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Health Quality Innovation Network

Critical Drivers of Hypertension: HEARTS Clinical Pathway to Improve Hypertension Control in Primary Care Practice

Jeffrey W. Brettler, MD

September 21st, 2022

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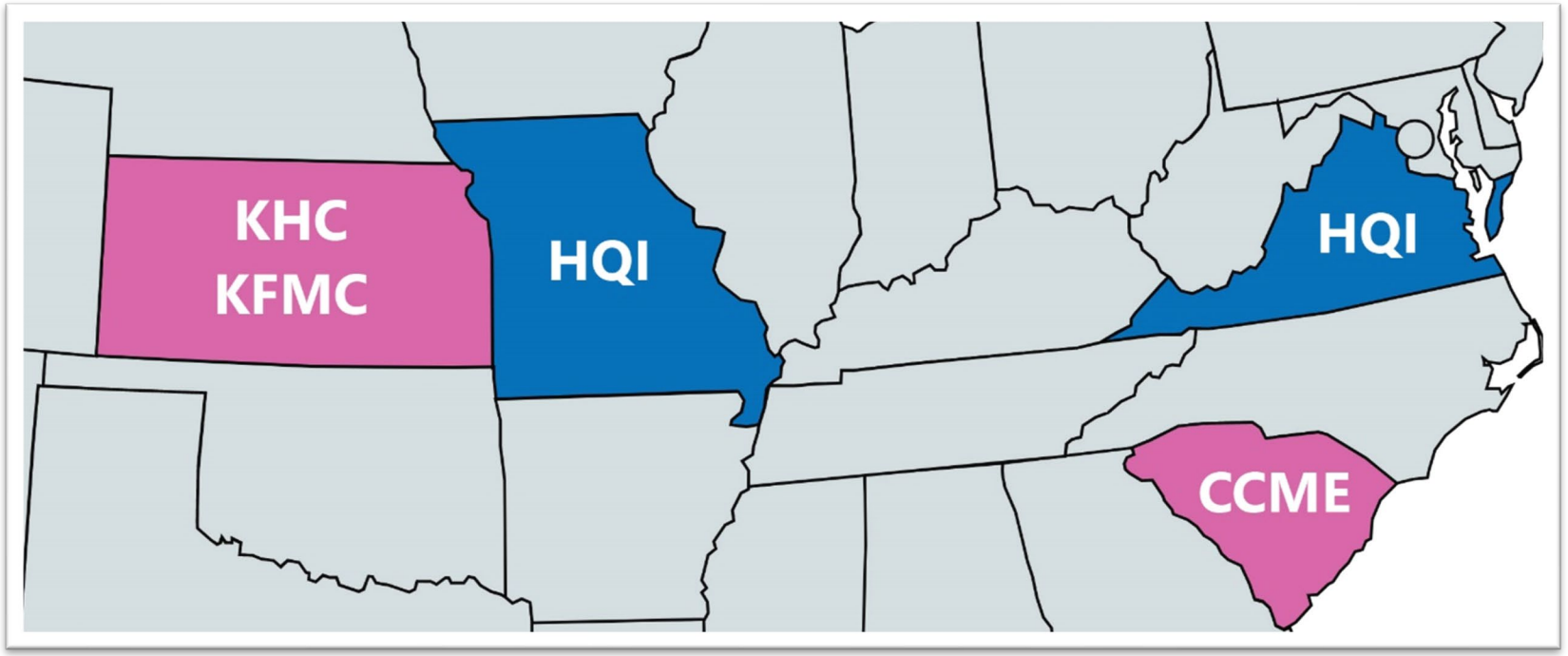

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This HQIN **HEARTS in America** series is delivered by **HEARTS** subject matter experts. They are introducing the pillars of the HEARTS Technical Package while beginning the conversation about HEARTS in America.

If you would like to speak to a HEARTS Advisor, learn more about the initiative, and discuss possibilities for your organization, please connect with your HQIN Quality Improvement Advisor to begin the next steps.

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Disclosures

Disclosure Information

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Invited Faculty:

Jeffrey W. Brettler, MD
- No Financial Relationships Were Declared

Logistics – Zoom Meeting

To ask a question during the presentation, please use **Chat**.

Raise your hand if you want to verbally ask a question.

Links from today's session will be posted in **Chat**.

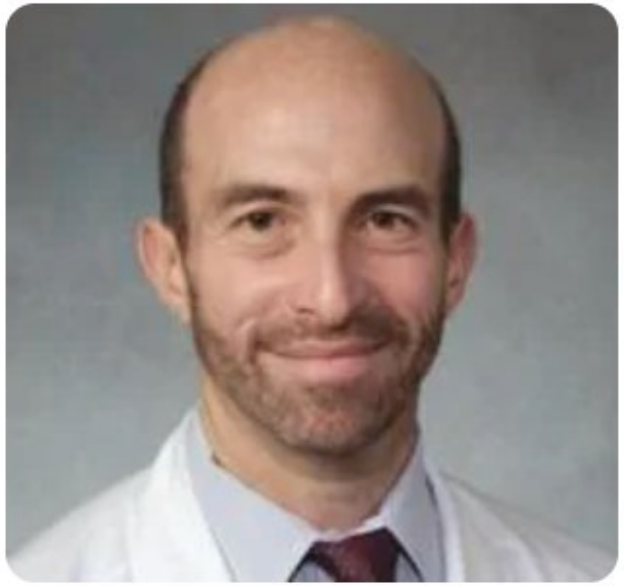
You may adjust your audio by clicking **Audio Settings**.

You have been automatically muted with video turned off.

Purpose & Learning Objectives

1. Detail the critical drivers of hypertension control in the primary care setting
2. Develop implantation strategies to address the critical drivers of hypertension control
3. Discuss disparity impacts to critical drivers of hypertension control

Jeffrey W. Brettler, MD



Dr. Jeffrey Brettler is a general internist that has practiced for more than 20 years with the Kaiser Permanente West Los Angeles Medical Center. He has served as the Chief of Internal Medicine, Population Care Physician Lead, and currently services as the Hypertension Lead for Southern California Kaiser Permanente. He is a Fellow of the American Society of Hypertension and Assistant Professor in the Department of Health Systems Sciences at the Kaiser Permanente Bernard J. Tyson School of Medicine.

Dr. Brettler earned his bachelor's degree in Chemistry and Molecular Biology from the University of California, Berkley before attending the University of Chicago, Pritzker School of Medicine. He is currently a consultant with the Pan American Health Organization assisting with implementation of comprehensive hypertension programs in Latin American and the Caribbean.

OPS 120 ANIVERSARIO

HEARTS EN LAS AMÉRICAS

Key drivers, scorecards, and HEARTS Clinical Pathway to improve hypertension control in primary care practice.

Jeff Brettler, MD

Physician Lead, Kaiser SCAL Hypertension Program

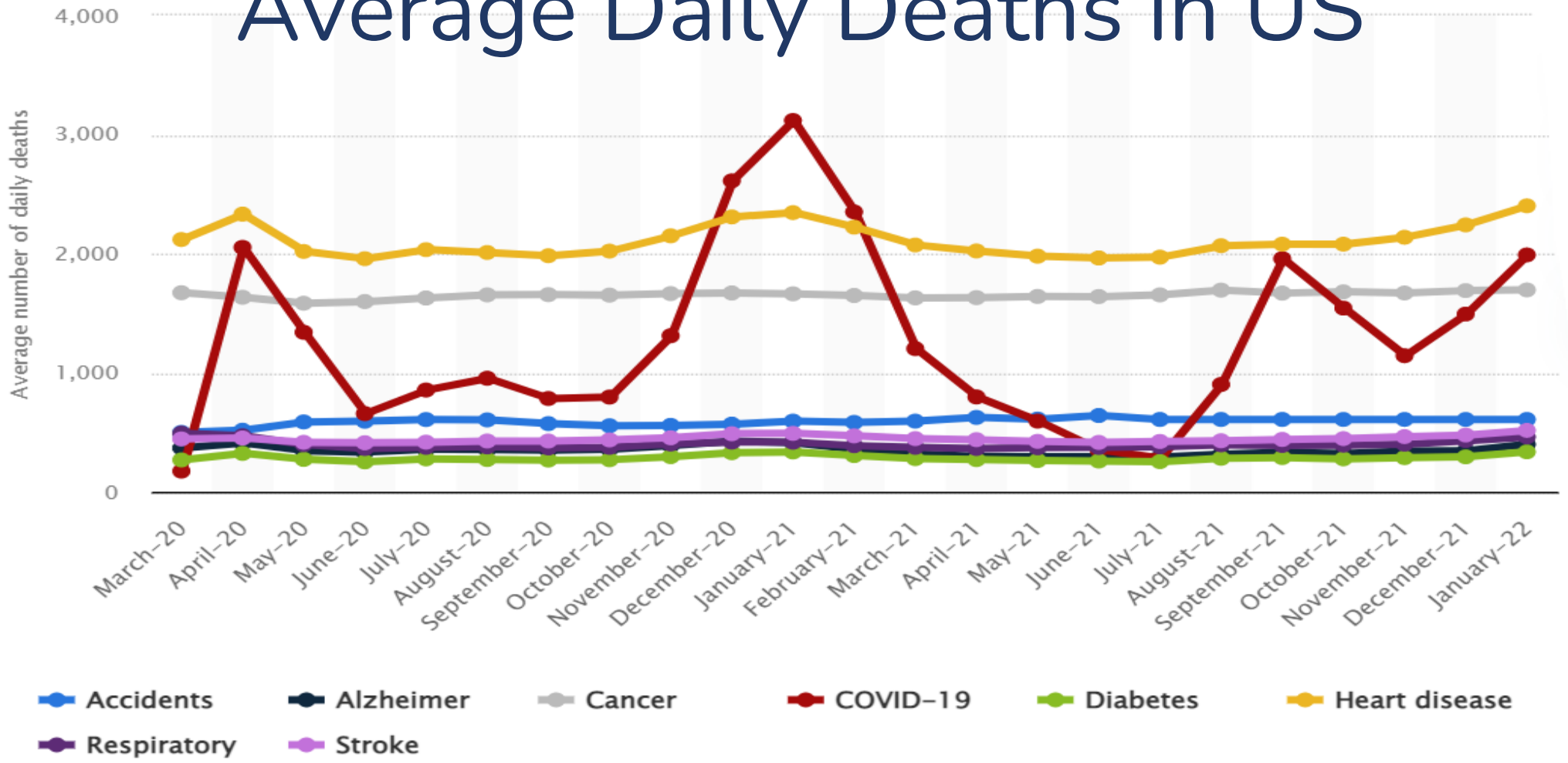
OPS Organización Panamericana de la Salud

Organización Mundial de la Salud
OFICINA REGIONAL PARA LAS Américas

Agenda

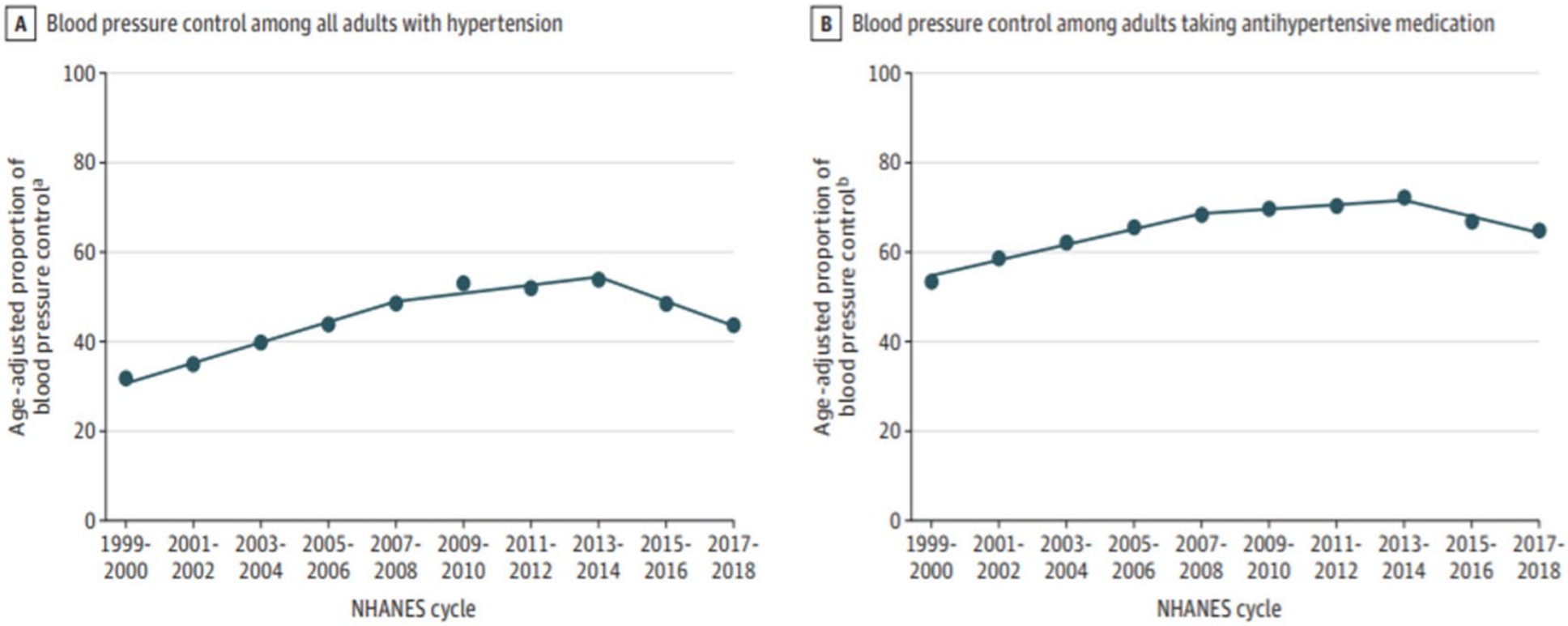
- Background including KP
- Explanation of key driver concept with examples
- HEARTS in the Americas Innovation Group
- HEARTS approach to key drivers

Average Daily Deaths in US



BP control rates are falling in US

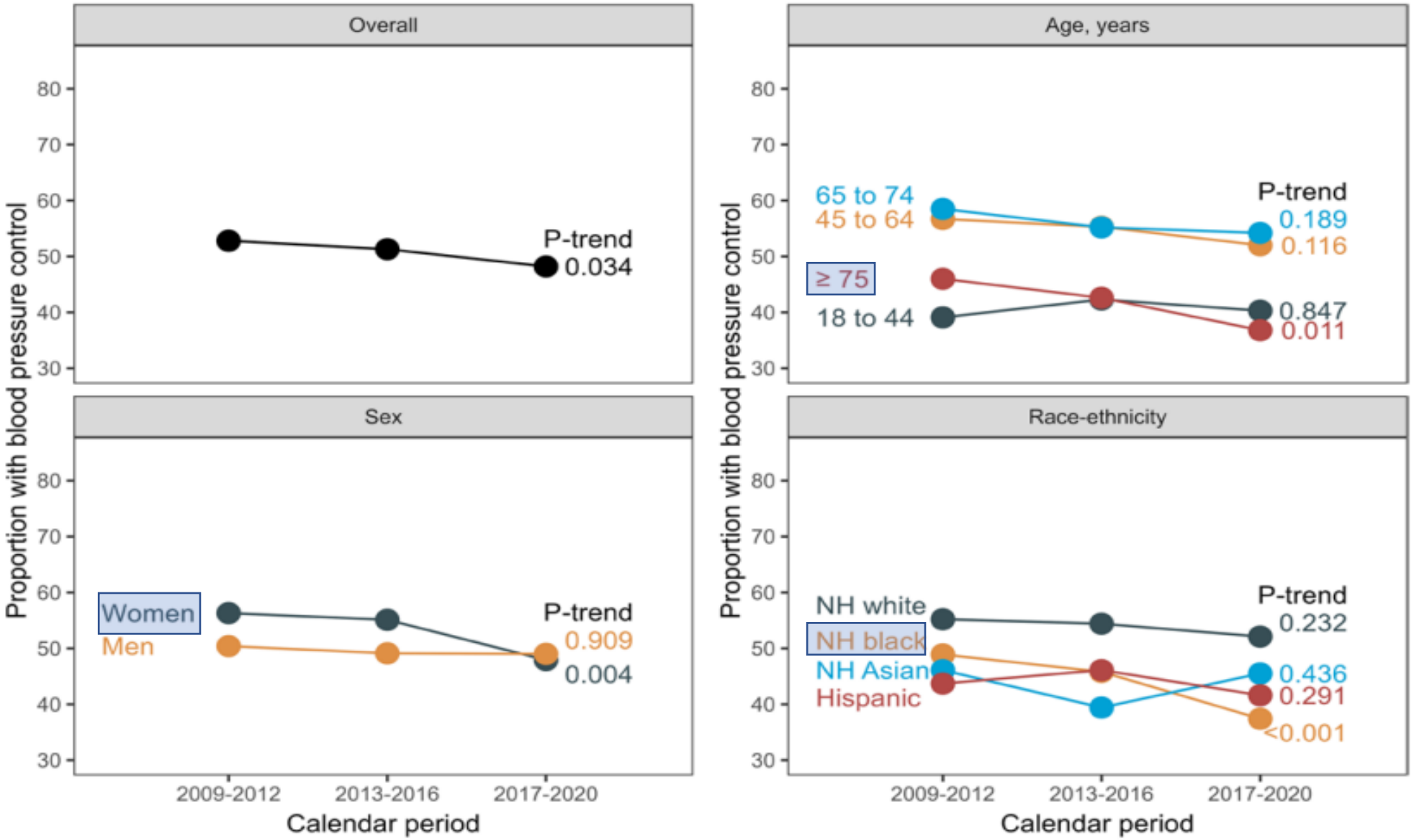
Figure. Age-Adjusted Estimated Proportion of Adults With Hypertension and Controlled Blood Pressure



