



Best Practices in Hypertension

Building a Hypertension Registry

Providence Medical Group
Beaverton, OR



MEDICAL GROUP PROFILE

- **Providence Medical Group (PMG) is a primary care provider organization** that has been delivering community-based ambulatory care for more than nine years.
- **PMG is part of a not-for-profit integrated health system** that includes acute care hospitals, other primary care provider organizations, home services, long-term care, and a managed care organization.
- **PMG operates 19 primary care clinics and three immediate care clinics** in the Portland metropolitan area.
- **PMG employs 820 individuals** including 203 providers (primary care physicians, gynecologists, nurse practitioners, and clinical pharmacy specialists).
- **In 2005, PMG served approximately 265,600 patients.**
- **Physicians provide more than 500,000 annual patient visits**, including 110,000 visits for Medicare beneficiaries.

FUNDING

Funding for registry development for diabetes mellitus and coronary heart disease was provided by Providence Health Plan and Merck & Co.

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EXECUTIVE SUMMARY

In 2000, the PMG's CEO, CMO and Quality Council estab-

lished a mandate to improve the quality of care in three clinical areas. Each of PMG's three Regional Associate Medical Directors was asked to lead a team in selecting a health condition, and then designing and implementing an intervention to improve the care provided to patients with the condition.

Health conditions were selected based on the following criteria: (1) high volume; (2) high cost; (3) high mortality and morbidity; and (4) evidence demonstrating that outcomes are sensitive to change. Hypertension was the first condition selected, based on examination of claims, utilization and epidemiological data from the GE Centricity electronic health record (EHR) and practice management databases, as well as literature review.

Hypertension:

- 1 **is a highly prevalent condition** representing PMG's most common reason for an office visit.
- 2 **is treatable** with well-developed, accepted guidelines.
- 3 **treatment is known to significantly increase satisfaction** with quality of life, and to reduce mortality, morbidity, and cost.

The other two conditions initially chosen to focus on were stroke prevention and urinary tract infections.

GOALS AND OBJECTIVES

The overall aim of the hypertension initiative was to improve the quality of care for all patients with hypertension. A query of PMG's EHR database in 2001 identified 13,749 patients with a diagnosis of hypertension. Of those, 8,572 patients (62.3%) had sub-optimally controlled hypertension as defined by a last blood pressure 140/90 mmHg.

The Hypertension Team, consisting of practicing physicians, health services researchers, and analysts, quickly recognized that the organizational imperative to improve blood pressure (BP) control across this sizable population would necessitate implementation of cost-effective interventions. Literature searches identified several promising interventions; however, there was little information comparing the relative cost-effectiveness of these different approaches. Recognizing the size of the hypertension population and the paucity of information available to guide intervention selection, the team formulated the following goals and objectives for the project:

Goal #1: To design, implement and test interventions that could practically be applied across a large population of patients with hypertension.

Objective #1a: To categorize the hypertension population into stages based on degree of uncontrolled BP.

Objective #1b: To customize interventions to improve BP based on these stages.

Objective #1c: To design the project with sufficient rigor to ascertain the cost and effectiveness of continuing the interventions.

Goal #2: To establish a foundation for sustained improvements in the management of hypertension care.

Objective #2a: To improve accuracy and validity of measurement and documentation of BP.

Objective #2b: To educate physicians on optimal management of hypertension.

Objective #2c: To develop a Web-based, automated disease-management program to continuously identify and display high-risk patients with hypertension.

Developing A Hypertension Registry

In 2002, PMG adopted Wagner's Chronic Care Model for population-based care as the guide for development and implementation of management programs for chronic diseases. The key components of the model, seen in the design of the study, include:

- **delivery system support;**
- **clinical information systems;**
- **decision support;** and
- **patient self-management/support.**

PMG is committed to the incorporation of nationally recognized and validated evidence-based standards and guidelines into the clinical practice and relies on the most current *Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High BP* (JNC 7) as the guideline for hypertension prevention and management.

The overarching principles for all of PMG's redesign initiatives are the Institutes of Medicine's (IOM) Six Aims for Improvement (see Table 1), that care should be:

- **safe,**
- **effective,**
- **patient-centered,**
- **timely,**
- **efficient** and
- **equitable.**

- **use of evidence-based management techniques;**

Table 1: Institute of Medicine's Aims for Improvement

Measure	IOM Aim	Data Source	Collection process
Clinical Outcomes			
Blood pressure	Effective	EHR database Blood pressure assessment at study visit	Query of the last blood pressure entered into the EHR was used to categorize patients into stages. A trained nurse assessed three BP readings five minutes apart, using good technique. The average of the second and third blood pressure was used to determine the effectiveness of the intervention
Medication compliance	Safe, Effective, Timely	Morisky 4-question validated patient self-administered survey	Administered by questionnaire at the beginning and end of the study.
Patient-Centered Outcomes			
Patient satisfaction	Patient-Centered, Equitable	Survey of 11 questions asking patients to rate their satisfaction with different aspects of their hypertension care. The survey as adapted from the PMG's routine satisfaction survey	Administered by questionnaire at the beginning and end of the study.
Quality of life	Patient-Centered	SF-36	Administered by questionnaire at the beginning and end of the study
Hypertension-related knowledge	Patient-Centered, Equitable	10-question quiz, constructed to assess basic understanding of hypertension and the principles of self-management	Administered by questionnaire at the beginning and end of the study.
Economic Outcomes			
Anti-hypertensive selection	Efficient	Electronic medical record	A chart review was conducted at the end of the study using a standardized data collection tool.
Utilization (i.e., office visits, ER visits, hospitalizations)	Efficient	Electronic medical record	A chart review was conducted at the end of the study using a standardized data collection tool.

Step 1 Identifying Target Population

Given the size of the total hypertensive population, the PMG Hypertension Team chose to focus on hypertensive patients whose last BP was above goal (140/90). These patients were categorized into stages adapted from the JNC 7 guidelines. The study population was identified from the EHR database using the following search requests:

Stage 1

- Diagnosis of hypertension (ICD-9 of 401.x)
- Last BP = 140-159/90-99 mmHg

Stage 2

- Diagnosis of hypertension (ICD-9 of 401.x)
- Last BP = 160-179/100-109 mmHg

Stage 3

- Diagnosis of hypertension (ICD-9 of 401.x)
- Last BP >180/110 mmHg

Detailed demographics for these stages, for both study and control groups, are displayed in Appendix 1.

Step 2 Setting up the Registry

Although hypertension-related data is available by querying PMG's robust EHR database, this process was found to be resource-intensive and did not produce real-time information or enable easy distribution to physicians and staff. As the concluding objective in this initiative, PMG developed Web-based disease management software to enable efficient, continuous, accurate monitoring, management, and performance feedback of care.

Step 2 Populating and Maintaining the Registry

The PMG disease management software program has been in development since approximately 2000. A multidisciplinary team including two physicians, a doctor of pharmacy, a project manager, an EHR database analyst and a programmer meet for three hours weekly for design. In addition, development requires approximately three FTEs for Web development, programming and QA. Additional multidisciplinary resources are involved in documentation, training development and delivery, implementation, and testing.

The software program automatically extracts requested data from the EHR database and formats the information for convenient Web-based presentation (see Appendix 2) to physicians and staff. The EHR database is continuously updated with information (e.g., patient visits, laboratory results, diagnostic testing, medications, etc.).

Step 4 Determining Types of Data to Collect

Data fields accessed include EHR problem lists (including diagnosis, diagnosis code and date of diagnosis), vital signs, laboratory results, medications, patient demographics, and appointment dates.

In the modules relating to hypertension, the PMG disease-management program identifies patients at high risk for a cardiac event, including:

- 1 patients with known heart disease;
- 2 patients with a CHD equivalent condition (e.g., diabetes, stroke, peripheral vascular disease, etc); and
- 3 primary prevention patients with a 20% or greater 10-year risk of a coronary event based on Framingham data.

For these patients, BP data and result, as well as other risk factors, are presented in an easy-to-interpret, color-coded view (see Appendix 3).

Staff are prompted to schedule patients overdue for BP assessment, and physicians are prompted for management of patients who are not meeting the guideline-recommended BP. In addition to specific information on patients, providers and staff also view their individual trended performance compared to an achievable benchmark (see Appendix 4).

INTERVENTIONS

Objective #1a: To categorize the hypertension population into stages based on degree of uncontrolled BP.

An EHR query of last BP was used to categorize patients with a diagnosis of hypertension into one of four categories. Table 2 provides the category definitions that were adapted from JNC 7 guidelines and are now used by PMG.

Table 2:
Hypertension Stage Definitions

Stage of BP	Systolic BP	Diastolic BP	# of Patients
0	<140	<9	5177 (38%)
1	140 - 159	90 - 99	5473 (40%)
2	160 - 179	100 - 109	2397 (17%)
3	>180	>110	702 (5%)

Objective #1b: To customize interventions to improve BP based on these stages.

Table 3 provides the three evidence-based interventions selected for this study. The pairing of an intervention with each stage was based on the resources required to deliver the intervention, the number of patients in each stage, and the magnitude of change in BP required for goal attainment. Since Stage 1 consisted of a very large population that was close to goal, a less-intense and less-costly intervention was selected. For Stages 2 and 3, the interventions selected were more resource-intense, but were also expected to yield more significant BP reduction.

Table 3:
Hypertension Stage Interventions

Category	Intervention tested (see Appendix 5 for more details related to each intervention)
Stage 1	A series of 2 mailed educational
Stage 2	Two 90-minute hypertension group classes OR Collaborative hypertension management with a Clinical Pharmacy Specialist
Stage 3	Collaborative hypertension management with a Clinical Pharmacy Specialist

Objective #1c: To design the project with sufficient rigor to ascertain the cost and effectiveness of continuing the interventions.

A series of randomized controlled studies were designed to determine the cost and effectiveness of each intervention. Table 1 details the specific measures, data source, and collection process for the studies, and their relationship to the Institute of Medicine's Six Aims for redesign of care processes. Results were compared between intervention and control groups. The duration of the study was 12 months from the time of patient consent. Results for the interventions are displayed in Appendices 6A and 6B.

Objective #2a: To improve accuracy and validity of measurement and documentation of BP.

A training program (see Appendix 7) was designed to ensure that every medical assistant (MA) in the organization demonstrated accurate measurement technique and appropriate chart documentation in the EHR. Following the training, all MAs were required to pass a knowledge quiz. An annual assessment of knowledge, skill and appropriate documentation by each MA measures continuing success on this objective.

Objective #2b: To educate physicians on optimal management of hypertension.

Two formal CME-approved educational programs were developed and both were attended by nearly 100% of PMG physicians, marking successful completion of this objective.

Objective #2c: To develop a Web-based, automated disease management program to continuously identify and display high-risk patients with hypertension.

PMG designed and developed a Web-based, automated disease-management program to continuously identify and display high-risk patients with hypertension. See Appendix 8 for a flowchart for stage 1 and the combined stages 2 and 3.

Certain project-related activities involved clinic staff and required some changes in workflow:

- **One nurse in each participating clinic was trained to provide training for the clinic staff in BP measurement technique.** The nurse then implemented the program at their local clinic by educating and certifying MAs annually, and by randomly observing technique and providing reinforcement.
- **Updated point-of-care EHR forms were implemented** to highlight the data entry fields for MA to input the measurements according to the new documentation standards.
- **Physicians were encouraged to attend two CME program** on hypertension management (see Appendix 11).
- **Clinic staff and providers attended a presentation about the purpose, design, timeline, measures, and their role.**
- **Front desk staff checked in patients who showed up for a hypertension group class or a study-related visit** to collect the final BP assessment and survey (see Appendix 9).

For a flowchart of interventions, see Appendix 8. For a timeline of the project, see Appendix 10.

OUTCOMES

Table 4 presents the hypertension demographics from 2001 baseline compared to 2005 after intervention implementation.

Table 4: Hypertension Demographics

Stage of BP	Systolic BP	Diastolic BP	2001		2002	
			# of Patients n	%	# of Patients n	%
0	<140	<90	5,177	38	17,986	59
1	140 - 159	990 - 99	5,473	40	9,990	33
2	160 - 179	100 - 109	2,397	17	1,793	6
3	>180	>110	702	5	332	1

Although the overall number of patients diagnosed with hypertension has increased as the medical group's patient population has grown, a comparison of current statistics demonstrates that overall BP control has improved from 2001. The multi-faceted hypertension interventions described in this case study have resulted in an impressive shift in the percentage of patients with a last BP <140/90 mmHg (from 38% to 59%). Additionally, the percentage of patients with BP that is moderately to severely above target (>160/>100 mmHg) has decreased from 22% to 7%.

