Quality, Technology and Rural Health

NRTRC 2018 Telehealth Conference
Salt Lake City, Utah
October 1-2, 2018

Joseph Humphry, MD FACP CPHIMS


Kauai
Kekaha
Kapaa
Lihue
Puuwai
Niihau
Kaulakahi Channel
Kauai Channel
Oahu
Pearl City
Honolulu
Pearl Harbor
Kaiwi Channel
Molokai
Kaunakakai
Lanai
Maui
Wailuku
Hana
Red Hill
Kahoolawe
Alenuihaha Channel
PACIFIC OCEAN
HAWAII
Hawi
Honokaa
Waimea
Mauna Kea
Hilo
Kailua
Hawaii
Pahoa
Captain Cook
Mauna Loa
Mountain View
Pahala
Naalehu

The Island of Lānaʻi

- Plantation history: ”The Pineapple Island”
- Population of 3,100
- Diverse mostly Asian (53%), Hawaiian (12%), Pacific Islander-Kosrae (5%)
- Over 40% of residents – Filipino
- 30 miles of paved road
- Current primary economic driver is the hotel/hospitality industry
- Fishing, hunting, empty beaches, fresh air

About Lānaʻi Community Health Center

- 501(c)3 Non-profit Organization
- Federally Qualified Health Center (FQHC)
- Provides services to approximately to 60% of the island's population
- LCHC provides holistic, INTEGRATED medical, dental, and behavioral health services
- Total number of employees is approximately 40, most are full time and hired local from the community
- Clinical professionals include 2 full-time Family Nurse Practitioners, the Medical Director .25 FTE clinical, 2 full-time psychologists and the dental team
- LCHC saw 2,010 unduplicated patients in 2017 and had 9,335 visits

Telehealth fading

- Focus on quality care- live longer and happier
- Telehealth and technology is the vehicle, not the driver
- Telehealth is better than no telehealth…improved outcomes, but the buck does not stop there!
- Transformation of the health care delivery system- when telehealth disappears as it is the way we deliver care for everyone, everyday

Bringing the care to the people…

- Tele-psychiatry with JABSOM's Department of Psychiatry
- Tele-dermatology with Dr. David Wong and DirectDerm
- Tele-ophthalmology with retinal imaging
- Tele-ultrasound (OB/abdominal) readings via cloud based technology of store and forward
- In the process of building tele-cardiology and obstetrics
- Tele-consultations: Nephrology, Surgery, Pediatrics and Gastroenterology
- Tele-diabetes education and Nutrition therapy

Laying the foundation for integrating behavioral health with primary care

Explanation of clinic's SBIRT/ integrated care interventions

- Screening, Brief Intervention, Referral to Treatment (SBIRT) (SAMHSA, 2011)
  - Evidence-based practice used to identify, reduce, and prevent problematic use, abuse, and dependence on alcohol and illicit drugs
  - Goal of reducing and preventing related health consequences, disease, accidents and injuries

- LCHC's use of SBIRT
  - Integrate across all departments (Medical, BH, Dental, Optometry, CHW), extensive training by BH providers to all other staff
  - Not limited to substance use (alcohol and tobacco), also includes screening for anxiety, depression, trauma (for adults)

What makes this integration?



- Staff Training and Engagement: Universal BH screening (SBIRT)
- Roles of MAs, DAs, and CHWs: Training/partnering with BH providers
- Psychiatry integration: Having available consults (within 24 hours) with psychiatrist, partners in establishing treatment protocol, providing medication management via telehealth, and using population-based strategies (i.e., registry)
- Providers: Standardized treatment/referral process to tele-psychiatry, uniformed patient management, and shared decision-making among the team
- Integrated Team-Based Care: One collaborative care plan, not individual to BH or primary care

Universal BH screener

Patient Stress Questionnaire (18+)

- PHQ-9 (depression)
- GAD-7 (anxiety)
- PC-PTSD (trauma)
- AUDIT (alcohol)

Tobacco Control Screener

Patient Stress Questionnaire-A (12-17)

- PHQ-A (depression)
- GAD-7 (anxiety)
- CRAFFT (substance use)

Tobacco Control Screener

Scoring

Patient Stress Questionnaire-Scoring and Interpretation

TABLE 1

PHQ-9 Scores and Proposed Treatment Actions*

PHQ-9 Score	Depression Severity	Proposed Treatment Actions
1 to 4	None	None
5 to 9	Mild	Watchful waiting; repeat PHQ-9 at follow-up
10 to 14	Moderate	Treatment planning, considering counseling, assertive follow-up and/or pharmacotherapy
15 to 19	Moderately Severe	Immediate initiation of pharmacotherapy and/or psychotherapy
20 to 27	Severe	Immediate initiation of pharmacotherapy and, if severe impairment or poor response to therapy, expedited referral to a mental health specialist for psychotherapy and/or collaborative management

*The authors gratefully acknowledge Henry Chung for development of this Table.

Scoring GAD-7 Anxiety Severity

This is calculated by assigning scores of 0, 1, 2, and 3 to the response categories, respectively, of "not at all," "several days," "more than half the days," and "nearly every day."
GAD-7 total score for the seven items ranges from 0 to 21.

0–4: minimal anxiety

5–9: mild anxiety

10–14: moderate anxiety

15–21: severe anxiety

Primary Care PTSD Screen (PC-PTSD)

Description

The PC-PTSD is a 4-item screen that was designed for use in primary care and other medical settings and is currently used to screen for PTSD in veterans at the VA. The screen includes an introductory sentence to cue respondents to traumatic events. The authors suggest that in most circumstances the results of the PC-PTSD should be considered "positive" if a patient answers "yes" to any 3 items. Those screening positive should then be assessed with a structured interview for PTSD. The screen does not include a list of potentially traumatic events.