Muntner et al, JAMA Sep 2020

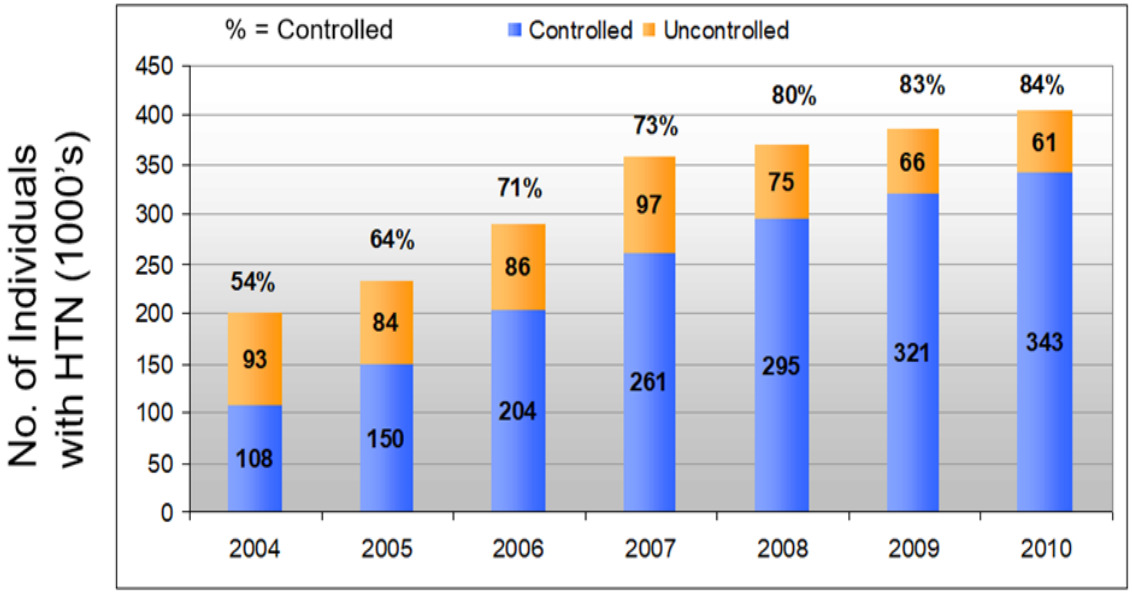
Panel A US adults with hypertension

NHANES data – Hypertension, August 2022



High BP control can be achieved

Kaiser SCAL HTN Control 2004 - 2010



J Sim et al, Can J Cardiol. 2014;30(5):544-552

Canadian Experience: BP Control 12% to 62% from 1992 to 2016

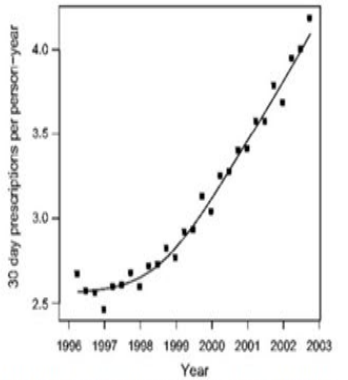


Figure 1. Total antihypertensive prescription sales (IMS Health-Canada) in Canada from 1996 to 2003. The prescription rates for 30-day prescriptions per person-year. The line is a nonparametrically modeled average, and the squares represent quarterly population-adjusted rates.

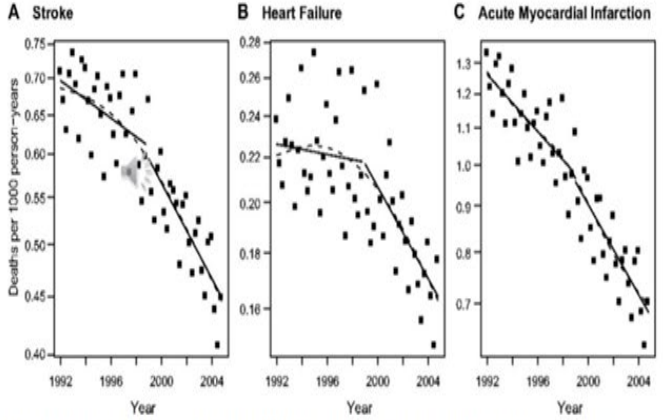
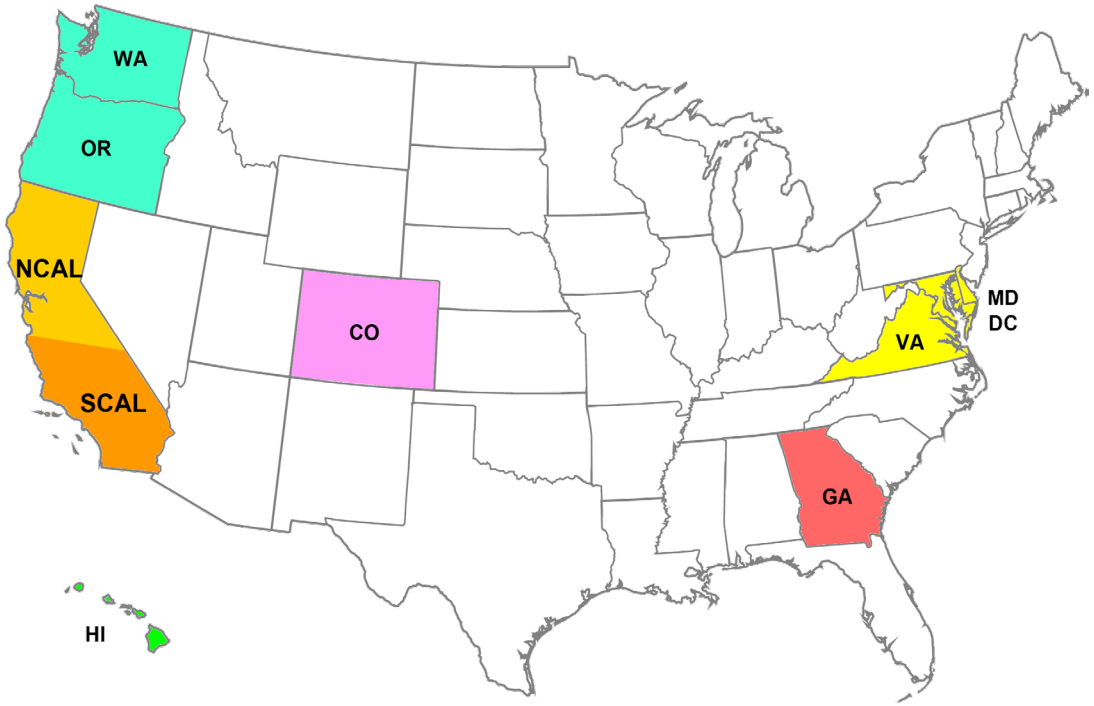


Figure 2. Mortality rates from stroke (A), HF (B), and AMI (C) in Canada from 1992 to 2003. The squares are quarterly rates adjusted for age and gender per 1000 population. The dark line is linear modeling for 1992–1998 and 1999–2003, and the dotted line is a nonparametrically modeled line.

Campbell et al. Hypertension Feb 2009

Kaiser Permanente – National



Largest nonprofit health plan in US:
$93.1 billion in operating revenue 2021

8 regions serving 8 states and D.C.

HEARTS IN THE AMERICAS

KP National

Members
12.6M

Hospitals
39

Medical offices
734

Physicians[2]
23,656

Nurses[3]
65,005

Employees+
217,014

KP SCAL

Members
4.8M

Hospitals
15

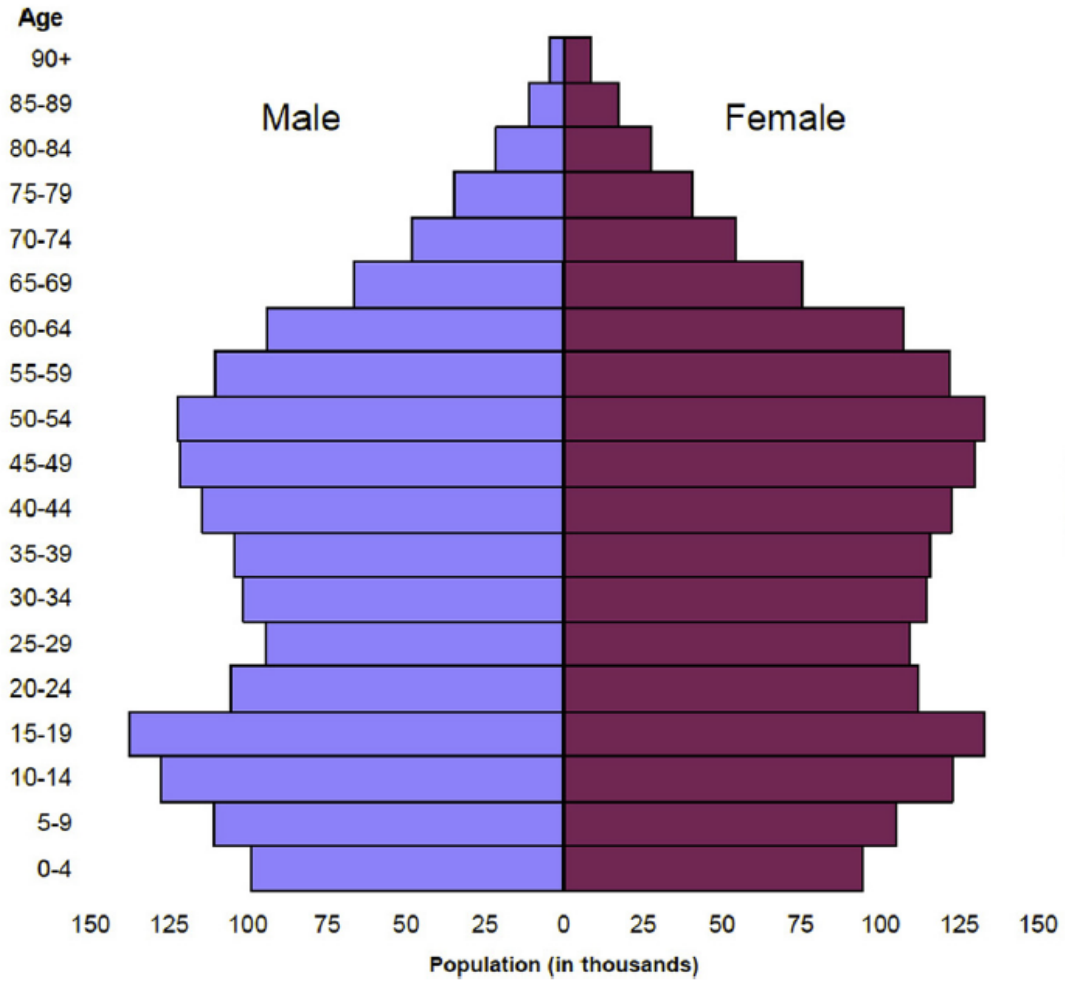
Medical offices[1]
236

Physicians[2]
7,880

Employees+
75,672

Pan American Health Organization
World Health Organization
Americas

PAHO



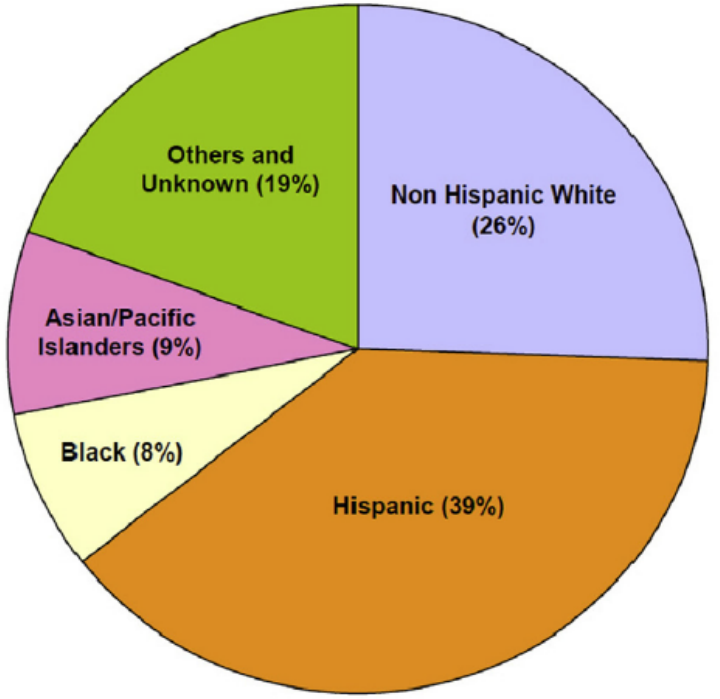


Figure 2. Kaiser Permanente Southern California population overview.

Kaiser Permanente SCAL Hypertension Program

2.3 million BP checks/month*

923,042 members with HTN

*pre-pandemic

Demographics for KP SCAL Region – HTN Registry

• AMERICAN INDIAN/ALASKA NATIVE	3,289
• ASIAN	95,310
• BLACK/AFRICAN AMERICAN	109,702
• HISPANIC/LATINO	284,281
• MULTIPLE	15,564
• NATIVE HAWAIIAN/OTHER PACIFIC ISLANDER	23,254
• OTHER	49,039
• WHITE	332,486

- Age distribution: Medicare 51.1%, commercial 48.9%

KP internal data

Control Rates by Product Line for SCAL Region*

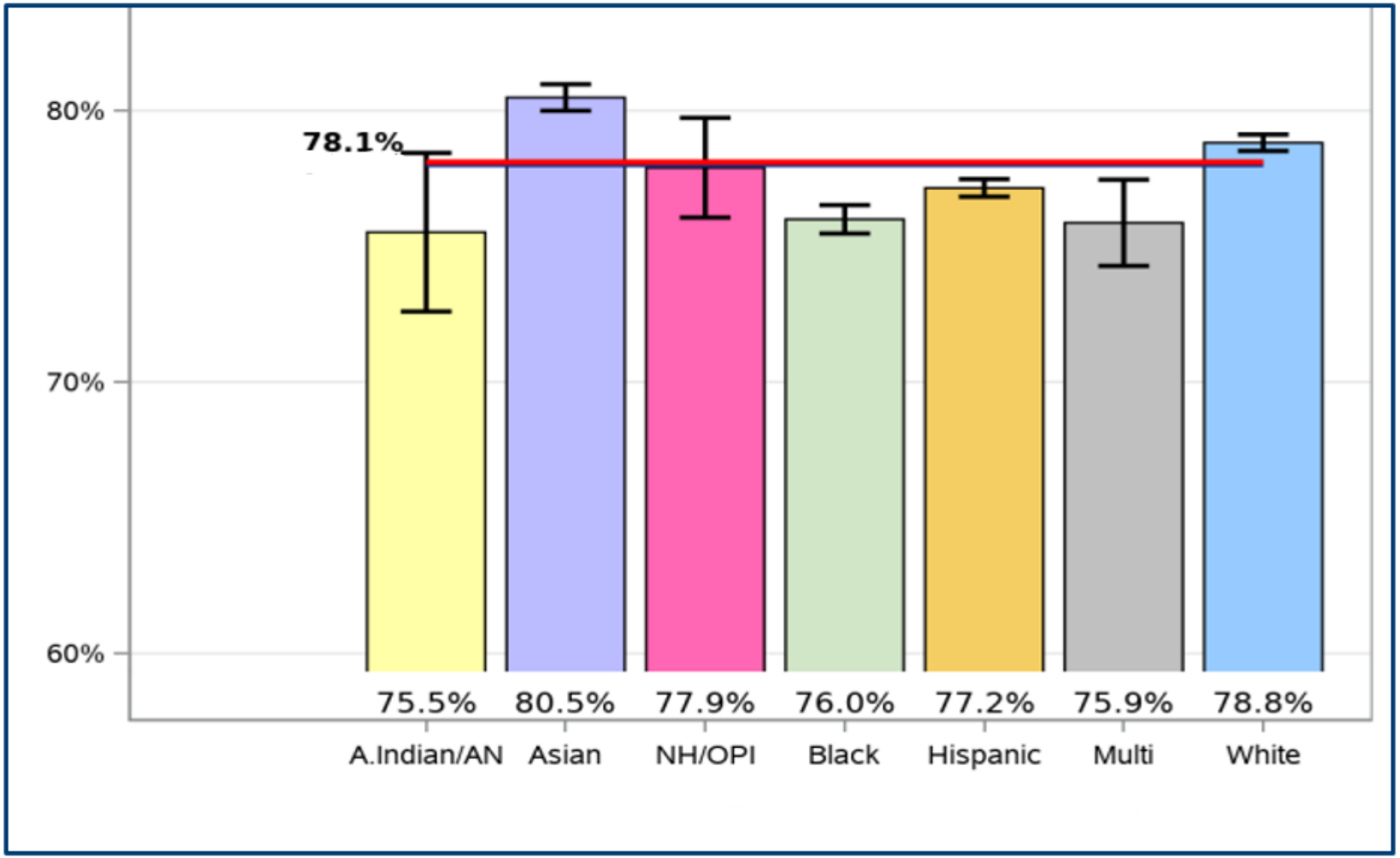
For data ending 9/30/21:

