



HEARTS

IN THE AMERICAS
Regional Workshop

Hypertension Clinical Assessment: Data Matters – South Carolina

Brent M. Egan, MD

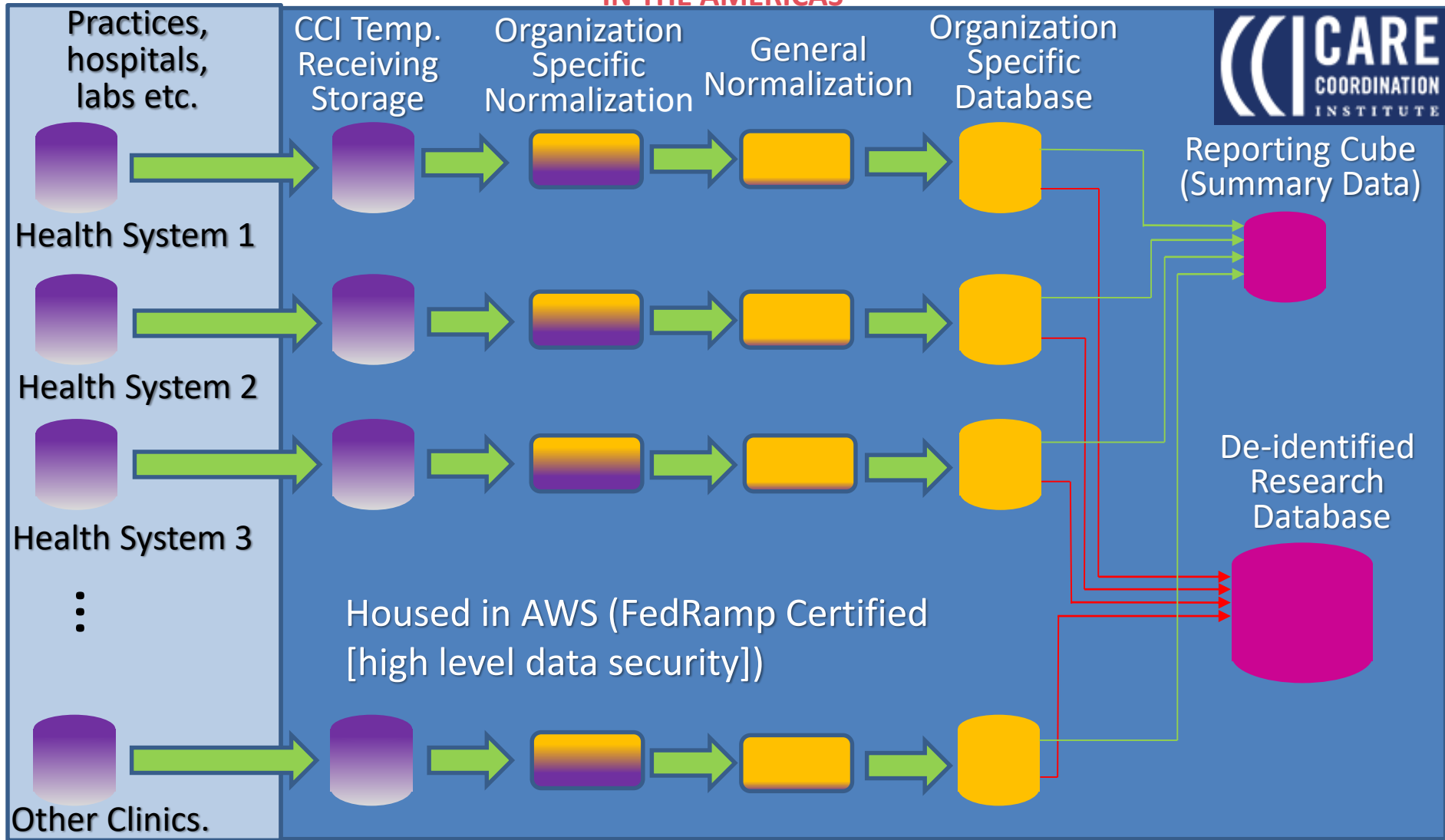
University of South Carolina SOM – Greenville, SC

USA



Hypertension Clinical Assessment: Data Matter – South Carolina

- Data acquisition and standardization
- Using Data to Facilitate a Hypertension QI Program using standardized monthly reports (structured queries)
- Clinical data analysis – identify key modifiable variables driving significant variance in clinical outcomes