AUDIT

Risk Level	Intervention	AUDIT score*
Zone I	Alcohol Education	0-7
Zone II	Simple Advice focused on Reduction of Hazardous Drinking	8-15
Zone III	Simple Advice plus Brief Counseling and Continued Monitoring	16-19
Zone IV	Referral to Specialist for Diagnostic Evaluation and Treatment for Alcohol Dependence	20-40

*The AUDIT cut-off score may vary slightly depending on the country's drinking patterns, the alcohol content of standard drinks, and the nature of the screening program. Clinical judgment should be exercised in cases where the patient's score is not consistent with other evidence, or if the patient has a prior history of alcohol dependence. It may also be instructive to review the patient's responses to individual questions dealing with dependence symptoms (Questions 4, 5 and 6) and alcohol-related problems (Questions 9 and 10). Provide the next highest level of intervention to patients who score 2 or more on Questions 4, 5 and 6, or 4 on Questions 9 or 10.

At-risk Alcohol use:			Recommended use:
	Occasion	Week	Occasion
MEN	4+	14+	2
WOMEN	3+	7+	1
OLDER ADULTS (65+)	1+	7+	

Brief Intervention examples

- **Example 1 (Brief Intervention -Alcohol):** “Based on your responses to your current alcohol use, I am concerned as you appear to be drinking more than the recommended use for a male and am worried as your use is considered at-risk which can contribute to your overall health.”

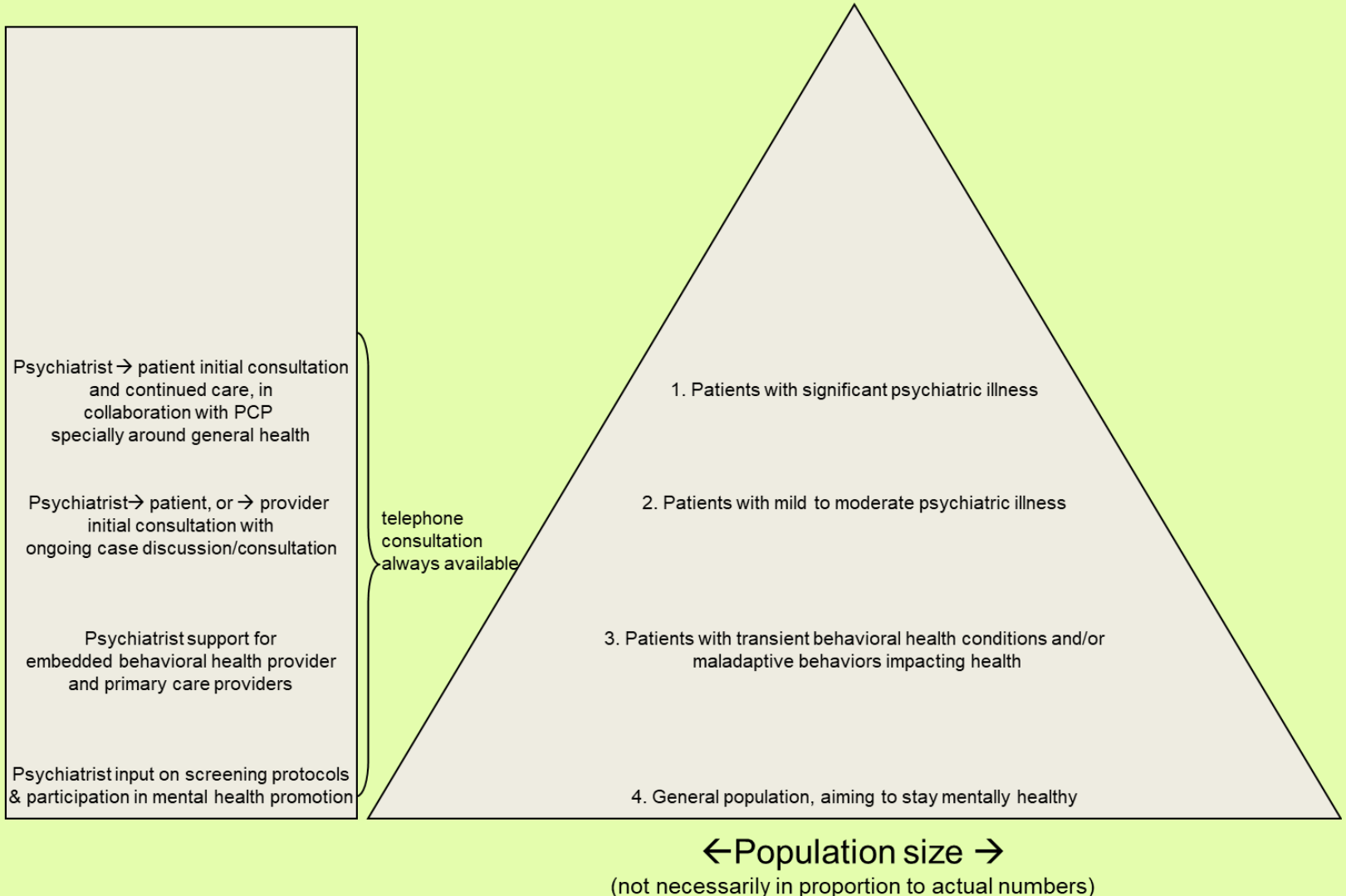
- **Example 2 (Brief Intervention/Referral to Tx –Tobacco):** “Quitting tobacco is the most important thing you can do for your health. We have a tobacco cessation program which assists individuals with quitting smoking. Would you be interested in hearing more about our program? If so, I can refer you to our tobacco treatment specialist.”

