

Cardiovascular Disease Prevention and Control: Self-Measured Blood Pressure Monitoring Interventions for Improved Blood Pressure Control - When Combined with Additional Support

Summary Evidence Table - Economic Review

Study	Study and Population Characteristics	Intervention & Comparison	Effectiveness	Program Costs	Healthcare Costs and Productivity Losses Averted	Economic Summary Measure
<p>Author (Year): Bondmass et al. (2000)</p> <p>Design: Pre Post</p> <p>Economic Method: Partial program cost only.</p> <p>Monetary Conversions: Reporting year 1995 and base 2014 in US\$.</p>	<p>Location: Chicago, IL</p> <p>Setting: Medical Center of University of Illinois, Chicago.</p> <p>Eligibility: African American older than 18 with uncontrolled BP past 1 year despite medication. Excluded MI, stroke, heart failure past 6 months or without phone line.</p> <p>Sample Size: Cohort of 33</p> <p>Characteristics: Mean Age 55 Female 70% 100% uncontrolled BP DM 21% Smoker 30% Obese and sedentary 76% Low income Some college 61% Unemployed 21%</p>	<p>Equipment included home monitor, a data-receiving computer, and a network server connection. Except server, all equipment from AvidCare (Milwaukee, WI). Device measures BP, heart rate, and weight and transmits through phone lines. Server with patient record storage and alarm system located in medical center's telemetry center. Alarms if BP over dangerous level. Staff at center 24/7 and trained in BP monitoring. Technicians installed and trained patient/family on use of equipment. Alarms trigger call to patients for serious deviations and triaged among</p>	<p>SBP/DBP Baseline 154.1/89.9 30 days 144.8/85.3 60 days 142.4/83.9 90 days 141.4/83.2</p> <p>90-day Change Reduced SBP/DBP by 12.7/6.7 mmHg</p> <p>% with controlled SBP/DBP Baseline 0% 30 days 60/70 60 days 53.3/63 90 days 50/67</p> <p>Total of 1099 alarms with highest for high SBP, DBP, followed by high heart rate, and low SBP, DBP, and low heart rate. There were 42 medication changes, 81 patient education sessions, 38 uses of emergency triage with 1 requiring EMS.</p>	<p>Home installation and training by technician 30 minutes</p> <p>Cost based on previous studies (dated 1997) done with same system. Cost per patient per day \$3.50. Authors state this may be an over estimate since the previous study's more expensive device collected more complex patient data and took more nurse time per patient.</p> <p>Cost drivers were cost of monitor device, and cost of telemetry center coordinating nurse.</p>	<p>Healthcare cost: No separate healthcare cost estimated. Coordinating nurse time included in program cost.</p> <p>Productivity: No assessment done</p>	<p>Summary Measure: No summary measure assessed.</p> <p>Cost per unit reduction in SBP =$(3.50 \times 90) / 12.7$ =\$24.80 per mmHg</p> <p>Cost per unit reduction in DBP =$(3.50 \times 90) / 6.7$ =\$47 per mmHg</p> <p>Limitation: Pre post and small number of patients.</p>

CVD: Self-measured Blood Pressure Interventions When Used With Additional Support – Economic Evidence Table

