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# Evaluating the Effectiveness of the Blood Pressure Plus Program at Thomas Jefferson University

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## **Introduction:**

### **Problem and Program**

Uncontrolled hypertension, despite a relative lack of symptoms, represents a widespread chronic condition responsible, in part, for a number of other serious diseases. Hypertension is classically diagnosed in an individual with a systolic blood pressure of greater than 140 mmHg or a diastolic blood pressure of greater than 90 mmHg.

A 2002 study estimated that uncontrolled blood pressure contributed to nearly 40,000 cardiovascular disease events, 8,300 CV-related deaths and accrued nearly \$1 billion in annual direct medical costs<sup>1</sup>. The prevalence of hypertension among adults, over a three-year period (2005-2008), was found to be roughly 31% and most commonly seen among the elderly and non-Hispanic blacks<sup>2</sup>.

Further, according to data published by the Million Hearts initiative—a national program launched by the US Department of Health and Human Services—only 46% of people with hypertension have adequately controlled blood pressure<sup>3</sup>. The Million Hearts campaign aims to prevent one million heart attacks and strokes over a period of five years (2012-2017) in part by aiming to reduce the number of patients with uncontrolled blood pressure. Other strategies of the campaign include other CVD risk factors, including better cholesterol control and smoking cessation. Of U.S. adults (>20 years old), 49.7% had at least one risk factor (uncontrolled BP, high cholesterol or current smoker), 21% had two of the three, and 2.4% had all three.

Somewhat optimistically, rates of blood pressure control increased from 33.2% in 1999 to the 46% mentioned previously. Clearly, however, there is great interest in well-designed, targeted strategies to address those with a greater risk for hypertension. The Healthy People 2020 target is to have 61.2% of hypertensive adults under control by year 2020.

The Blood Pressure Plus Program (BP+) at Thomas Jefferson University's (TJU) Center for Urban Health (CUH) was designed to address undiagnosed hypertension and improve control in those with hypertension.

Section 9007 of 2009's Patient Protection and Affordable Care Act mandates that tax exempt hospital's must provide a community health needs assessment (CHNA), and

subsequently implement a strategy to help meet the needs identified. TJUH's "Community Benefit Plan" was expanded to meet this requirement and provide free to low-cost medical care, care for low-income Medicaid beneficiaries, and, more broadly, to improve community health and access to care.

The three stated goals of TJU's CUH include "1) facilitating collaborations around research, community projects, program planning/implementation, and evaluation; 2) strengthening the capacity of Philadelphia neighborhoods to address community identified needs; and 3) initiating and monitoring sustainable collaborative interventions."<sup>4</sup> Indeed, the need to heavily involve communities is the heart of the CUH and the catalyst for programs like BP+.

Hypertension was chosen not only for the national health priorities presented above, but also because of a low-cost non-invasive screening measure. It was felt that blood pressure screenings would provide an excellent gateway from screening to education about hypertension and other chronic health conditions, as well as facilitating conversations about diet, exercise, smoking, and access issues.

A significant effort was made to reach out to community leaders (church leaders, community organizers, shop owners, etc.) to promote health advocacy within their community.

In addition to screening, BP+ aimed to help the population with smoking cessation, referrals to PCP's, health education, and medication. These services included physician Q+A's, biannual review of medication, and a variety of classes stressing the importance of health and chronic care.

This paper will attempt to quantify and analyze the data collected during Blood Pressure Plus screening events. This will represent a snapshot of the current progress made by the program. Suggestions based upon the data will be provided to improve its reach and efficiency.

## **Methods:**

### **Demographics of Point Breeze and Grays Ferry**

The TJU Community Benefit Plan analyzed the demographics, morbidity and mortality, health behaviors and access to care in ten underserved areas within Jefferson's proximity. Blood Pressure Plus arose out of this analysis with the goal of identifying undiagnosed cases of hypertension, raising awareness of the dangers of uncontrolled hypertension and attempting to

reduce barriers to care. The gateway to this initiative was, as mentioned, an initial blood pressure screening and subsequent follow-ups. This program aligns itself with the ideas presented in the Expanded Chronic Care Model (ECCM), initially proposed by Barr et. al, that espouses community oriented services, with a shift away from primary care and hospital-based care<sup>4,5</sup>.

Point Breeze and Grays Ferry were chosen based on a needs-based analysis. A brief subset of the neighborhood demographics are presented here.

