



Improving Hypertension Control in Primary Care with Home and Ambulatory Monitoring

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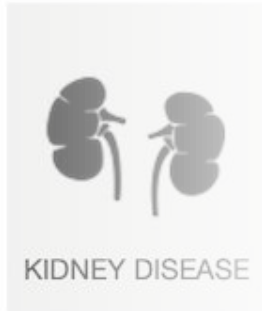
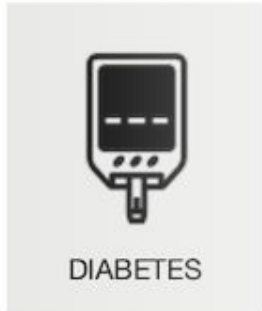
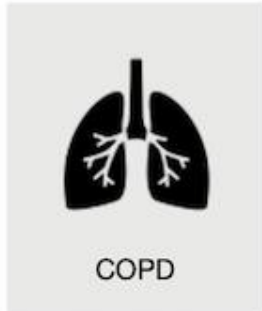
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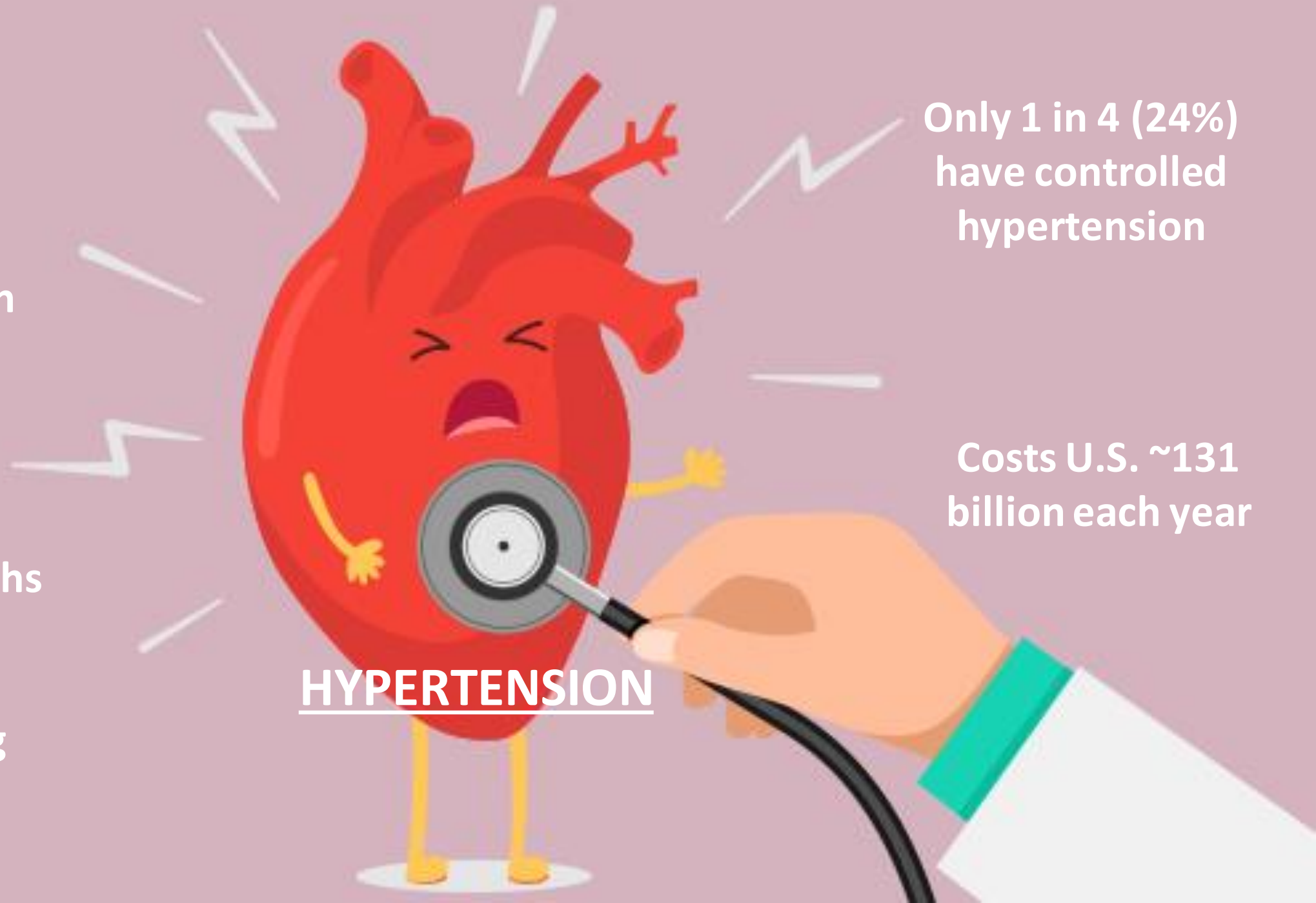
Family Medicine