- Overall: 78.3%
- Medicare: 82.1%
- Commercial: 73.1%
- Medi-Cal: 78.5%

- *Internal rates as of 3/31/22 about 1% higher

KP internal data

CSG Equitable Care Reports 2021 Q3

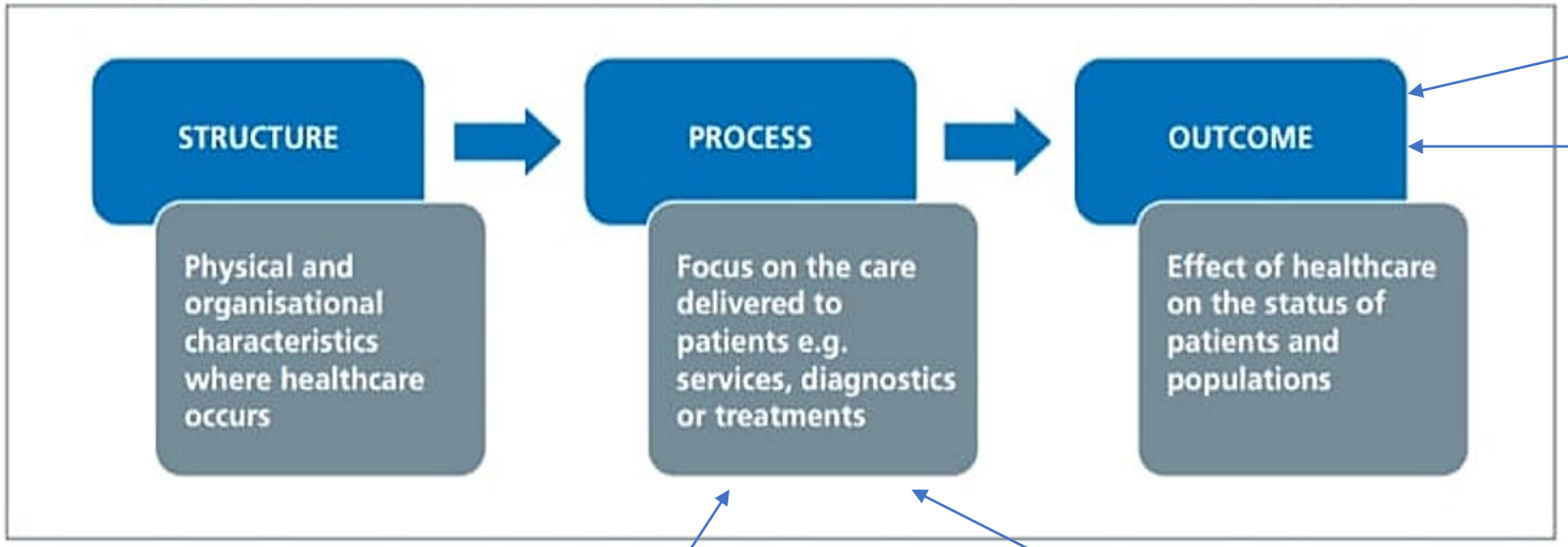


Characteristics of High Performing Health Systems

In addition to focusing on outcome measures:

- Identify key drivers
- Translate key drivers into process measures
- Performance feedback to front-line clinicians and clinics

According to the Donabedian health care quality model, quality measures can be characterized as structure, process or outcome measures.



Donabedian A. An Introduction to Quality Assurance in Health Care. New York: NY: Oxford University Press; 2003.

Is the key driver/process measure approach recognized and supported by evidence?

HEARTS

Journal of the American Heart Association

ORIGINAL RESEARCH

Tracking Blood Pressure Control Performance and Process Metrics in 25 US Health Systems: The PCORnet Blood Pressure Control Laboratory

Rhonda M. Cooper-DeHoff, PharmD, MS; Valy Fontil, MD, MAS; Thomas Carton, PhD; Alanna M. Chamberlain, PhD; Jonathan Todd, PhD; Emily C. O'Brien, PhD; Kathryn M. Shaw, MPH; Myra Smith, MPH; Sujung Choi, PhD; Ester K. Nillis, PhD; Daniel Ford, MD, MPH; Kristen M. Tecson, PhD; Princess E. Dennar, MD; Faraz Ahmad, MD, MS; Shenghui Wu, MD, PhD; James C. McClay, MD, MS; Kristen Azar, RN, MSN/MPH; Rajbir Singh, MBBS; Madelaine Faulkner Modrow, MPH; Christina M. Shay, PhD; Michael Rakotz, MD; Gregory Wozniak, PhD; Mark J. Pletcher, MD, MPH

J Am Heart Assoc. 2021;10:e022224

Pan American Health Organization
World Health Organization
PAHO

Blood pressure control metrics		
No.	**Name (range)**	**Overall, weighted average† (range‡)**
1	Blood pressure control, <140/<90 mm Hg, % of patients	62% (44%–74%)
2	Blood pressure control to *2017 Hypertension Clinical Practice Guidelines* goal, <130/<80 mm Hg, % of patients	30% (20%–38%)
3	Improvement in blood pressure, % of patients	29% (17%–41%)
4	Confirmatory repeated blood pressure measurement, % of visits	23% (0%–100%)
5	Medication intensification after uncontrolled blood pressure, % of visits	12% (0.6%–25%)
6	Repeat visit in 4 weeks after uncontrolled blood pressure, % of visits	35% (15%–47%)
7	Average SBP reduction after medication intensification, mm Hg±SD	15±20 (5–18)
8	Prescription of a CCB or thiazide or thiazide-like diuretic among Black patients prescribed at least one medication, % of patients	75% (32%–80%)
9	Prescription of fixed-dose combination product among patients prescribed at least 2 classes of medications, % of patients	25% (0%–90%)

Table 2. Blood Pressure Control Metrics in the Most Recent Measurement Period* Overall and by Race and Ethnicity

Blood pressure control metrics			By race/ethnicity, weighted average†					
No.	Name (range)	Overall, weighted average† (range‡)	Asian, not Hispanic	Black, not Hispanic	White, not Hispanic	Hispanic, any race	Other/ multiple/ missing	*P* value§
1	Blood pressure control, <140/<90 mm Hg, % of patients	62% (44%–74%)	66%	57%	62%	62%	61%	<0.0001
2	Blood pressure control to *2017 Hypertension Clinical Practice Guidelines* goal, <130/<80 mm Hg, % of patients	30% (20%–38%)	33%	25%	31%	30%	29%	<0.0001
3	Improvement in blood pressure, % of patients	29% (17%–41%)	30%	29%	29%	29%	24%	<0.0001
4	Confirmatory repeated blood pressure measurement, % of visits	23% (0%–100%)	39%	20%	22%	33%	24%	<0.0001
5	Medication intensification after uncontrolled blood pressure, % of visits	12% (0.6%–25%)	14%	13%	11%	14%	14%	<0.0001
6	Repeat visit in 4 weeks after uncontrolled blood pressure, % of visits	35% (15%–47%)	30%	37%	35%	34%	32%	<0.0001
7	Average SBP reduction after medication intensification, mm Hg±SD	15±20 (5–18)	15±19	14±20	15±20	15±19	16±20	0.005
8	Prescription of a CCB or thiazide or thiazide-like diuretic among Black patients prescribed at least one medication, % of patients	75% (32%–80%)	N/A	75%	N/A	69%	N/A	<0.0001
9	Prescription of fixed-dose combination product among patients prescribed at least 2 classes of medications, % of patients	25% (0%–90%)	22%	26%	24%	25%	27%	0.082

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

Pan American Health Organization
World Health Organization Americas
PAHO

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.

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.

Measure Accurately, Act Rapidly, and Partner with Patients (2018) – a Classic QI and Key Driver Study

Hypertension Primary Care

OPEN

Improving Hypertension Control in Primary Care With the Measure Accurately, Act Rapidly, and Partner With Patients Protocol

Results at 6 and 12 Months

Brent M. Egan, Susan E. Sutherland, Michael Rakotz, Jianing Yang, R. Bruce Hanlin, Robert A. Davis, Gregory Wozniak

Egan et al, Hypertension. 2018;72:1320–1327

Measure Accurately, Act Rapidly, and Partner with Patients

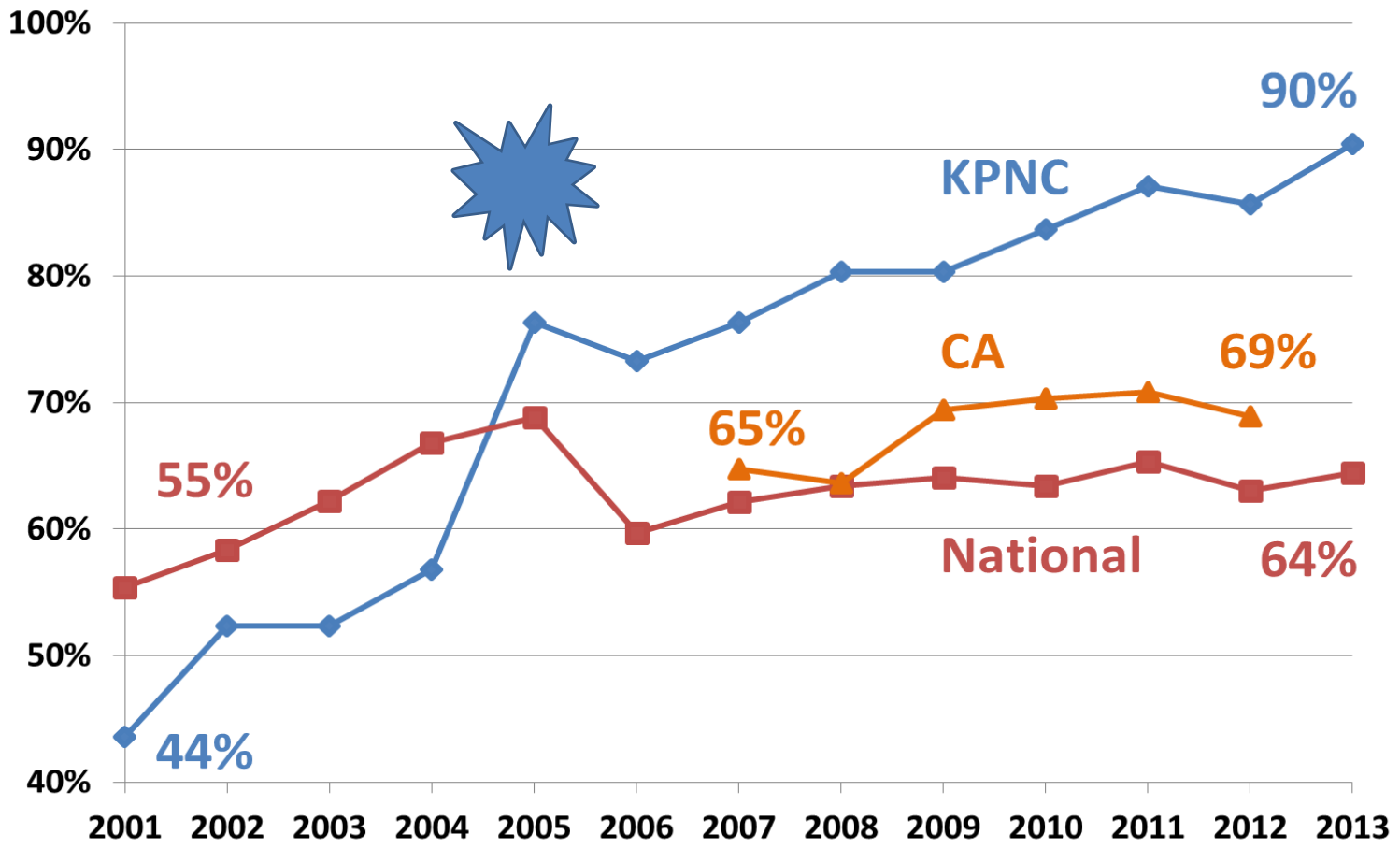
MAP implemented in 16 practices, 16,000+ hypertensive patients in South Carolina: BP measurement, treatment intensification, monthly dashboard

BP control improved from 64.4% at baseline to 74.3% (P<0.001) at 6 and 73.6% (P<.001) at 12 months

Among adults with uncontrolled baseline BP and no medication changes (n=3654), measure accurately resulted in 11.1/5.1 mm Hg lower BP

During the first 6 months of MAP, therapeutic inertia fell (52.0% versus 49.5%; P=0.01)

KPNC vs. National and California HTN Control



Kaiser Story - What Happened in 2005?

- **Combination therapy** with lisinopril-HCTZ FDC became 1st step of national KP algorithm
- Widespread implementation of **2-4 week follow-up BP checks** with medical assistant or LVN.

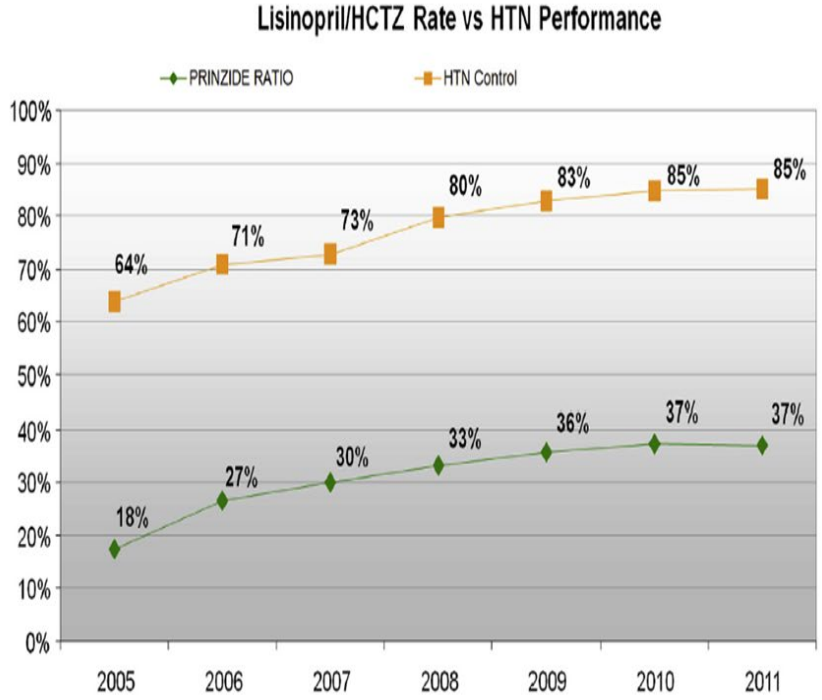


Figure 4. Combination pill use and hypertension control at Kaiser Permanente Southern California. Since 2005, when the combination of lisinopril/HCTZ was advocated, hypertension control rates have steadily increased, paralleling the proportion of those prescribed the lisinopril/HCTZ combination pill.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

Sim, J et al. Canadian J of Cardiology 30 (2014)

Can Kaiser Model Work in Other Settings?

Adapting and evaluating a health system intervention from Kaiser Permanente to improve hypertension management and control in a large network of safety-net clinics

Valy Fontil, MD, MAS[1,3], Reena Gupta, MD[1], Nathalie Moise, MD,MS[4], Ellen Chen, MD[5], David Guzman, MS[1,3], Charles E McCulloch, PhD[2], and Kirsten Bibbins-Domingo, PhD, MD, MAS[1,2,3]

Circ Cardiovasc Qual Outcomes. 2018 July ; 11(7)

Key elements of the Kaiser Permanente Northern California (KPNC) hypertension program adopted in Bring it Down San Francisco

Program components	KPNC Hypertension Program	Bring it Down San Francisco
Evidence-based treatment protocol	Designed to accomplish • simple and fast titration of BP treatment to goal • emphasis on increased use of fixed-dose combination pharmacotherapy, and • guidance for management of resistant HTN	Protocol modified to account for: • drug coverage and affordability, • patient complexity, and provider preferences that are pertinent to safety-net patient populations • New evidence and clinical guidelines
BP check visits led by non-physician professional staff	• Led by medical assistants	• Led by nurses and pharmacists • The type of allied health professional or entry-level staff used varied by clinic site based on capacity.
Standard BP measurement protocol	• Kaiser Permanente already had standardized methods for BP measurement	• Partnered with nurse leaders to design a standardized BP measurement protocol
Hypertension patient registry	• Used to generate performance reports and highlight high-performing sites	• Used to generate performance reports
Performance reports	• Initially distributed every 3 months and then available by query at any time to authorized individuals.	• Clinic-level reports, stratified by race, shared with clinic leaders monthly • Hypertension registry available to clinic leaders to generate their own reports and monitor progress

Adapting Interventions from KP

24 months, 16K patients:

- BP control: 68% to 74%, P<0.01
- Black control rate 60% to 66%, White 69% to 75%, Latino 67% to 72%, Asian 78% to 82% (all P<.01)
- Increased use of FDC

Evidence for individual key driver/process measures

Driver - Accurate BP Measurement

Recommendation: Repeat BP when initial BP elevated.