	<b>Philadelphia</b>	<b>Grays Ferry + Point Breeze</b>
Dr. Told You Had High BP?	35.9%	53.3%
Have Insurance?	83.9%	76.5%
Current Smoker?	25.2%	30.8%
Exercise 3+ Days Per Week?	58.2%	54.2%

**Table I: Grays Ferry and Point Breeze vs. Philadelphia**

\*Statistics based on PHMC Household Health Survey 2010 Adult Respondents

If one averages the two communities together, as in Table I, the response survey suggests that there is significantly higher prevalence of hypertension within Grays Ferry and Point Breeze than Philadelphia as a whole. They also have a lower rate of insured adults, a higher rate of smoking and tend to exercise less. Indeed, these neighborhoods could benefit from a targeted screening program with diet, exercise and smoking cessation assistance.

In Table II, below, the Healthy People 2020 goals are added.

	<b>Grays Ferry</b>	<b>Point Breeze</b>	<b>HP2020</b>
Hypertension	45.3%	27.3%	26.9%
Elevated Cholesterol	24.9%	33.6%	13.5%

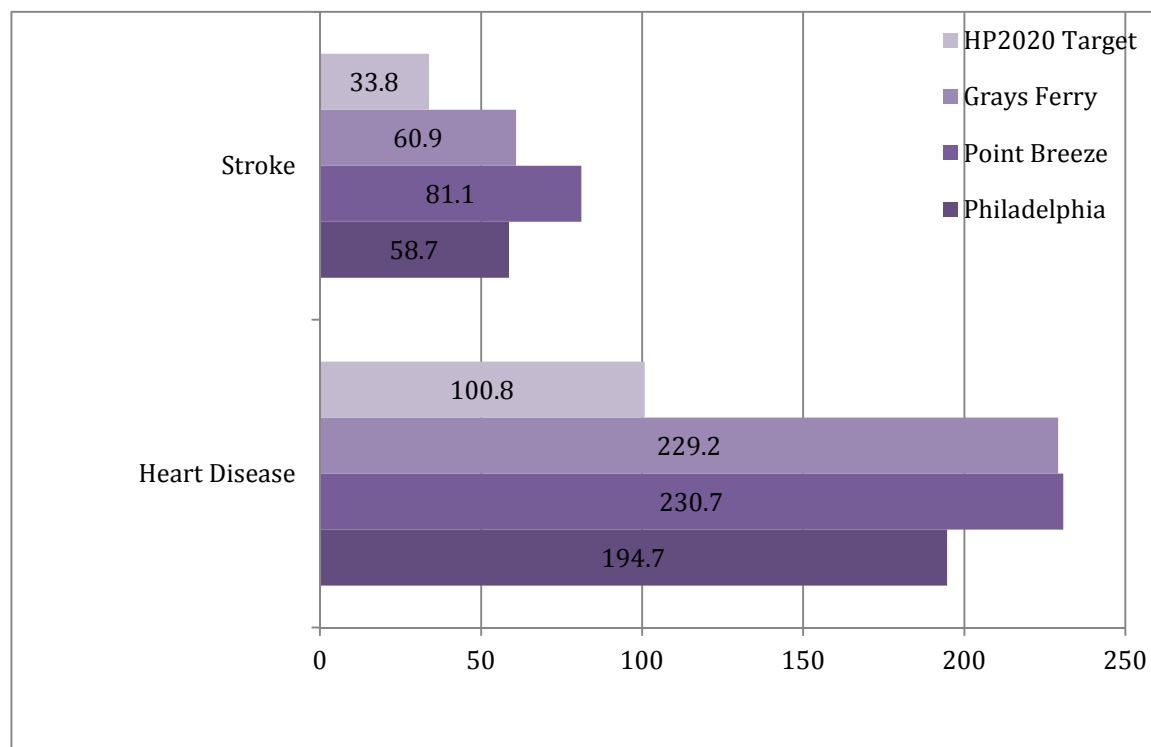
**Table II: Grays Ferry and Point Breeze vs. HP2020 Targets**

\*Statistics based on 2008 PHMC Household Health Survey Adult Respondents

In this case, when compared to long-term goals, the rates of hypertension are elevated, particularly in the case of Grays Ferry. When elevated cholesterol is added, the prevalence is much higher than the HP2020 goals. This indicated a particularly fertile community for TJUH's Public Health Benefit program to work with.

With regard to socioeconomic status, according to the 2008 PHMC Household Survey, Point Breeze and Grays Ferry have 47.5% and 55.3% of their inhabitants living <200% below the Federal Poverty Line. This is in comparison with the greater Philadelphia area rate of 41.2%.

As a final illustration, Figure I, below, represents the cause of death, age-adjusted per 100k. Point Breeze and Grays Ferry have a much higher rate of death due to CHF than Philadelphia as a whole, and the HP2020 goals. The Point Breeze numbers in particular would suggest that self-reporting of heart disease is low when compared to mortality figures.