- **Example 3 (Warm Hand-off):** “It sounds like you might be under a lot of stress right now. We have a behavioral health specialist, Dr. Cori Takesue, who specializes in helping with these issues. I would like you to speak to her today to better help you. Is it alright with you if I introduce you to her?”

- **Example 4 (Referral to Tx):** “From some of your answers on this questionnaire, it looks as if you may be feeling down lately. We have a behavioral health specialist, Dr. Cori Takesue, who can help with the way you are feeling. Would you be open to a referral to see her?”

Vertical integration with psychiatry

- The vertical integration of the University of Hawai‘i (UH) Department of Psychiatry with the behavioral and primary care team. (Guerrero et al, 2017)



Mental Health Diagnosis, primary* (n=30)		
Neurodevelopmental Disorders	8	26.67%
Depressive Disorders	7	23.33%
Schizophrenia Spectrum, other Psychotic Disorders	5	16.67%
Anxiety Disorders	4	13.33%
Neurocognitive Disorders	3	10.0 %
Bipolar Disorders	2	6.67 %
Substance Use Disorders	1	3.33 %

*Twenty (66.67%) participants had comorbid mental health diagnoses.

Number of Medications Prescribed (n=27*)		
1 medication	12	44.44%
2-3 medications	9	33.33%
>3 medications	6	22.22%

*Three (3.33%) participants were not prescribed medication.

Value: Accessible, Easy, and Convenient

- PCPs having easily accessible psychiatry consults.
- PCPs are a part of the telehealth visits which allows them to be apart of the treatment plan.
- Increases the ability for patient to receive care instead of leaving the island to receive care.
- Hawaii State law allows medical providers who see patients via telehealth to bill as if it was a face to face visit.

Data integration

Using the right software for the right function

EHR –Replaces paper chart and practice management

Nightly data upload from EHR

Data warehouse
Population reporting, decision support
Analytic

Care Management (Cloud based)
Clinical data
Patient generated data
Integration

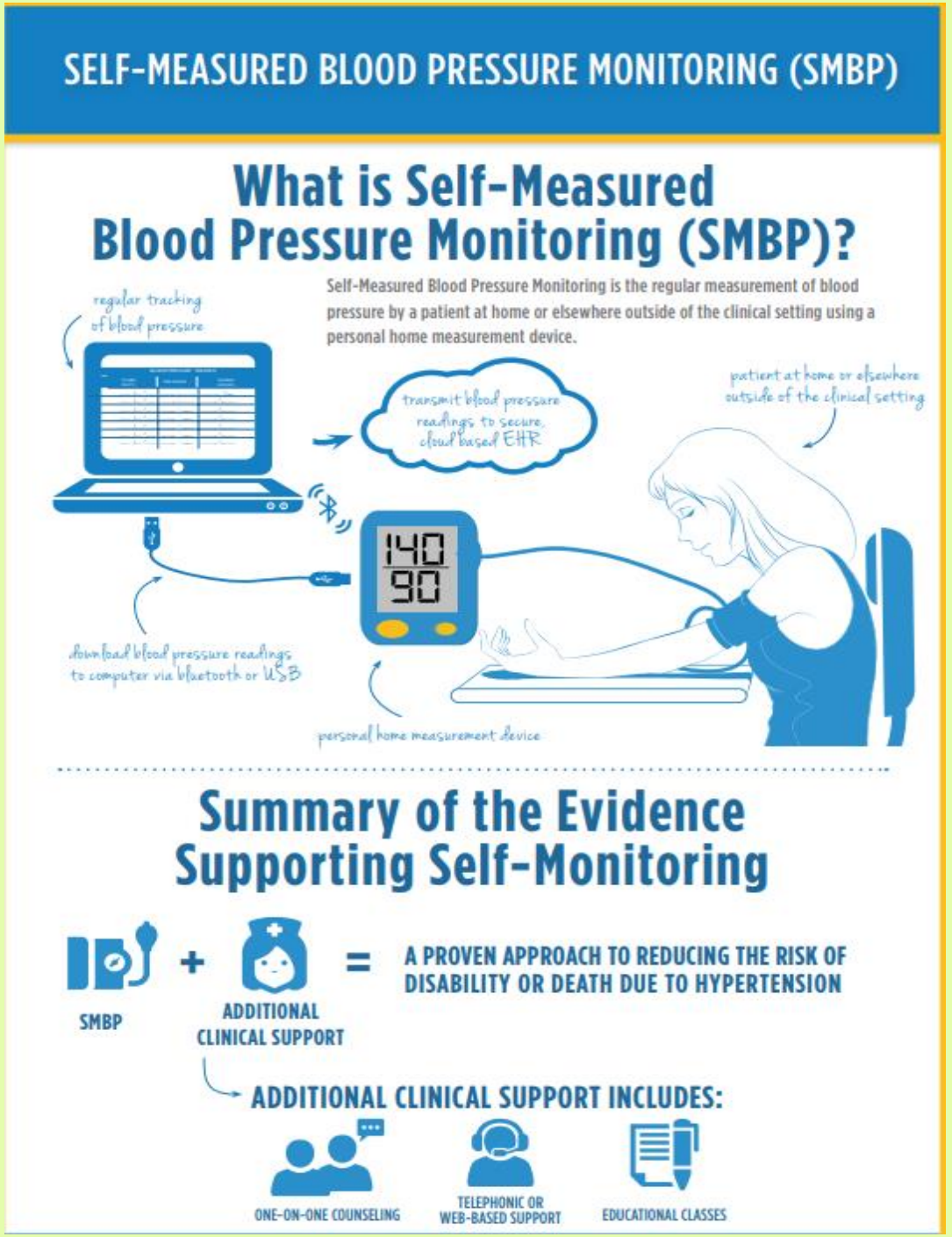
Pharmacy Access

Patient portal
Patient generated data with charts
Education
Communication

Note: Most EHRs are legacy systems structurally designed to store and retrieve individual patient records generated in the office setting. Storing patient generated data (SMBP and SMBG) is always possible, but likely very expensive to achieve. EHRs are not designed to accept or manage patient generated data.