Evidence: Reliability of single office BP measurement:

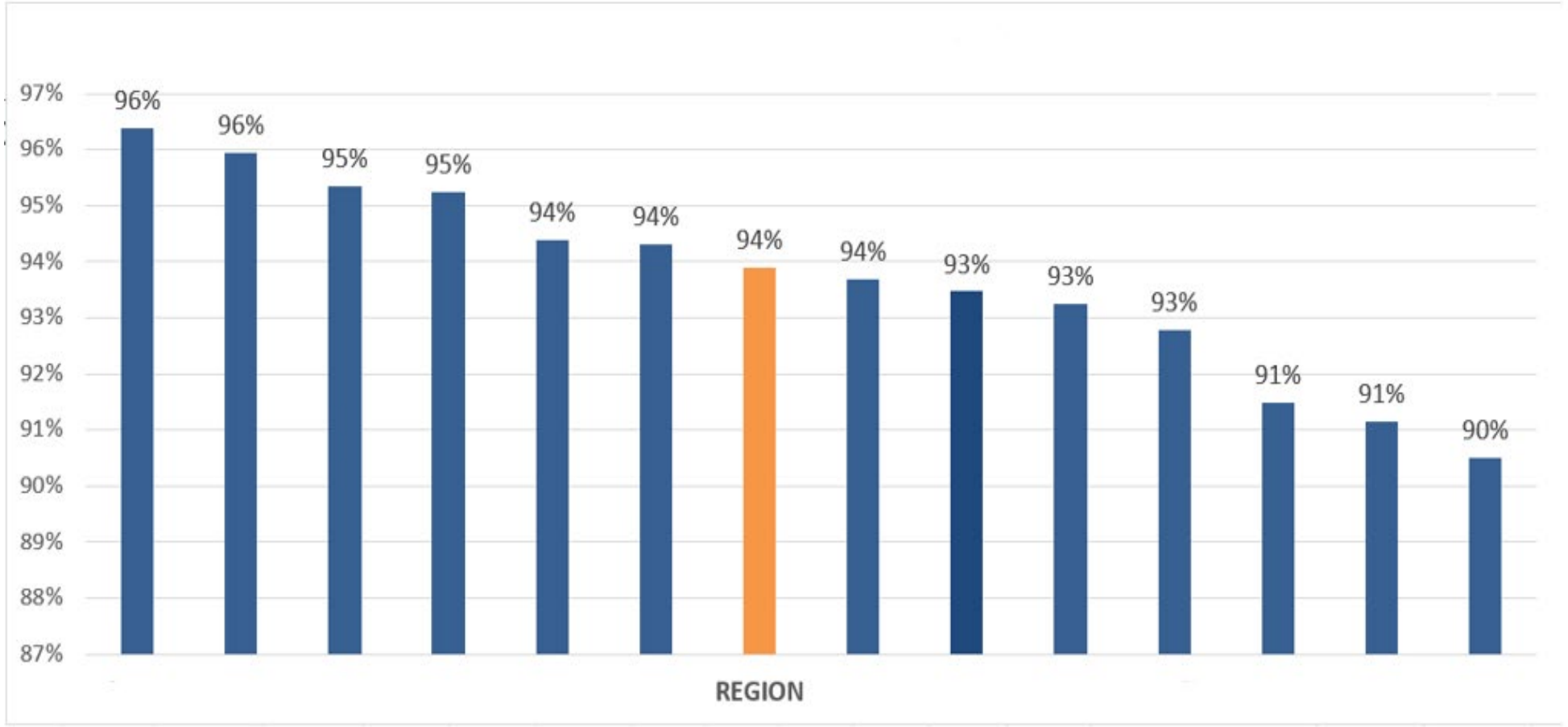
- 34% of initially elevated BPs normalized with recheck
- In 24%, SBP dropped more than 10 mm.[1]

Opportunity: BP repeated only 23% of time when initial reading elevated[2]

Support: ACC/AHA 2017, ESC/ESH 2018, ISH 2020, AHA Scientific Statement Measurement of BP in Humans 2019

- [1]*Burkhard et al, Heart 2018 Jul 104 (14)*
- [2]*Cooper-DeHoff et al, J Am Heart Assoc. 2021: 10:e022224*

Repeat BP Report – March 2022



Driver – Standardized Treatment Protocol

Recommendation: Use established protocol with FDC

Evidence:

- Most patients require more than one medication.[1]
- FDCs improve adherence, control, and decrease length of time to achieve control.[2]

Opportunity: FDCs used in only 19% of patients in the US 2013-2016.[3]

Support: WHO 2021 HTN guideline, ISH 2020, ESC/ECH 2018, ACC/AHA 2017

- *[1]Whelton et al, JACC 2018; 71 (19)*
- *[2]Derrington et al, J Hum Hypertension 2020; 34 (9)*
- *[3]Derrington et al, Hypertension 2020; 75 (4)*

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.)

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]

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]

If **not** in control ↓

Calcium Channel Blocker (CCB)

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

If **not** in control ↓

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:

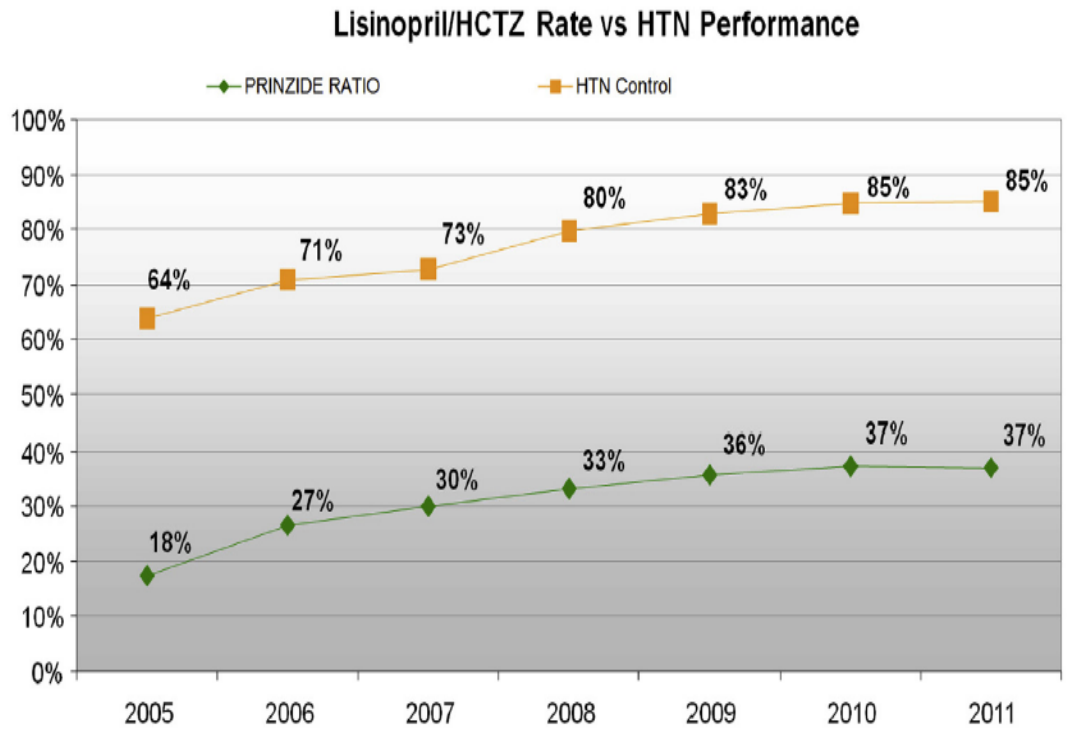
bisoprolol 2.5 mg ⇒ 5 mg daily ⇒ 10 mg daily

Titrate to BP; maintain pulse of > 55

Benefits of a Simplified Combination Medication Protocol

- Decreased daily pill burden
- Improved medication adherence
- Faster BP control; less time exposed to CVD-risk
- **Facilitates team-based care including titration by provider other than MD**

Combination Pill Use and BP Control – Kaiser SCAL



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Sim, J et al. Canadian J of Cardiology 30 (2014)

Treatment Intensification Driver

- **In a recent study of 25 US health systems, when medication was added for uncontrolled BP:**
- **SBP decreased by 15 mm Hg**

- Cooper-DeHoff et al, J Am Heart Assoc. 2021;10:e022224

Treatment Intensification over Time in US

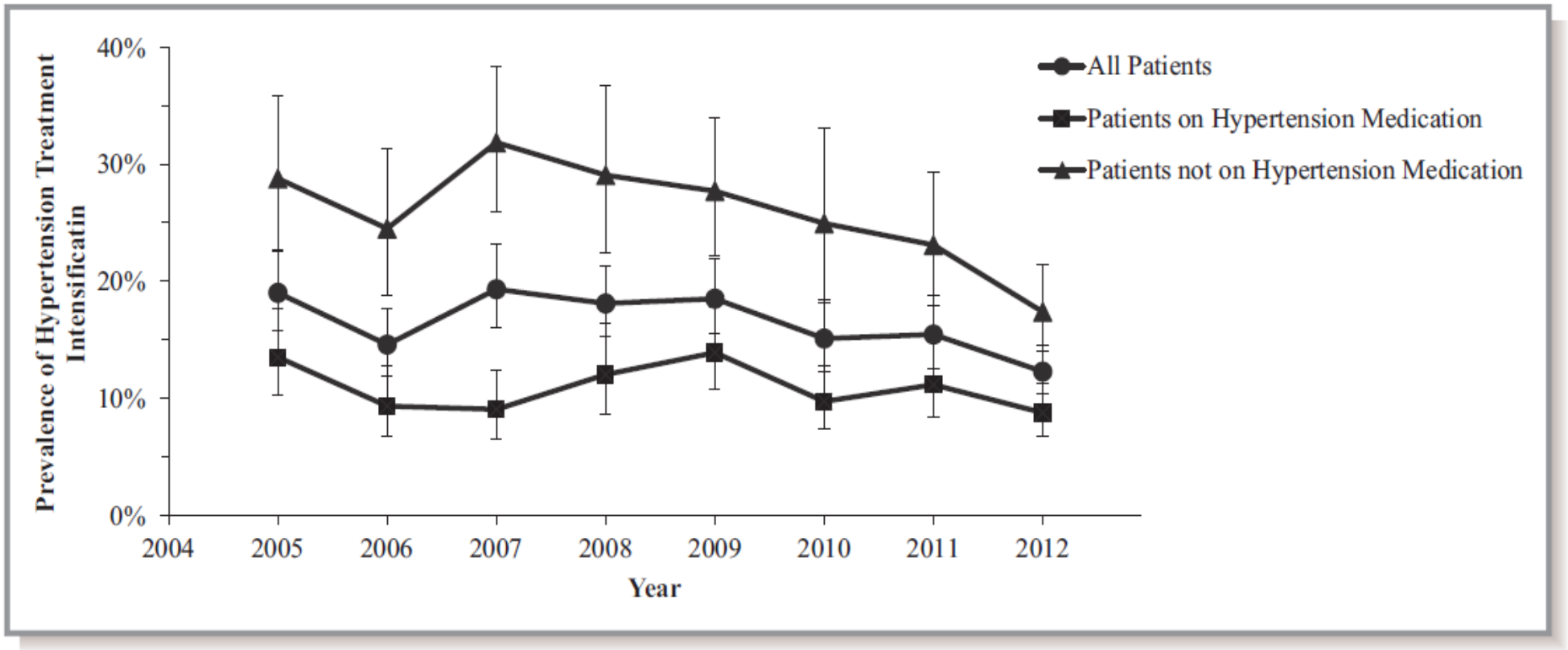


Figure 1. Prevalence of hypertension treatment intensification in the United States 2005–2012.

Lu, Min J Am Heart Assoc. 2016;5

KP Approach: Team Based Care - Hypertension Visit with non-MD provider

- BP is only complaint that's addressed.
- Focus only on BP related issues – recent vitals, current regimen, adherence, side effects
- Emphasis on titration whenever possible
- Use standard combination medication algorithm
- Repeat every 2 weeks until BP controlled
- Physical or virtual

KP: Treatment Intensification - MDs

- MD specific data
- Yearly educational programs
- Academic detailing – MD champion meets with colleague
- Monthly meetings at level of clinic or module with shared data

KP: Provider Education

- Thiazide-related hyponatremia
- Gout occurring on thiazide
- Erectile dysfunction
- ACE inhibitor cough and angioedema
- Calcium blocker related edema
- Managing potassium and renal function with ACEI/ARBs
- Tips for using spironolactone

Case studies

Which side effects are dose related?

When should medications be discontinued?

Driver – Team-based Care

Recommendation: Medication Titration by non-MD

Evidence:

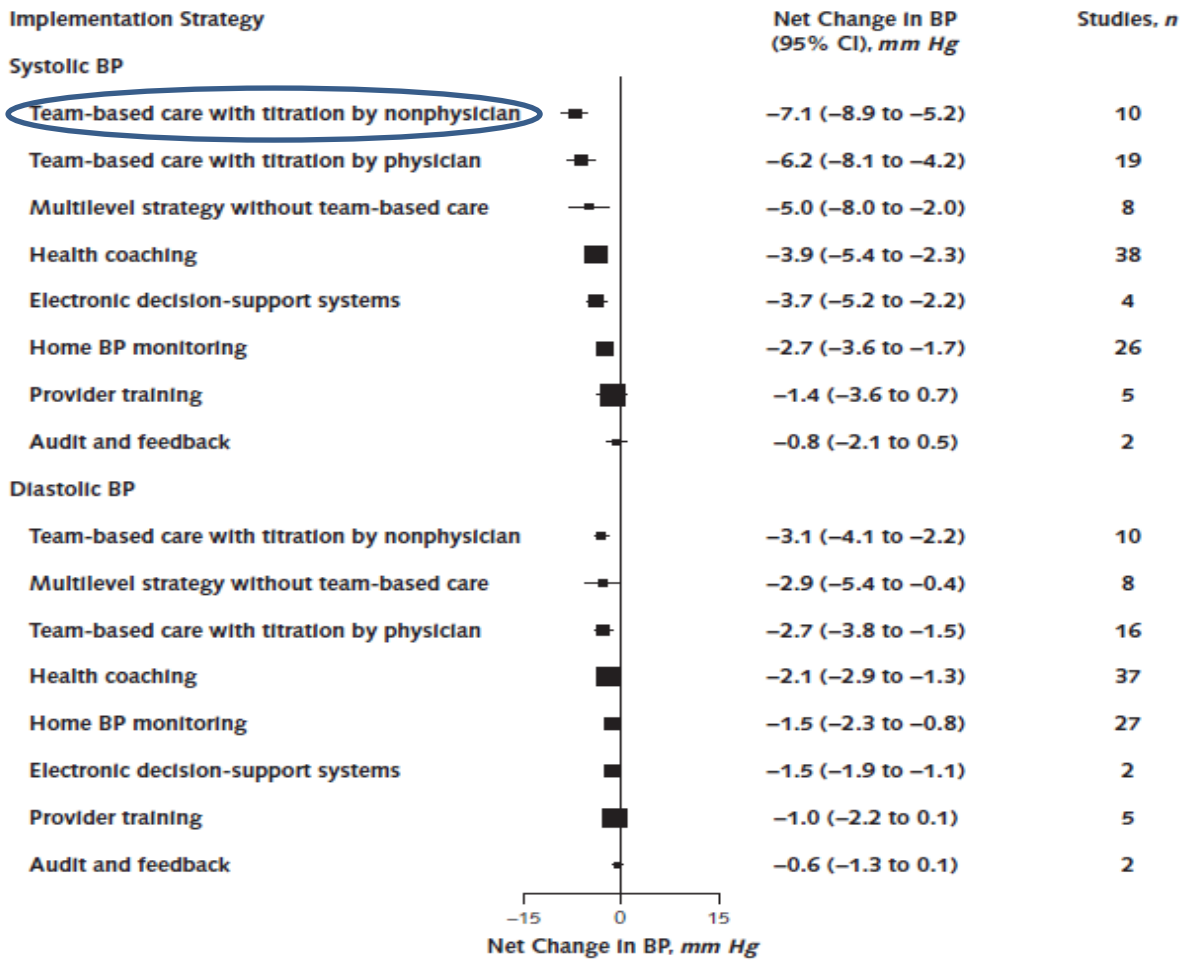
- Team-based care with titration by non-MD most effective implementation strategy
- Global shortage of MDs to treat HTN

Opportunity: difficult to quantitate but large

Support: WHO 2021 HTN guideline , ACC/AHA 2017 (IA recommendation)

- [1]*Whelton et al, JACC 2018; 71 (19)*
- [2]*Derrington et al, J Hum Hypertension 2020; 34 (9)*
- [3]*Derrington et al, Hypertension 2020; 75 (4)*

Figure 2. Adjusted mean net reduction in BP associated with implementation strategies.



Mean net reductions were estimated using generalized estimating equations and adjusted for sex, age, baseline systolic (or diastolic) BP, trial duration, type of control group, and all other intervention strategies. Boxes are weighted by sample size. BP = blood pressure.

Meta-Analysis of Implementation Strategies
Mills, et al. Annals of Int Med Dec 2017

Structured, Team-Based Care Interventions for Hypertension Control

COR	LOE	Recommendation for Structured, Team-Based Care Interventions for Hypertension Control
I	A	A team-based care approach is recommended for adults with hypertension.