LEADERSHIP

As described previously, the impetus for this entire effort was the mandate in 2000 by PMG's CEO, CMO and Quality Council directing the Regional Medical Directors to identify three clinical areas for quality improvement. The Medical Director and Director of Pharmacy recommended a study of the comparative effectiveness and cost-effectiveness of different interventions for control of hypertension, after an analysis of the EHR database and literature search revealed the scope of the problem in PMG's population. The Senior Management Team (CEO, COO, CFO, CMO) then designated hypertension as one of the three targeted clinical areas for improvement, authorized the study, and sought grant funding.

The Associate Medical Director led the project, and was assisted in planning and implementation by the COO and the Directors of Medical Management, Pharmacy, Quality and Research. The

study team held weekly meetings for the first three months to launch the project and then met twice monthly for the remaining 18 months for problem solving, to identify and remove barriers, and track and review information being reported.

Senior leadership continues to demonstrate dedication to the long-term goal of improving hypertension management with ongoing investments in disease management information technology and an enterprise-wide quality incentive program that includes BP control.

Changing Physician Practice

Several methods were used to change physician practice:

Education – All physicians received education on hypertension diagnosis, treatment and monitoring. This consisted of two formal CME programs over the course of three years, as well as less-formal oral and written presentations as new hypertension-related evidence was published.

- **CME program #1** – A traditional PowerPoint presentation reviewing recommended changes in hypertension management from the newly updated JNC 7 guidelines (see Appendix 11).
- **CME program #2** – An interactive program, modeled after the television quiz show *Jeopardy*, to quiz physicians on the most recent evidence and guidelines.

Disease management registry – Physicians have access to continually updated Web-based views of their own patients with uncontrolled hypertension.

Performance feedback – The Web-based disease management software is now an essential tool for providing feedback to clinicians on their own performance. This software program enables physicians to view their hypertension-related performance compared to the “Achievable Benchmarks of Care” (ABC), an evidence-based measure composed of the top performers in the peer organization. As all clinicians utilize the system to improve outcomes, the ABC increases, continually setting a higher (but obtainable) performance standard for all clinicians. Because the top performers are within the organization, they can share their strategies for improved outcomes.

Incentive compensation program – Also following the study, an incentive compensation program was implemented to influ-

ence physician practice. The program is intended to incentivize physicians and staff to increase the proportion of their high-risk patients who attain guideline-recommended BP goals (see Appendix 12).

KEYS TO SUCCESS

Research. Because PMG tested various interventions through a carefully designed research project, the group was able to answer important questions about impact of BP control, medication adherence, knowledge, patient satisfaction, quality of life, cost of implementation, and clinician acceptance prior to development of the disease management registry, care management system and financial incentive program.

Multidisciplinary Team. Having a multidisciplinary team designing and implementing the program contributed to its success, by bringing an impressive array of clinical expertise to all elements of the project and by developing trust in the program among clinicians and staff.

EHR. A critical element of the program's success was a comprehensive EHR, which enabled identification of the population, standardization of data collection and documentation, point-of-care decision support and addition of automated disease management software.

LESSONS LEARNED

This project was among PMG's first randomized, controlled studies after several years of carrying out population-based quality improvement projects. A bit naively, PMG designed a three-tiered randomized, controlled study implemented over nine different primary care clinics. The clinicians and researchers involved in the study design were highly capable, but had little experience implementing a study of this complexity. The greatest challenges were a result of implementation inexperience. Several lessons gained from this experience have informed subsequent study models and care management strategies.

Study Design. The PMG study design was too ambitious for the experience level of staff, and because of the limited resources, this ultimately made it difficult for participating clinicians to quickly grasp. PMG's tendency now is to focus on specific interventions in fewer settings, so that various chronic care management strategies and interventions using fewer organizational resources can be validly assessed.

Subject (Patient) Recruitment. The complex study design required recruitment of a significant number of patients for a least a 12-month period. To achieve sufficient sample size for the study, several waves of recruitment were necessary. PMG has since gained invaluable experience in conducting recruitment and has adopted new strategies to minimize patient drop-out.

Data Systems. Dedicated tracking systems with built-in data validation methodologies are necessary to maintain the integrity of project results, and provide credibility for eventual full-scale implementation of cost-effective interventions. PMG learned, too late, that it is imperative to involve the statistician during the study design phase to assure that all of the requisite data fields are prospectively collected and entered in an appropriate format for analysis. Because PMG had not done this, the group was forced to "back track" and redesign the data tracking system while the study was underway.

Physician Buy-in. Unlike earlier population-based strategies, this randomized, controlled study required that patients accept an IRB-approved invitation to participate (see Appendix 13). Upon receiving an invitation letter, many patients called their physicians to learn more about the study and to ask whether they should participate. Physicians who weren't "on board" yet with the value and importance of the study, did not effectively assist their patients in a thoughtful evaluation of whether consenting to participate was right for them. Physician ambivalence compounded the patient recruitment problem, but more importantly, it resulted in a missed opportunity to educate patients about their potential role in answering important practice-based research questions relating to hypertension. Over time, PMG has learned to communicate more effectively with physicians about the studies being conducted by the group. PMG also now emphasizes the role of practice-based research in clinics and has provided each clinic with educational aides to share with their patients on the topic.

Also, it has been PMG's experience that when trying to improve the quality of care, it is unavoidable to start by establishing that the current effort "isn't good enough," always a tricky communication to have with physicians. The group now involves the entire team in identifying problems system-wide to establish a communal commitment to the need for improvement. This also validates development of pay-for-performance incentives as part of the solution rollout. PMG now spends more time with physician leaders in the design and implementation phases to obtain their buy-in and address any ongoing concerns at the beginning of the initiative.

FOR ADDITIONAL INFORMATION

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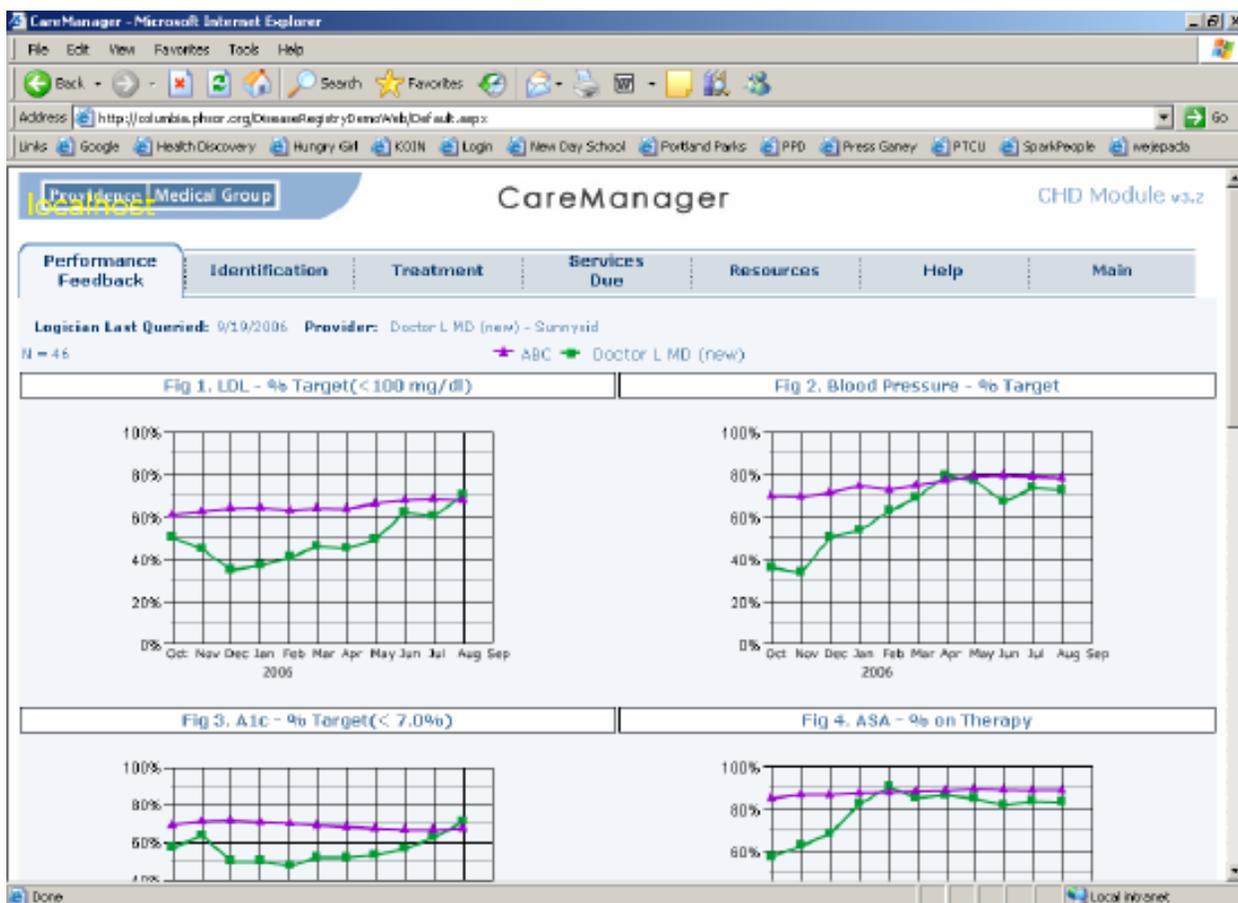
Appendix 1

PROVIDENCE MEDICAL GROUP TARGET HYPERTENSION BASELINE POPULATION DEMOGRAPHICS

Stage 1						
	Usual Care Group (n=150)			Intervention Group (n=162)		p
Age, mean (SD)	69.3 (12.3)			69.2 (12.4)		0.920
Women %	59			57		0.822
Body mass index (mean ± SD)	29.6 (6.7)			28.5 (7.1)		0.157
Ethnicity (%)						
Caucasian	90.7			88.9		0.741
Black	4.0			1.2		0.236
Hispanic	0.7			2.5		0.415
Pacific Islander	1.3			0		0.445
Asian	0			4.9		0.016
American Indian or Alaska Native	1.3			1.2		0.999
Education (mean years ± SD)						
Less than a high school diploma	8.0			6.8		0.848
High school graduate	31.3			29.0		0.747
College graduate	15.3			18.5		0.550
Graduate degree	10			6.2		0.330
Current smoker (%)	6.7			9.3		0.526
Diabetes (%)	12.7			17.9		0.346
Patient reported duration of hypertension						
<5 years	35.7			37.1		0.670
5-10 years	22.1			29.1		0.228
>10 years	41.0			33.1		0.181
Baseline systolic blood pressure (SD)	144 (7.0)			144 (7.3)		0.984
Baseline diastolic blood pressure (SD)	80 (10.2)			82 (8.9)		0.139
Stage 2 & 3						
	Before Withdrawal			After Withdrawal		
	Usual Care (n=215)	Intervention (n=207)	p-value	Usual Care (n=130)	Intervention (n=142)	p-value
Age, mean (SD)	68 (13)	69 (12)	0.78	68 (13)	69 (12)	0.52
Male (%)	35	37	0.59	31	38	0.21
Race (% White)	NA	NA		95	93	0.56
Body mass index, mean (SD)	31 (7)	30 (6)	0.39	30 (7)	30 (6)	0.98
Married (%)	NA	NA		61	69	0.23
Education (%)						
Less than a high diploma	NA	NA		7	9	0.60
High school /some college				65	59	
College graduate or above				28	32	
Family income (%)	NA	NA				
\$0–19,999				29	25	0.38
\$20,000–39,999				29	36	
\$40,000–59,999				24	17	
\$60,000 or more				18	22	
Commercial insurance (%)	30	34	0.43	29	28	0.85
Asthma or COPD (%)	11	12	0.77	9	12	0.46
Current smoker (%)	8	10	0.52	6	6	0.86
Diabetes (%)	24	25	0.73	21	27	0.19
History of stroke (%)	2	7	0.03	2	6	0.16
Coronary artery disease (%)	18	21	0.42	18	22	0.39
Renal impairment (%)	3	3	0.72	2	3	0.47