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	<p>SBP/DBP 154.1/89.9</p> <p>Time Horizon: Intervention length was 90 days (3 months). Intervention dates not provided.</p>	<p>technician, nurse, and call to EMS. Nurse coordinated most telecare following JNC-6.</p>	<p>Mean (Median) weight reduced from 245.6 (247.5) to 224.0 (225.0). Disease knowledge improved. No change in QoL.</p>			
<p>Author (Year): Fishman et al. (2013)</p> <p>Linked to Green (2008)</p> <p>Design: Based on RCT</p> <p>Economic Method: Program cost and cost-effectiveness.</p> <p>Monetary Conversions: Reporting year 2009 and base 2014 in US\$.</p>	<p>Location: Western Washington, USA.</p> <p>Setting: 10 primary care medical centers of Group Health Cooperative.</p> <p>Eligibility: Age 25 to 75 with hypertension and taking medicines. Exclude DM, CVD, and serious conditions. DBP between 90 and 109 mmHg and SBP between 140 and 199 mmHg.</p> <p>Sample Size: BPM 259 BPM+ 261 Usual 258</p> <p>Characteristics: Mean age 25 to 54 were 27 to 31%, age 55 to 64 were 41 to 44%, age 65 to 75 were 25 to 29%;</p>	<p>Electronic Communications and Home Blood Pressure Monitoring to Improve Blood Pressure Control (e-BP).</p> <p>3-arm trial. All members of group health have EMR integrated into patient website.</p> <p>Home BP Monitoring (BPM) Usual care plus home BP device, training on use of device and usual website tools to work with physician to control BP measured by device.</p> <p>Home BP Monitoring Plus Pharmacist Care (BPM+) All features of BPM and care</p>	<p>Main outcomes were change in SBP/DBP and percentage patients achieving SBP/DBP <140/90 mmHg at 12 months.</p> <p>Percent with BP control BPM+ 56% BPM 36% Usual 31%</p> <p>Reductions in BP <u>BPM+ vs BPM</u> SBP 6.0 mmHg less DBP 2.6 mmHg less <u>BPM+ vs Usual</u> SBP 8.9 mmHg less DBP 3.6 mmHg less <u>BPM vs Usual</u> SBP 2.6 mmHg less DBP No difference</p> <p># Secure Messages BPM+ 22.3 BPM 3.3 Usual 2.4</p>	<p>All materials and labor valued except for the EMR system. Source is project reports.</p> <p>Usual Care – Identifying eligible, informational literature, informing regarding BP.</p> <p>BPM – Usual plus sessions (1 hour) to train on device and web tools, cost of BP device. BP records entered on website. Website handled BP reports to physician by interface.</p> <p>BPM+ - Cost of BPM plus time of pharmacist in training and patient and physician contact. 3 pharmacists equally shared the panel (87</p>	<p>Healthcare cost from study records: Statement that there was no significant difference in inpatient, outpatient, ER. Except higher specialist visits for pharmacist arm.</p> <p>Productivity gains: No assessment performed.</p>	<p>Summary Measure: Life years gained modeled based on literature BP control produces 3.4 to 6.2 years for men and 1.6 to 4.5 years for women.</p> <p>Discounted Life Years Gained (Men/Women) Usual 0.31 (0.25) BPM 0.35 (0.29) BPM+ 0.53 (0.44)</p> <p>Cost per Life Year Gained <u>BPM vs Usual</u> was dominated – not significantly effective <u>BPM+ vs BPM</u> Men \$1850 Women \$2220</p> <p>Cost per Systolic mmHG <u>BPM vs Usual</u> \$23.76</p>

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	<p>Females 45 to 56%; Caucasian 79 to 86%; Less than High School 3 to 5%; SBP 151.3 to 152.2; DBP 88.9 to 89.4.</p> <p>Time Horizon: Intervention length is 12 months. Trial period June 2005 to December 2007.</p>	<p>supervision by clinical pharmacist trained in BP. Stepped medication following JNC-7. Patient-centered behavioral counseling for medication adherence and lifestyle. Pharmacist detailed initial patient plan and follow-up including drug changes and stepped protocol. Plan sent to patient and physician for input. Clinical decisions made by physician. Communications among three occurred over the web. Patient reported readings and progress toward goals.</p> <p>Omron Hem-705-CP BP device.</p> <p>Comparison: Usual Care patients provided wallet card with BP numbers, pamphlet on BP control, medication adherence and</p>	<p># Phone Encounters BPM+ 7.5 BPM 3.8 Usual 4.0</p> <p>No significant difference in inpatient, outpatient, ER. Modest but significantly less specialist visits for HBP+ relative to others.</p> <p>Increased life years gained modeled based on BP control.</p>	<p>each). Pharmacist time based on logs was 4 hours per week in patient care and 2 hours per month in consultation with senior pharmacist.</p> <p>Cost per Patient for Usual, BPM, BPM+ Screening and produce self-management materials \$3.40, \$5.62, \$4.76 Patient training \$6.17, \$25.00, \$25.00 Protocol and training for pharmacists \$0, \$0, \$15.33 Pharmacist services \$0, \$0, \$310.63 Home BP monitor \$0, \$35.00, \$35.00 Overhead/fixed costs \$0.99, \$1.74, \$9.65 Total \$10.56, \$67.36, \$400.36</p>		<p><u>BPM+ vs BPM</u> \$65.29</p> <p>Cost per Diastolic mmHG <u>BPM vs Usual</u> was dominated – not significant <u>BPM+ vs BPM</u> \$114.82</p> <p>Cost per 1 pct pt increase in BP Control <u>BPM vs Usual</u> was dominated – not significant <u>BPM+ vs BPM</u> \$16.65</p> <p>Author Conclusion: BPM+ appears cost-effective relative to BPM alone based on cost per life year gained.</p> <p>Comment: Cost does not include effect on healthcare because RCT found no difference. Numerator is intervention cost alone. Group health is an integrated system other patients may need</p>