Data Management Using a Federated Structure

STANDARDIZING MEDICAL TERMS WITHIN AND ACROSS HEALTH SYSTEMS AND CLINICS

- **ICD-10, International Classification of Disease, 10 edition** (diagnoses)
- **CPT, Current Procedural Terminology** (procedures)
- **SNOMED CT, Systematized Nomenclature of Medicine – Clinical Terminology**
- **Logical Observation Identifiers Names and Codes (LOINC)** for both laboratory data and medical observations – laboratory data
- **RxNorm: Prescriptions**

OTHER KEYS TO DATA QUALITY

- Verify a subset of data, e.g., 5 % – 10% on initial downloads by comparing medical record entry to data extracts until >99% accuracy is achieved and sustained
- Use reference ranges for individual variables when available
- Use control charts to detect if the volume of data for each variable is outside the expected range for each participating clinic or health system
- Encourage clinicians and others receiving reports to comment when unexpected findings occur, e.g., ‘more than 10% of my patients with diabetes have a HbA1c in the past year’

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MAP Hypertension Control Program

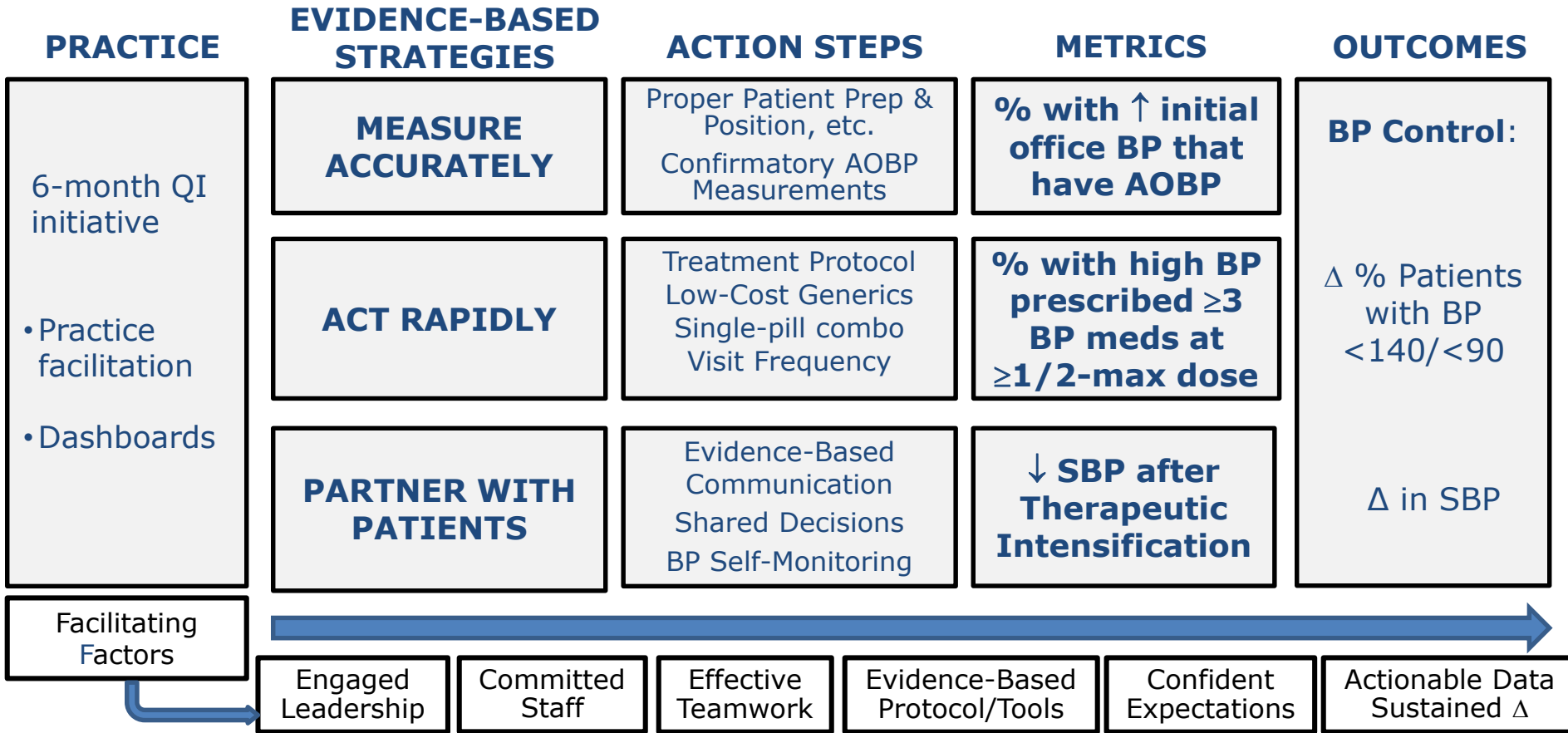
Measure accurately

Act rapidly

Partner with patients

for a rapid and sustained improvement in BP control



MAP Hypertension Control Program



CCI Reports for Nick Riviera (demo)

CCI MAP Report

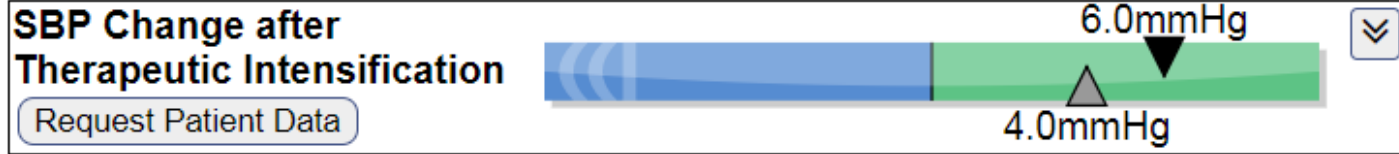
▼ Nick Riviera (demo) compared to ▲ Springfield General Hospital (demo)

Sep 2017 to Sep 2018  

All Hypertensive Patients



Uncontrolled Hypertensive Patients



OFFICE BP MEASUREMENT: Important, often unreliable

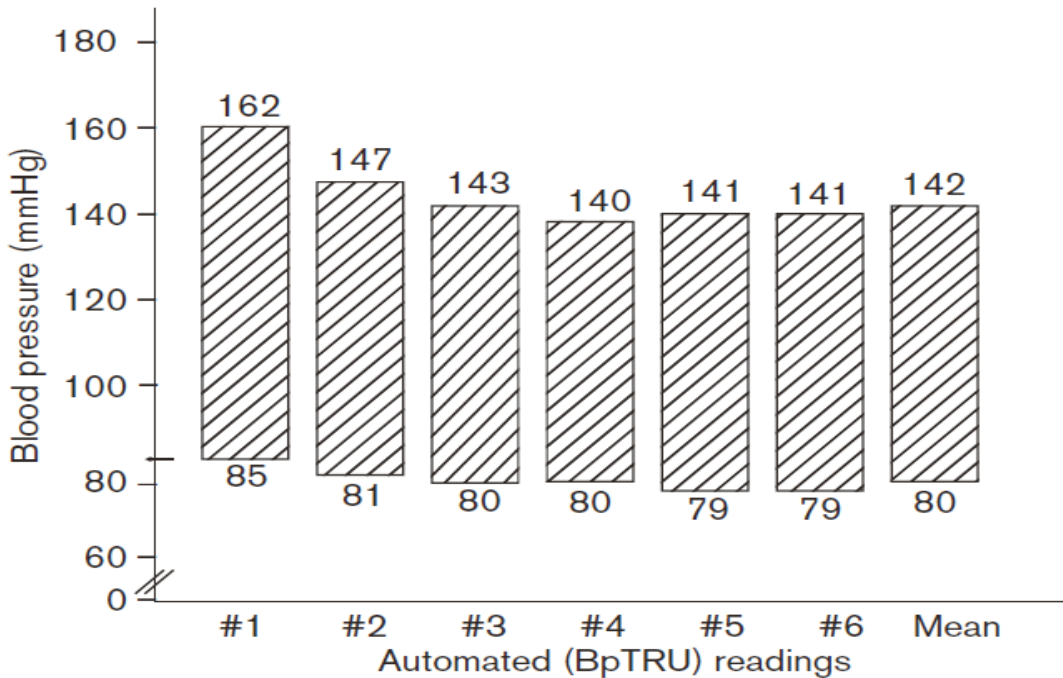
Measurement Error	BP Effect
1. Back unsupported	5–10 mmHg
2. Arm not supported heart level	5–10 mmHg
3. BP Cuff over sweatshirt	10–40 mmHg
4. Legs crossed	2–8 mmHg
5. Bladder full	10–15 mmHg
6. Feet not flat on floor	5–10 mmHg
7. Patient talking	10–15 mmHg
8. Patient listening	