Appendix 2

PROVIDENCE MEDICAL GROUP SAMPLE DISEASE MANAGEMENT WEB-BASED PRESENTATION



Appendix 3

PROVIDENCE MEDICAL GROUP SAMPLE REPORT FOR PATIENTS AT HIGH RISK FOR A CARDIAC EVENT

Patients	Age	Risk	LDL	Statin	BP	A1c	ASA	BB	ACEI/ARB	Tobacco Status	BMI	Last Appt	Next Appt	Select
ALDER, DONNIE 06/03/1948	58	2.00%	171		116/74					85/90/96	29	05/02/06		<input type="checkbox"/>
BECKSTROM, TEODORO 06/23/1924	82	CHD	78	YES	102/92			YES			40	08/15/06		<input type="checkbox"/>
BENAK, VELNA 04/18/1961	45	EQUIV	38	YES	106/78	7.0			YES		31	12/20/05		<input type="checkbox"/>
BIRLEY, JACQUILINE 07/06/1939	67	EQUIV	81	YES	128/78	6.8		YES	YES		40	12/27/05		<input type="checkbox"/>
BOULDIN, TENNIE 12/06/1914	91	EQUIV	38		112/78	6.8					39	09/05/06		<input type="checkbox"/>
COPPERSMITH, DENITT 02/13/1926	79	EQUIV	85	YES	112/74	6.8					34	05/09/06		<input type="checkbox"/>
DELPAPA, ALYSSA 01/10/1922	84	CHD	92		118/78	6.8					37	07/17/06		<input type="checkbox"/>
DENZLER, BERT 11/01/1961	44	EQUIV	82		128/78	6.8					29	06/14/06		<input type="checkbox"/>
DORSON, GRETA 06/04/1958	48	EQUIV	82	YES	122/78	6.4			YES		29	06/21/06		<input type="checkbox"/>
DOUKAS, LYNDIA 06/25/1957	49	EQUIV	72	YES	128/78	6.8			YES		30	09/15/06		<input type="checkbox"/>
DURALL,														<input type="checkbox"/>

Appendix 4

PROVIDENCE MEDICAL GROUP SAMPLE REPORT FOR PROVIDERS AND STAFF TO VIEW INDIVIDUAL TRENDED PERFORMANCE COMPARED TO AN ACHIEVABLE BENCHMARK



Appendix 5

PROVIDENCE MEDICAL GROUP – DESCRIPTION OF HYPERTENSION INTERVENTIONS

MAILED EDUCATIONAL PACKETS

Packet #1

- Introductory letter from primary care provider
- Pamphlet (*Understanding & Controlling High Blood Pressure*. Krames 159021-01/99) providing an overview of hypertension, including:
 - Definition of hypertension
 - Complications of hypertension
 - Measurement of blood pressure
 - Tips for healthy eating
 - Tips for healthy lifestyle
 - Tips for taking medications
 - Community resources
- Refrigerator magnet displaying blood pressure target

Packet #2

- Introductory letter from primary care provider
- Pamphlet (Part 2: *High blood Pressure Treatment & Monitoring*. Providence Medical Group 05/01) providing an overview of hypertension monitoring and treatment, including:
 - Review of antihypertensive drug classes
 - Factors that influence the selection of antihypertensive medications
 - Medication side effects
 - Tips to improve compliance
 - Introduction to home monitoring
 - Recommendations for selection of a home blood pressure monitor
 - Tips for accurate blood pressure measurement
- Home blood pressure monitoring log

HYPERTENSION GROUP CLASSES

Session #1

- Overview of hypertension (video)
- Consequences of uncontrolled hypertension
- Lifestyle modification
- Weight loss
- Exercise
- Sodium intake
- Alcohol
- Tobacco cessation

Session #2

- Importance of medication compliance
- Compliance tips
- Selection of medications
- Antihypertensive drug classes
- Medication side effects
- Home blood pressure monitoring

COLLABORATIVE HYPERTENSION MANAGEMENT WITH A CLINICAL PHARMACY SPECIALIST

Collaborative Visits

- Subjects allocated to the pharmacy practitioner arm were given an appointment with one of five Doctors of Pharmacy.
- The location for appointments was in the patient's primary care clinic.
- The intervention was in keeping with the Board of Pharmacy's administrative rule [855-041-0400] and the Board of Medical Examiners' rule on "collaborative drug therapy management."
- During the initial visit the pharmacy practitioner reviewed subjects' medications and lifestyle habits, assessed vital signs, screened for adverse drug reactions and other barriers to medication compliance, provided education and optimized the antihypertensive regimen in keeping with pre-established collaborative hypertension management guidelines. Alterations in the antihypertensive regimen could have made to titrate the dose of an existing medication, add a new medication, switch a medication (e.g., due to an intolerable side effect or cost) or consolidate therapy (e.g., replace two antihypertensive agents with an existing combination product).
- Subsequent visits or telephone calls were scheduled at the discretion of the pharmacist.
- At the end of each clinic visit or telephone call a note documenting the interaction was placed in the EMR and forwarded to the primary care provider for co-signature.

Appendix 5 (con't)

PROVIDENCE MEDICAL GROUP – DESCRIPTION OF HYPERTENSION INTERVENTIONS

IMPROVING ACCURACY AND VALIDITY OF HYPERTENSION MEASUREMENT AND DOCUMENTATION

Training and Annual Assessment of Medical Assistants

- A consultant was hired to develop a BP assessment train-the-trainer program for clinic nurse managers to implement in their clinics.
- Clinic nurses were trained, and in turn provided training to MAs following standard curriculum including educational materials, a presentation slide set and skill practice.
- Upon completion of training, MAs were tested using a standardized knowledge quiz and skills assessment instrument, and competency documented in personnel file.
- Clinic nurse managers periodically monitor performance and formally assess performance annually, using a standard assessment instrument.
- MAs not demonstrating competency are retrained until competency is established.

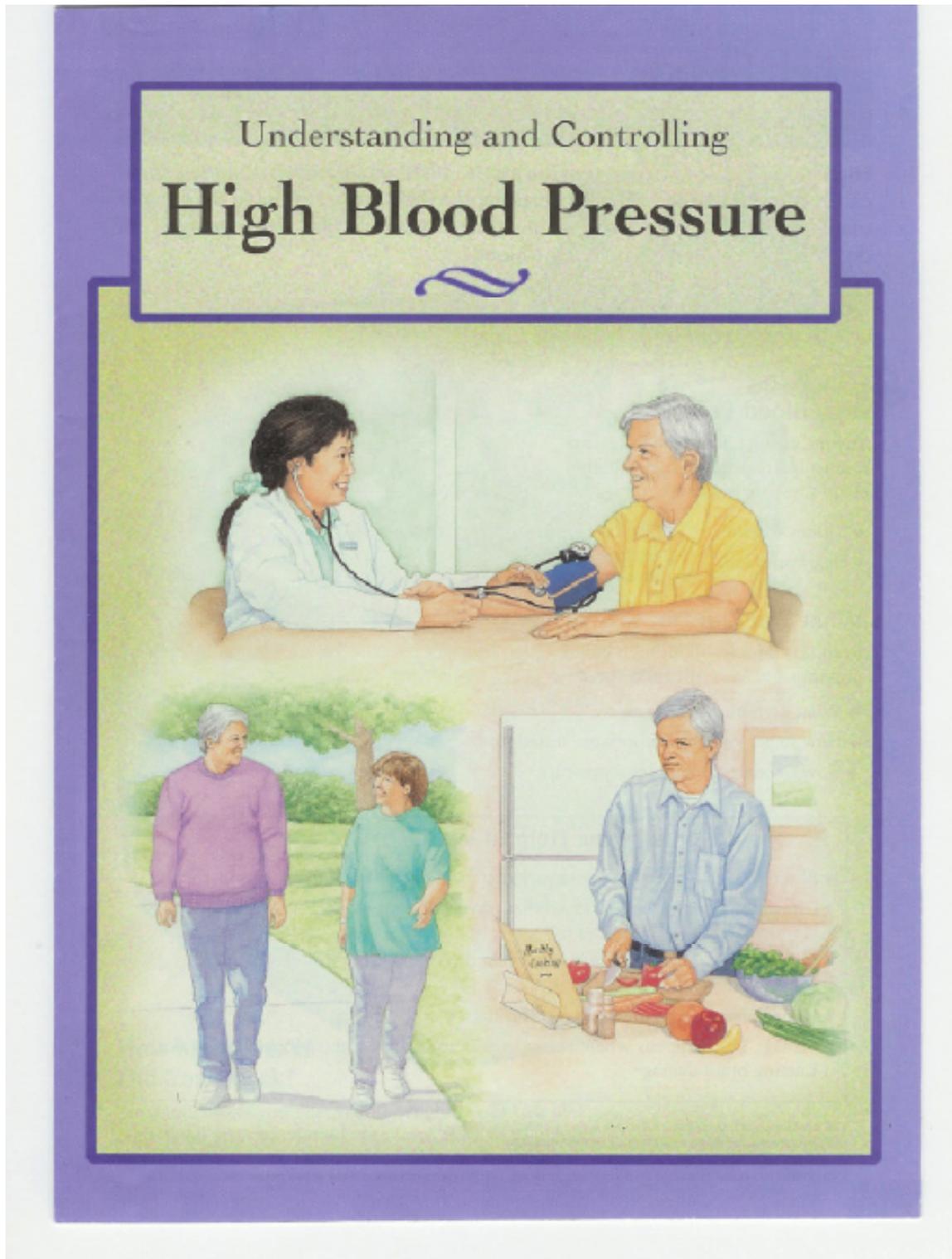
EDUCATING PHYSICIANS ON OPTIMAL MANAGEMENT OF HYPERTENSION

Continuing Medical Education for All Group Physicians

- A formal CME program, based on the recently published JNC 7 guidelines, was developed and presented to PMG physicians.
 - A second program, modeled after the game show *Jeopardy*, was presented in each clinic one year later. The training format consisted of teams of physicians responding to questions about hypertension such as diagnosis, secondary causes, treatment and special populations.
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Appendix 5b

PROVIDENCE MEDICAL GROUP – EDUCATIONAL BOOKLET #1 PROVIDED TO STAGE 1 HYPERTENSION PATIENTS
(3 SAMPLE PAGES OF A 16-PAGE BOOKLET)



Appendix 5b (con't)

PROVIDENCE MEDICAL GROUP – EDUCATIONAL BOOKLET #1 PROVIDED TO STAGE 1 HYPERTENSION PATIENTS
(3 SAMPLE PAGES OF A 16-PAGE BOOKLET)

High Blood Pressure and You

High blood pressure (**hypertension**) is called the silent killer. This is because many people who have it don't know they do. A simple test can check if your blood pressure is too high. If it is high, you can take steps to lower it. Doing so could save your life.

Who Gets High Blood Pressure?

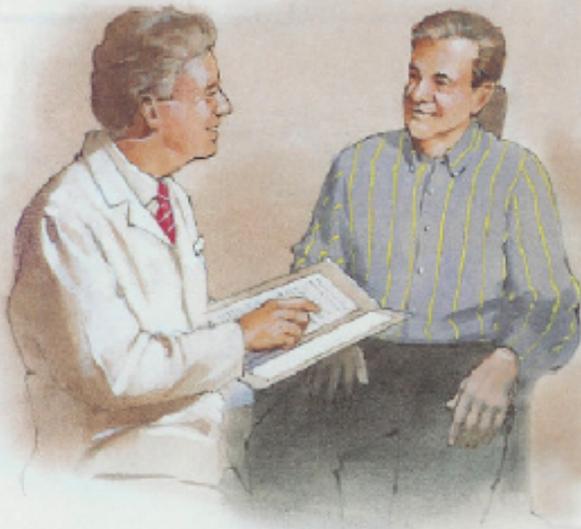
Anyone can get high blood pressure. It must be treated. Untreated high blood pressure can cause:

- ◆ Kidney disease
- ◆ Stroke
- ◆ Heart problems
- ◆ Blindness

What You Can Do

Read this booklet about high blood pressure and learn the following:

- ◆ What high blood pressure is
- ◆ How to get your blood pressure tested
- ◆ How to control high blood pressure



Some Helpful Words to Know

- ◆ **Blood vessels:** These are like hoses that carry blood to all parts of your body.
- ◆ **Cholesterol:** A fatlike substance that travels in your blood. It can block your blood vessels.
- ◆ **Heart attack:** This happens when a blood vessel in the heart gets blocked, causing damage to the heart.
- ◆ **Hypertension:** The medical word for high blood pressure.
- ◆ **Stroke:** This happens when a blood vessel in the brain gets blocked or breaks, causing brain damage.