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		lifestyle info to control BP, website with EMR/Lab access, appointments/refills, secure messaging with physician. Those with uncontrolled BP encouraged to talk to physician.				to bundle providers from different systems. Trial involved mostly white patients with web access. No patient costs considered.
<p>Author (Year): Friedman et al. (1996)</p> <p>Design: RCT</p> <p>Economic Method: Average Cost Proximal Cost-effectiveness</p> <p>Monetary Conversions: Reporting year 1990 and base 2014 in US\$.</p>	<p>Location: Boston, Massachusetts</p> <p>Setting: Recruitment from 29 community sites such as senior centers.</p> <p>Sample Size: 299 eligible and randomized. 267 (89%) completed study and used in analysis. TLC-133; Usual-134.</p> <p>Characteristics: Patients >60 years old under care of physician for HBP and taking BP medications. Must have SBP=>160 and DBP=>90.</p>	<p>Telephone-Linked Computer (TLC) System</p> <p>TLC communicates with patient that calls in with self-measured BP on weekly basis. Computer-aided feedback on adherence to treatment. Touch-tone key-pad used by patient to respond to questions. Patient also provided drugs and dosage information. TLC also provides Educational and motivational counseling. Average session length is 4 minutes. TLC sends physician summary</p>	<p>At home visit, BP measured, Quality of Life (QoL) by SF36, demography by questionnaire, adherence by pill count.</p> <p>At 6 months, adherence improved only for those not adherent at baseline (taking <80% of meds), +36 pct pt for TLC and +26 pct pt for Control.</p> <p>SBP No difference in SBP for all participants. Significant for non-adherent at baseline, TLC: -12.8 mmHg and Usual: -0.9 mmHg</p> <p>DBP</p>	<p>Program cost considered computer and telecommunications costs, facilities charges, supplies, and support personnel for start-up and maintenance of the system. Patient training included.</p> <p>Cost per patient user \$32.50 for 6 months.</p>	<p>Healthcare cost: Not considered or reported.</p> <p>Productivity: Not considered or reported.</p>	<p>Summary Measure:</p> <p><u>Cost-effectiveness for DBP</u> All TLC patients: \$7.39 per mmHg For baseline non-adherent patients: \$3.69 per mmHg for 80% adherence cutoff to \$0.87 per mmHg for 50% adherence cutoff at baseline</p> <p><u>Cost-effectiveness for SBP</u> For baseline non-adherent patients: \$2.73 per mmHg for 80% adherence cutoff at baseline</p> <p>Limitations: Components of program cost</p>