You can’t get there from here!

https://millionhearts.hhs.gov/tools-protocols/smbp.html



Why are we here? Population health!

- CDC:

July 18, 2018 - But you can take steps to control your blood pressure and lower your risk of heart disease and stroke. About 1 of 3 U.S. adults—or about **75 million** people—have high blood pressure. Only about half (**54**%) of these people have their high blood pressure under control.

Recommendation Summary

Population	Recommendation	Grade (What's This?)
Adults aged 18 years or older	The USPSTF recommends screening for high blood pressure in adults aged 18 years or older. The USPSTF recommends obtaining measurements outside of the clinical setting for diagnostic confirmation before starting treatment (see the Clinical Considerations section).	A

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A new definition of Hypertension

"obtain measurements outside of the clinical setting for diagnostic confirmation"

ACC/AHA Hypertension Guidelines
Out-of-Office and Self-Monitoring of BP

COR	LOE	Recommendation for Out-of-Office and Self-Monitoring of BP
I	A^{SR}	Out-of-office BP measurements are recommended to confirm the diagnosis of hypertension and for titration of BP-lowering medication, in conjunction with telehealth counseling or clinical interventions.

SR indicates systematic review.

AMERICAN COLLEGE of CARDIOLOGY

American Heart Association
life is why™

Blood pressure measurement and detection of hypertension

Thomas G Pickering

Hypertension can be identified only by measurement of the blood pressure. However, conventional detection methods are unreliable for three main reasons: (*a*) technical inaccuracies, some of which are avoidable; (*b*) the inherent variability of blood pressure; and (*c*) the tendency for blood pressure to increase in the presence of a physician (white-coat hypertension). For clinical practice, the gold standard is measurements made with the Korotkoff sound technique and a mercury sphygmomanometer by a physician, but there is increasing evidence that this approach can lead to misclassification of numerous individuals as hypertensive.[1]

Neither the distribution of blood pressure in the population nor the relation between blood pressure and cardiovascular morbidity provides any justification for a rigid separation between normotension and hypertension.[2] Nevertheless, for clinical purposes one needs to establish a threshold level of pressure above which antihypertensive

as 25 mm Hg.[3] This is not surprising for a method that depends exclusively on detection of sounds produced in the artery, their transmission to the ear of the observer, and the observer's auditory acuity.

Alternative methods of measurement have not generally found favour, and scanty epidemiological data have been obtained with them. However, the oscillometric technique is becoming popular for ambulatory blood pressure monitors and its accuracy compares favourably with the Korotkoff sound technique.[4]