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WHO Hypertension Guideline 2021

8. RECOMMENDATION ON TREATMENT BY NONPHYSICIAN PROFESSIONALS

WHO suggests that pharmacological treatment of hypertension can be provided by nonphysician professionals such as pharmacists and nurses, as long as the following conditions are met: proper training, prescribing authority, specific management protocols and physician oversight.

Conditional recommendation, low-certainty evidence

Implementation remarks:

- Community health care workers (HCWs) may assist in tasks such as education, delivery of medications, blood pressure (BP) measurement and monitoring through an established collaborative care model. The scope of hypertension care practised by community HCWs depends on local regulations and currently varies by country.
- Telemonitoring and community or home-based self-care are encouraged to enhance the control of BP as a part of an integrated management system, when deemed appropriate by the treating medical team and found feasible and affordable by patients.
- Physician oversight can be done through innovative methods such as telemonitoring or similar to ensure access to treatment is not delayed.

Global Gap in HTN Clinic Visits

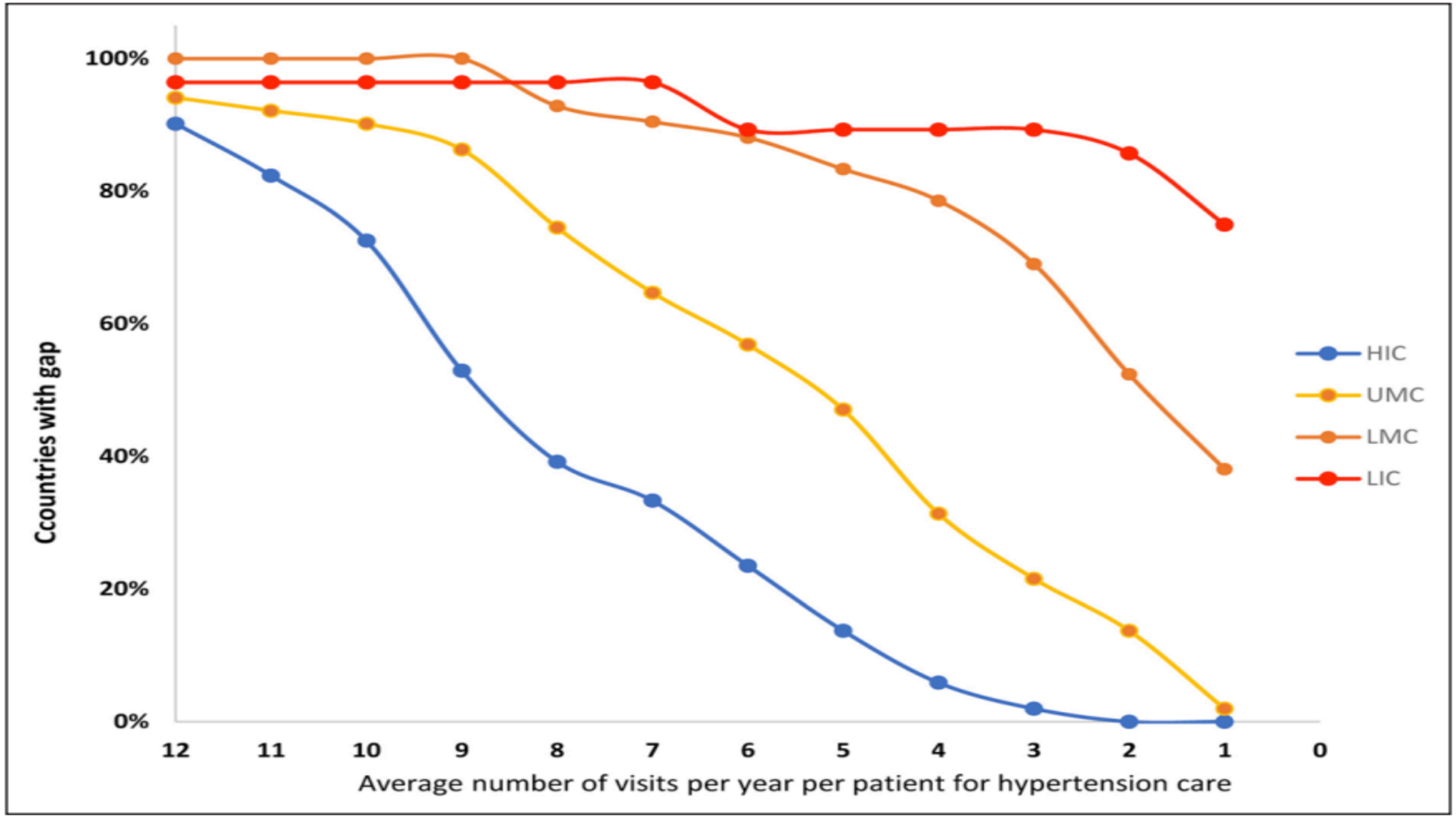
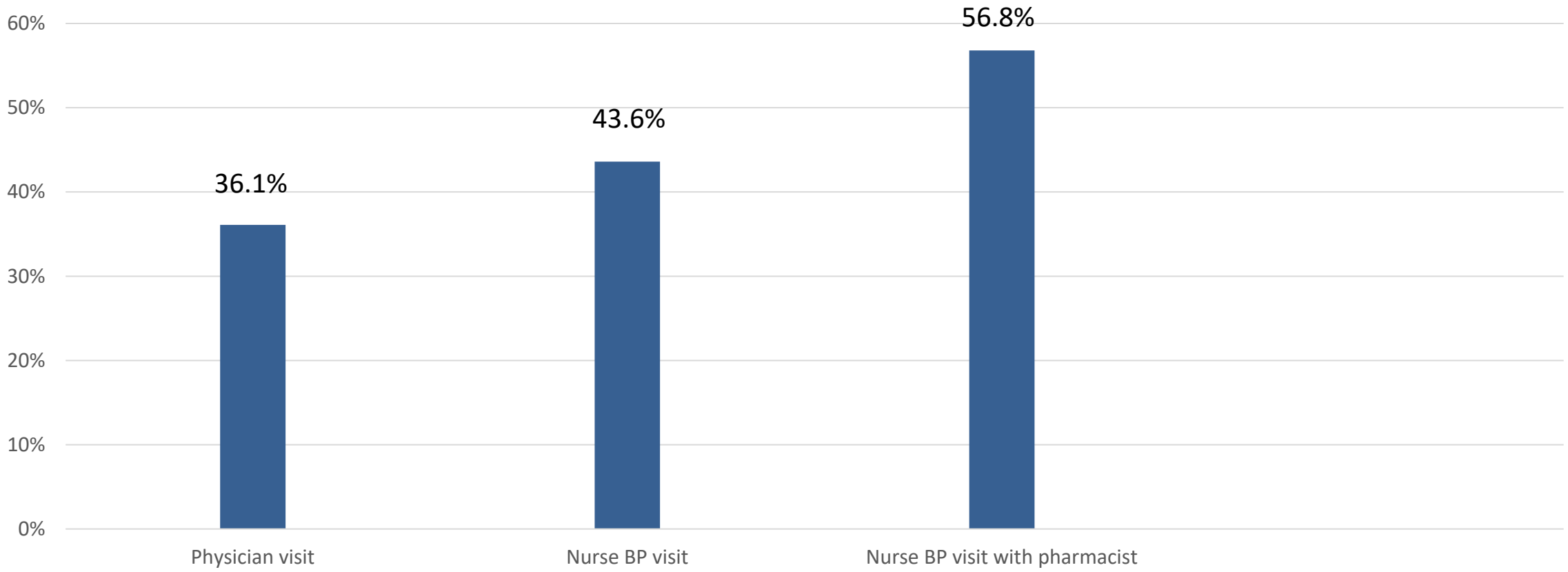


Figure 3. Percentage of countries with gap by number of visits per year, stratified by tier of income status (base scenario).

Neupane et al, Hypertension 2021; 78

HEARTS IN THE AMERICAS

Treatment Intensification Rates by Visit Type
KP SCAL data July 2021



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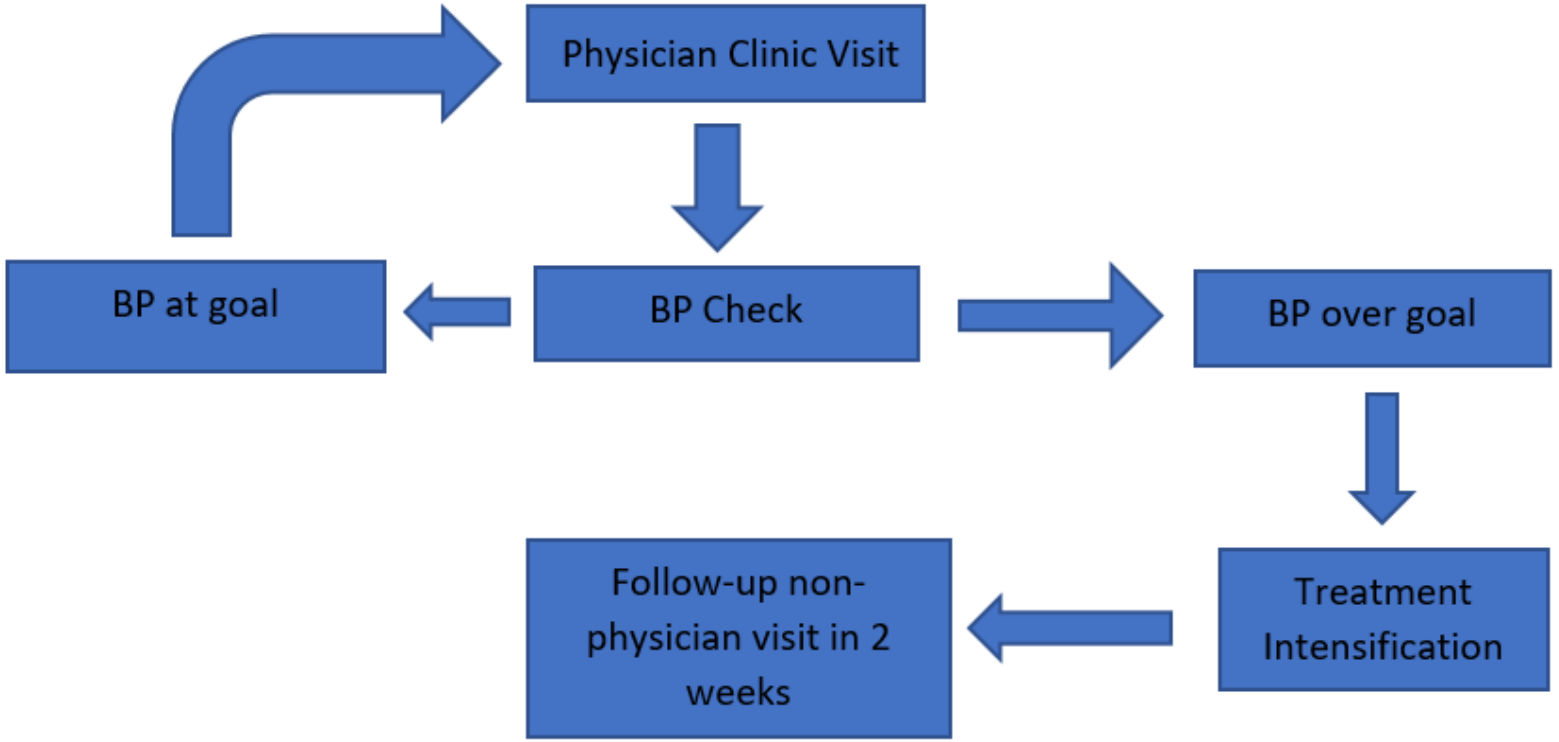
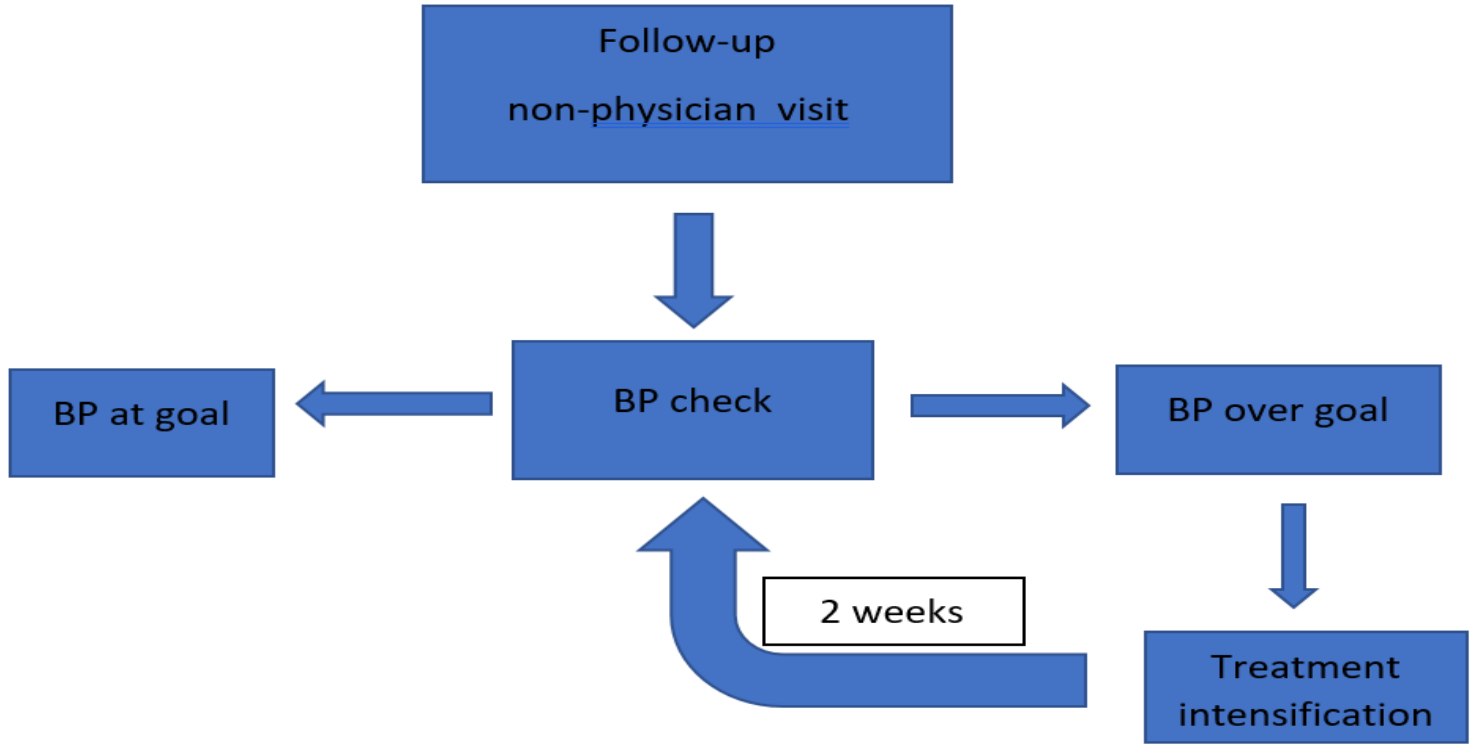
Physician BP visit workflow



Non-physician BP visit workflow

Non-physician visit begins “closed loop” system

Cycle repeats every 2 weeks until BP is controlled



Encounter Interval Driver - Improved Time to Control

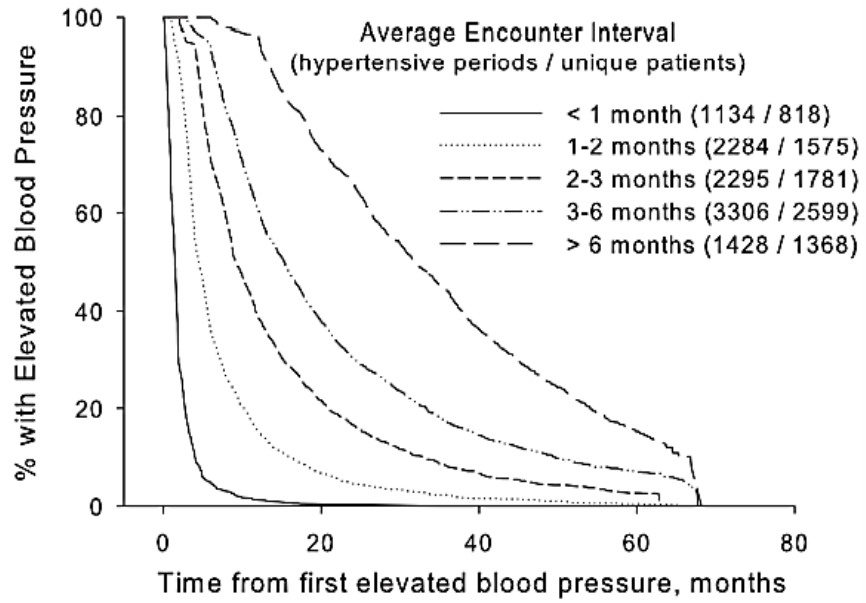


Figure 1. Encounter Interval and Time to Blood Pressure Normalization
Kaplan-Meier curves for time to normalization of blood pressure during a period of continuously elevated blood pressure were plotted for different average encounter intervals. Distinct periods of elevated blood pressure (from the first elevated to the first normal blood pressure) for the same patient were analyzed separately.