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	<p>Those who agreed to participate visited at home by technician who did baseline measurements and determined final eligibility.</p> <p>Mean age:76 Female:77% Black:11% Heart disease 29-34% Stroke 6-7% Diabetes 16-20%</p> <p>Time Horizon: Intervention length is 6 months. Home visit at baseline and after 6 months to collect data and measure BP.</p>	<p>report with clinically significant data.</p> <p>Those randomized to TLC trained to use automatic BP monitor (Omron) and the telephone system.</p> <p>Comparison: Usual care</p>	<p>Significant for all participants, TLC: -5.2 mmHg and Usual: -0.8 mmHg. Significant for non-adherent at baseline, TLC: -6.0 mmHg and Usual: +2.8 mmHg.</p>			<p>provided but not the cost breakdown. Older patients >60 make it less generalizable to hypertensives.</p> <p>Comments: Authors discuss that the effect is likely due to the telemedicine system that affected patient medication adherence. In the case of SMBP, they state its unlikely contribution because studies at the time had not shown positive effects on BP control.</p>
<p>Author (Year): Kaambwa et al. (2014)</p> <p>Linked to McManus (2009, 2010)</p> <p>Design: Based on RCT</p> <p>Economic Method: Modeled cost-effectiveness.</p>	<p>Location: West Midlands, UK.</p> <p>Setting: 24 general practices.</p> <p>Eligibility: Recruited by PCP's from 24 general practices based on clinical records. Age 35-85 with SB/DBP over 140/90 mmHg, currently treated</p>	<p>Telemonitoring and self-management in hypertension (TASMINH2) Trial</p> <p>Intervention: Self-monitoring with self-titration of antihypertensives and telemonitoring of blood pressure measurements (HBPM).</p>	<p>In the trial, compared to usual care: HBPM reduced SBP/DBP by 5.4/2.7 mmHg at 12 months. Most HBPM patients made at least one change to their treatment HBPM patients used more medication</p>	<p>Assumed intervention cost observed in 12 month trial maintained over model's 35 years.</p> <p>Equipment and training cost was 230 pounds. This was annuitized at 3.5% based on 5 year life.</p>	<p>Healthcare cost: Resource use in model based on those observed in trial and long term outcomes based on disease progression and resource use estimated in national data.</p> <p>Includes inpatient, outpatient, primary care consultations,</p>	<p>Summary Measure: UK NHS perspective. In the base analysis, Men (/Women) Incremental cost 383 pounds (576 pounds) Incremental QALY 0.24 (0.12) Cost per QALY 1624 pounds (4923 pounds)</p>

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<p>Monetary Conversions: Reporting year 2009 and base 2014 in UK Pounds.</p>	<p>with two or fewer drugs, and be willing to self-measure and self-titrate.</p> <p>Sample Size: Cohort model</p> <p>Time Horizon: Recruit March 07 to May 08. Intervention length is 12 months. 35 year model.</p>	<p>Training provided 1.0-1.75 hours. Device was automated Omron 705IT plus equipment to transmit readings. Drug choices left to physician. Patient made changes in dose based on home BP target of 130/85</p> <p>Comparison: Usual care consisting of annual hypertension review per UK national guidelines.</p>	<p>Assumed BP reduction observed in trial maintained over the 35 years of modeling, using the reduction in SBP which was 6.4 for men and 4.4 for women.</p> <p>Cohort Markov model distinguishing men and women extrapolating from trial data used to determine long-term health, cost and cost-effectiveness outcomes.</p> <p>Initial state was 'well' representing stable but poorly controlled BP. Transition acute states were well state, stroke, MI, angina, and heart failure. Survival from acute phase naturally moves to chronic state where quality of life is lower than at initial well state. No secondary events and 1 year cycle assumed. Probabilities based</p>		<p>drugs, equipment and training, 5-year replacement/retraining.</p> <p>In the 30-year analysis, intervention group had higher cost than control: Incremental 30-year cost Men 372 pounds Women 558 pounds</p> <p>Productivity gains: No assessment performed.</p>	<p>HBPM was cost-effective with 99% probability based on threshold of 20,000 pounds per QALY.</p> <p>Cost per QALY for men and women were less than 20,000 when varying the time horizon 30 to 5 years.</p> <p>Cost per QALY for men remained below threshold of 20,000 pounds as effectiveness was reduced by 20% at 2, 5, and 15 years after start of intervention.</p> <p>Cost per QALY for women fell below threshold of 20,000 pounds after 5 years, when effectiveness was reduced by 26% at 2, 3, 5, 6, and 15 years after start of intervention.</p> <p>Author Conclusion: HBPM is cost-effective relative to</p>