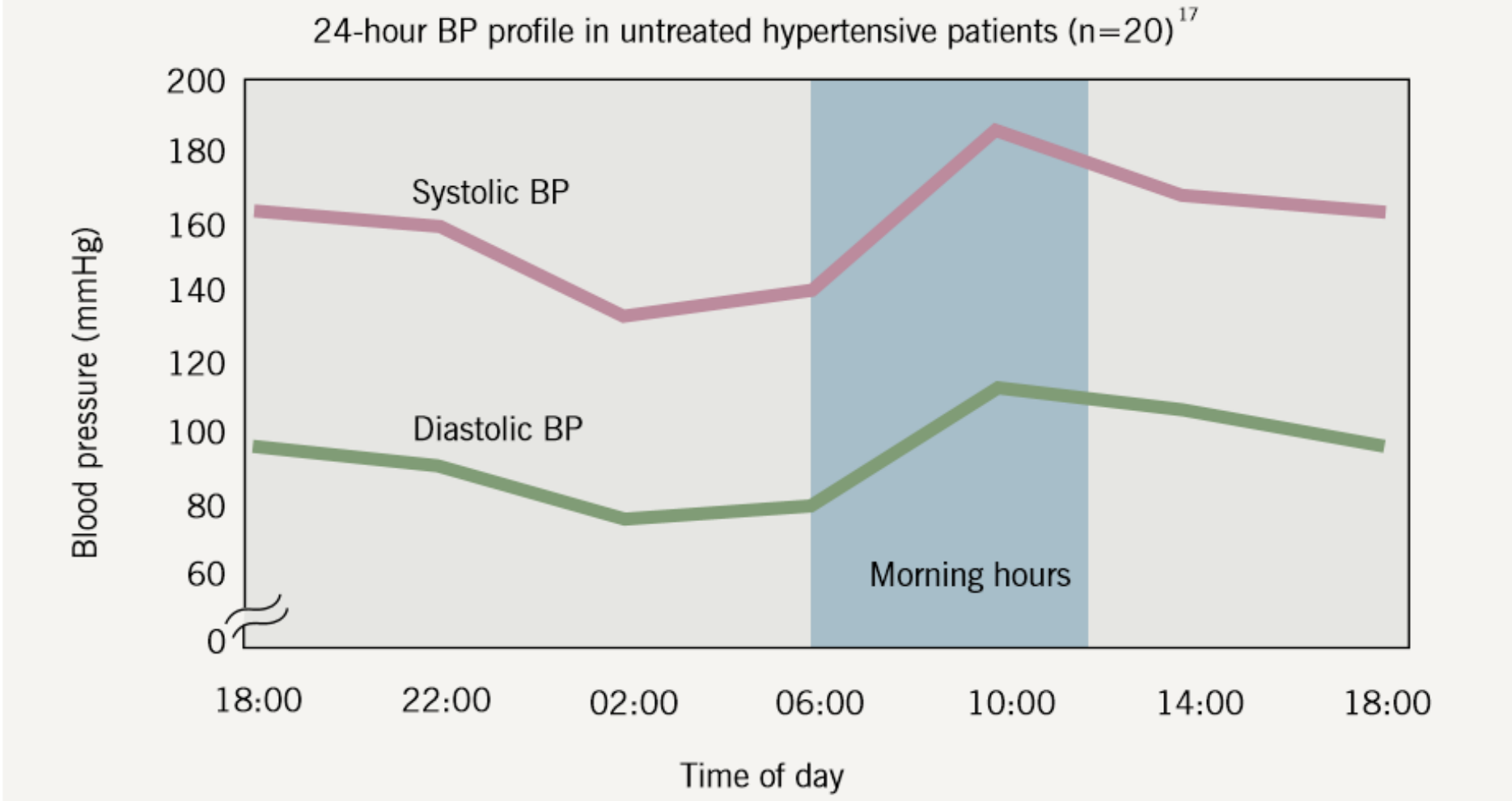
Clinic measurement

Conventional measurement of blood pressure in the clinic involves an interaction between the patient and the physician (or whoever is taking the reading). Factors related to both may lead to a tendency either to overestimate or to

Lancet:344;31-35 1994

A. Technical inaccuracies, some of which are avoidable
B. The inherent variability of blood pressure
C. The tendency for blood pressure to increase in the presence of a physician (white coat hypertension)

Figure 1. The circadian rhythm of blood pressure[1]



Key: BP= blood pressure

ORIGINAL RESEARCH

Measuring and Managing Blood Pressure in a Primary Care Setting: A Pragmatic Implementation Study

John Doane, MD, Jenni Buu, PharmD, M. Jason Penrod, MD, Michelle Bischoff, MD, Molly B. Conroy, MD, MPH, and Barry Stults, MD

Background: **Accurate blood pressure (BP) measurement is essential to hypertension diagnosis and management. Automated office blood pressure (AOBP) and home blood pressure measurement (HBPM) may improve assessment, but barriers exist in primary care settings.**

Methods: **We implemented an AOBP/HBPM program in a primary care clinic in 2015 to 2016. Patients with elevated BP determined by guideline-quality observed BP measurement and/or AOBP entered the HBPM program. Patients with average home BP ≥ 135/85 mm Hg provided HBPM results for medication adjustment. Clinic staff and patients completed satisfaction questionnaires.**

Results: **Initial HBPM results in 183 patients with elevated office BP revealed white-coat BP elevation in 35% of untreated patients and in 37% of treated patients. The prevalence of white-coat BP elevation was similar whether enrollment BP was by observed BP or AOBP. Subsequent HBPM facilitated BP control in 49% of patients with elevated home BP. Most providers, staff, and patients endorsed the utility of the program. Barriers to implementation included a temporary period of incorrect AOBP technique, patients failing to provide HBPM results, and incorrect HBPM technique.**

Discussion: **Our clinic-based AOBP/HBPM program detected white-coat BP elevation in one third of enrolled patients, facilitated control of home BP, and was acceptable to staff and patients. We identified barriers to be addressed to ensure sustainability. (J Am Board Fam Med 2018;31:375–388.)**