This booklet is not intended as a substitute for professional medical care. Only your doctor can diagnose and treat a medical problem.

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Appendix 5b (con't)

PROVIDENCE MEDICAL GROUP – EDUCATIONAL BOOKLET #1 PROVIDED TO STAGE 1 HYPERTENSION PATIENTS
(3 SAMPLE PAGES OF A 16-PAGE BOOKLET)

Could You Have High Blood Pressure?

Some people are more likely than others to get high blood pressure. To see if you are at greater risk, take the quiz below.



HIGH BLOOD PRESSURE QUIZ

Check each box below that applies to you.

Your Lifestyle

- You smoke.
- You often eat salty, fried, or greasy food.
- You often feel very stressed.

Your Background

- You're a man or woman over the age of 60.
- You're African-American.

Your Health History

- You're overweight.
- Your cholesterol level is more than 240.

- You often have more than 2 alcoholic drinks (or 1 ounce of alcohol) each day.
- You don't get much exercise at work or at home.
- A parent, brother, or sister has high blood pressure or heart disease.
- You have diabetes, heart disease, or kidney disease.
- You have had a stroke or a heart attack.
- It has been more than 1 year since you had your blood pressure checked.

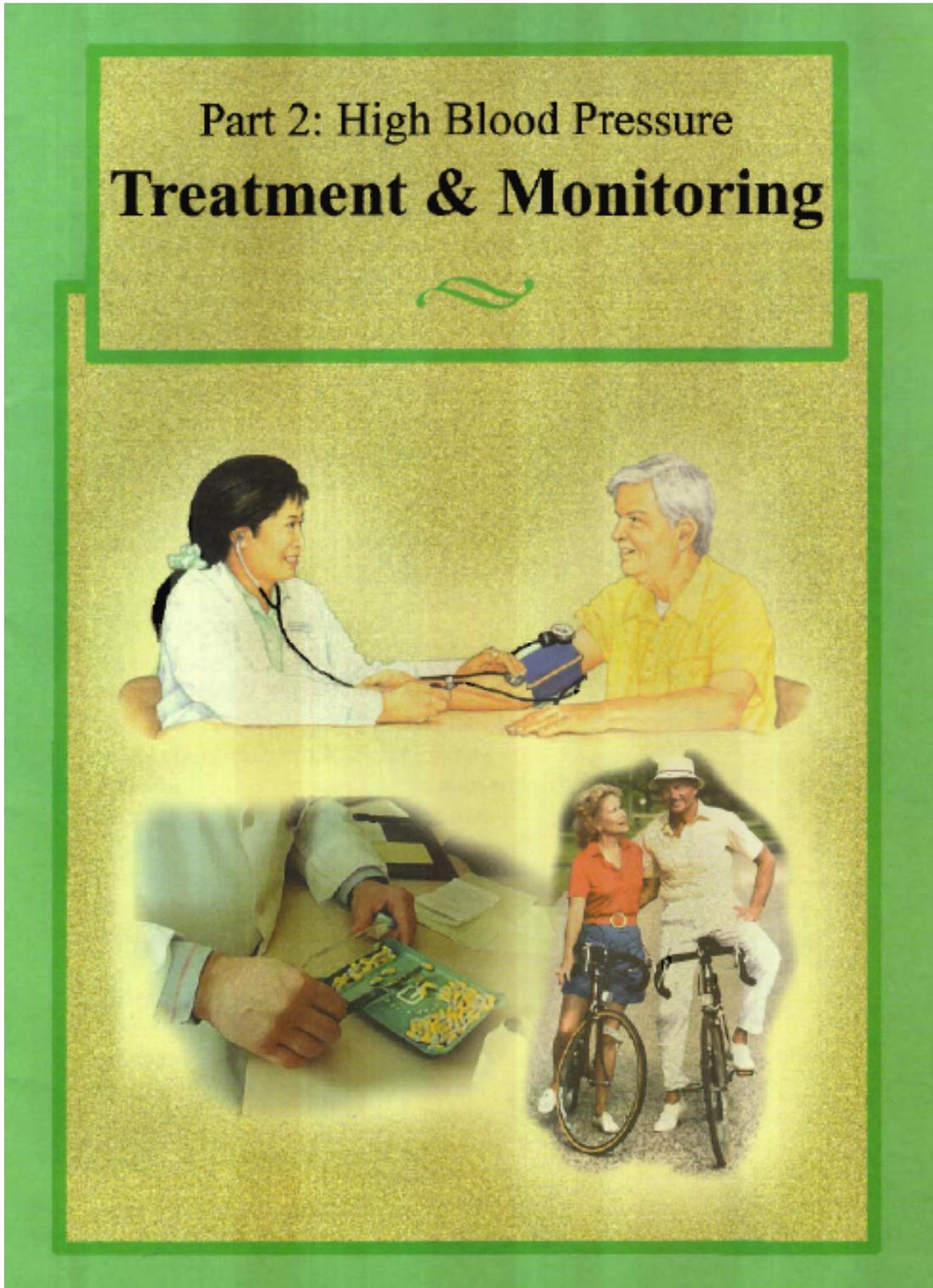
How Many Boxes Did You Check?

The more boxes you checked, the higher your risk of high blood pressure. But you can learn ways to keep high blood pressure from hurting you. Keep reading.

3

Appendix 5c

PROVIDENCE MEDICAL GROUP – EDUCATIONAL BOOKLET #2 PROVIDED TO STAGE 1 HYPERTENSION PATIENTS
(3 SAMPLE PAGES OF A 16-PAGE BOOKLET)

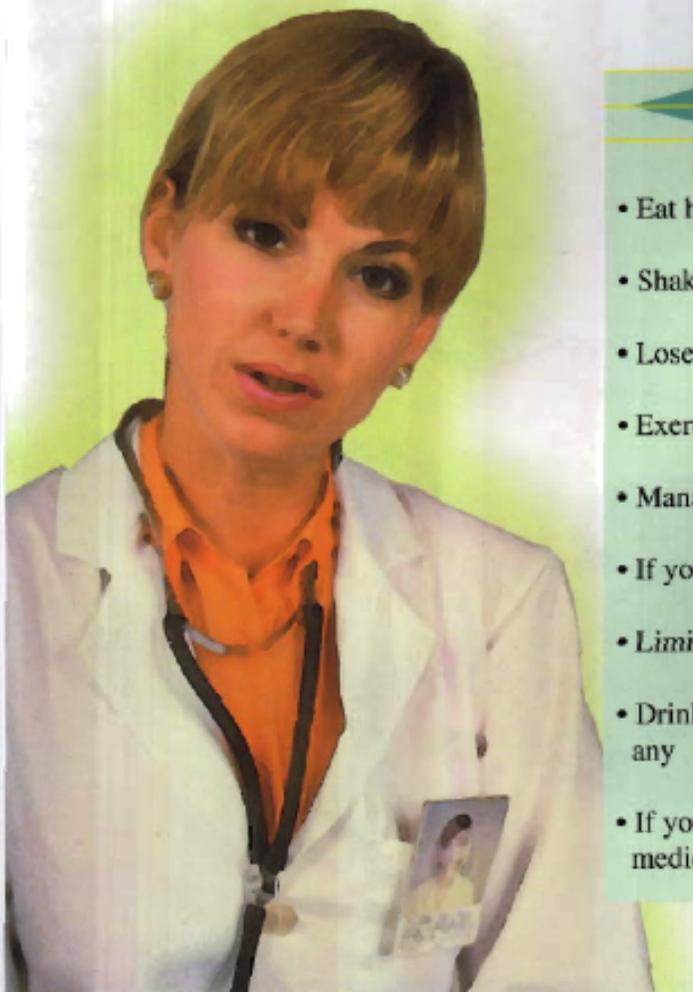


Appendix 5c (con't)

PROVIDENCE MEDICAL GROUP – EDUCATIONAL BOOKLET #2 PROVIDED TO STAGE 1 HYPERTENSION PATIENTS
(3 SAMPLE PAGES OF A 16-PAGE BOOKLET)

Treating High Blood Pressure

Sometimes healthy habits alone are not enough to lower your blood pressure to target. You may need to take one or more medicines. Medicine works in combination with healthy habits such as exercise and healthy eating. If your health care provider starts you on medication, it is important to continue healthy habits. Medicines will be more effective if used along with exercise and healthy eating.



Tips

For Health Habits

- Eat healthy foods
- Shake the salt habit
- Lose weight if you need to
- Exercise regularly
- Manage stress
- If you smoke, stop!
- *Limit caffeine*
- Drink very little alcohol, if any
- If your doctor prescribes medicine, take it as instructed

Appendix 5c (con't)

PROVIDENCE MEDICAL GROUP – EDUCATIONAL BOOKLET #2 PROVIDED TO STAGE 1 HYPERTENSION PATIENTS
(3 SAMPLE PAGES OF A 16-PAGE BOOKLET)

Understanding Your Medications

There are many choices for medicines now available to treat high blood pressure. Blood pressure medicines are grouped together based on their action in the body. Below are the groups of medications commonly used to treat high blood pressure:

Diuretics are sometimes called “water pills” because they flush excess sodium and water from the body through the urine stream. This reduces the amount of fluid in the blood. Although Diuretics are called water pills, they usually don’t cause excess urination after the first week.

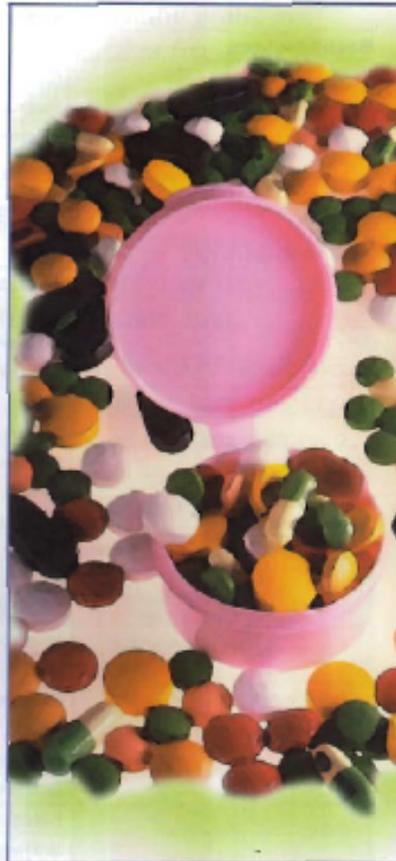
Beta-blockers work by blocking the effects of adrenaline, thus easing the heart’s pumping action and widening blood vessels.

Angiotensin Converting Enzyme (ACE) inhibitors block a chemical which is made in the kidney. This chemical constricts the blood vessels and causes blood pressure to rise. Blocking it with these medications allows the vessels to widen and blood pressure to fall.

Angiotensin Receptor Blockers (ARB) block the same kidney chemical from a different direction than ACE inhibitors.