- Retrospective cohort study of over 5,000 patients with diabetes and HTN in Massachusetts
- BP of patients with **average interval between encounters ≤ one month normalized at 1.5 months compared to 12.2 months for the encounter interval greater than one month** ($p < 0.0001$ for all).

Turchin et al, Hypertension. 2010 July ; 56(1): 68–74

Encounter Interval Driver – Improved Outcomes

Table 4 | Effects of characteristics of treatment strategy assessment period on overall mortality risk

Characteristic	No (%) or mean (SD)	Hazard ratio (95% CI)	P value
Fifths of mean time to intensification (months):			
0–1.406	16 233 (20.0)	1.00	—
1.407–4.646	16 238 (20.0)	1.11 (1.03 to 1.20)	0.009
4.647–8.684	16 236 (20.0)	1.24 (1.14 to 1.34)	< 0.001
8.685–15.350	16 238 (20.0)	1.20 (1.10 to 1.30)	< 0.001
≥ 15.351	16 233 (20.0)	1.30 (1.19 to 1.42)	< 0.001

Retrospective cohort study of primary care practices in the UK in 88K patients with HTN.
Delays in titration > 1.4 months associated with increased CV events or death

Xu et al, BMJ 2015;350

Randomized Controlled Trials Data

Trial	Number of patients	Timeframe to reach BP <140/90 mmHg	Mean BP reduction (mm Hg)	CV outcomes	Reduction of CV outcomes in early BP response (%)
VALUE	14,400	6 months	12.3/6.1	Total CV events Stroke All cause death	12 17 10
ALLHAT	42,418	6 months	6.7/4.4	Total CV events Stroke All cause death HF	33 21 16 22
ASCOT-BPLA	19,342	1 year	21.9/11.7	Fatal and non-fatal Total CV events All-cause mortality	23 16 11
SCOPE	4,964	3 months	21.7/10.8	Fatal and non-fatal stroke	24

Volpe, *et al.* Int J of Cardiology 254, 2018

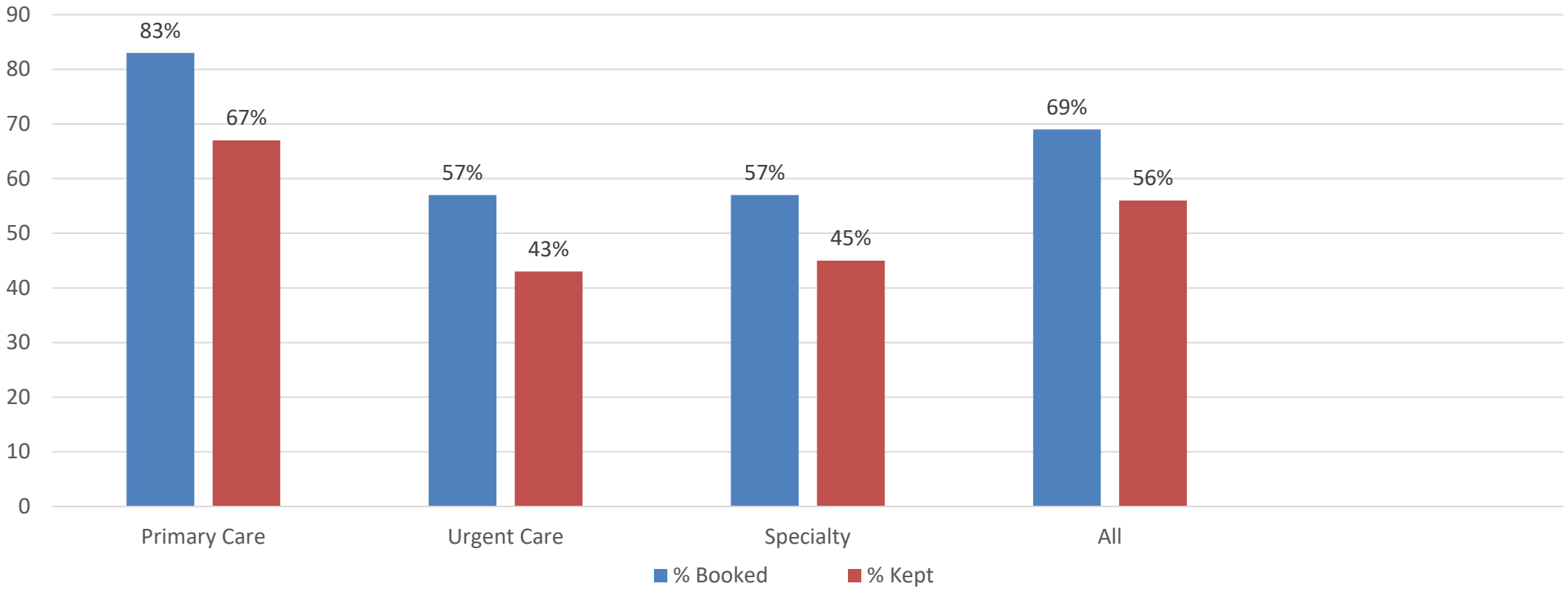
Follow-up of Elevated BPs - KP

2-4 week follow-up is key, but 2 is more effective

Automate: follow-up appointment can be booked before provider sees patient

Need to measure and report monthly - clinic and nurse level data

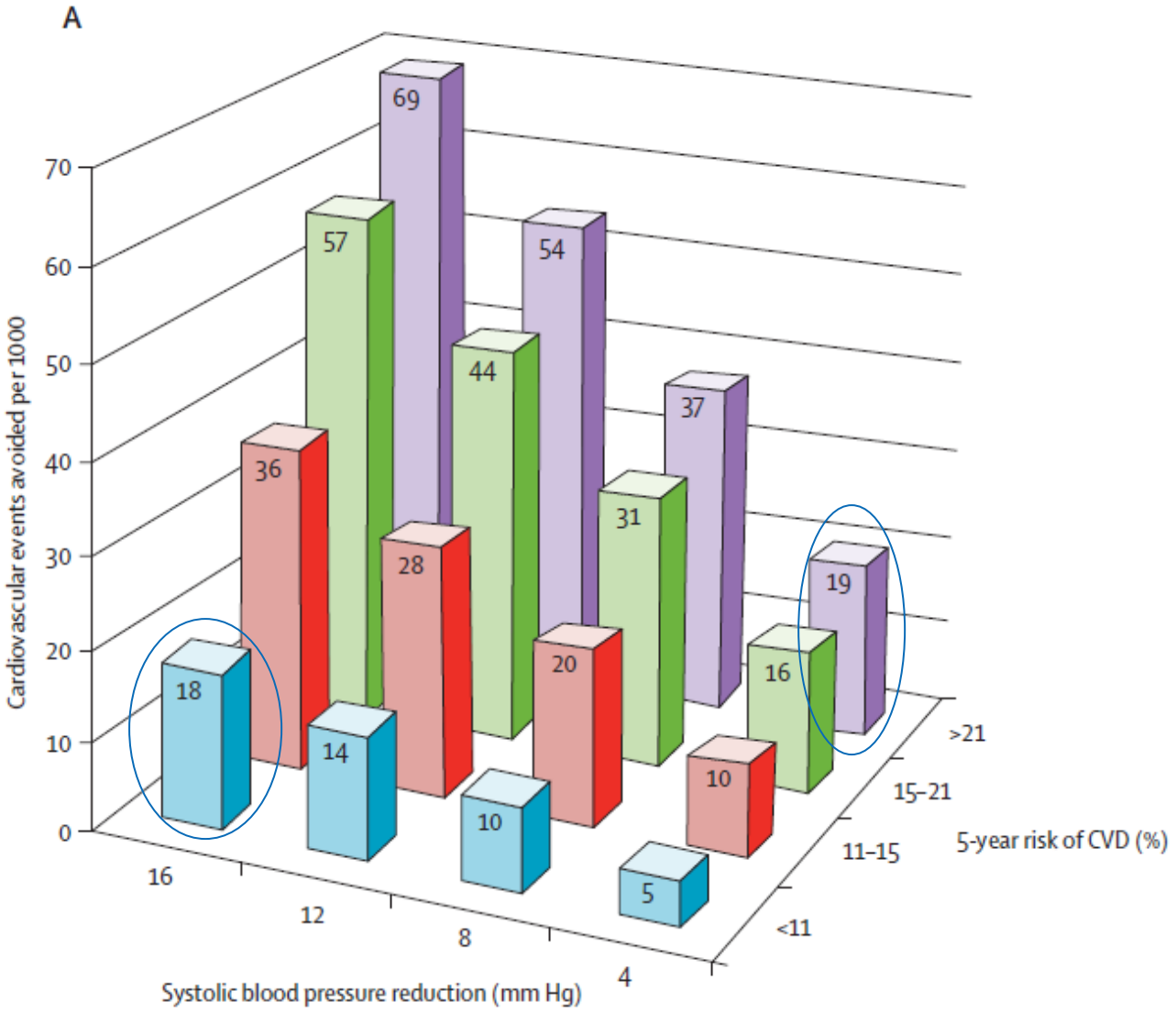
Elevated BP Follow-up – April 2021 - KP



CVD Risk Assessment

- SPRINT clinical trial: benefit of more intensive treatment in high risk
- Findings largely replicated by STEP trial (NEJM 2021) - SBP 110 - < 130 vs 130 - < 150 in patients 60-80 (65% had FRS > 15%). 26% reduction in CV events, 33% reduction in stroke, 33% reduction in ACS, 73% reduction in acute decompensated HF.
- Meta-analysis of individual participant data from 11 trials and 48K participants: CVD risk strategy avoided more CV events than BP strategy alone*
- WHO 2021: target SBP < 130 in high-risk patients (CVD, DM, CKD)
- *Karmali et al, PLOS Medicine 2018; 15(3)

CV event avoidance according to baseline CV risk and BP reduction

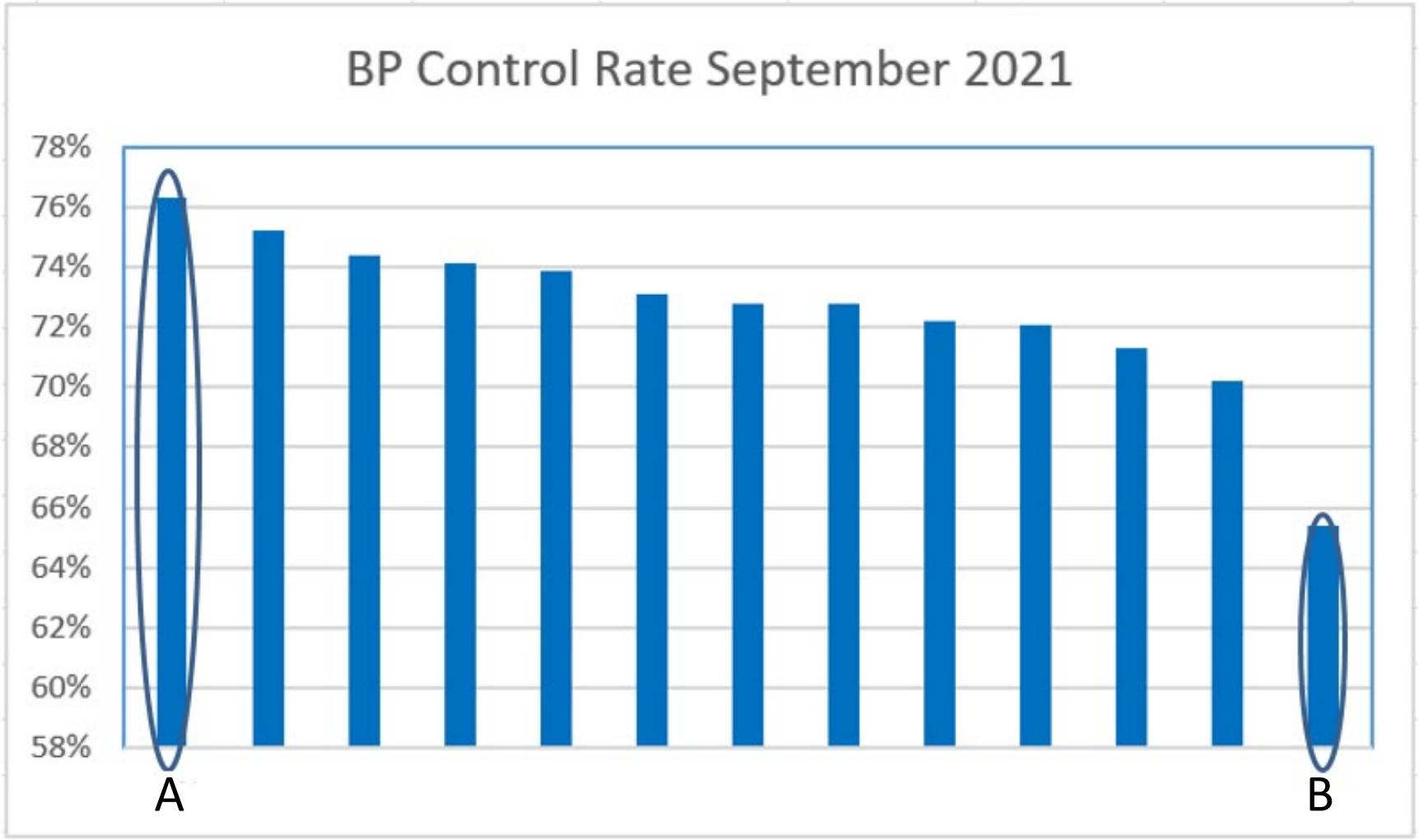


The Blood Pressure Lowering Treatment Trialists' Collaboration – Lancet 2014; 384

System for Performance Evaluation with Feedback

- Key finding of high-performing systems
- Only way to evaluate if key drivers implemented successfully.
- Feedback must be frequent and drilled down to individual physicians and staff