Loma Linda University



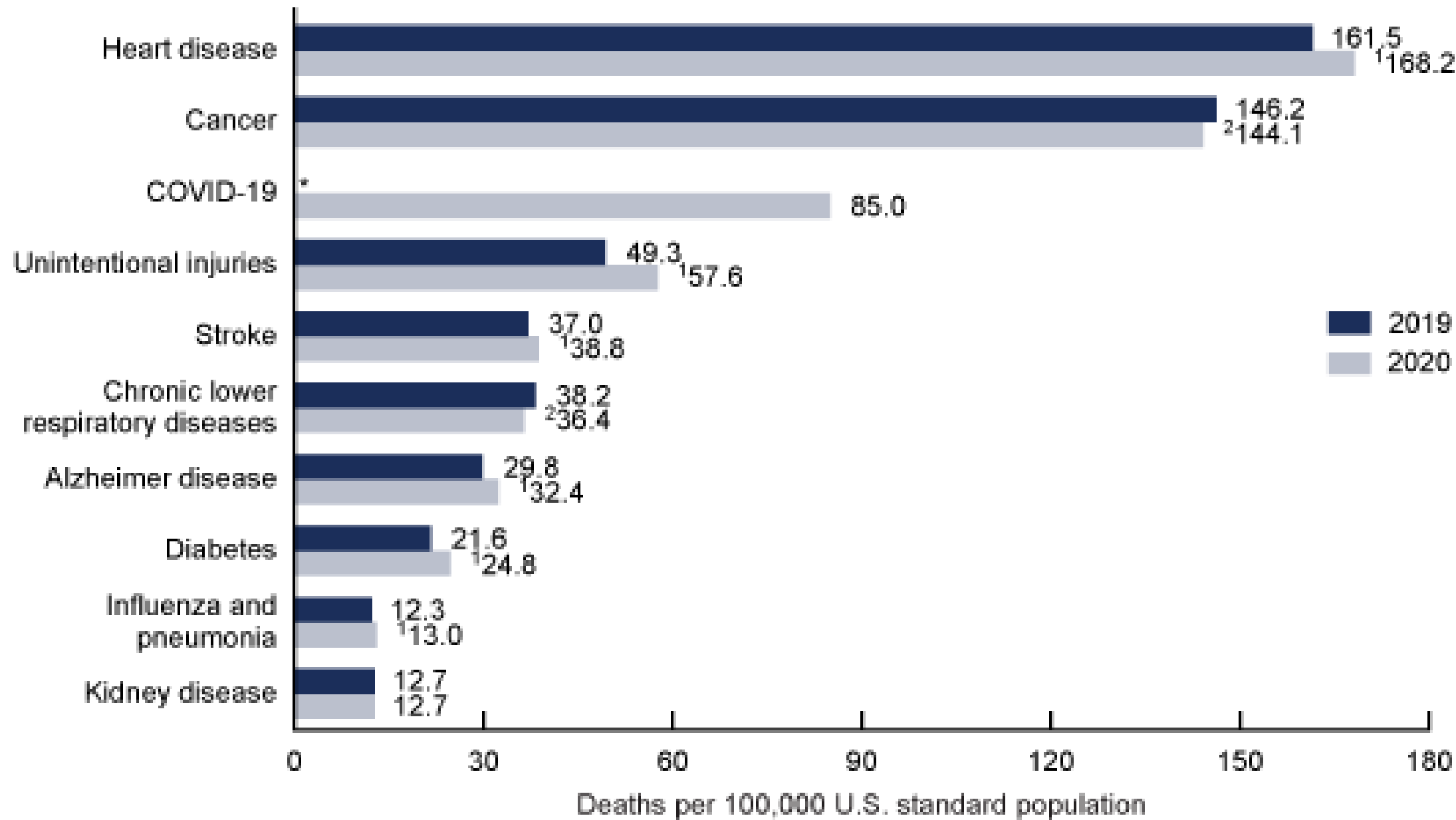
116 Million
U.S. Adults
have
hypertension

In 2020,
>670,000 deaths
had HTN as
primary or
contributing
cause




Only 1 in 4 (24%)
have controlled
hypertension

Costs U.S. ~131
billion each year



Reducing the Blood Pressure–Related Burden of Cardiovascular Disease: Impact of Achievable Improvements in Blood Pressure Prevention and Control

Shakia T. Hardy , Laura R. Loehr, Kenneth R. Butler, Sujatro Chakladar, Patricia P. Chang, Aaron R. Folsom, Gerardo Heiss, Richard F. MacLehose, Kunihiro Matsushita and Christy L. Avery

Originally published 27 Oct 2015 | <https://doi.org/10.1161/JAHA.115.002276> |
Journal of the American Heart Association. 2015;4:e002276

Articles

Blood pressure lowering for prevention of cardiovascular disease and death: a systematic review and meta-analysis

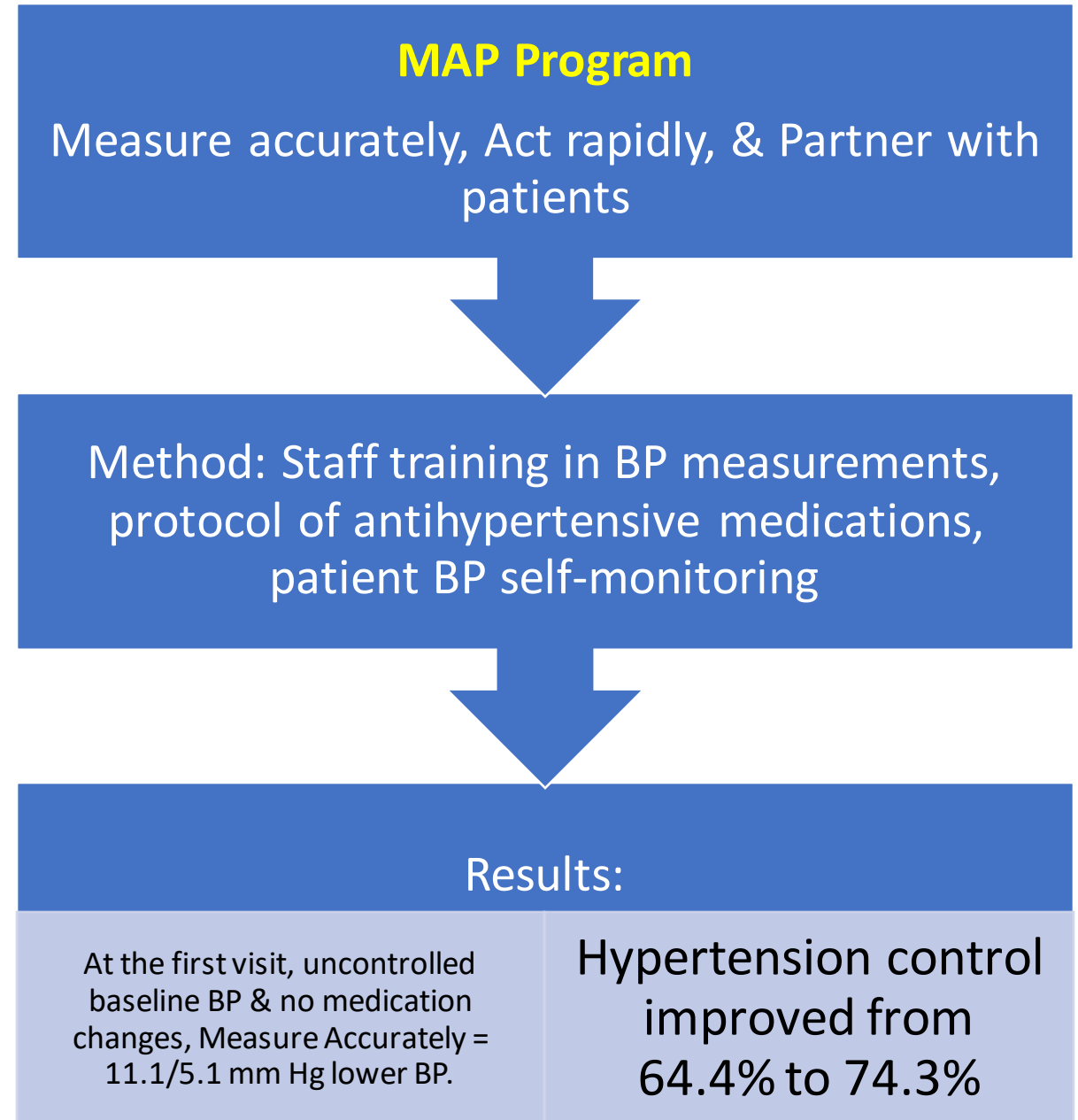
Dena Ettehad MSc^a, Connor A Emdin HBSc^a, Amit Kiran PhD^a, Simon G Anderson PhD^{a, c}, Thomas Callender MB ChB^{a, d}, Jonathan Emberson PhD^b, Prof John Chalmers PhD^e, Prof Anthony Rodgers PhD^e, Prof Kazem Rahimi DM FRCP^{a, g} 

Lowering blood pressure to prevent myocardial infarction and stroke: a new preventive strategy

Law M, Wald N, Morris J.