Two major challenges in clinical BP measurement:

1. Obtaining an accurate BP that reflects intra-arterial values
2. Obtaining a representative BP that reflects usual daytime pressures

Automated Office BP: Obtaining an Accurate and REPRESENTATIVE BP



50 HTN Pts. 1st BP taken by physician using an AOBP device. The 2nd thru 6th BPs were taken using the AOBP device with the Pt in alone in the exam room.¹

The white coat response with office BP is virtually eliminated with AOBP.²

AOBP devices endorsed by Hypertension Canada include:

- Microlife Watch BP Office
- Omron HEM-907
- Welch-Allyn ProBP 2400

Myers MG. *Blood Press Monit.* 2006; 11:59–62.

Myers MG, et al. *J Hypertension.* 2009; 27:280–286

MAP Step 2: Act Rapidly

- In most clinical trials of antihypertensive therapy, patients required an average of 3 or more BP meds to pursue goal BP
- Yet, *most adults with uncontrolled hypertension in clinical practice are not prescribed 3 different BP meds at 1/2-maximal doses*
- Thus, failure to prescribe adequate pharmacotherapy is as a key barrier to better BP control

Bakris GL. *Arch Intern Med.* 2001;161:2661–2667.

Egan BM, et al. *Hypertension.* 2013;62:691–697.

Why Focus on Three BP Meds at 1/2-Maximal Doses?

- Few patients are controlled to goal on monotherapy¹
- Complementary antihypertensive medications have additive BP lowering effects
- Approximately 80% of the antihypertensive benefit of most medications is obtained at 1/2-maximal dose²
- ***Adding a BP medication at 1/2-maximal dose has 3–4 times the BP lowering effect of doubling a current BP med from 1/2-maximal to maximal dose***

1. Whelton PK, et al. *Hypertension*. 2017;71:e13–e115.

2. Law MR, et al. *BMJ*. 2003;326:1427.

MAP Step 3 – Partner Proactively with Patients



To empower patients in controlling their BP:

1. Engage patients using *evidence-based communication strategies e.g. shared decision making and 'teach back'*
2. Assist patients in accurate *self-measured (SM)BP*
3. *Direct patients and families to resources and supports that foster adherence with meds and healthy lifestyles*
4. Use *low-cost medications (reduce out-of-pocket costs), single-pill combinations (fewer pills), refill consolidation (fewer pharmacy) visits*
5. Follow-up monthly when BP uncontrolled

CCI Reports for Nick Riviera (demo)