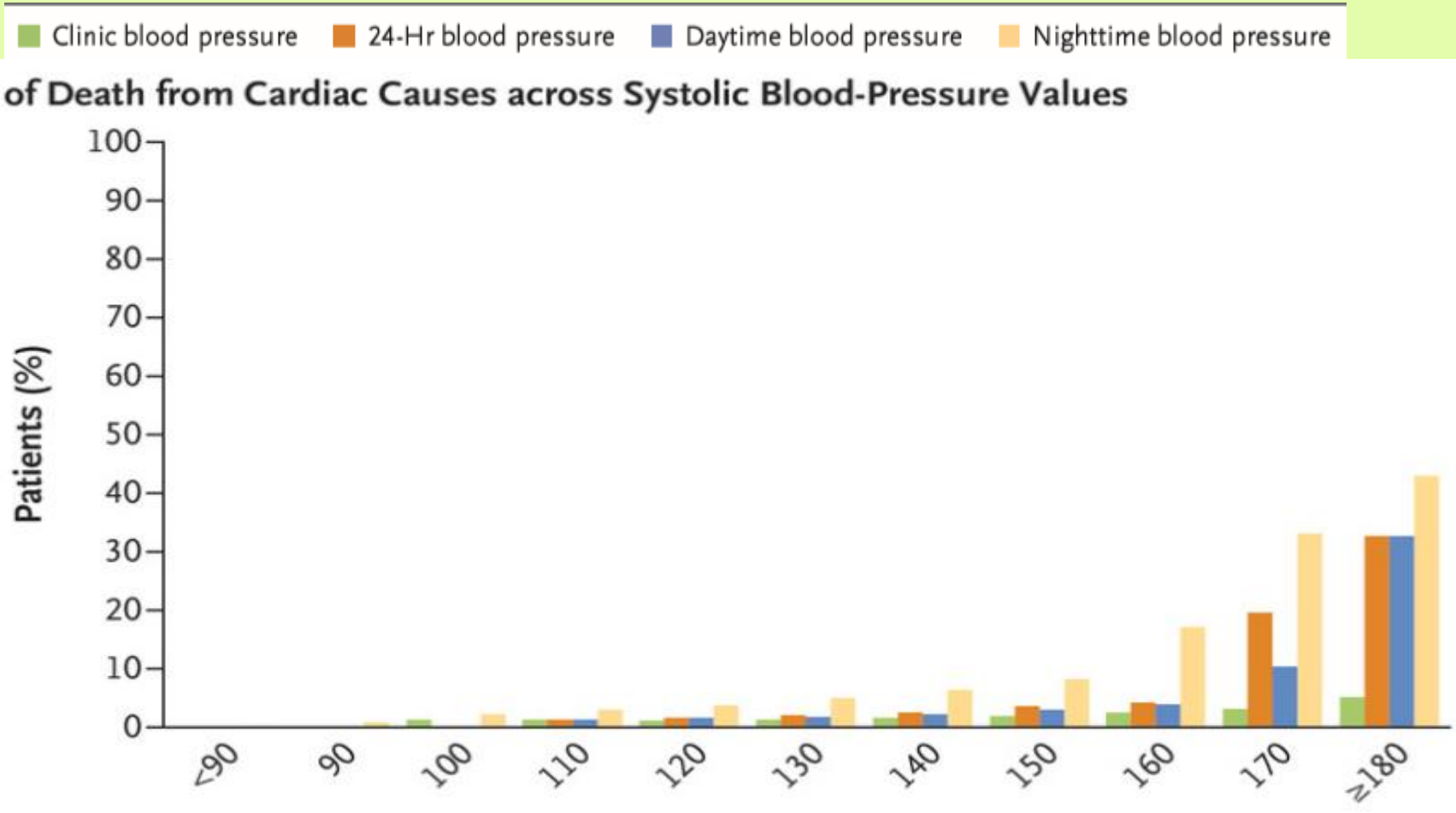
doi:
10.3122/jabfm.2018.03.170450

ORIGINAL ARTICLE

Relationship between Clinic and Ambulatory Blood-Pressure Measurements and Mortality

Characteristic	All Patients (N=63,910)
Male sex — no. (%)	37,050 (58.0)
Age — yr	58.4±14.2
Blood pressure — mm Hg	
Clinic systolic	147.9±18.8
Clinic diastolic	86.7±11.6
24-Hour systolic	129.2±13.7
24-Hour diastolic	76.5±10.1
Daytime systolic	132.3±14.0
Daytime diastolic	79.4±10.7
Nighttime systolic	120.2±15.8
Nighttime diastolic	68.4±10.2

N Engl J Med 2018;378:1509-20. DOI: 10.1056/NEJMoa1712231



No. at Risk

Clinic	42	165	721	2,181	6,006	11,029	15,707	12,682	7,646	4,049	3,682
24-Hr	46	444	3,498	12,087	19,443	16,040	7,780	3,046	1,024	337	165
Daytime	35	301	2,349	8,912	17,332	18,075	10,437	4,233	1,510	500	226
Nighttime	648	3,983	12,419	17,691	14,205	8,149	3,927	1,747	690	268	183

N Engl J Med 2018;378:1509-20. DOI: 10.1056/NEJMoa1712231

Risk of death from cardiac causes across systolic blood pressure

No. at Risk	<90	90	100	110	120	130	140	150	160	170	>180
Clinic	42	165	721	2181	6006	11029	15707	12682	7646	4049	3682
24-Hr	46	444	3498	12087	19443	16040	7780	3046	1024	337	165
Daytime	35	301	2349	8912	17332	18075	10437	4233	1510	500	226
Night-time	648	3983	12419	17691	14205	8149	3927	1747	690	268	183

N Engl J Med 2018;378:1509-20. DOI: 10.1056/NEJMoa1712231

ORIGINAL ARTICLE

Relationship between Clinic and Ambulatory Blood-Pressure Measurements and Mortality

Hypertension phenotypes	Percent	Hazard Ratio
Masked Hypertension	8.4%	2.83
White coat hypertensive	27.7%	1.79
Sustained Hypertension	46.8%	1.8
Controlled hypertension	10.5%	
Normotensive	6.6%	1.0

Changing the way that healthcare is delivered (Barriers)

- Health care transformation has been insurance reform and payment reform essentially leaving the delivery system intact
- MU, PCMH, P4P and Quality Metrics (MIPS) have not driven effective changes in the delivery system
- The expectation that Health Information Technology will drive change
- The mismatch between communication technology (i.e. going viral) and our existing delivery system
- Inertia of physicians and physician organization to restructure the delivery system

54 year old Filipino male

6/16/2017	**156/106**	**139/101**
8/14/2017	142/96	
10/17/2017	138/91	141/95
10/23/2017	140/96	130/30
10/25/2017	139/92	
11/13/2017	137/84	
2/26/2018	139/98	142/99
3/19/2018	160/102	146/104
3/26/2018	140/100	136/97
4/9/2018	157/93	

Blood Pressure Log

Date	12am - 4am	4am - 8am	8am - 12pm	12pm - 4pm	4pm - 8pm	8pm - 12am	Total Daily Readings	Daily Average
04/09/2018		122/76, 123/78					2	122.5/77
04/08/2018		126/83, 133/85				126/83, 122/87	4	126.75/84.5
04/07/2018		129/79, 129/82				124/88, 129/89	4	127.75/84.5
04/05/2018		119/81, 117/76				125/86, 129/90	4	122.5/83.25
04/03/2018		133/85				122/83, 127/86	3	127.33/84.67
04/02/2018		123/84, 127/89				130/81, 127/88	4	126.75/85.5
04/01/2018		132/87, 135/92				115/87, 129/93	4	127.75/89.75
03/30/2018		124/80, 123/83				119/78, 119/82	4	121.25/80.75
03/28/2018		125/84, 130/83				120/83	3	125/83.33
03/27/2018			132/89, 128/96			111/83, 121/77	4	123/86.25
Average		126.47/82.76	130/92.5			123.24/84.94		

ASCVD Risk Estimator:

* Gender: (•) Male ( ) Female

* Race: API - Other

* Age (Years): 54

* Total Cholesterol (mg/dL): 220

* HDL - Cholesterol (mg/dL): 55

* Systolic Blood Pressure (mm Hg): 157

Treatment for Hypertension: [x]