Kaiser SCAL Example

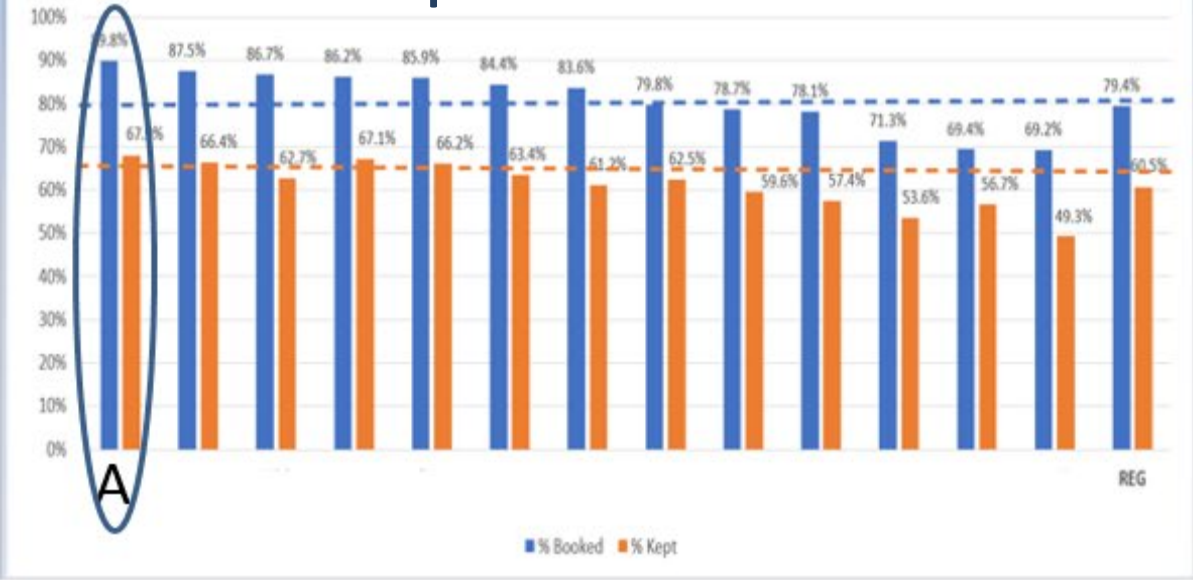


KP SCAL internal data

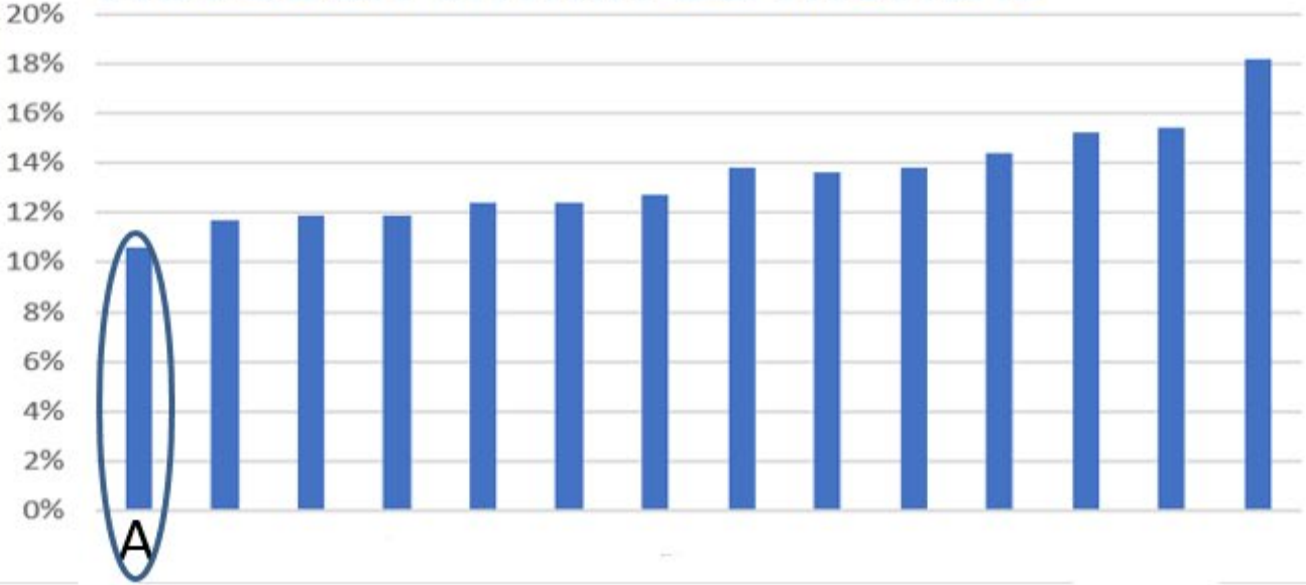
Repeat BP

Treatment Intensification Rate

Follow-up after elevated BP

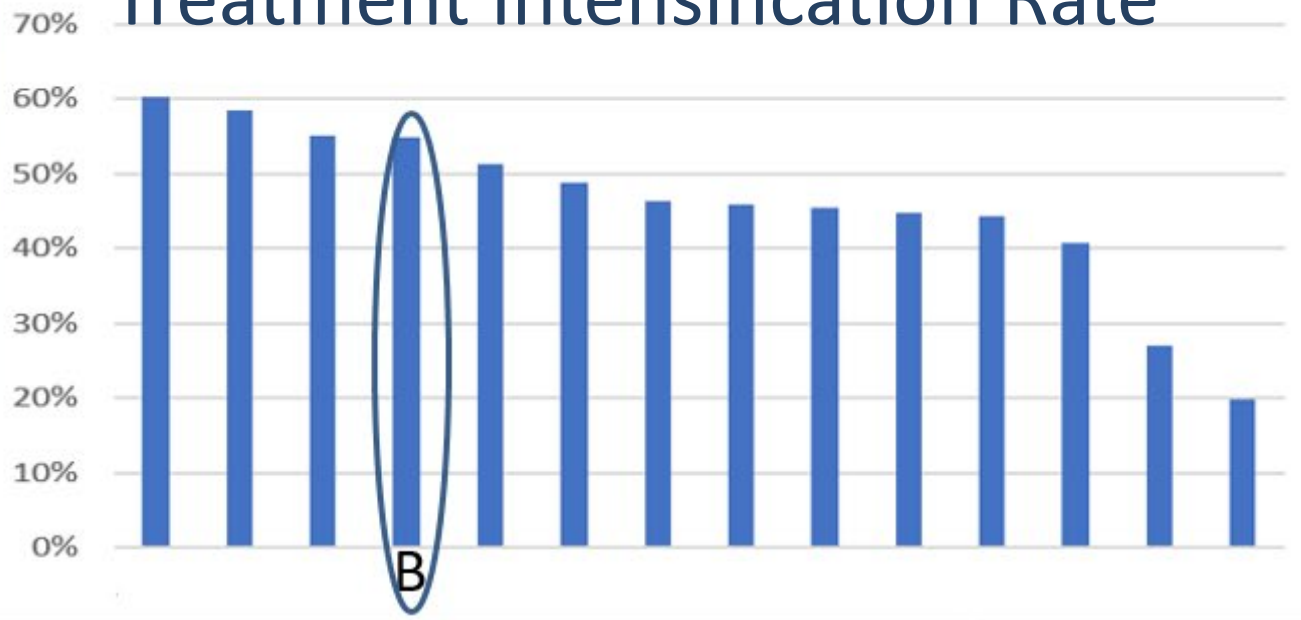


Not seen within 12 months

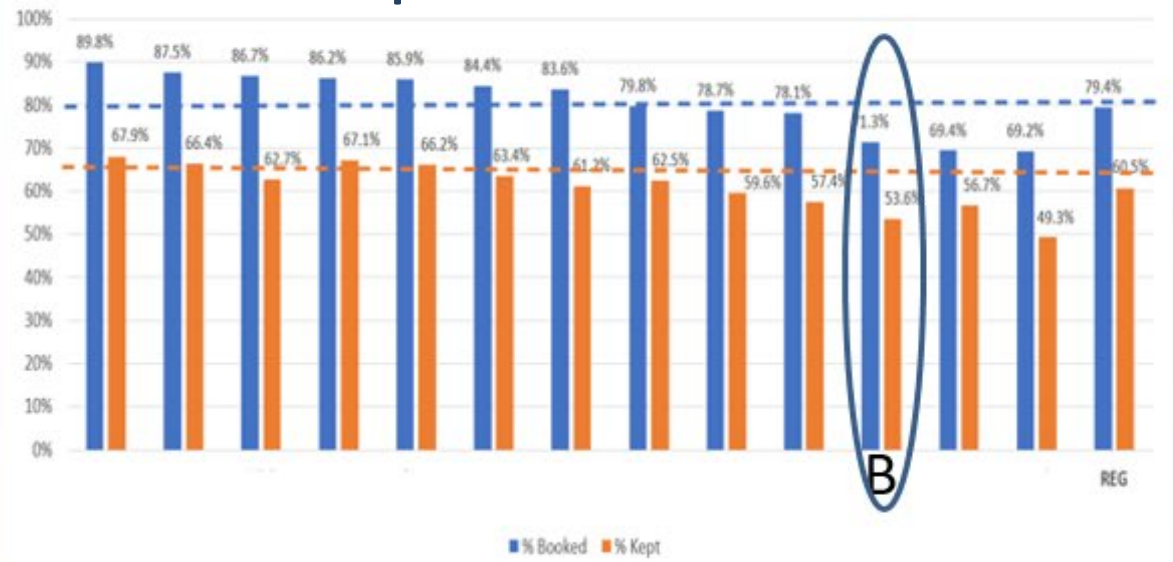


Repeat BP

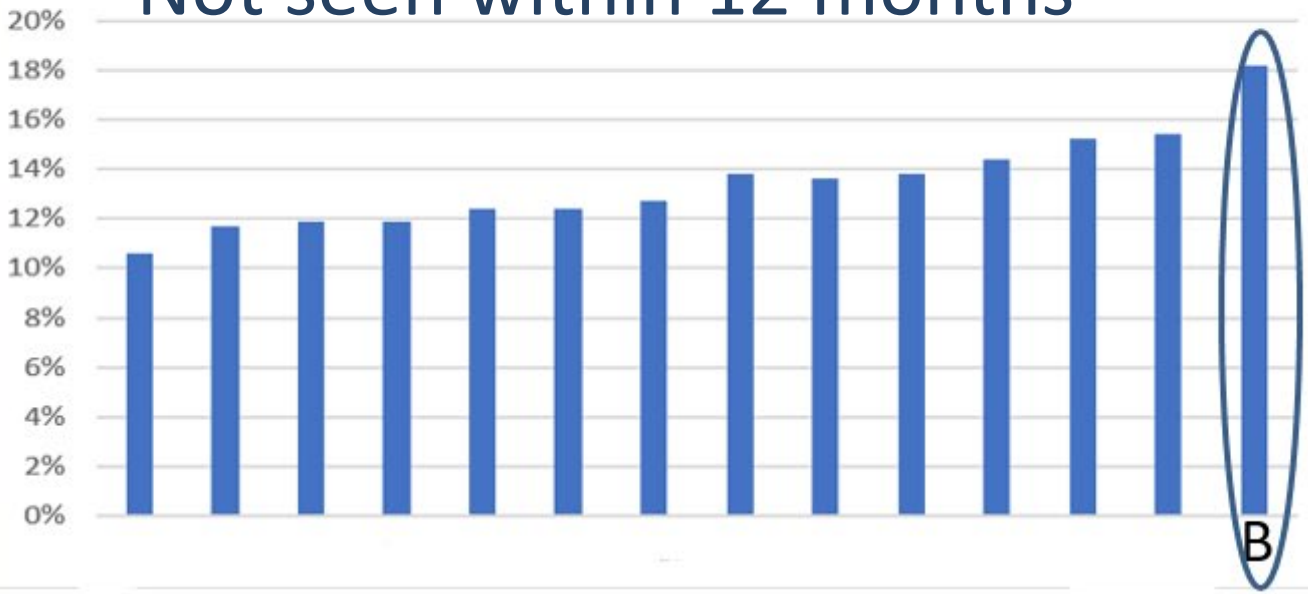
Treatment Intensification Rate



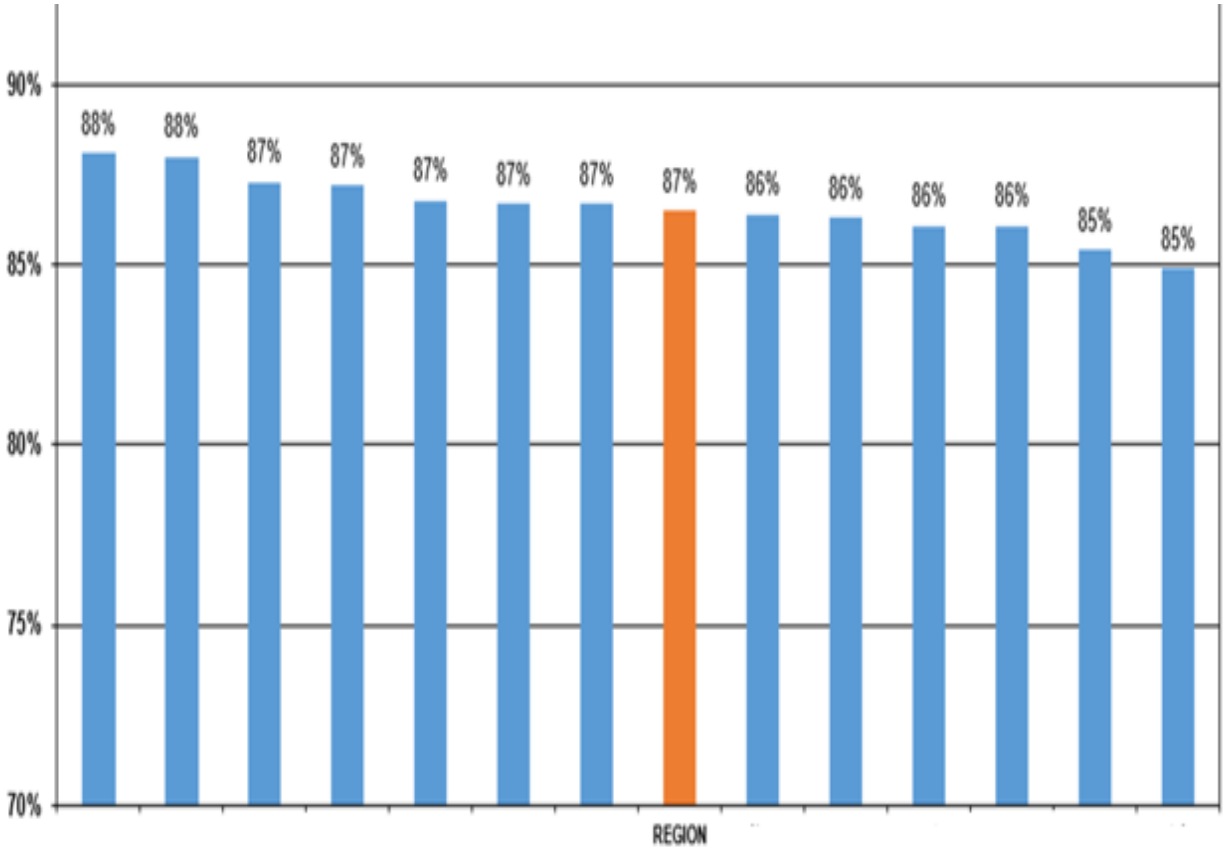
Follow-up after elevated BP



Not seen within 12 months



KP Scorecards – BP control

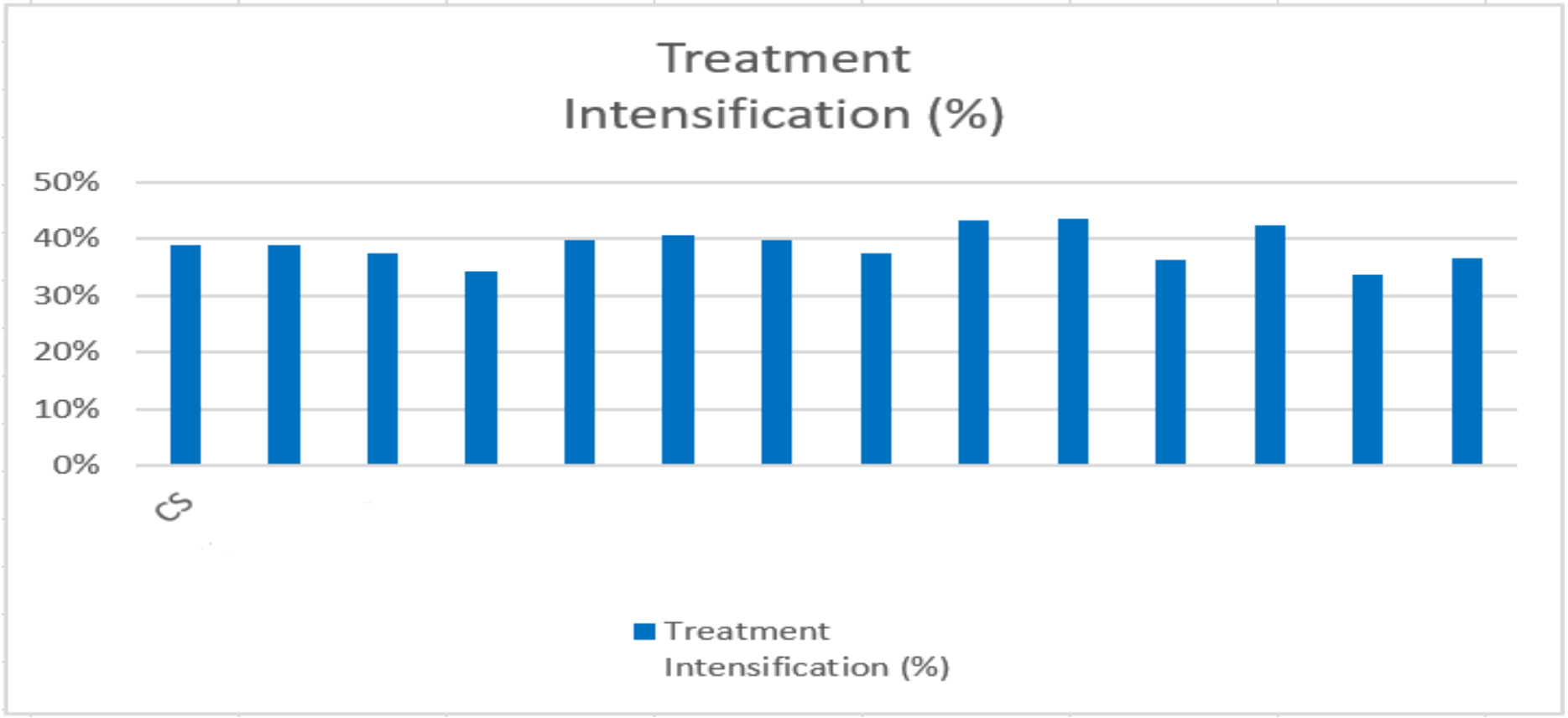


PCP	HTN Pts (age 18+)						
	Population	BP Controlled		BP Uncontrolled		No BP	
	Pts	Pts	%	Pts	%	Pts	%
	288	255	88.5 %	20	6.9 %	13	4.5 %
	786	642	81.7 %	95	12.1 %	49	6.2 %
	583	493	84.6 %	64	11 %	26	4.5 %
	610	488	80 %	92	15.1 %	30	4.9 %
	277	213	76.9 %	35	12.6 %	29	10.5 %