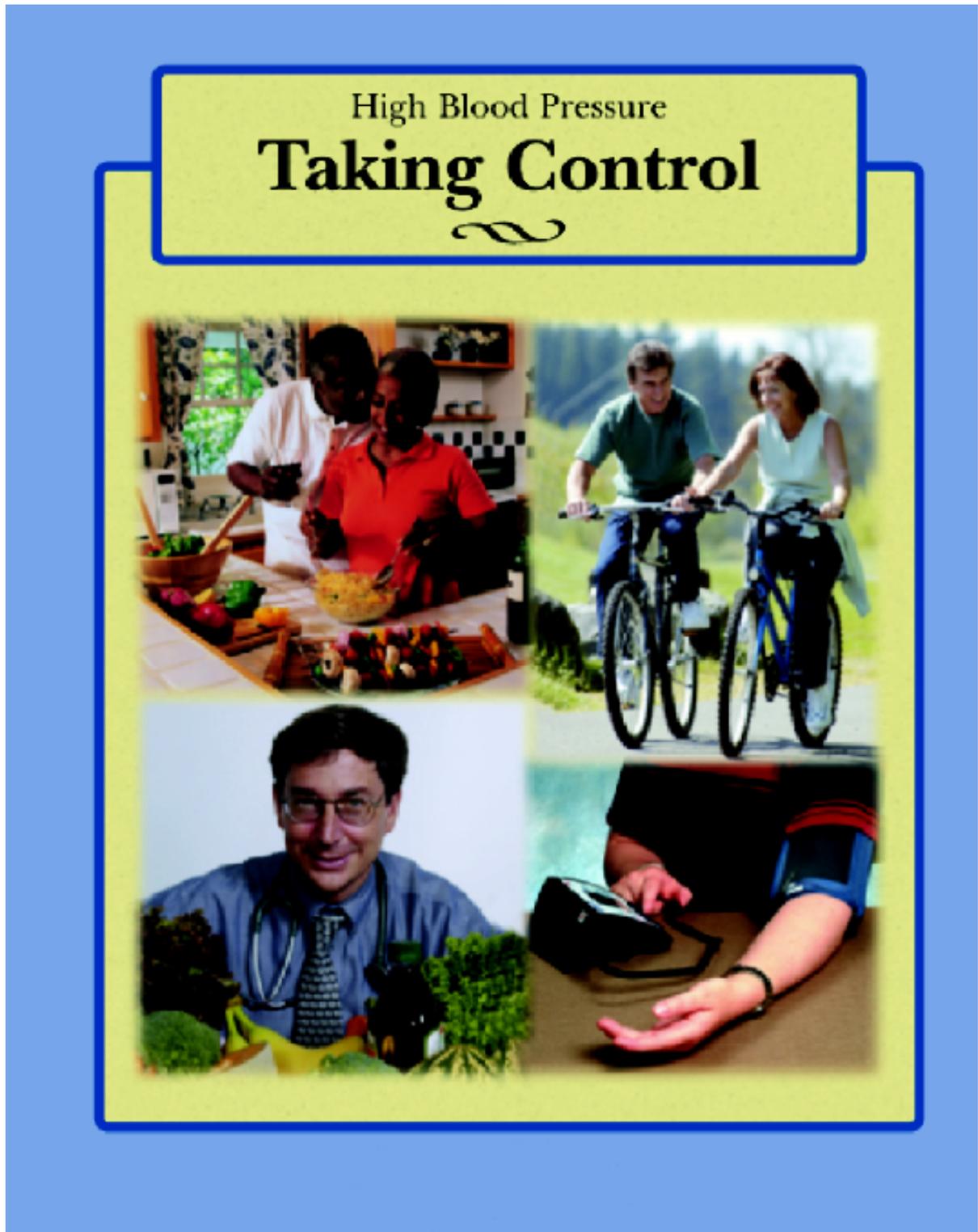
Calcium Channel Blockers (CCB) keep calcium from entering the muscle cells of the heart and blood vessels. This causes the blood vessels to relax and blood pressure to go down. Although they are named “calcium channel blockers,” this group of medicines does not interfere with calcium in food, vitamins, or your bones.

Alpha blockers reduce nerve impulses to the blood vessels. This relaxation of the vessels leads to a lowering of blood pressure.



Appendix 5d

PROVIDENCE MEDICAL GROUP – EDUCATIONAL BOOKLET USED DURING GROUP CLASSES OFFERED TO STAGE 2 HYPERTENSION PATIENTS (4 SAMPLE PAGES OF A 48-PAGE BOOKLET)



Appendix 5d (con't)

PROVIDENCE MEDICAL GROUP – EDUCATIONAL BOOKLET USED DURING GROUP CLASSES OFFERED TO STAGE 2 HYPERTENSION PATIENTS (4 SAMPLE PAGES OF A 48-PAGE BOOKLET)

Index

Get Acquainted	1
Hypertension Quiz	2
Chapter 1: Hypertension Overview	3
Chapter 2: Nutrition & Weight	9
Chapter 3: Exercise	22
Chapter 4: Sodium	28
Chapter 5: Tobacco	35
Chapter 6: Stress	45
Chapter 7: Medications to Treat High Blood Pressure	49
Chapter 8: Monitoring Blood Pressure at Home	55
Glossary of Terms	60

Appendix 5d (con't)

PROVIDENCE MEDICAL GROUP – EDUCATIONAL BOOKLET USED DURING GROUP CLASSES OFFERED TO STAGE 2 HYPERTENSION PATIENTS (4 SAMPLE PAGES OF A 48-PAGE BOOKLET)

Activity Getting Acquainted

Participating in a group class enables you to learn from the health care instructor, as well as from the experiences of your classmates. Let's start by getting to know your classmates.

You will have approximately five minutes to talk with one of your classmates. You will then be asked to introduce him/her to the rest of the group. Below are some suggested questions to help you in the discussion.

Instructions:

1. Team up with one of your classmates.
2. Take approximately five minutes to interview your partner and five more minutes for your partner to interview you.
3. Suggested questions:
 - What is your name?
 - How long have you lived in this state?
 - Who was your favorite teacher? Why?
 - What was your first car? What color was it?
 - What do you hope to get out of this class?
4. When the time is up, you will be asked to introduce your partner to the group.
5. GO!



Appendix 5d (con't)

PROVIDENCE MEDICAL GROUP – EDUCATIONAL BOOKLET USED DURING GROUP CLASSES OFFERED TO STAGE 2 HYPERTENSION PATIENTS (4 SAMPLE PAGES OF A 48-PAGE BOOKLET)

Activity Hypertension Quiz

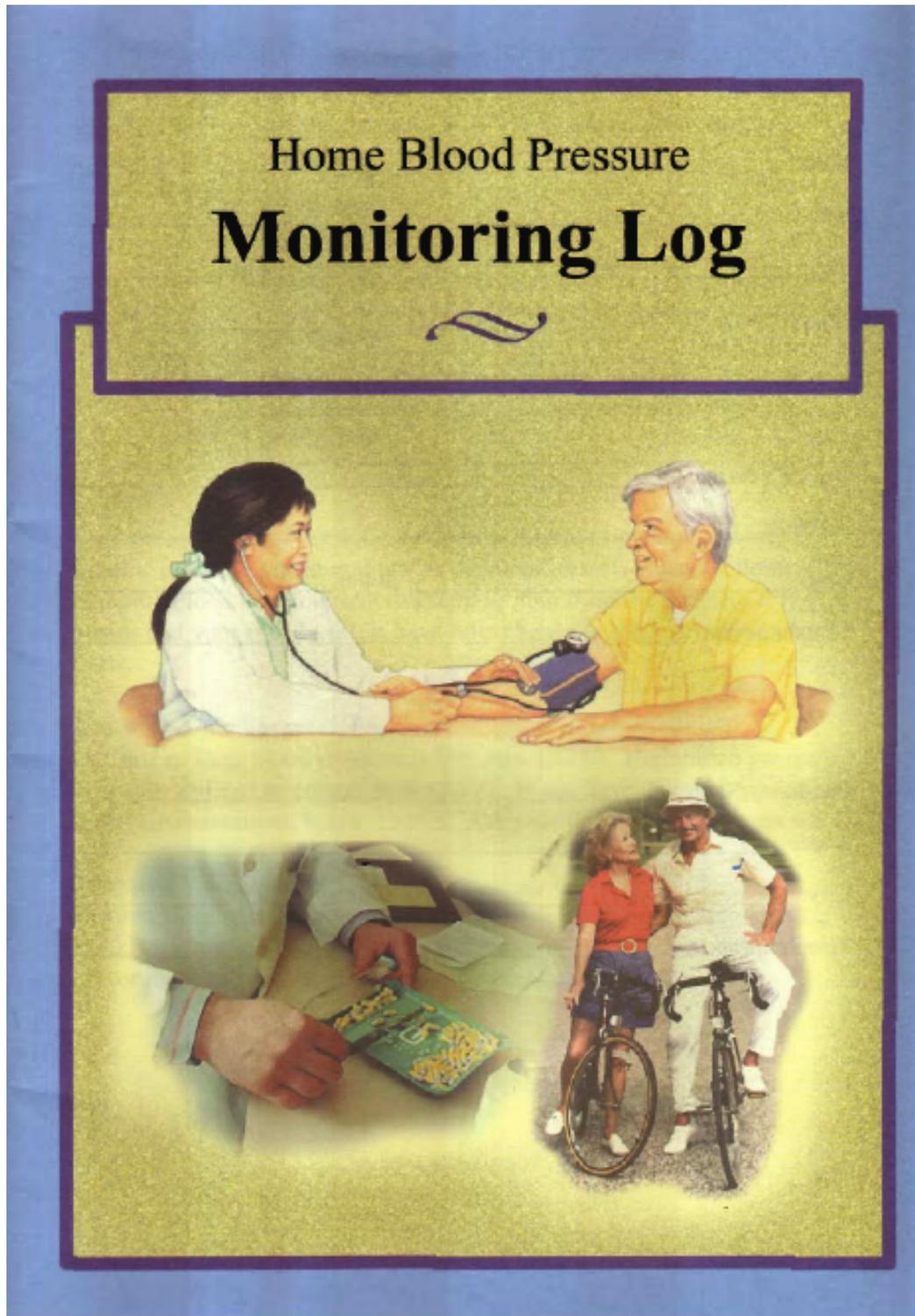
From your memory, mark the correct box after each of the statements below.

	True	False	Don't know
a. Hypertension mainly affects people who are under a lot of stress.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Home blood pressure monitoring is never reliable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. If your doctor prescribes medication for high blood pressure, it is important to take it every day.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Your blood pressure goal is 100 plus your age.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. A beta-blocker is a medication often prescribed for high blood pressure.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. High blood pressure is not very common.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. High blood pressure can increase your risk for stroke.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. High blood pressure usually causes no symptoms.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Once your blood pressure improves to normal levels, you should stop your medication.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. If you have high blood pressure you should try to increase the amount of salt in your diet.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Write your blood pressure goal in the box below

Appendix 5e

PROVIDENCE MEDICAL GROUP – HOME BLOOD PRESSURE MONITORING LOG USED AS EDUCATIONAL MATERIALS FOR STAGE 2 AND STAGE 3 HYPERTENSION PATIENTS (6 SAMPLE PAGES OF A 7-PAGE BOOKLET)



Appendix 5e (con't)

PROVIDENCE MEDICAL GROUP – HOME BLOOD PRESSURE MONITORING LOG USED AS EDUCATIONAL MATERIALS FOR STAGE 2 AND STAGE 3 HYPERTENSION PATIENTS (6 SAMPLE PAGES OF A 7-PAGE BOOKLET)

Home Blood Pressure Monitoring Log

Name: _____

Address: _____

City: _____ State: _____ Zip: _____

Telephone no. (____) _____ - _____

Doctor's Name: _____

Address: _____

City: _____ State: _____ Zip: _____

Telephone no. (____) _____ - _____

Pharmacy Name: _____

Address: _____

City: _____ State: _____ Zip: _____

Telephone no. (____) _____ - _____

Appendix 5e (con't)

PROVIDENCE MEDICAL GROUP – HOME BLOOD PRESSURE MONITORING LOG USED AS EDUCATIONAL MATERIALS FOR STAGE 2 AND STAGE 3 HYPERTENSION PATIENTS (6 SAMPLE PAGES OF A 7-PAGE BOOKLET)

Checking Your Blood Pressure

Keeping track of your blood pressure can help you and your doctor to control your blood pressure.

140
90

Systolic – the “top” number is the pressure or force the heart places on the walls of your blood vessels as it is pumping with each heartbeat

Diastolic – the “bottom” number is the lowest pressure the blood places on the walls of your blood vessels when the heart is relaxed between beats

Both the systolic and diastolic measurements are important. A high systolic pressure indicates strain on the blood vessels when the heart is pumping blood into your bloodstream. If your diastolic pressure is high it means that your blood vessels have little chance to relax between heartbeats.

Knowing Your Target

Optimal or ideal blood pressure is less than 120/80. High blood pressure is usually defined as greater than 140/90. If you have diabetes, you should target a measurement below 130/85. Ask your doctor about your target.

Tracking Your Readings

Remember to write down your blood pressure results and bring this Log Book with you to the doctor. Accurate records will help you and your doctor make the best decision about your treatment plan.