History of Diabetes: [ ]

Current Smoker: [ ]

Aspirin Therapy: [ ]

* =Required Field

Calculate Reset

Results

Baseline 10-Year ASCVD Risk 8.7%

This analysis provides the PROSPECTIVE 10-year ASCVD risk estimate and the EXPECTED AVERAGE risk reduction associated with a preventive intervention based on Longitudinal ASCVD Risk Estimator

ASCVD Risk Estimator:

* Gender: (•) Male ( ) Female

* Race: API - Other

* Age (Years): 54

* Total Cholesterol (mg/dL): 220

* HDL - Cholesterol (mg/dL): 55

* Systolic Blood Pressure (mm Hg): 124

Treatment for Hypertension: ☐

History of Diabetes: ☐

Current Smoker: ☐

Aspirin Therapy: ☐

* =Required Field

Calculate Reset

Results

Baseline 10-Year ASCVD Risk 5.0%

This analysis provides the PROSPECTIVE 10-year ASCVD risk estimate and the EXPECTED AVERAGE risk reduction associated with a preventive intervention based on Longitudinal ASCVD Risk Estimator

68 year old female with DM, Hypertension and previous stroke (2003) and ER visit for dizziness.

Oxygen Level			
Blood Pressure	141/93	171/102	109/73
Repeat Blood Pressure	141/91	159/95	

Blood Pressure Log

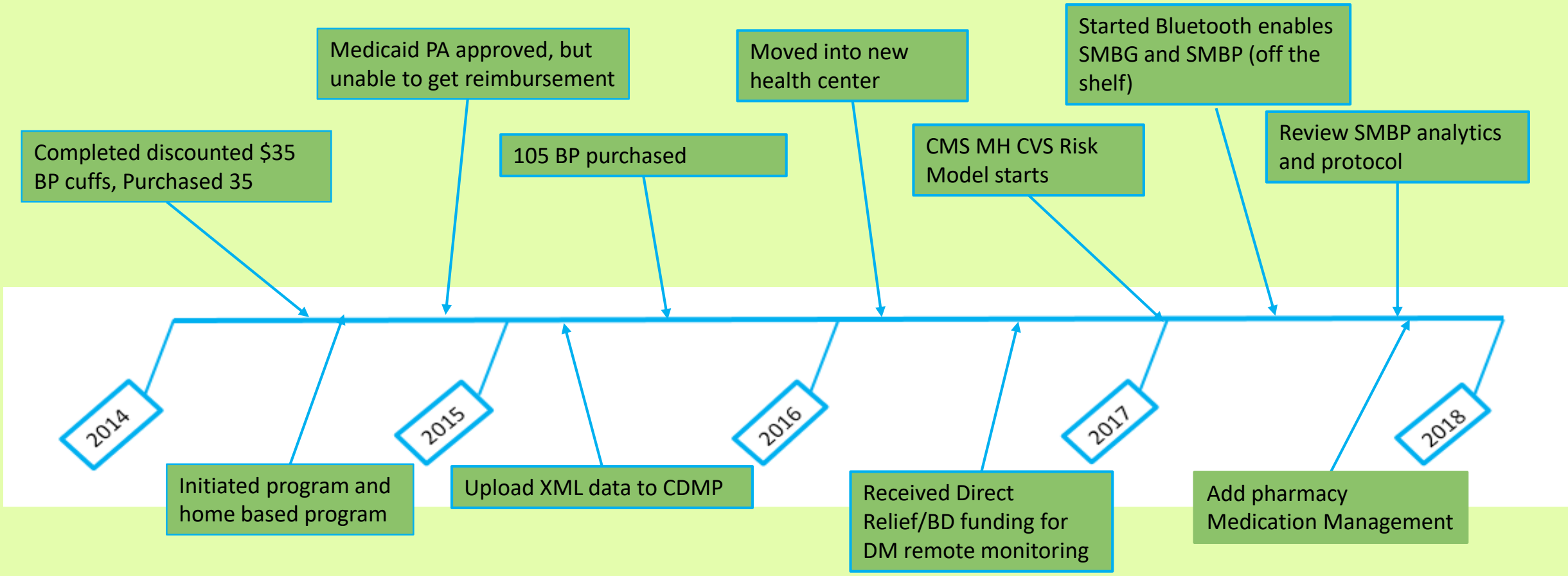
Date	12am - 4am	4am - 8am	8am - 12pm	12pm - 4pm	4pm - 8pm	8pm - 12am	Total Daily Readings	Daily Average
03/23/2018			123/75, 124/76				2	123.5/75.5
03/22/2018			107/68, 116/69			133/84	3	118.67/73.67
03/21/2018		126/79	120/75			122/77	3	122.67/77
03/20/2018			107/70, 111/76			125/77	3	114.33/74.33
03/19/2018		103/64, 106/68				110/88	3	106.33/73.33
03/18/2018			115/72, 127/73			103/64	3	115/69.67
03/17/2018			103/70, 102/69			108/70	3	104.33/69.67
03/16/2018			95/66, 104/66			120/65	3	106.33/65.67
03/15/2018			103/68, 101/65			118/81	3	107.33/71.33
03/14/2018			104/65, 108/74			103/67	3	105/68.67
03/13/2018				121/76		112/68	2	116.5/72
03/11/2018			107/69				1	107/69
03/10/2018			132/75		115/62		2	123.5/68.5
03/09/2018			105/66				1	105/66
03/08/2018		129/81			100/69		2	114.5/75
03/07/2018						114/74	1	114/74
03/02/2018			104/67				1	104/67
Average		116/73	110.38/70.19	121/76	107.5/65.5	115.27/74.09		

- Below the Target Range (120/40) - Within the Target Range - Above the Target Range (180/90)

Changing the way that healthcare is delivered

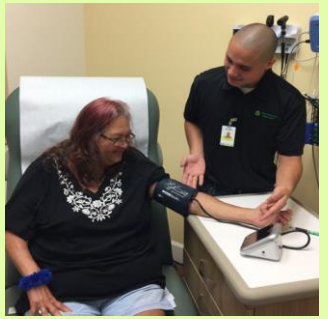
- Do it right from the beginning-think big-plan for the whole population
- Define Quality
- Get the leadership and providers on board (Critical)
- Measure CVD outcomes, not hypertension goals
- Use health information technology to support change, not drive change
- Patient options- community based care
- Quality comes before efficiency- safe lives, not dollars.