CCI MAP Report

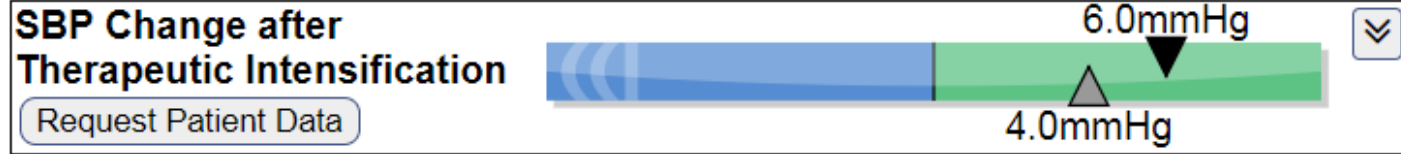
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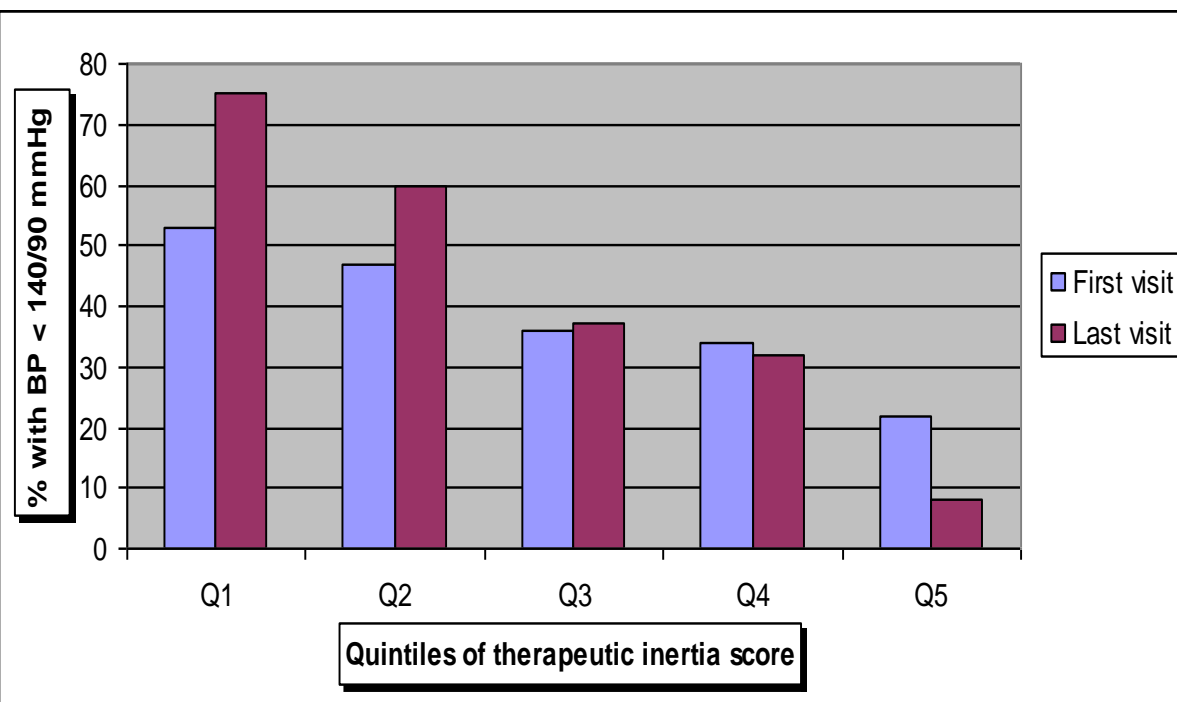


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- Using Data to Facilitate a Hypertension QI Program
Clinical data queries for standardized monthly reports to support quality improvement
- ***Clinical data analysis – identify key modifiable variables driving significant variance in outcomes***

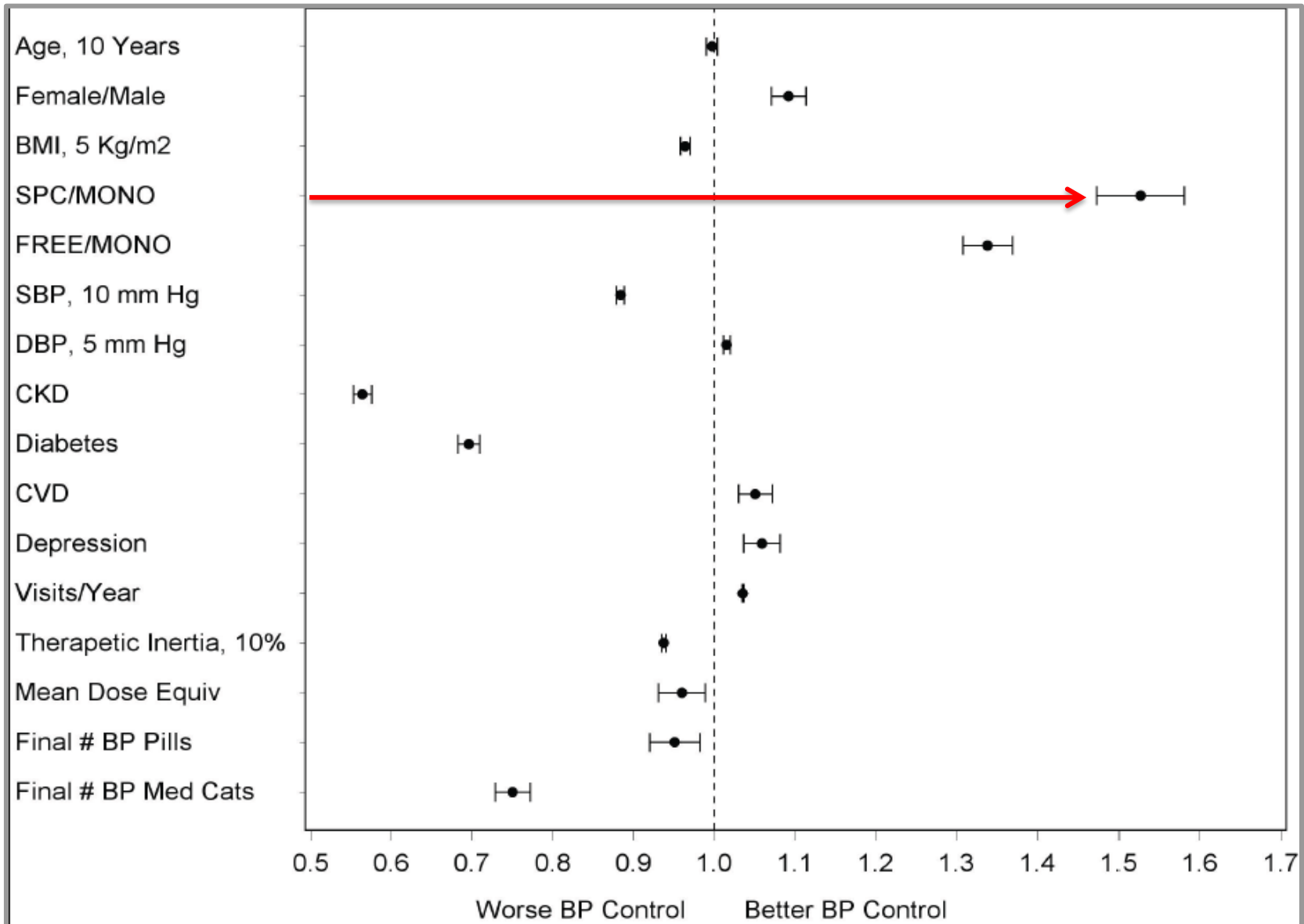
Therapeutic Inertia Is an Impediment to Achieving the Healthy People 2010 Blood Pressure Control Goals