Appendix 5e (con't)

PROVIDENCE MEDICAL GROUP – HOME BLOOD PRESSURE MONITORING LOG USED AS EDUCATIONAL MATERIALS FOR STAGE 2 AND STAGE 3 HYPERTENSION PATIENTS (6 SAMPLE PAGES OF A 7-PAGE BOOKLET)

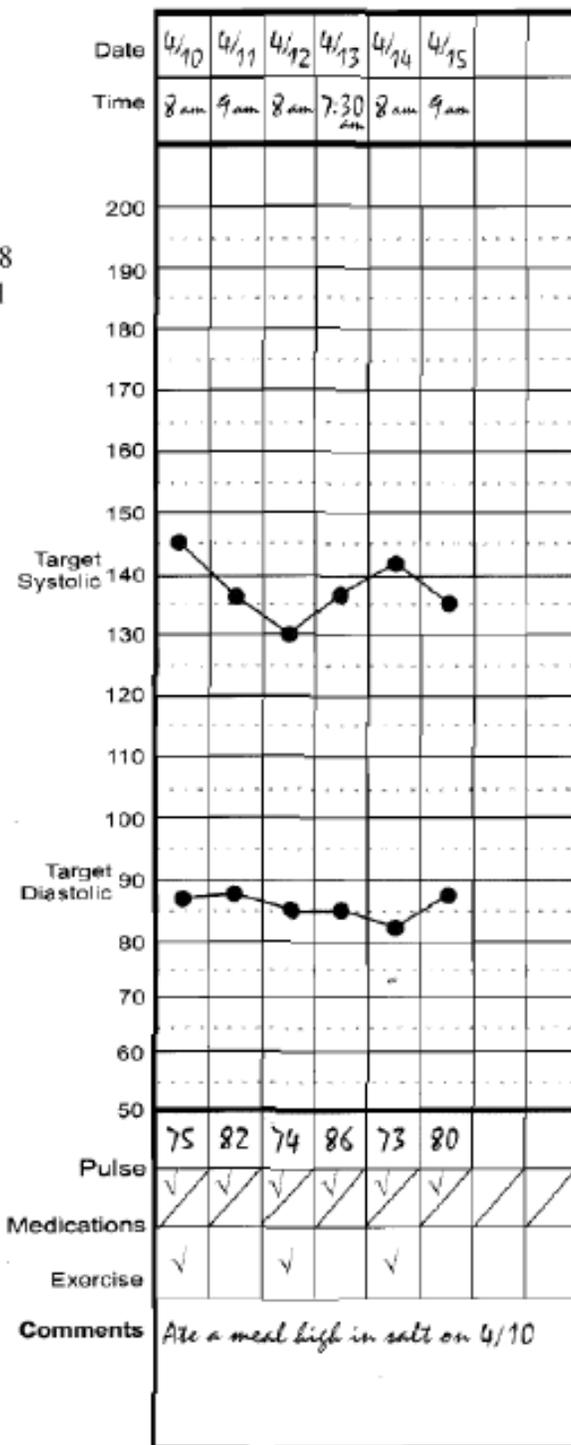
Using Your Log Book

1. Write the month of the year in the upper left corner.
2. Check your blood pressure AFTER sitting quietly for at least 5 minutes.
3. Record the day of the month and the time of day at the top of the chart.
4. Place a (●) in the correct box to indicate your systolic and diastolic reading.
5. Record your Pulse or Heart rate in the appropriate box.
6. Please a (✓) to indicate that you have taken your blood pressure medication(s) for the day
7. Place a (✓) in the box if you exercised
8. The “Comments” section provides space to write down events that may have affected your blood pressure. For example – “sick with the flu” or “forgot to take medications”.

Appendix 5e (con't)

PROVIDENCE MEDICAL GROUP – HOME BLOOD PRESSURE MONITORING LOG USED AS EDUCATIONAL MATERIALS FOR STAGE 2 AND STAGE 3 HYPERTENSION PATIENTS (6 SAMPLE PAGES OF A 7-PAGE BOOKLET)

For example, on 4/10, if your blood pressure reading is 145/88 and your pulse is 75, you would mark your log as seen on right.



Use the boxes to the right to track medications and exercise.

Appendix 6a

PROVIDENCE MEDICAL GROUP – MANAGING STAGE 1 HYPERTENSION INTERVENTION RESULTS

Blood pressure assessments

	Usual Care Group	Intervention Group	p-value
Systolic blood pressure (SD)	137 (15.4)	135 (14.7)	0.229
Diastolic blood pressure (SD)	77 (10.7)	77 (11.1)	0.858

Hypertension-related knowledge*

	Usual Care Group	Intervention Group	p-value
Score (SD)	7.09 (1.6)	7.48 (1.6)	0.019
<i>* 10-item survey, 1 point for each correct answer</i>			

Home blood pressure monitoring

	Usual Care Group	Intervention Group	p-value
Average number of days patient assessed BP in last 30 days	5.7 days	8.7 days	0.078
Percentage of patients recording BP readings in logbook	54 %	73 %	0.05

Patient satisfaction*

	Usual Care Group (n=150)	Intervention Group (n=162)	p-value
Overall treatment	8.18	8.51	0.180
Personal physician	8.91	9.28	0.037
Respect shown by physician and staff	9.12	9.41	0.037
Explanation of hypertension	8.09	8.66	0.008
Explanation of hypertension drugs	7.93	8.51	0.017
Selection of hypertension medications	8.57	8.88	0.115
Frequency of BP monitoring	8.01	8.77	0.011
Staff/doctor time spent on HTN	7.31	7.84	0.078

** 1="worst possible", 10="best possible"

Appendix 6b

PROVIDENCE MEDICAL GROUP – MANAGING STAGE 2 & 3 HYPERTENSION INTERVENTION RESULTS

Blood pressure assessments

	Usual Care Group	Intervention Group	p-value
Systolic blood pressure (SD)	143 (18)	137 (17)	0.007
Diastolic blood pressure (SD)	78 (11)	75 (9)	0.003

Hypertension-related knowledge*

	Usual Care Group	Intervention Group	p-value
Score (SD)	7.6	7.9	0.19
Change in score from baseline	- 0.51	+ 0.93	0.001

*10-item survey, 1 point for each correct answer

Medication compliance

	Usual Care Group	Intervention Group	p-value
Subjects reporting high compliance	68%	66%	0.79

Home blood pressure monitoring

	Usual Care Group	Intervention Group	p-value
Assess home BP in last 30 days (%)	51.1	70.0	0.007
Record BP readings in logbook (%)	38.4	75	<0.0001

Patient satisfaction

	Usual Care Group	Intervention Group	p-value
Overall satisfaction with HTN care	8.4	8.7	0.12

*1="worst possible", 10="best possible"

Quality of Life

	Usual Care Group	Intervention Group	p-value
SF-36 Overall health (SD)	3.2 (1.1)	3.4 (1.0)	0.35

Appendix 7

PROVIDENCE MEDICAL GROUP – HYPERTENSION MEDICAL ASSISTANT TRAINING

Task Qualification Training Packet

Volume 1

Date _____

Performing Blood Pressure Checks

SUBJECT AREA: Vital Signs

EQUIPMENT REQUIRED: Blood Pressure cuff, stethoscope, and a watch with a second hand

TRAINING REFERENCE(s): Lippincott Manual of Nursing Practice, current edition, and Blood Pressure Cuff Operating Instructions
Bates: Physical Diagnosis

OBJECTIVE: The trainee will successfully demonstrate without error the performance aspects of measuring Blood Pressure.

EVALUATION INSTRUCTIONS:

1. After the trainee has received instruction, allow sufficient practice on each part of the task.
2. Trainee should be evaluated on this task by the manual method of measuring the blood pressure.
3. The evaluator will STOP the procedure immediately and correct the trainee if performance could become detrimental to patient safety at any time.
4. Document task competency upon completion of the evaluation in the trainee's OJT (on-the-job training record). All reoccurring training should be documented annually in the OJT.
5. Use the performance checklist to ensure all steps of the task are accomplished.
6. Document task competency upon completion of the evaluation on the trainee's record

Appendix 7 (con't)

PROVIDENCE MEDICAL GROUP – HYPERTENSION MEDICAL ASSISTANT TRAINING

MEDICAL ASSISTANT TRAINING

LESSON PLAN

1. The importance of Blood Pressure measurement

- a. Hypertension or high blood pressure means that there is a higher than normal pressure in the arteries. This is important because the arteries carry blood to all of the organs and tissues in the body including the heart, the brain and the kidneys. Pressure in the arteries causes pressure on the organs, which causes organ damage.
- b. High blood pressure is a major cause of heart attacks, heart failure, kidney damage and strokes.
- c. Treatment of high blood pressure can dramatically decrease the risk of a poor outcome.
- d. Treatment of high blood pressure is especially important in diabetic patients.
- e. Depending on your practice setting, up to one out of every five patients you see is likely to be hypertensive and in need of treatment.

2. Importance of measuring an accurate Blood Pressure

- a. The blood pressure is used to initiate treatment and monitor the effects of drug therapy.
- b. A false low reading may lead to under treatment, which will lead to more organ damage.
- c. A false high reading may lead to over treatment and the possibility of drug-induced side effects.
- d. The most accurate blood pressures are taken by trained medical personnel using the manual method.

3. Describing the Blood Pressure

- a. Two pressures are detected
 1. Pressure in the arteries while heart is pumping = systolic blood pressure (SBP)
 2. Pressure in the arteries while heart is resting between beats = diastolic blood pressure (DBP)
- b. Systolic blood pressure is heard first, diastolic blood pressure is heard second
- c. Blood pressure is measured in millimeters of mercury (abbreviated mmHg)
- d. The blood pressure is written systolic/diastolic (e.g., 140/86)
- e. There should also be an indication of the position (standing or sitting) and which arm was used
- f. There is no such thing as a "normal blood pressure"
 1. In general, a blood pressure of less than 130/85 is usually acceptable
 2. Systolic Blood Pressure over 140 or a diastolic over 90 indicates a need for further evaluation
 3. A systolic blood pressure of >180 or a diastolic blood pressure >110 should be brought to the physician's attention
 4. At a systolic blood pressure of less than 90 there may not be enough pressure to push blood into the brain and the patients may have symptoms of dizziness or, in severe cases, the patient can pass out. In these cases patients are often placed reclining with the head down and feet up to keep blood flowing to the brain.

4. Anatomy and Physiology of Blood Pressure

- a. Blood pressure is usually taken in the brachial artery which runs down the inside of the arm, closest to the body.
- b. The pulse in the brachial artery can be felt just above the elbow crease.
- c. Inflation of the blood pressure cuff puts pressure on the brachial artery until the artery is completely compressed, and the circulation to arm is cut off (you should not be able to feel a pulse at this point).
- d. As the cuff is deflated, pressure in the artery increases. When the pressure in the artery is equal to the pressure in the cuff, the first sound can be heard. The sounds continue with each pulse until the pressure in the artery is less than the cuff pressure, at which point the sounds disappear. This is the resting or diastolic blood pressure.

Appendix 7 (con't)

PROVIDENCE MEDICAL GROUP – HYPERTENSION MEDICAL ASSISTANT TRAINING

5. Anatomy and Physiology of the Pulse

- a. The pulse reflects the number of times the heart beats in one minute (the heart rate or ventricular rate).
- b. The pulse is helpful to the physician in choosing which medication to use, the effects of therapy, and adverse effects.
- c. The pulse should be measured with every blood pressure.