LCHC SMBP TImeline

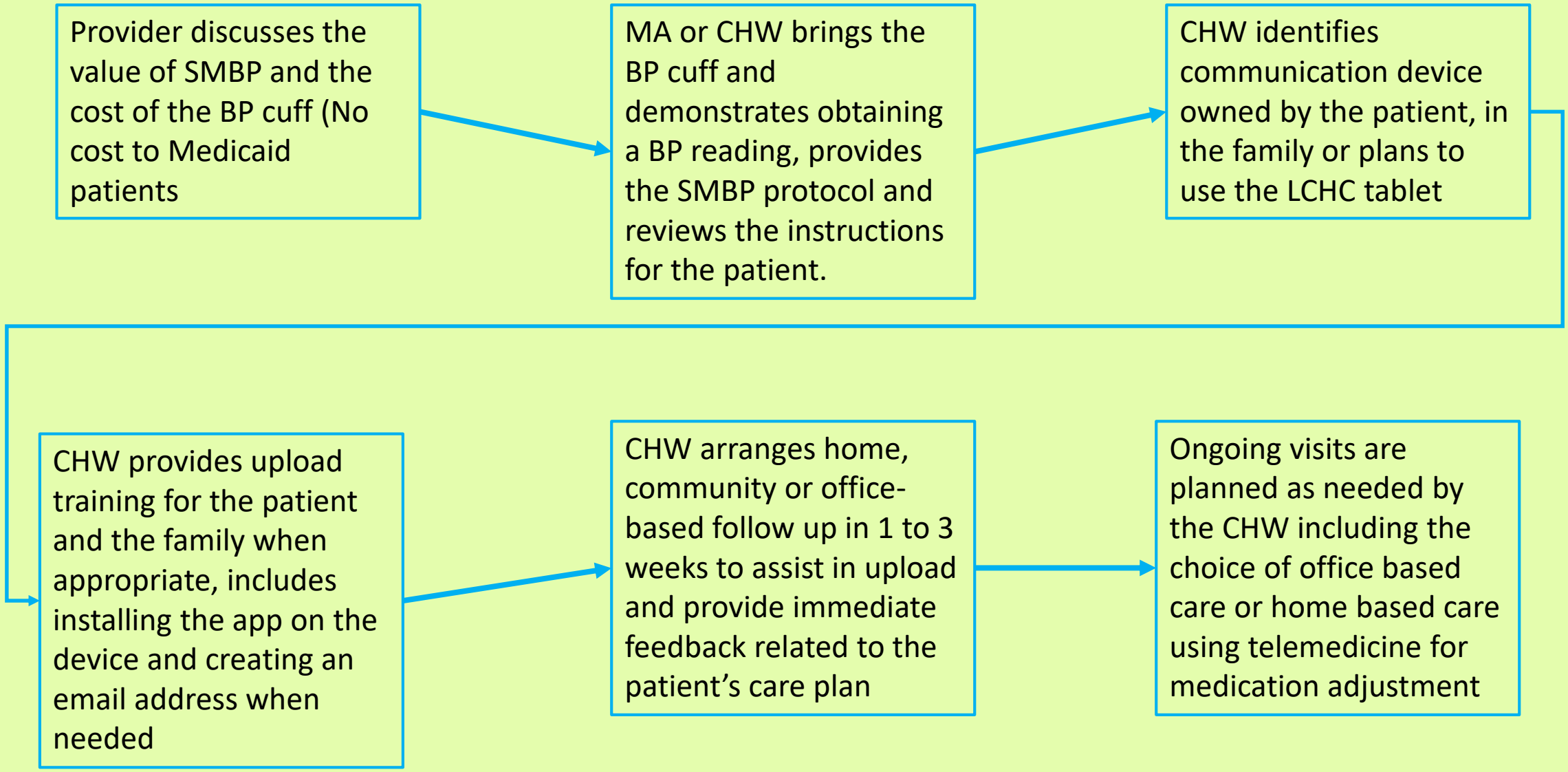


Team-based care

- Patient engagement: Self-management, data gathering and transmission, share decision making
- Roles of MAs and CHWs: Training and partnering with patients, BP data uploads and tracking, life style coaches and communication to providers
- Pharmacy integration: Available clinical data including home BP and BG readings to assist in mediation management; partners in treatment protocol and providing medication management via telehealth
- Providers: Standardized treatment protocol for uniform patient management, share decision making, interpretation of home readings and supervision of MAs and CHWs



SMBP Bluetooth Implementation



Take home message

- SMBP (remote monitoring) better defines the CVD risk population than office blood pressure (75 million people with hypertension)
- To be effective, the use of SMBP requires a structure clinical intervention
- Effective use of health information technology greatly reduces error and increases efficiency for patients and providers to gather and analyze SMBP data.
- Patient generated data (remote monitoring, survey tools) requires integration of the telehealth technology with an integrated information system
- VTC is fully integrated with primary care and specialty care- redesign of the health care delivery system addressing both increased access and increased quality

Mahalo!

Lāna'i Community Health Center

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