Eni C. Okonofua, Kit N. Simpson, Ammar Jesri, Shakaib U. Rehman,
 Valerie L. Durkalski, Brent M. Egan



Individuals in the lowest TI quintile were 33 times more likely to have their BP controlled at the last visit than those in highest quintile (OR 32.7, $p < 0.001$).

If TI decreased from $\sim 7/8$ to $\sim 2/3$ visits, BP control would increase from 45.1% to a projected 65.9% in 1 year.



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Select a Treatment Regimen that is Evidence-Based and Acceptable to Most Clinicians and Patients

Regimen-1 3 pills; 3 meds	Regimen- 2 2 pills; 3 meds	Regimen- 3 2 pills; 3 meds	Regimen – 4 2 pills; 4 meds
Lisinopril 20	Benazepril / Amlodipine 20/5	Valsartan / HCT 160/25	Benazepril / Amlodipine 20/5
Amlodipine 5	Chlorthalidone 12.5	Amlodipine 5	HCTZ / Spiro- lactone 25/25
Indapamide 1.25			

Notes:

1. Half-maximal doses shown
2. Treatment regimens shown should control $\geq 80\%$ of patients to $<140/<90$
3. If patients have compelling indications for specific BP med classes, then include them in the regimen

Impact of AOBP on BP in Adults with Uncontrolled Hypertension

- In our Phase 2 testing of the MAP protocol, among 2131 adults with an initial office BP that was ≥ 140 systolic and/or ≥ 90 diastolic¹:
- 731 (34%) had non-hypertensive AOBP; BP fell 147/84 to 129/77 (−18/−7)
- 1400 (66%) had hypertensive AOBP; BP fell 158/89 to 152/87 (−6/−2)

When using AOBP, $<135/<85$ equivalent to attended office BP $<140/<90$

When using AOBP, $<130/<80$ equivalent to attended office BP $<130/<80$ ²

¹Egan BM, et al. *Hypertension*. 2018;72:1320–1327

²Whelton PK, et al. *Hypertension*. 2018;71:e13–e115

Advantages of Single-Pill Combination Therapy

- ***Single-pill combinations produce better BP control in primary care than guideline-based care***
- BP declines more rapidly and control rates are better with single-pill combinations than sequential Rx
- Adherence is better and therapeutic inertia lower with single-pill combinations than when the same meds are given in separate pills
- ***Refill consolidation improves adherence – fewer pharmacy visits***

Williams B, et al. 2018 ESC/ESH Guidelines for the management of arterial hypertension. *Eur Heart J* 2018; doi:10.1093/eurheartj/ehy339.

Choudhry NK, et al. *Arch Intern Med.* 2011;171:814- 822.

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