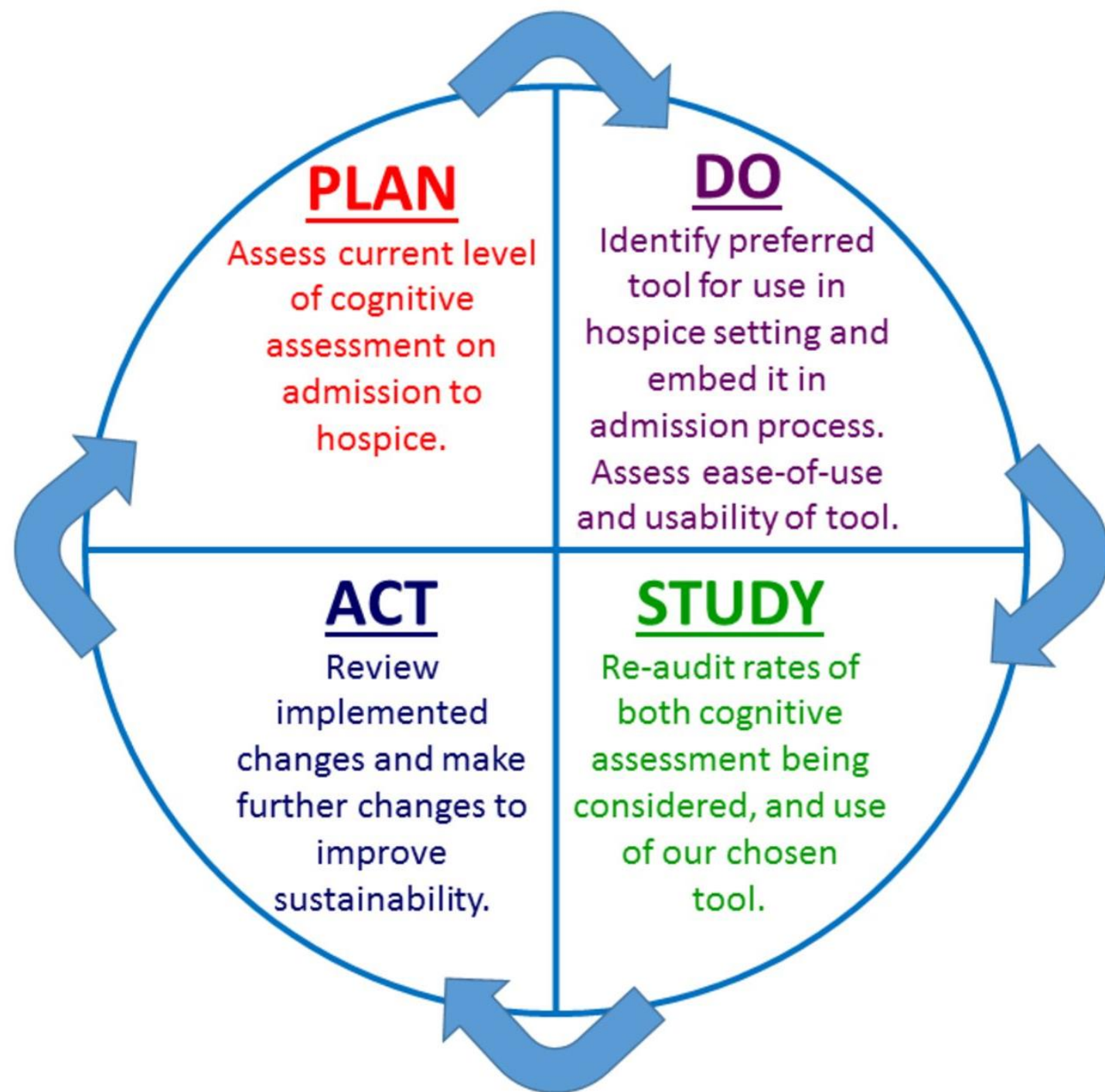
Improving Hypertension Control in Primary Care With the Measure Accurately, Act Rapidly, and Partner With Patients Protocol

Brent M Egan^{1 2 3}, Susan E Sutherland^{1 2}, Michael Rakotz⁴, Jianing Yang⁴,
R Bruce Hanlin^{2 5}, Robert A Davis^{1 2}, Gregory Wozniak⁴

