visits, walk ins welcome
    - Removing all barriers for patients
  - Simple algorithm – easy for providers and patients
    - One BP goal (<140/90) for all patients
    - Emphasis on combination pills (lisinopril / HCTZ)
    - Emphasis on getting to target BP control quickly
  - Feedback on Performance / Transparency
    - Panel management electronic tools

Acknowledgements

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- Loan Nguyen, MD
- Kathryn Brown
- Carol Foster, MD
- Susan Fiorella, MD
- Joyce Jones
- Jerry Penso, MD
- Stacey Shapiro

Clinical References

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AMGA Best Practices in Hypertension:

Controlling Blood Pressure, Kaiser Mid-Atlantic 2006

- http://www.amga.org/research/research/Hypertension/Compendiums/kaiser.pdf

Hypertension Best Practices, Kaiser Mid-Atlantic 2010

- http://www.amga.org/research/research/Hypertension/Symposium/kaiser.pdf

CDC:

- http://www.cdc.gov/bloodpressure/
- http://www.cdc.gov/dhdsp/data_statistics/fact_sheets/fs_bloodpressure.htm

NHLBI

- http://www.nhlbi.nih.gov/health/prof/heart/index.htm#hbp
- http://www.nhlbi.nih.gov/health/prof/heart/hbp/salt_upd.pdf

AHA

- http://www.heart.org/HEARTORG/
- http://www.heart.org/HEARTORG/General/Heart-and-Stroke-Association-Statistics_UCM_319064_SubHomePage.jsp#

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NICE guidelines: National Institute of Clinical Excellence (Britain)

- http://www.nice.org.uk/guidance/CG127
- http://www.nice.org.uk/nicemedia/live/13561/56015/56015.pdf

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- http://www.ndei.org/dsl/newslide.aspx?Slideid=2990
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- http://www.escardio.org/guidelines-surveys/esc-guidelines/GuidelinesDocuments/Essential_Messages_CVD_Prevention.pdf
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Detailed list of international guidelines

- http://bestpractice.bmj.com/best-practice/monograph/26/treatment/guidelines.html

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