6. Steps for taking the Blood Pressure

- a. Positioning the Patient
 1. The patient should be resting for at least 5 minutes before the blood pressure is taken.
 2. Legs should not be crossed- this may falsely elevate the blood pressure.
 3. The patient should not be talking during blood pressure measurement. This may falsely elevate the blood pressure.
- b. Choose the appropriate cuff size
 1. Cuff size is determined by the circumference of the arm
 2. Cuff sizes are marked on the inside by a measuring line and a size: Pediatric, Adult Regular, Adult Large, and Thigh Cuff
 3. Measure the cuff on the arm to make sure it is appropriately sized for the person
 4. If the cuff is too small – the blood pressure will be falsely high
 5. If the cuff is too large- the blood pressure may be falsely low
- c. Choose the appropriate arm.
 1. You should not use an arm:
 - a. That has a dialysis shunt placed
 - b. On the same side as a mastectomy
 - c. On the side affected by a stroke
 2. You should try to use the same arm each time the blood pressure is taken
- d. Palpate the pulse in the brachial artery
- e. Remove any obstructive clothing from between the blood pressure cuff and the arm. A shirt sleeve can decrease the ability to hear the pulse sounds, and may lead to inaccurate measurement.
- f. Place the cuff on the arm, checking the size and placement by use of the arrow or symbol on the cuff that should be over the artery.
- g. Loosen the stopcock on the bulb by turning it several times before tightening closed. This is to be sure you can loosen the stopcock easily with one hand.
- h. Place the blood pressure gauge in good view.
- i. The patient's arm should be placed at level even with his or her heart. If the patient is seated, rest the arm on the table. If the patient is standing, hold the arm up with your hand (see demonstration).
 1. If the arm is left below the heart, particularly if the patient is standing, the blood pressure can be elevated by as much as 20 mmHg.
- j. The cuff should be pumped to 10 to 20 mmHg above the usual blood pressure or, if no previous blood pressures are recorded, pump to 160 to 180 mmHg.
- k. Loosen the stopcock on the bulb so that the pressure decreases by 2-3 mmHg per second. Listen carefully for the first sound.
 1. If sounds are heard right away, deflate the cuff immediately
 2. Let the arm rest for at least 2 minutes or switch arms if possible.
 3. Repeat at step J but increase the inflation target to 220 mmHg
- l. Note the pressure at which the first sound is heard. This is the systolic pressure.
- m. Continue to deflate the cuff at 2-3 mmHg per second
- n. Note the point at which the sounds disappear. This is the diastolic pressure.
 1. In some patients the diastolic pressure never completely disappears
 2. In these patients note the point at which the sounds muffle.
- o. Record in the chart as systolic/ diastolic and position of patient and which arm was used

Appendix 7 (cont)

PROVIDENCE MEDICAL GROUP – HYPERTENSION MEDICAL ASSISTANT TRAINING

7. Taking the Pulse

- The pulse should be taken with each blood pressure
- The pulse is best felt with the first two fingers placed at the wrist in a straight line down from the index finger.
- Feel for a few seconds to note whether the pulse is regular or irregular.
- Ideally, the number of beats should be measured for one full minute.
 - In practice it is more common to take the pulse for 15 seconds and multiply by 4 or for 30 seconds and multiply by 2.
 - However, if the pulse is not regular, the pulse should be taken for at least 30 seconds to get a more accurate measurement.
- The pulse is recorded in beats per minute or B/min
- Note next to the pulse whether it is regular or irregular (Note: this is required under Medicare rules).

P = 72 reg.

8. Orthostatic Blood Pressures

- Orthostatic blood pressures are done when we are suspecting postural changes in blood pressure.
- As you move from sitting to standing the blood pressure should not change. The body reacts to push blood flow back to the heart and keep blood flowing to the brain.
- Some patients lose this natural response and the blood pools in the lower extremities and there is less perfusion to the brain. The patient may complain of dizziness or lightheadedness upon standing.
- This may happen naturally with age or certain diseases or conditions.
- This can also mean an excessive effect of blood pressure medication.
- Checking orthostatic blood pressure
 - May be done lying to sitting to standing, but usually done sitting to standing
 - It is important to start in the "down" position- the patient (ie., sitting position)
 - Follow the normal procedures for blood pressure and pulse measurement.
 - Carefully document the blood pressure and pulse rate and the position.
 - Leave the cuff in position
 - Have the patient stand up, being careful to support from the back and front in case of dizziness.
 - Let the patient stand for 1-2 minutes.
 - Repeat the blood pressure and pulse measurement standing, careful to keep the arm at heart level.
 - Record the standing blood pressure and pulse. Indicate which blood pressure was done first.
 - A drop in the blood pressure by 20 mmHg systolic or 10 mmHg diastolic with an increase in the pulse by at least 10 B/min indicates orthostatic blood pressure changes.

160/90		Rt.	P = 72 B/min (reg)
↓			
130/80		Rt.	P = 116 B/min (reg)

9. Case Examples

- An 38-year-old ex-football player is concerned because at a health screening they told him his blood pressure was high at 170/90. He is overweight but still lifts weights. Why could he have a falsely elevated blood pressure?
 - He likely has increased arm size. If a small cuff was used the pressure could be falsely elevated.
 - If the arm was left dangling when the blood pressure was taken it may be falsely elevated.
 - His legs may have been crossed.
 - He may have been talking during the blood pressure measurement.
 - All of the above together

Appendix 7 (con't)

PROVIDENCE MEDICAL GROUP – HYPERTENSION MEDICAL ASSISTANT TRAINING

MEDICAL ASSISTANT TRAINING

WRITTEN TEST

1. High blood pressure may lead to:

- a. Heart Attacks
- b. Stroke
- c. Kidney damage
- d. All of the above

2. Accurate measurement of blood pressure is important because:

- a. You are likely to see several hypertensive patients throughout the day
- b. Blood pressure is used to diagnose and guide therapy
- c. Inaccurate blood pressure may lead to organ damage
- d. All of the above

3. Which of the following is true?

- a. The diastolic blood pressure is always greater than the systolic blood pressure
- b. The systolic blood pressure is the first sound heard
- c. Blood pressure is measured in mmH20
- d. The vast majority of patients have a normal blood pressure

4. Blood pressure is measured using:

- a. The brachial artery
- b. The radial artery
- c. The main vein
- d. A pulse oximeter

5. Which of the following is true?

- a. It is ok to ask the patient questions while you are measuring the blood pressure
- b. The patient should cross their legs, right over left, before the blood pressure is taken
- c. A pulse is only necessary if the blood pressure is very low
- d. The marking on the blood pressure cuff should be placed over the brachial artery

6. In taking the blood pressure:

- a. You should not use the arm on the same side that was affected by a stroke
- b. The cuff should be deflated at a rate of 2-3 mmHg per minute
- c. The blood pressure should never be taken in a standing position
- d. A and B only

Appendix 7 (con't)

PROVIDENCE MEDICAL GROUP – HYPERTENSION MEDICAL ASSISTANT TRAINING

MEDICAL ASSISTANT TRAINING

WRITTEN TEST

7. In taking the blood pressure:

- a. The cuff should never be placed on the bare arm
- b. The arm should always be below the level of the heart
- c. If the the sounds never disappear, the point at which the sounds muffle is used for the diastolic pressure
- d. None of the above

8. In taking the pulse:

- a. You should only note whether it is regular or irregular if the blood pressure is taken while standing
- b. You should only note the pulse if the blood pressure is abnormal
- c. If the pulse is regular you can measure the number of beats in 15 seconds and multiply by 10 to get the pulse rate in B/min
- d. The pulse indicates how many times the heart beats in one minute

9. If sounds are heard immediately when deflating the blood pressure cuff:

- a. The cuff pressure was too high
- b. You need to deflate the cuff and start over at a higher pressure target
- c. The diastolic blood pressure is too high
- d. All of the above

10. In checking a patient for orthostatic pressure:

- a. You should check sitting then standing
- b. The highest blood pressure should be recorded
- c. You should check standing then sitting
- d. A and B only

BLOOD PRESSURE

WRITTEN TEST ANSWER KEY

- 1. d
- 2. d
- 3. b
- 4. a
- 5. d
- 6. d
- 7. c
- 8. d
- 9. b
- 10. a

Appendix 7 (con't)

PROVIDENCE MEDICAL GROUP – HYPERTENSION MEDICAL ASSISTANT TRAINING

MEDICAL ASSISTANT TRAINING

PERFORMANCE CHECKLIST

PERFORMANCE ITEM	SAT	UNSAT
01 Greet pt and/or family member 02 Explain procedure/treatment/task to pt and/or family member 03 Select appropriate size cuff 04 Inspect cuff for serviceability 05 Palpate artery before applying cuff 06 Attach cuff to appropriate body location with arrow pointing towards artery 07 Choose appropriate stethoscope bell size according to pt's body size 08 Place stethoscope ear piece in ears and bell directly over artery 09 Ensure BP cuff valve stem is in closed position 10 Inflate cuff until beats cannot be heard 11 Open valve stem slowly to release pressure from cuff 12 Listen for systolic beat 13 Listen until diastolic beat is heard 14 Open wide BP cuff valve stem to release air pressure from cuff 15 Repeat steps 8-14, if unable to ascertain systolic/diastolic beats 16 Ensure cuff has been completely deflated and there has been at least a 10 second delay before redoing above steps 17 Remove BP cuff from pt 18 Document appropriate forms or medical records 19 Repeat BP in opposite arm, if reading is abnormal 20 Inform nurse/pt care provider, if BP is abnormal		
FINAL RESULTS		

Trainer

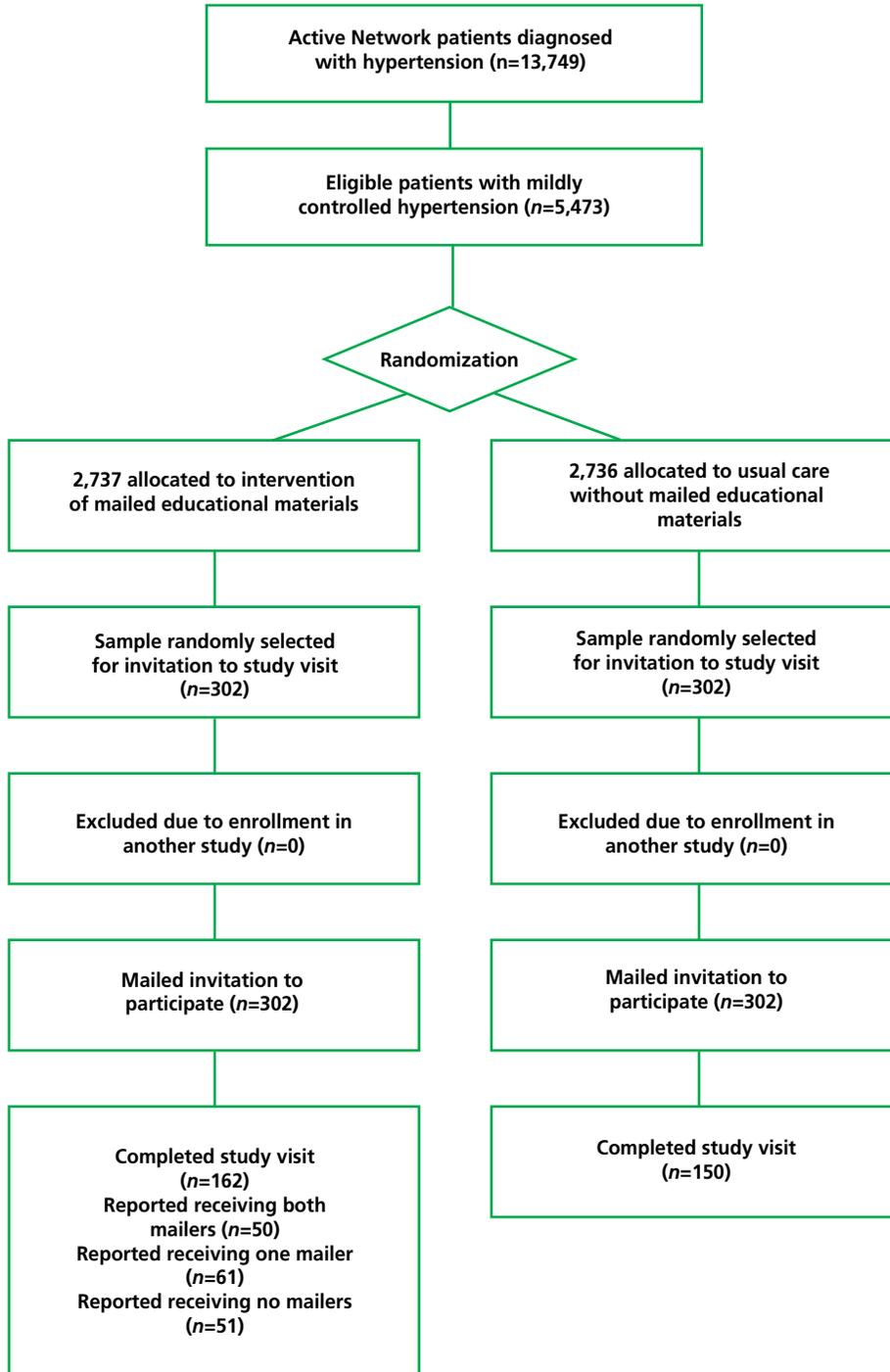
Trainee

Note: The information in the box below must be included at the end of all QTPs.