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			<p>on Framingham 10-year CV risk. Effect of drugs on risk of CV event obtained from meta-analytic study of trials.</p>			<p>usual care for hypertension.</p> <p>Comment: Sensitivity analysis allowed for fadeout of effectiveness which strengthens finding. Minimum appears to be 2 years for men and 5 years for women before fade-out.</p>
<p>Author (Year): Madsen et al. (2011)</p> <p>Linked to Madsen et al. (2008)</p> <p>Design: RCT</p> <p>Economic Method: Intervention and healthcare cost. Cost per unit BP reduction.</p> <p>Monetary Conversions: Reporting year 2007 and base 2014 in Danish Kroner (DKK).</p>	<p>Location: Denmark.</p> <p>Setting: Primary care practices</p> <p>Eligibility: Patients age 20-80, newly diagnosed or treated with clinic-based SBP/DBP > 150/95 or SBP>150 and DBP<90.</p> <p>Sample Size: HBPM 105; CBP 118</p> <p>Characteristics: Mean Age 55-57; Men 48-50%; BP diagnosed within 1 year of enrollment for about 50%</p> <p>Time Horizon:</p>	<p>Main objective is to compare the cost of telemonitored home BP (HBPM) to clinic based measurement of BP (CBP) for hypertension.</p> <p>HBPM patients received free devices – Omron 705 IT. Connected to pocket PC from HP and interface software from Bang and Olufsen. Readings transferred to central server via mobile phone unit. Physicians accessed patient readings via home portal where two-way communication possible between</p>	<p>Target home BP set at SBP/DBP<135/85. Target clinic SBP/DBP<140/90 Both targets set lower for diabetics.</p> <p>Reduction in ambulatory SBP/DBP at 6 months HBPM 11.9/6.2 Control 9.6/5.4 Difference lower SBP by 2.8 and higher DBP by 1.1 but not significant Telemonitored home BP was as effective as clinic based measurements in reducing ambulatory blood pressure.</p>	<p>Cost of BP device, PDA and cell phone, telemonitoring and server equipment included plus 15 minute instruction by physician on use of device and transmitting reading. Assumed 4 year life of equipment with end of study value of 300 DKK.</p> <p>6-month Equipment Cost Per Patient Server 111 DKK Mobile phone 288 DKK Device plus ancillary equipment 944 DKK Total 1343 DKK</p> <p>Part of intervention cost is cost of</p>	<p>Healthcare cost estimated from study records: Includes HTN meds, physician visits, 6-month Costs for HBPM (Control) Difference Medications 471 DKK (628 DKK) 156 DKK lower Consultations 276 DKK (751 DKK) 475 DKK lower Total 747 DKK (1379 DKK) 631 DKK lower</p> <p>Productivity: No assessment done</p>	<p>Summary Measure: Healthcare cost plus equipment, ancillary, training cost</p> <p>6-month total cost per patient HBPM 2090 DKK Control 1379 DKK Difference 711 DKK higher</p> <p>Cost per unit SBP reduction =711/2.8 =254 DKK/mmHg (not significant)</p> <p>Author Conclusion: High cost of equipment may be because it was developed for</p>

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	<p>Intervention length was 6 months. Continuous enrollment during April 04 to April 06.</p>	<p>patient and physician and by email. Phone could be used for those without internet access. Medication changes made by physician.</p> <p>Comparison: Usual Care and usual physician visits. BY measured using same as home device. Medication changes by physician.</p>		<p>training patients included in consultation cost but was only 15 minute physician time.</p>		<p>purpose of study. Total cost higher for intervention but cost of meds and consultation both lower for intervention group.</p> <p>Further, 50% of replicates in bootstrapping for cost and effectiveness were in northeast quadrant indicating HBPM was more effective but also more costly than usual care.</p>
<p>Author (Year): Parati et al. (2009)</p> <p>Design: RCT</p> <p>Economic Method: Partial intervention and healthcare cost</p> <p>Monetary Conversions: Reporting year 2006 and base 2014 in Euro for Italy.</p>	<p>Location: Milan, Italy</p> <p>Setting: 12 primary care physicians and their hypertensive patients.</p> <p>Eligibility: Age 18 to 75 with uncontrolled essential BP (140/90 or ABP 130/80).</p> <p>Sample Size: 329 eligible randomized. Interv-216 Control-113.</p> <p>Characteristics:</p>	<p>TeleBPCare – HBPM plus telephone transmissions.</p> <p>BP threshold was SBP/DBP of 130/80. Intervention and control groups required 5 meetings, at screening, randomization, f/u at 4, 12, and 24 weeks.</p> <p>Intervention was a home self-measured BP plus telecommunication. Device was Tensiophone. Device</p>	<p>In addition to BP, data collected on blood chemistry, Quality of Life (QoL), compliance with HBPM device, and change in drugs.</p> <p>Baseline for Intervention (Clinic/Day Time) SBP 148.4/139.4 DBP 88.8/83.9 Baseline for Control SBP 148.7/140.3 DBP 88.8/84.3</p> <p>End of Study for Intervention (Clinic/Day Time)</p>	<p>Rental cost HBPM device considered but may be included in the total healthcare cost. No mention of the patient cost of training and staff time. Note the HBPM is a rental service backed by a call center that monitors the patient.</p> <p>No direct estimate of program cost provided.</p>	<p>Healthcare cost: Considered additional unscheduled PCP visits, number and type of exams and drugs. Based on study records of treatment changes and orders.</p> <p>Cost of exams Intervention E5.83 Control E7.31 Overall cost of patient management Intervention E123.41 Control E125.26</p>	<p>Summary Measure: No summary measures reported</p> <p>Limitations: Cannot distinguish effect of HBPM and telemonitoring. The healthcare cost effects were not significant partly because of small sample size powered for primary outcome measurement.</p>