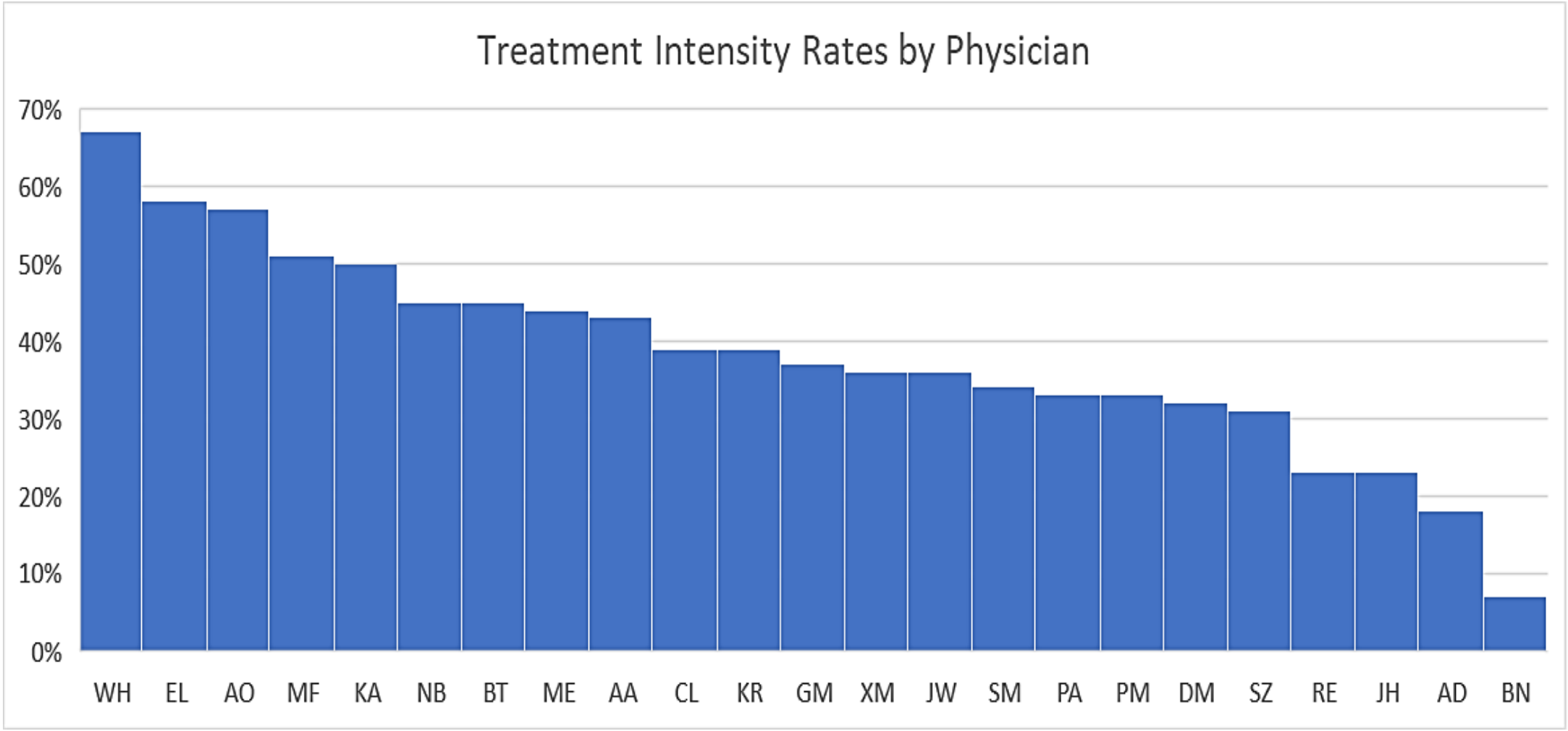
Repeat BP Report – March 2022 - KP

Urgent Care				
	H	18	17	94%
	B	15	15	100%
	R	20	15	75%
	A	10	7	70%
	N	27	24	89%
	S	3	3	100%
	B	1	0	0%
	R	15	15	100%
	L	24	23	96%
	G	1	1	100%
	M	11	10	91%
	C	43	40	93%
	M	2	2	100%
	L	4	4	100%
	H	27	26	96%
	H	2	2	100%
	A	1	1	100%
	C	1	1	100%
	U	16	15	94%
	M	5	4	80%
	S	6	5	83%
	T	2	1	50%
	K	24	23	96%
	M	42	40	95%
	U	49	14	29%
	G	26	26	100%
	S	42	41	98%
	C	21	17	81%
	G	11	11	100%

Treatment Intensity Rates by Medical Center - KP



BLOOD PRESSURE CONTROL DRIVERS AT PRIMARY HEALTH CARE CENTERS

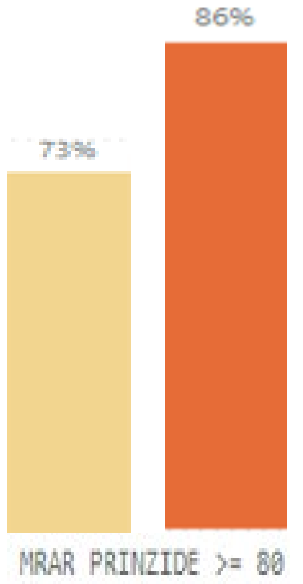


Individual physician TI rates at BHC clinic for 3-month period March – May 2021

Process Measures and Health Equity - KP

Kaiser example: current Black-White disparity gap in control rate about 2%

- No difference in clinic visitation, treatment intensification or follow-up after elevated BP.
- However, adherence lower in all medication classes – led to focus and training on communication skills for providers.



Medication adherence in Black vs White hypertensives

HEARTS in the Americas Innovation Group:

Multidisciplinary - nursing, primary care, specialty care (cardiology, nephrology, research); ministries of health, PAHO, health facility leads

Participants from 12 countries:

- Teresa Aumala, MD (Ecuador)
- Allana Best, MD (Trinidad and Tobago)
- Shana Cyr, MD (Saint Lucia)
- Modesta Haughton, RN, MPH (Panamá)
- Mirna Jiménez de la Rosa, MD (República Dominicana)
- Taraleen Malcolm, PhD (Trinidad and Tobago)
- Javier Maldonado, MD, MPH (Colombia)
- Carolina Neira Ojeda, RN, MBA (Chile)
- Vivian Perez, MD (Perú)
- Gonzalo Rodríguez, MD (Argentina)
- Yamilé Valdés González, MD, MSc (Cuba)
- Peter Wood, BAppSc MSc (Canada)
- Eric Zuñiga, MD (Chile)

HEARTS in the Americas Innovation Group

- Met every 2 weeks from May 2020 – May 2021
- Focused on Team-Based Care and Systems for Monitoring modules with emphasis on identification of key drivers for BP control
- Studied best practices from high-performing systems including Kaiser and others (CDC 2020 Hypertension Control Change Package)

WHO – New Recommendations 2021

- Threshold for the initiation of pharmacological treatment
- Cardiovascular disease risk assessment
- Specific medication classes and use of FDC
- Target blood pressure
- Frequency of assessment
- Treatment by nonphysician professionals

THE LANCET Regional Health Americas

Drivers and scorecards to improve hypertension control in primary care practice: Recommendations from the HEARTS in the Americas Innovation Group

Jeffrey W. Brettler,[a,b] Gloria P Giraldo Arcila,[c] Teresa Aumala,[d] Allana Best,[e] Norm RC Campbell,[f] Shana Cyr,[g] Angelo Gamarra,[c] Marc G. Jaffe,[h] Mirna Jimenez De la Rosa,[i,j] Javier Maldonado,[k] Carolina Neira Ojeda,[l] Modesta Haughton,[m] Taraleen Malcolm,[n] Vivian Perez,[o] Gonzalo Rodriguez,[p] Andres Rosende,[c] Yamilé Valdés González,[q] Peter W. Wood,[r] Eric Zúñiga,[s] and Pedro Ordunez[c,]*

ARTICLES | VOLUME 9, 100223, MAY 01, 2022

Key Drivers Identified

Domain	Key Driver	Recommendations
Diagnosis	BP measurement accuracy	Training, standardized protocol, validated monitors
	CVD risk assessment	Assess in all patients; statins and ASA as appropriate
Treatment	Standardized treatment protocol	Specific medication with doses, use of FDC
	Treatment intensification	Initiate treatment after diagnosis; titrate when BP above goal
Continuity of care and follow-up	Continuity of care and follow-up	F/u within 4 weeks if uncontrolled; 3-6 months if controlled
Delivery system	Team-based care and task shifting	BP measurement, f/u BP visit, medication titration
	Medication refill frequency	3-month refills
System for performance evaluation	System for performance evaluation with feedback	Monthly performance feedback

Hypertension control drivers		Recommendations	Goals	Score (points) Total = 21
Diagnosis	1. BP measurement accuracy			3
		1.a Establish BP measurement training every six months for all staff involved with BP measurement.	≥ 90%	1
		2.a Institute standardized BP measurement protocols, including patient preparation and repeated BP measurement if the first BP reading is elevated.	≥ 90%	1
		3.a Implement the exclusive use of validated automatic BPMD for clinical practice.	≥ 90%	1
	2. CVD risk assessment			2
		2.a Assess the CVD risk in all patients with hypertension to guide BP goal and frequency of follow-up.	≥ 80%	1
		2.b Use of combination BP medication, statin, aspirin (as needed) in high CVD risk patients, including those with Diabetes and CKD.	≥ 80%	1
Treatment	3. Standardized Treatment Protocol			2
		3.a Standardized Treatment Protocol with specific medications and doses	Implemented	1
		3.b Established protocol using FDC medication	Implemented	1
	4. Treatment intensification			2
		4.a Initiate pharmacological treatment immediately after the diagnosis of HTN is confirmed.	≥ 70%	1
		4.b Medication must be added or intensified as per standard protocol if BP ≥ 140/90 or SBP ≥130 mmHg for high-risk patients	≥ 80%	1
Continuity of care and follow-up	5. Continuity of care and follow-up			3
		5.a 5.a Follow-up of elevated BP within 2-4 weeks if not controlled	≥ 80%	1
		5.b BP visit within six months for all patients with hypertension stable and well-controlled.	≥ 80%	1
		5.c BP visit within 3 months for all patients with hypertension and high CVD risk, including diabetes and CKD	≥ 80%	1
Delivery System	6. Team-based care and task-shifting			3
		6.a BP measurement by NPHW appropriately trained and certified	≥ 90%	1
		6.b Follow-up BP visits with NPHW under supervision and guided by protocol	≥ 70%	1
		6.c Medication titration by a NPWH under supervision and guided by protocol.	≥ 70%	1
	7. Medication refill frequency			3
		7.a Implement standard 3-month refill intervals for all BP medication prescriptions for patients stable and controlled	Three months refill	3 (2 month refill = 2; monthly refill = 1)
System for performance evaluation	8. System for performance evaluation with feedback			3
		8.a Implement monthly performance evaluation with feedback to facilitate tracking, prevent substantial deviations and promote timely program corrections. (Bi-monthly evaluation and feedback can be acceptable for small facilities, and evaluation every three months is the minimum acceptable).	Monthly feedback	3 (Bi-monthly = 2; every three months = 1)

HEARTS Process Maturity Index (1-21)

Level 1	Level 2	Level 3	Level 4	Level 5
< 7	7-10	11-14	15-18	19-21

HEARTS Performance Index

Indicators	Level of performance, goal, and scores				
	Poor (<50%)	Incipient (≥ 50%)	On Track (≥ 60%)	High (≥ 70%)	Excellent (≥ 80%)
1. Coverage	0	1	2	3	4
2. Control (<140/90 mmHg) among all hypertensives treated	0	1	2	3	4
3. Control (<130 mmHg SBP) among all hypertensives-high CVD risk treated	0	1	2	3	4

HEARTS Performance Index

NOT IMPLEMENTED	INCIPIENT	ON TRACK	HIGH	EXCELLENT
<0.8	0.9 – 1.6	1.7 – 2.4	2.5 – 3.2	3.3 – 4.0

1. BP measurement accuracy

2. CVD risk assessment

3. Standardized Treatment Protocol

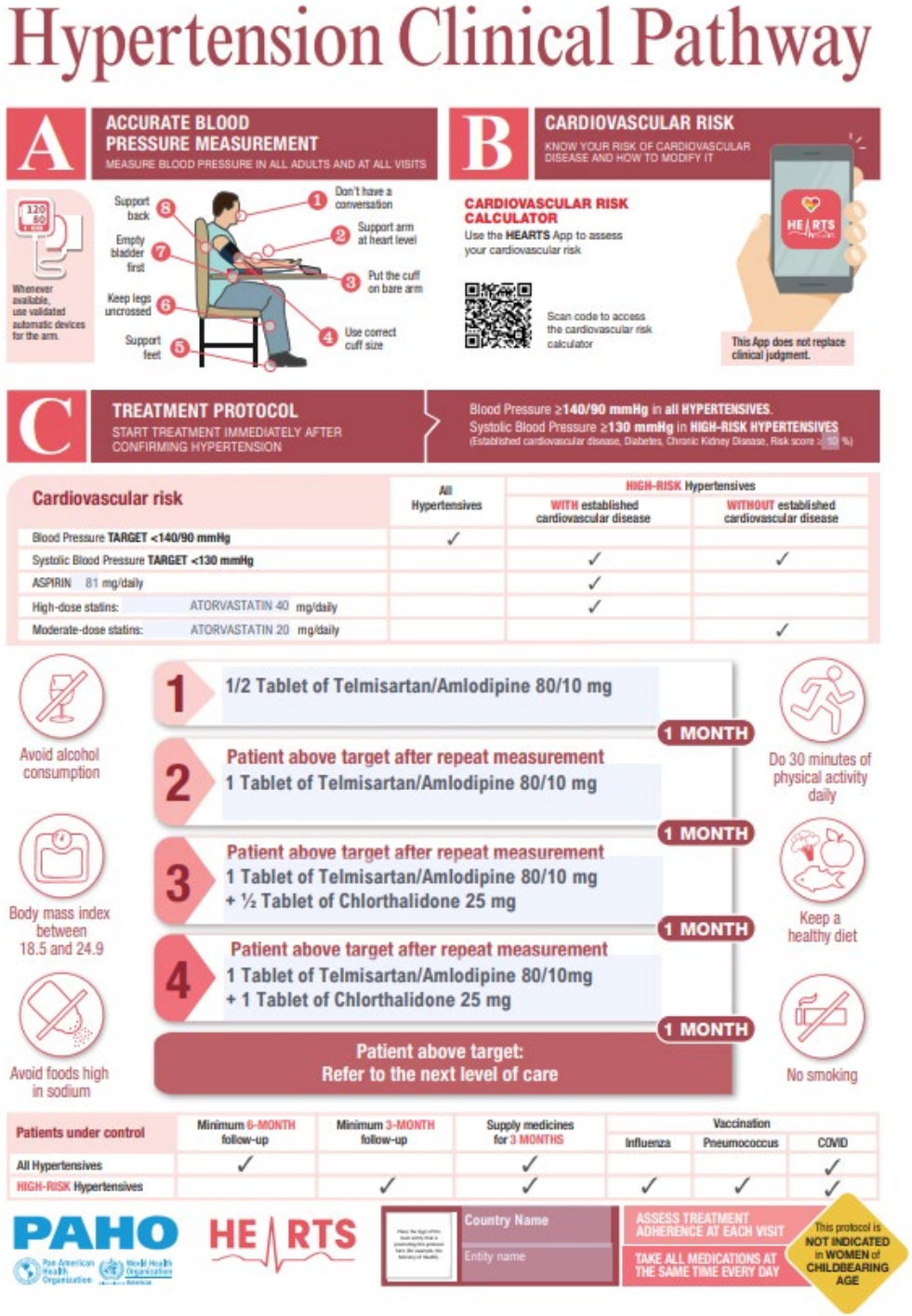
4. Treatment intensification

5. Continuity of care and follow-up

6. Team-based care and task-shifting

7. Medication refill frequency

8. System for performance evaluation with feedback



BLOOD PRESSURE CONTROL DRIVERS AT PRIMARY HEALTH CARE CENTERS

- Introduction/Overview of the Course. Key Hypertension Control Drivers Overview
- Module 1: Overview of quality improvement
- Module 2: Accurate BP Measurement
- Module 3: Medication Titration
- Module 4: Follow-Up Blood Pressure Check
- Module 5: Utilization of Scorecards for Quality Improvement
- Module 6: Community Outreach
- Module 7: Home Blood Pressure Monitoring
- Special module: COVID-19, Hypertension Control and Cardiovascular Disease

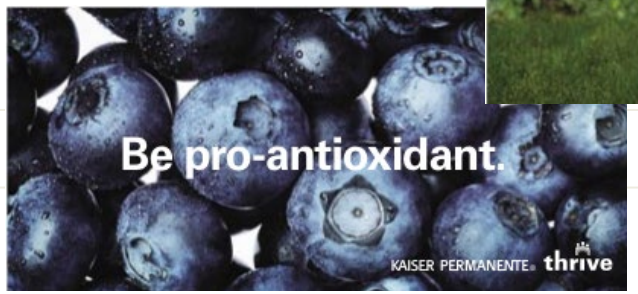
Conclusions

To improve BP control:

- Identify key drivers of BP control; translate those key drivers into process measures; use those process measures in a performance feedback system with front-line clinicians and clinics.
- *Key drivers are evidence-based and guideline-supported.*
- *Identifying key drivers and process measures is not an academic exercise. They are practical and essential tools for PHCs and systems to improve control rates.*

HEARTS
IN THE AMERICAS

Thank you!



Questions:
Jeffrey.W.Brettler@kp.org

Pan American Health Organization
World Health Organization
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Questions?

Join us for our next
HEARTS in America event:

Hypertension, Diabetes, and Chronic Disparities Paradigm

David Flood, MD
October 5th@ 12:15pm

CME Process

CME credit and certificate distribution are managed through SMA's **online process**. Within one week after the conclusion of the webinar, **please be on the lookout for an email from the Southern Medical Association (customerservice@sma.org) that will include your unique link to an online form** to complete the evaluation, attendance attestation, and claim credit. Please review the following process to receive your certificate awarding credit (for physicians), or a certificate of participation (for non-physician attendees).

- Southern Medical Association (SMA) **will create an online account for you** including your unique login, **using the email address you provided during registration** (your username/ID is your email address).
- Upon receipt of your post-meeting email, click the link provided, and please **make sure that your name and email address appear at the top of the form before completion**.
- **After you complete and submit your evaluation and attendance documentation, your certificate will be emailed to you as a .pdf attachment from customerservice@sma.org within 24 hours.**

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HQIN Health Quality Innovation Network

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