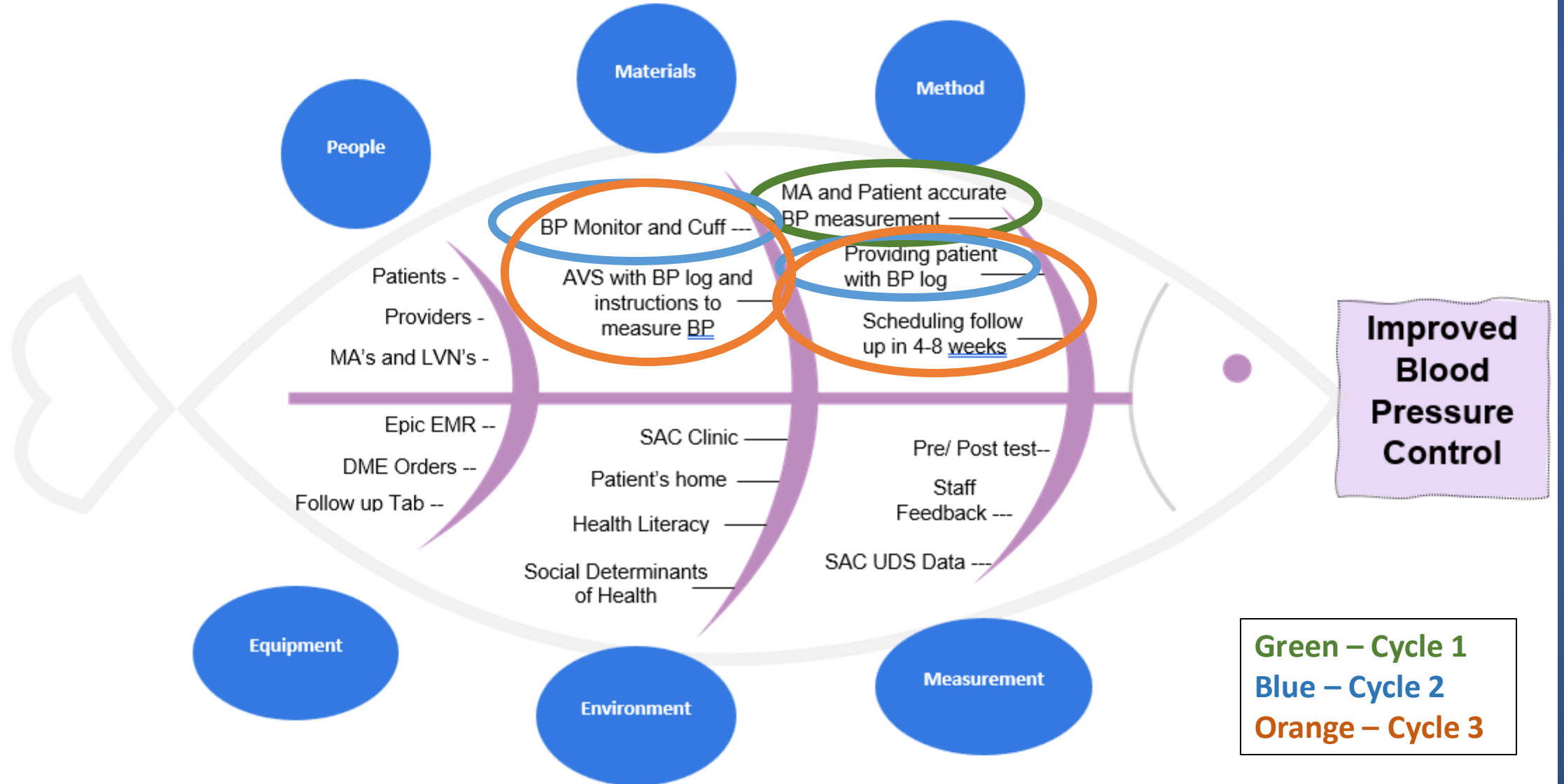


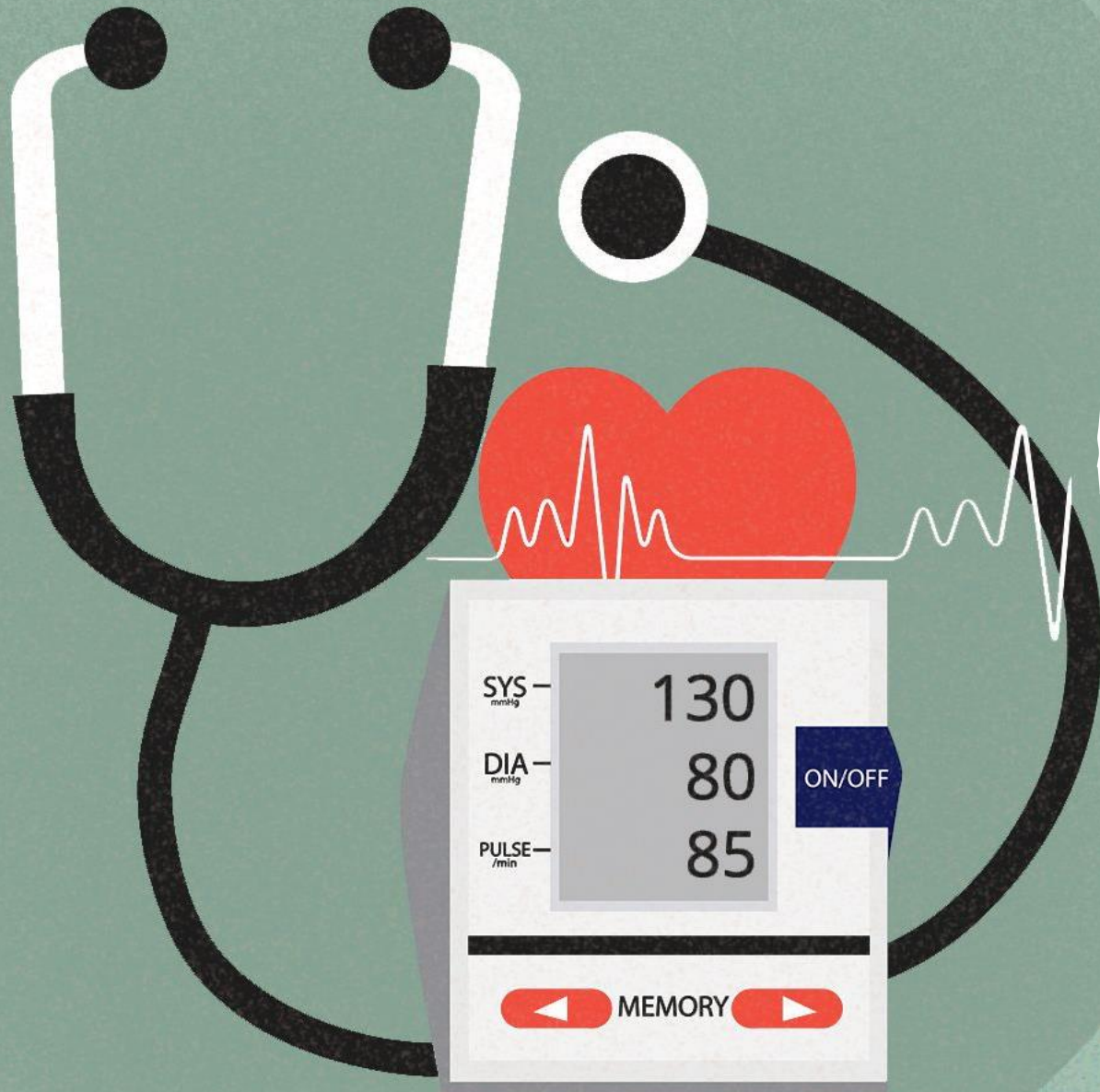
Resident Led Multidisciplinary QI team addressed BP Control with 3 PDSA Cycles

- Resident team members work up the team hierarchy with roles and responsibilities each PGY
- Senior Residents choose the aim every June for the academic year to take turns leading 4-month cycles
- Attendings, staff, behavioral health, population health, and other faculty guide and support projects
- Monthly 7am team meetings with set agendas