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	<p>Mean age:57 to 58 Male:54 to 55%</p> <p>Time Horizon: Intervention length is 6 months.</p>	<p>comes with modem connected to phone line that transmits readings and sends patient reminder beeps. High BP readings trigger nurse call from call-center. BP measurements, treatment changes, adverse events, and adherence information sent by mail, fax, or e-mail to PCPs before visits.</p> <p>Comparison: Usual care with Office BP monitoring.</p>	<p>SBP 137.5/124.6 DBP 83.6/75.3 End of Study for Control SBP 138/127.1 DBP 83.3/76.4</p> <p>Quality of Life (QoL) Intervention 37.7 to 38.4 Control 38.2 to 38.3</p> <p>Percent achieving BP Control Intervention 62% Control 50%</p>		<p>Productivity: Not considered or reported.</p>	
<p>Author (Year): Stoddart et al. (2013)</p> <p>Linked to McKinstry et al. (2013)</p> <p>Design: RCT</p> <p>Economic Method: Cost-effectiveness based on BP</p> <p>Monetary Conversions:</p>	<p>Location: Lothian, Scotland, UK</p> <p>Setting: Recruit from 20 primary clinics.</p> <p>Eligibility: Ambulatory SBP/DBP =>135/85 and <210/135. Exclude those on stroke or diabetes register, CVD event in 6 months, major surgery in 3 months, renal failure, BP not</p>	<p>(HITS) trial.</p> <p>Intervention is telemonitoring of BP (HBP). Nurses provided training in use of equipment.</p> <p>Automated BP device Stabil-O-Graph mobil, IEM, Germany. Linked via Bluetooth to cell phone. Transmit to central server. Patients and physicians log on to website and see</p>	<p>Threshold SBP/DBP for HBP < 135/85 mmHg. at 80-89 mmHg</p> <p>Main outcome is reduction in BP based on ambulatory measurement from baseline to 6 months.</p> <p>HBP Vs Usual Reduction in Adjusted BP SBP 4.3 mmHg lower</p>	<p>6-month Cost of Intervention per patient £70.77</p> <p>Composed of: Initial device use training £12.00 Per Patient one time only. All others were per patient per month, as follows: HBPM device £1.20 (53.11 each) Mobile phone £1.44 (48.48 each)</p>	<p>Tracked number of contacts (visits, email, phone) with general practitioner, nurse practitioner, and district nurse. Emergency calls to NHS24, and ER visits. Source was patient records. Practice records provided medication, doses, and days taken.</p> <p>Inpatient stays were collected but details regarding nature of</p>	<p>Summary Measure: Healthcare cost without inpatient plus program cost</p> <p>HBP 287.18 Usual 177.95 Incremental cost £109.23</p> <p>Incremental cost per unit reduction in SBP was £25.56 and for DBP was £47.49</p> <p>Author Conclusion: The</p>