**Figure I:** Cause of Death (Age Adjusted Rate, per 100k)

There were nine screening sites, including churches, senior centers, a YMCA, a farmer's market and a barbershop. The last of which was added later, owing to increasing evidence that training community members, barbers in particular, as health advocates is an effective practice<sup>6,7</sup>.

Results were obtained via a Personal Health form filled out by participants and collected on-site, prior to screening. The form included typical demographic inquiries, smoking status, previous HTN diagnoses, and if they were currently taking HTN medication..

## Results

### Population, New Cases, Demographics

<b>Site</b>	<b>Age</b>	<b>Average Systolic Blood Pressure at 1<sup>st</sup> Screening</b>	<b>Have PCP? (Of those who answered)</b>
Dixon House (n=49)	33.88	114.17	53%
Freddie Barbershop (n=16)	51.14	120.80	100%

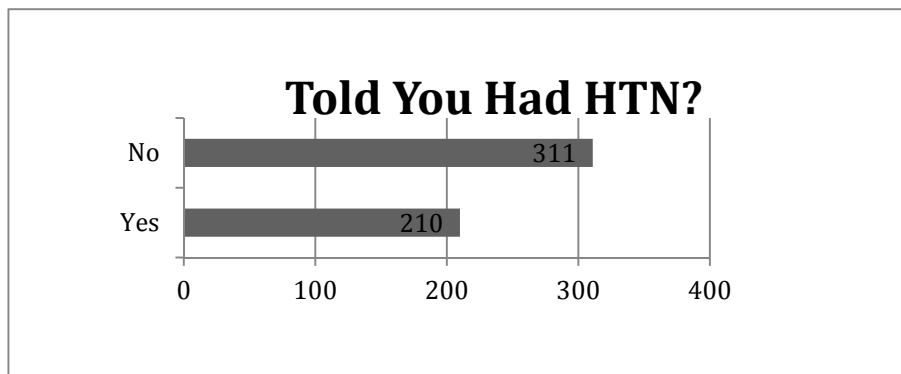
As of August 2012, the BP+ program had screened 522 individuals with an average age of 53.3. Nearly 60% of those screened were female (n=312). Roughly 83% were non-Hispanic black, who typically carry the highest risk for hypertension..

**Table III:** Population Age and BP by Site

Nearly 80% of the population had a PCP and claimed to have insurance. Table III, above, summarizes age, blood pressure and PCP information gathered during the first screening at all nine sites.

Greater St. Matthew Church (n=50)	52.13	122.96	83%
Point Breeze Market (n=24)	56.69	124.87	92%
St. Charles Senior Center (n=89)	74.33	127.94	94%
St. Simon (n=96)	60.52	125.55	76.5%
Wilson Park Apts (n=92)	40.48	118.40	82%
Y Christian St (n=83)	46.02	118.00	83%
Zion AME (n=23)	62.59	125.91	96%

A brief glance at Table III would reveal, intuitively, that the screening sights with the older average age tended to have a hypertensive systolic reading. While many sites showed a population that were covered by a PCP, there were a few areas—particularly Dixon House—where BP+ had a great opportunity to link hypertensive individuals with physicians. The data in Figure II, below, show that nearly 40% of our population had been told by a physician that they had hypertension, in line with the demographics data presented earlier.



**Figure II** Number Screened Previously Diagnosed Hypertensive

Having analyzed the population in general, more specific analysis was undertaken. Women (18%) were more likely to be hypertensive than their male (12%) counterparts. Blacks tended to be slightly more likely (n=53, 12.5%) to be hypertensive than whites (n=5, 11%). Whites were more likely to follow up at least once (n=26, 41%) than blacks (n=152, 35%).

Overall, 35% followed up at least once. Women (37.5%) were more likely than men (30%) to come back. The range of follow up rates per site varied greatly, from 20% (Wilson Park Apts) to 59% (St. Charles Senior Center).

In total, roughly 12% of participants had a hypertensive reading and about 20% had prehypertensive readings (in this case, systolic BP > 130 and < 140).

We also looked how the program did identifying new, i.e. previously undiagnosed, cases of hypertension. As Figure II, above, showed, 311 of those screened did not have a previous hypertension diagnosis. Of the 311, 43, or 14%, screened with a systolic blood pressure above 140mmHg on their initial screen. Pre-hypertensive readings (sys > 130mmHg) were obtained in 28, or 9%, of individuals without a previous diagnosis.

Almost two-thirds (63.6%) of individuals with a hypertensive reading, without a previous diagnosis, did *not* have a PCP at time of screening. 38% did not have insurance. Finally, of those without a previous diagnosis but with a screening suggesting hypertension, about 30% (13) followed up at least once.