Root Cause Analysis of Barriers to BP Control: Fishbone Diagram





2022-23 Aim

Improve Hypertension Control

PDSA Cycle 1 Aim

**Improve BP
measurement accuracy**

1. Patient & staff education
2. Clinic workflow for BP repeat measurement if $>140/90$

New Clinic Workflow & BPA

BLOOD PRESSURE CHECKLIST

- Position** the patient
 - Feet flat on the floor and uncrossed
 - Arm and back supported
 - Ask patient to not talk, use the phone, text, or email during the measurement
- Choose the **appropriate cuff size**
 - Measure the cuff on the arm to make sure it is appropriate size for the patient

RECOMMENDED CUFF SIZES	
Arm Circumference	Adult Cuff Size
22 to 26 cm	Small adult (12X22 cm)
27 to 34 cm	Adult (16X30 cm)
35 to 44 cm	Large adult (16X36 cm)
45 to 52 cm	Adult thigh (16X42 cm)

- Choose the appropriate arm**
 - Avoid arm with dialysis shunt
 - Avoid on the same side as a mastectomy
 - Avoid on the side affected by a stroke
- Place the cuff on upper arm against **bare skin** and positioned patient's arm to be **at heart level**
- If **SBP >140 and/or DBP >90**
 - repeat the above again in the examination room AFTER patient has been seated for **at least 5 minutes**



Quality and Compliance (1)

Blood pressure is elevated (BP > 140/90). Please re-check the patient's blood pressure in 5 minutes.

Enact

Ignore

Blood pressure is uncontrolled

The following actions have been applied: _____

✓ Added: Set QUALITY - BP SCREENING DONE? to Yes

High priority (1)

Patient's BP > 180/110 (Critical). Please ask a provider to recheck the patient's BP and clinical status.

The following actions have been applied: _____

✓ Added: Set QUALITY - BP SCREENING DONE? to Yes

Quality and Compliance (1)

Persistent elevated BP with documented history of HTN.
 Proceed to the SmartSet for patient instructions. Please make a follow up appointment for the patient.

Open Order Set

Do Not Open

Gen Rooming Hypertension [Preview](#)

Quality and Compliance (1)

Persistent elevated BP without a documented history of HTN.
 Proceed to the SmartSet for patient instructions. Please make a follow up appointment for the patient.

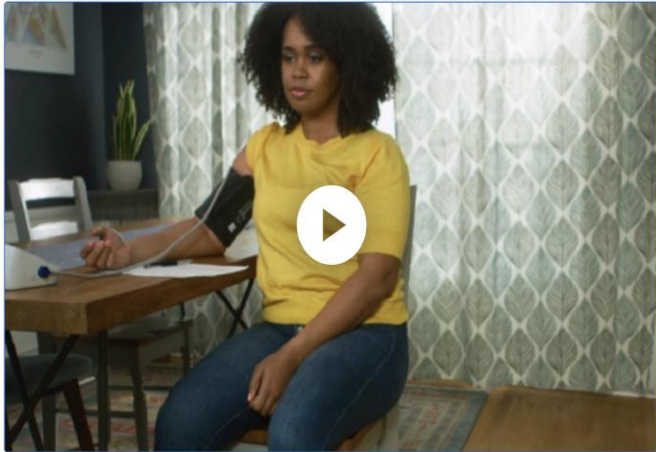
Open Order Set

Do Not Open

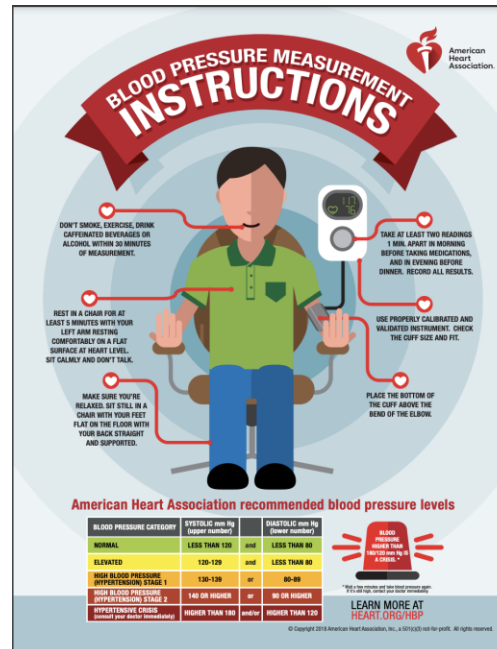
Gen Rooming Elevated Blood Pressure [Preview](#)

Patient and Staff Education

Waiting Room Video



Flyer in clinic visit



BLOOD PRESSURE MEASUREMENT INSTRUCTIONS

AMERICAN HEART ASSOCIATION

- DON'T SMOKE, EXERCISE, DRINK CARBONATED BEVERAGES OR ALCOHOL WITHIN 30 MINUTES OF MEASUREMENT.
- TAKE AT LEAST TWO READINGS 1 MINUTE APART IN MORNING, BEFORE TAKING MEDICATIONS, AND IN EVENING BEFORE DINNER. RECORD ALL RESULTS.
- BEST IN A CHAIR FOR AT LEAST 5 MINUTES WITH YOUR LEFT ARM RESTING COMFORTABLY ON A FLAT SURFACE AT HEART LEVEL. SIT CALMLY AND DON'T TALK.
- USE PROPERLY CALIBRATED AND VALIDATED INSTRUMENT. CHECK THE CUFF SIZE AND FIT.
- MAKE SURE YOU'RE RELAXED. SIT STILL IN A CHAIR WITH YOUR FEET FLAT ON THE FLOOR WITH YOUR BACK STRAIGHT AND SUPPORTED.
- PLACE THE BOTTOM OF THE CUFF ABOVE THE BEND OF THE ELBOW.