Feedback: Using this checklist as a source of information, discuss the trainee's performance indicating strengths, weaknesses, suggested improvements, etc. If the trainee performed all steps of the task satisfactorily, document the results in the trainee's OJT record.

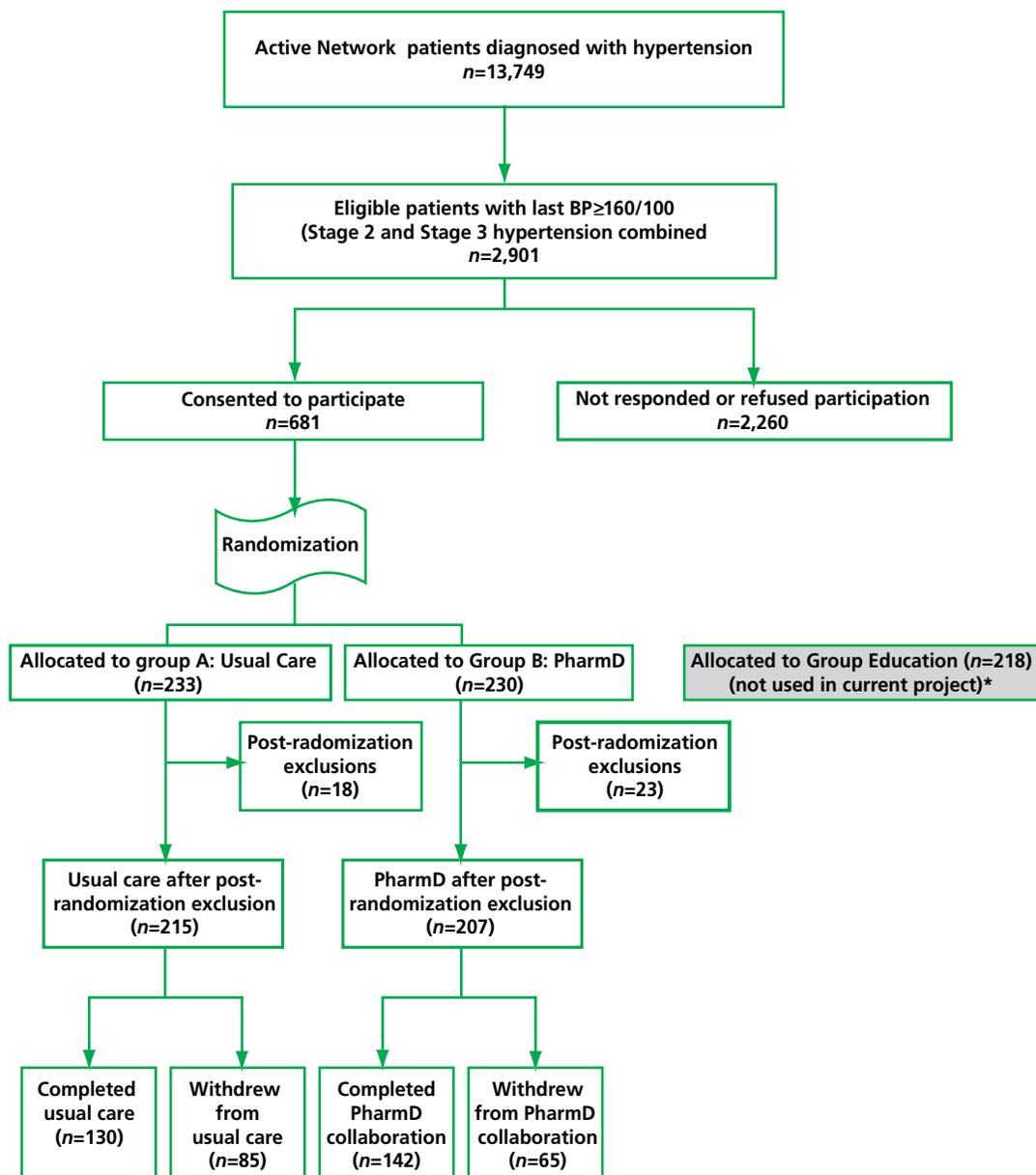
Appendix 8

PROVIDENCE MEDICAL GROUP – FLOWCHART OF INTERVENTIONS STAGE 1



Appendix 8 (con't)

PROVIDENCE MEDICAL GROUP – FLOWCHART OF INTERVENTIONS STAGE 2 AND 3 (COMBINED)



* Insufficient data to include group class arm.

Appendix 10

PROVIDENCE MEDICAL GROUP – MANAGING HYPERTENSION TIMELINE OF KEY EVENTS

Project Related Activities	2001				2002				2003				2004			
	Q1	Q2	Q3	Q4												
Objective #1a: Categorize the hypertension population into stages based on degree of uncontrolled blood pressure																
Review literature to define HTN stages	█															
EMR query to determine number of patients in each stage	█															
Objective #1b: Customize interventions to improve blood pressure based on these stages.																
Review literature to identify effective interventions	█	█														
Develop and pilot educational mailer		█	█	█												
Develop and pilot group class		█	█	█												
Develop and pilot collaborative PharmD visits		█	█	█												
Objective #1c: Design the project with sufficient rigor to ascertain the cost and effectiveness of continuing the interventions.																
Developing the protocols and measurement tools			█	█												
Acquire local Institutional Review Board approval				█												
Develop implementation strategy and communication plan				█												
Design a tracking database				█												
Recruit and consent patients					█	█	█	█	█	█	█	█	█	█	█	█
Implement interventions					█	█	█	█	█	█	█	█	█	█	█	█
Collect study measures					█	█	█	█	█	█	█	█	█	█	█	█
Analyze and present program results													█	█	█	█
Objective #2a: Improve accuracy and validity of measurement and documentation of blood pressure.																
Identify consultant to develop train-the-trainer program		█	█													
Train clinic nurses to train medical assistant staff				█												
Clinical level training of all medical assistants					█	█										
Annual certification of all medical assistants								█					█			
Objective #2b: To educate physicians on optimal management of hypertension.																
Develop educational program			█						█							
Acquire CME approval				█						█						
Advertise program				█							█					
Deliver educational program					█	█	█	█	█	█	█	█	█	█	█	█
Objective #2c: Develop web-based, automated disease management program to continuous identify and display high-risk hypertension patients.																
Evaluate currently available disease management software																█
Develop clinical specifications	█	█	█	█												
Design web-based views		█	█	█												
Facilitate expert panel #1 to review design			█													
Redesign specifications and views based on panel				█												
Design synergistic point-of-care EMR forms					█											
Facilitate expert panel #2 to review design						█										
Develop software						█	█									
Develop EMR forms						█	█									
Pilot test with providers and staff							█	█	█	█	█	█	█	█	█	█
Develop workflows									█							
Develop training and implementation plan										█						
Implement											█	█	█	█	█	█
Acquire large scale feedback on tool and workflow													█	█	█	█
Continuous process and software improvement													█	█	█	█
Annual certification of all medical assistants									█				█			
Objective #2b: To educate physicians on optimal management of hypertension.																
Develop educational program			█							█						
Acquire CME approval				█							█					
Advertise program				█								█				
Deliver educational program					█	█	█	█	█	█	█	█	█	█	█	█
Objective #2c: Develop web-based, automated disease management program to continuous identify and display high-risk hypertension patients.																
Evaluate currently available disease management software																█
Develop clinical specifications	█	█	█	█												
Design web-based views		█	█	█												
Facilitate expert panel #1 to review design			█													
Redesign specifications and views based on panel				█												
Design synergistic point-of-care EMR forms					█											
Facilitate expert panel #2 to review design						█										
Develop software						█	█									
Develop EMR forms						█	█									
Pilot test with providers and staff							█	█	█	█	█	█	█	█	█	█
Develop workflows										█						
Develop training and implementation plan											█					
Implement												█	█	█	█	█
Acquire large scale feedback on tool and workflow													█	█	█	█
Continuous process and software improvement													█	█	█	█

Appendix 11

PROVIDENCE MEDICAL GROUP – PHYSICIAN CME PROGRAM FOR HYPERTENSION MANAGEMENT
(FIRST 6 SLIDES PROVIDED AS SAMPLE, 30-SLIDE PRESENTATION)

Recent Hypertension Trials

2002

ACE inhibitors vs. beta-blockers and diuretic

In the Very Old: STOP-HTN-2 (1999)

STOP-hypertension (1991) showed value of treating elderly hypertensives with beta-blockers or diuretics

- STOP-HTN-2 compared traditional drugs of STOP with ACE (enalapril or Lisinopril) or calcium channel blocker felodipine or isradipine)

ACE inhibitors vs. beta-blockers and diuretic

In the very old: STOP -HTN-2 (1999)

• STOP showed value of treating elderly hypertensives with beta-blocker or diuretic

• STOP-2 compared STOP drugs with ACE (enalapril or lisinopril) or Ca⁺⁺ blocker (felodipine or isradipine)

STOP-HTN-2

- Age 70-84 years
- SBP \geq 180 or DBP \geq 105
 - Mean starting BP = 198/98
 - At 54 months mean BP = 159/81
 - Continuous decline throughout study

STOP-HTN-2

- No difference in treatment regimens on overall CV mortality
- ACE protective against myocardial and cerebrovascular events
- ACE > Ca⁺⁺ blockers in prevention of MI and CHF
- ACE did not decrease incidence of DM

ACE inhibitors vs. beta-blockers and diuretic

- Age 25-66 years: CAPP (1999)
- Captopril 50 mg. QD or 25 mg. BID
- Patients previously treated with conventional therapy washed out and entered into trial

Appendix 12

PROVIDENCE MEDICAL GROUP 2006 INCENTIVE PROGRAM

PILLAR OF EXCELLENCE	GOAL	PERFORMANCE-PAYMENT SCHEDULE		CLINIC ACHIEVEMENT	PAYOUT DATE
<p>QUALITY</p> <p>Blood Pressure</p> <p>Weighted Value: 25% (\$750)</p>	<p>Goal:</p> <p>To improve blood pressure control in patients at high risk for a coronary event.</p> <p>Based on:</p> <p>Clinic BP goal attainment (<140/90 mmHg for CHD and high risk patients; 130/80 mmHg for diabetes).</p>	Performance	Payment	TBD	Q1 2007
		71%	\$750		
		66%	\$600		
		61%	\$450		
		56%	\$300		
51%	\$150				

Appendix 13

PROVIDENCE MEDICAL GROUP IRB-APPROVED INVITATION LETTER SENT TO PATIENTS

[DATE]

DEAR [PMG MEMBER],

Your doctor and the staff at Providence Medical Group are committed to providing you the highest quality health care. Your doctor's records indicate that you are currently being treated for hypertension (high blood pressure), and that your last blood pressure reading taken in the office was higher than your target. Your doctor believes that reaching and maintaining a goal blood pressure lower than 140/90 is a team approach that includes YOU. It is important to keep your blood pressure under control to stay healthy and avoid the complications of high blood pressure. Please take a few minutes to read through the enclosed booklet that highlights the essential things that you should know about hypertension.

To help you gain better control of your blood pressure, Providence Medical Group would like to invite you to be a part of a new hypertension program. This program is designed to test the effectiveness of an educational class for patients with high blood pressure. This class will train participants in all aspects of managing high blood pressure. You would learn more about weight management, exercise, and other non-medication ways to control your blood pressure. You can also learn more about medications and home blood pressure monitoring. Willing participants will be enrolled into one of three groups:

- Group (1) Routine care from your Primary Care Physician
- Group (2) Educational class followed by routine care from your Primary Care Physician
- Group (3) Educational class followed by care from a Doctor of Pharmacy in addition to routine care from your Primary Care Physician.

Access to your doctor will be the same in all three groups. Information collected from this program will be included in your office chart and will be kept secret. This information will be used to find which of these methods might better control high blood pressure for people in the future. There will be no additional charge for your involvement, beyond the normal co-pay for an office visit. Regardless of your decision to take part in this program, you will continue to receive usual care from your doctor.

If you choose to participate in the hypertension program you will receive state-of-the-art information on hypertension. Additionally, your name will be put in a drawing for numerous prizes, such as free home blood pressure monitoring systems. To enroll in the hypertension program please fill out the enclosed, self-addressed stamped invitation as soon as possible. Contact Dr. Jacquelyn Hunt, Pharm.D., if you have any questions about this program (215-6640).

Wishing you good health,

[Patients PCP]



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