These “new” cases are summarized below, by age and gender.

Age	# of HTN Diagnoses
0-35	12
36-50	10
50-65	11
65+	8

**Table IV:** “New” HTN Diagnosis by Age

Gender	# of HTN Diagnoses
Male	19
Female	24

**Table V:** “New” HTN Diagnosis by Gender



Of these “new” cases, the average BP at first screening was 145/80.7. Interestingly, on first follow up, average BP was 136.3/77.7 and those who followed up a second time had an average BP of 132/78.18. Potential reasons for this decline are too numerous to draw many conclusions, but present an interesting result nonetheless.

## **Discussion**

When discussing whether programs like BP+ are worthwhile, it’s important to look generally at cost. According to a 2007 study we spend, in general, \$1,598 per person with hypertension per year<sup>8</sup>. According to Trogdon, et. al, 51% of all HTN-related costs are attributable to non-medication related expenses, such as ER visits, outpatient and inpatient care<sup>9</sup>. Judging by these numbers, finding a way to reduce the number of acute care visits is an attractive way to limit hypertension-related expenses. Therefore, there is tremendous value in the ability to screen 500 at-risk individuals, with a 35% follow up rate. The ability to penetrate at-risk communities through screening measures, and subsequently train community members to be health advocates and work with individuals on their diet and exercise plans are increasingly important aspects of chronic care.

The Expanded Chronic Care Model (ECCM) mentioned previously emphasizes prevention efforts, recognition of the social determinants of health and enhanced community participation<sup>10</sup>. Plumb, et. al wrote<sup>4</sup> that “physicians and the health systems in which they work need to understand the principles of community engagement and proactively join in efforts....in communities in which they serve.” These models allow the physician the ability to refer patients to community organizations for additional support and education, removing part of the burden from the health care system, while enhancing local roles for community leaders. According to a CDC task force, physicians should “include as many elements of a community as possible.”

The Plumb paper concluded that models following the ECCM need to be examined through a cost-benefit analysis, similar to what is proposed in the previous paragraph, as well as an extensive evaluation of process. What follows is a brief look at the current state of the Blood Pressure Plus program.

With regard to the data obtained, we found that women were more likely to be screened and more likely to be hypertensive. There were nearly one hundred more women screened than men, which is in line with the rate of response for the Public Health surveys conducted, which

helped develop this initiative. Attracting more men and enticing them to be more involved in their health should be a goal moving forward.

We also found that while blacks were more likely to be hypertensive, they were less likely to follow up. It's not clear why this is the case, or whether this should be viewed as a bad result, as we'll discuss later.

Because of the wide spread of follow up rates by site, our method of informing residents/members of specific sites of subsequent visits should be monitored for non-uniformity.

One of the more interesting outcomes is related to the discovery of hypertensive individuals who did not have a previous diagnosis. While the caveat of a small sample size applies, we found that as these individuals followed up, their average systolic and diastolic (-13s/-2d) blood pressures tended to decline significantly. This could be due to the diet and exercise component, or other aspects of the program or, of course, it could be statistical noise. Therein lies the main problem plaguing evaluation of BP+: the difficulty of obtaining post-screening data from individuals.

The follow up rate for this ongoing program currently stands at 35%, however one year ago the follow up rate stood at 40%. It's difficult to qualify this outcome, because we do not have sufficient data to determine what the 65% who do not follow up have done since their first screening. One can imagine a participant who is screened at a site, has a hypertensive reading, is referred to a PCP and begins a drug regiment for hypertension. This individual may feel less inclined to visit at screening again, because they've already begun the process of controlling their condition. This can be viewed as a positive outcome of BP+. It's also, however, not difficult to imagine the flipside, someone who attends a screening, requires additional resources and is completely lost to follow up.

In order to accurately assess the reach of BP+, we need to develop a post-screening feedback system. Most methods involving phone tracking prove relatively ineffective. We should look to include e-mail addresses and other, easier forms of communication into our post-screening efforts. Additional considerations should include incentivizing feedback through the use of small gifts.

In summary, Thomas Jefferson University Hospital's Blood Pressure Plus program enhances the role of the community in chronic disease prevention and management. There is much evidence that controlling disease and cost is greatly improved through the involvement of

community leaders and resources. By offering free blood pressure screenings, the BP+ program was able to document the current status of many underserved individuals in the city of Philadelphia, provide the necessary education and referrals. Perhaps more importantly, the program allowed us to foster relationships with individuals who could further the efforts of chronic care management within their communities. More and more we're seeing that the challenge of care does not begin and end with the hospital/health care system but rather locally, with those who have the respect of their peers and the power to produce change.

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