American Heart Association recommended blood pressure levels

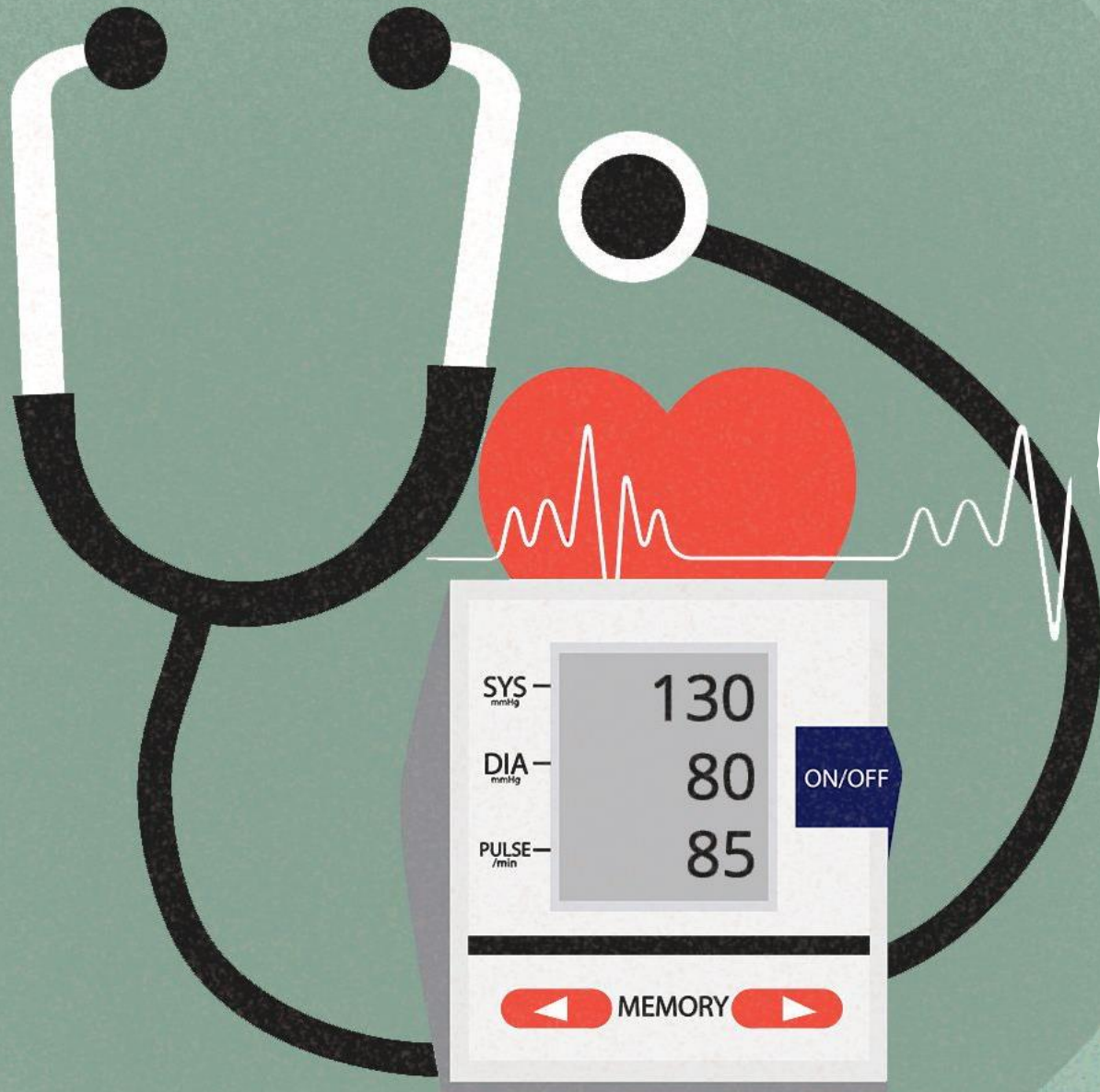
BLOOD PRESSURE CATEGORY	SYSTOLIC mm Hg (upper number)	DIASTOLIC mm Hg (lower number)
NORMAL	LESS THAN 120	and LESS THAN 80
ELEVATED	120-129	and LESS THAN 80
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1	130-139	or 80-89
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2	140 OR HIGHER	or 90 OR HIGHER
HYPERTENSIVE CRISIS (seek your doctor immediately)	HIGHER THAN 180	and/or HIGHER THAN 120

LEARN MORE AT HEART.ORG/BP

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AMA Video for Staff





2022-23 Aim

Improve Hypertension Control

PDSA Cycle 2 Aim

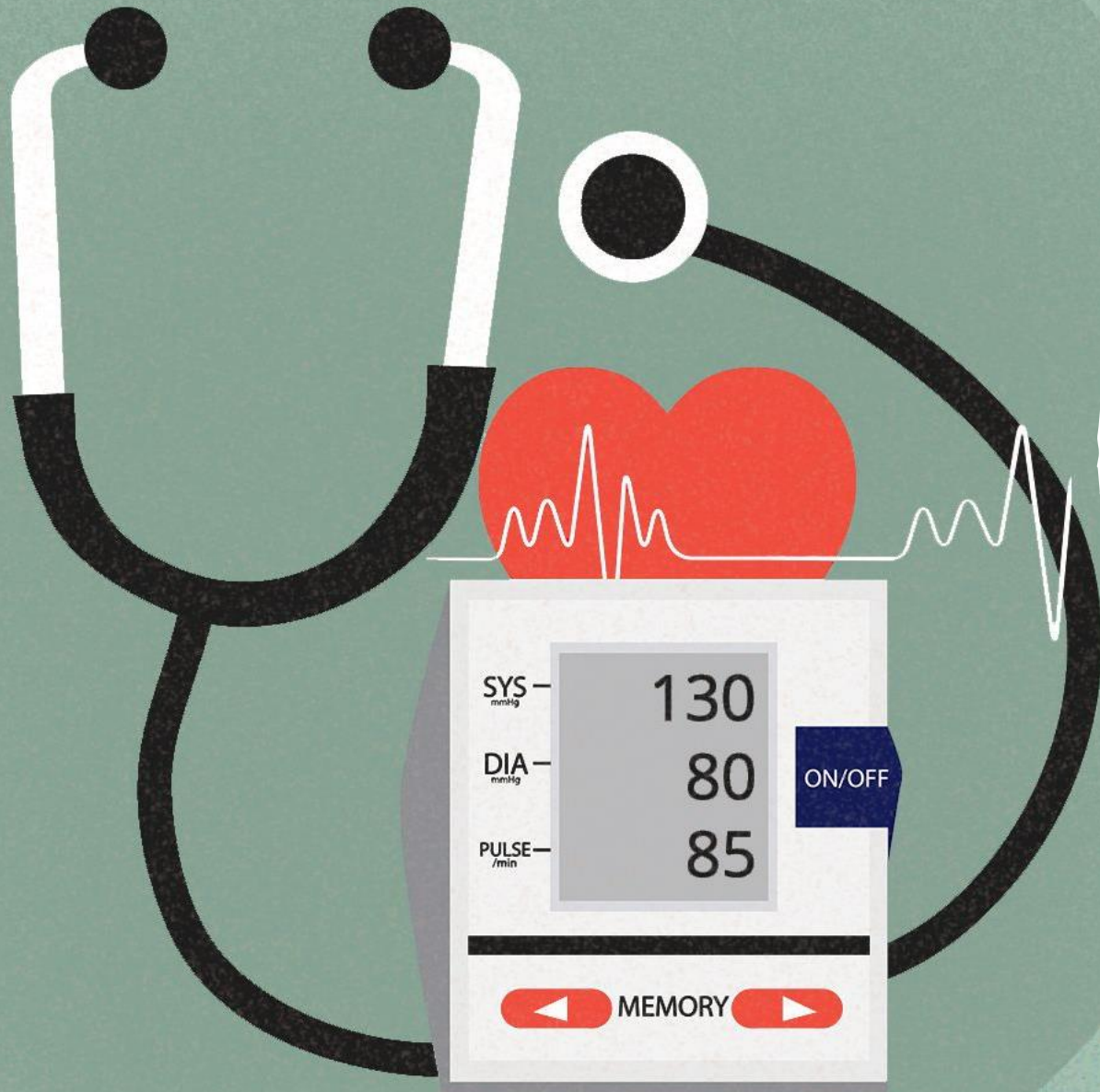
Use appropriate BP cuff sizes in clinic and home

1. Clinic access to XL BP cuffs
2. Clinic workflow to measure and document correct arm cuff size

Staff Education Flyers

- Cuff sizes = upper arm circumference posted at attending desks in PODs
- Small to Large cuffs order from pharmacy
- Extra Large cuffs order as DME

Arm Circumference	Recommended Cuff Size (width x length in cm)
22 - 26	12 x 22 (small child)
27 - 34	16 x 30 (adult)
35 - 44	16 x 36 (large adult)
45 - 52	16 x 42 (extra-large adult)



2022-23 Annual Aim

Improve Hypertension Control

PDSA Cycle 3 Aim

Improve Clinic & Home BP Recording and Follow-up

1. Clinic workflow to order home BP monitor & include AVS home BP log
2. Patient education to log BP & follow-up with PCP

MA Blood Pressure Checklist:

1. Position the Patient

- Feet flat on the floor and uncrossed
- Arm and back supported
- Ask patient to not talk or use their phone during the measurement

2. Choose the appropriate cuff size

- Measure patient's arm circumference and use the chart to make sure it is the appropriate cuff size

Arm Circumference		Recommended Cuff Size (width x length in cm)
cm	in	
22 - 26	8.7 - 10.2	12 x 22 (small adult)*
27 - 34	10.6 - 13.4	16 x 30 (adult)*
35 - 44	13.8 - 17.3	16 x 36 (large adult)*
45 - 52	17.7 - 20.5	16 x 42 (extra-large adult)

3. Choose the appropriate arm

- Avoid arm with dialysis shunt, side affected by stroke or same side as mastectomy

4. Measure Blood Pressure

- Place the cuff on patient's upper arm against bare skin and position patient's arm at heart level
- **If SBP > 140 and/or DBP > 90**, repeat the blood pressure measurement again in examination room after the patient has been seated for **at least 5 minutes**

5. Questions to ask Patient and Documentation

- "Have you been told by a provider that you have high blood pressure?"
- "If so, do you have a blood pressure monitor and cuff at home?"
- Log arm circumference and if patient has BP equipment at home in a note on Epic

6. Discharge with BP Log in AVS

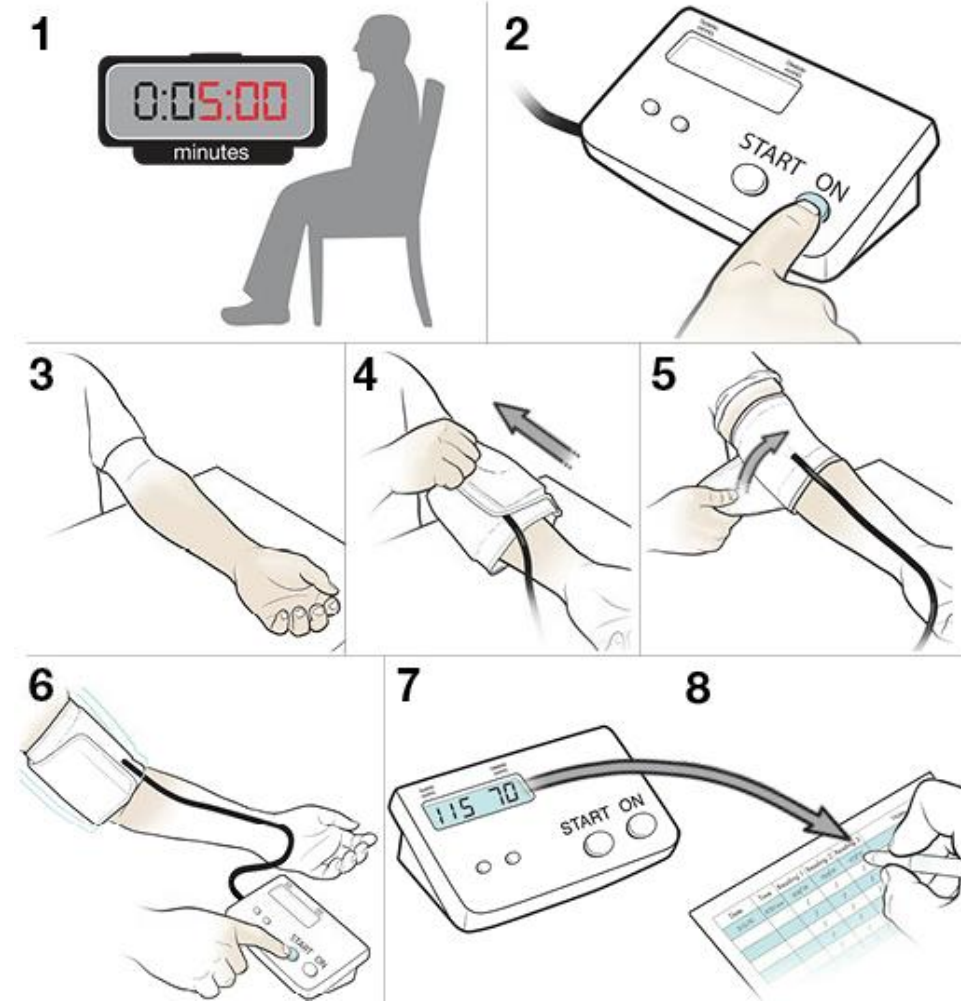
- For patient's with diagnosis of elevated blood pressure or hypertension include the dot phrase (.FMHTNLOG or .FMHTNLOGSPANISH) into Patient Instructions section to print out Blood pressure log into AVS and
- Remind patients to bring BP log to next visit

Smart Phrase to include in AVS

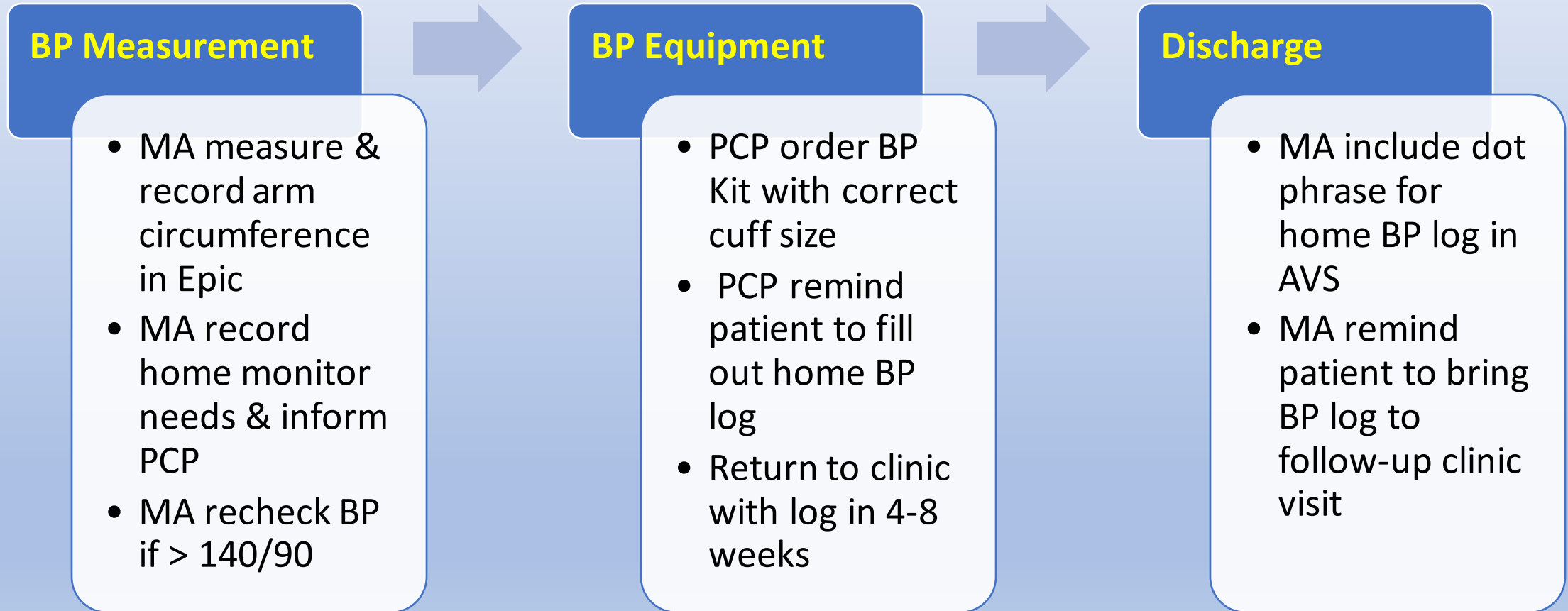
.FMHTNLOG

- Includes instructions for patients on how to correctly measure BP
- BP log with AM and PM recordings
- Follow up instructions to return in 4-8 weeks with BP log
- Lifestyle education to control BP

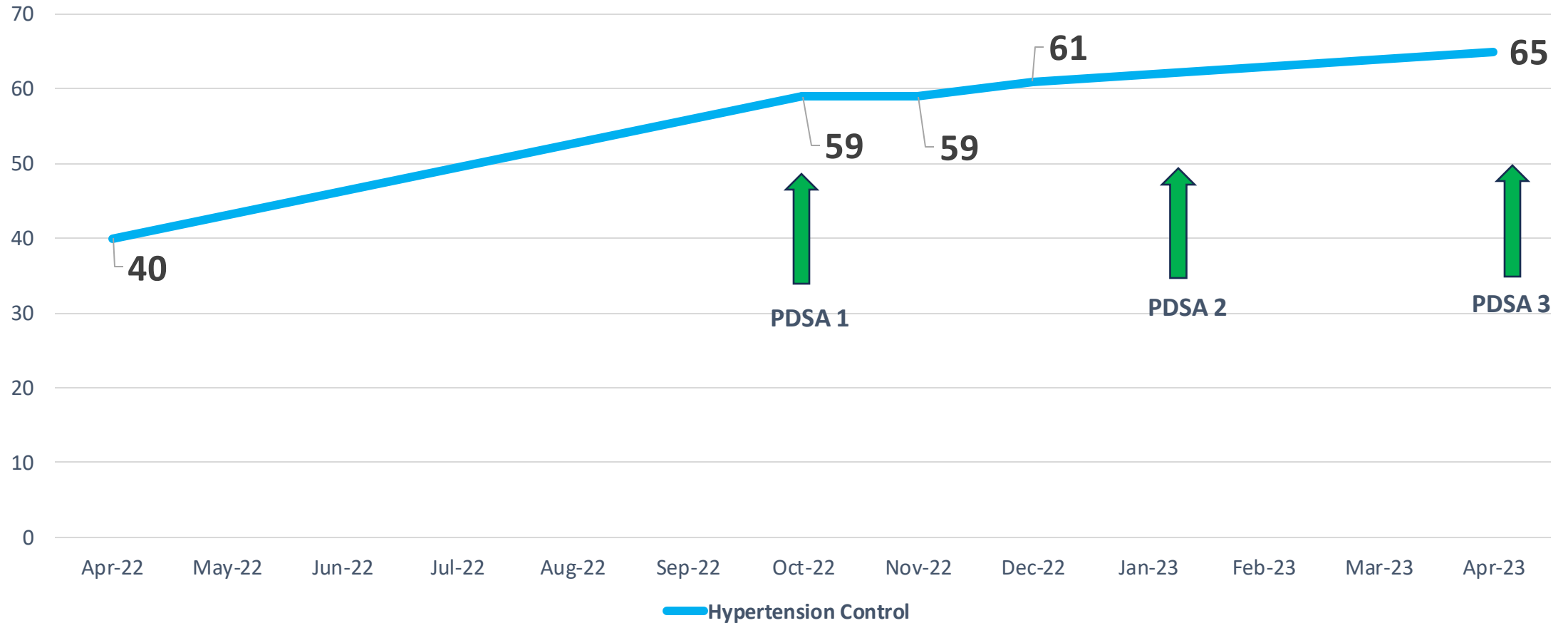
Checking your Blood Pressure at Home:



QI Interventions across 12 months to improve hypertension control:



Percentage of Family Medicine Residency Patients with Controlled Hypertension



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Thank you!