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<p>Reporting year 2010 and base 2014 in UK Pounds.</p>	<p>managed in primary care.</p> <p>Sample Size: HBP 200 U 201</p> <p>Characteristics: Practices ranged in SES from deprived to affluent. Mean age 60.5 to 60.8; Females 40 to 42%; Clinic SBP/DBP (152.4 to 152.9)/(89.9 to 92.1); Median doses of HTN meds 1.5 to 1.7.</p> <p>Time Horizon: Intervention length is 6 months. Recruitment ended 03/11/2009.</p>	<p>data. Can send SMS text/emails to patients. Patients and physicians could contact each other.</p> <p>Comparison: In usual care (U), those with high BP advised to consult with Primary Care Provider and target SBP/DBP<140/90.</p>	<p>DBP 2.3 mmHg lower</p>	<p>Server hosting £0.42 Web hosting £2.59 Sim card £1.98 Nurse time £2.17</p>	<p>admission not recorded. So, matched to adverse events log and described narratively. Direct connection to telemonitoring could not be determined. So, not included in cost analysis.</p> <p>Inpatient was higher in HBP by £105.47 and by £16.56 with outliers removed.</p> <p>6-month healthcare cost per patient for HBP (Usual) [Difference] GP Consults £150.17 (£118.19) [+£31.97] NP Consults £26.43 (£17.89) [+£8.54] District Nurse £0.67 (£3.94) [-£3.26] Other consults £8.37 (£4.60) [+£3.77] Medications £24.07 (£23.59) [+£0.48] ER £6.70 (£9.74) [-£3.04]</p>	<p>HBP intervention cost the NHS more than usual care but was more effective than usual care in reducing BP. There is no criteria to determine if intervention is cost-effective based on cost per mmHg. Longer term trials or modeling will be needed to determine effects on healthcare of reduced BP.</p> <p>Comment: No restriction on participant age and broad SES categories included implies generalizability. Limitation may be that outpatient visits not captured in trial not included in cost. Also, no baseline cost captured.</p>

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					Total healthcare excluding inpatient £216.41 (£177.95) [+£38.46] Productivity: No assessment done	
<p>Author (Year): Trogdon et al. (2012)</p> <p>Design: Modeled based on Pre-Post study outcomes</p> <p>Economic Method: Modeled Cost-effectiveness</p> <p>Monetary Conversions: Reporting year 2007 and base 2014 in US\$.</p>	<p>Location: Utah, USA</p> <p>Setting: Recruit from Health Plan claims data. Care within general practice.</p> <p>Eligibility: Newly diagnosed HTN's (based on claims) among plan members contacted by phone every 6 months. Those with uncontrolled BP (SBP/DBP =>140/90) asked if they wanted self-management kit.</p> <p>Sample Size: 534 patients from 2007 round that received BP monitors. 422 had data in 6 month f/u.</p> <p>Characteristics: Members of health plan.</p>	<p>Utah Department of Health, Heart Disease and Stroke Prevention Program (HDSSP) in partnership with SelectHealth to increase BP control among plan members. Part of Intermountain Health. SelectHealth partnership with Utah Department of Health, Heart Disease and Stroke Prevention Program (HDSPP).</p> <p>Intervention is patient education to promote self-management of high BP. Patient kits included basic info about BP, motivational video, medication adherence tools, nutrition guide, pedometer with walking program</p>	<p>Primary measurement was BP Control observed in study. Note 56% did not know whether controlled at baseline. Assume these were controlled similar to national average or assumed these were uncontrolled. For those missing data at follow-up assumed they were not controlled or same as those had data.</p> <p>Observed Controlled BP: 45% at 6 months</p> <p>For counterfactual, assumed either 2.2 pct pt improvement in entire health plan (HEDIS) or no change from baseline.</p> <p>Modeled outcomes based on BP control</p>	<p>Annual cost for all including those who did not receive BP cuffs</p> <p><u>Development</u> \$14,087</p> <p><u>Recruitment</u> \$15,455</p> <p><u>BP cuffs ~\$50 each, communication, telecommunication, transcription</u> \$79,455</p> <p><u>Administration</u> \$13,406</p> <p>Total \$122,403 (\$229.22 PPPY)</p> <p>Development cost is for the patient education materials. Recruitment cost includes the patient interactive voice response system.</p>	<p><u>6 month pre to 6 month post claims based analysis for Intervention group</u></p> <p>Mean drug claims Increased 0.41 Mean GP/Specialist visits Reduced 1.10</p> <p>Healthcare cost also computed from modeled adverse outcomes based on BP control for acute AMI, stroke, congestive HF, and RF based on BP control.</p> <p>Comment: Modeling based on binary outcome for control and not effect based on mmHg reduction.</p> <p>Incremental annual healthcare cost including drugs, physician visits, and cost of</p>	<p>Summary Measure: Modeled on 3 scenarios Base</p> <p><u>Assumptions:</u> No impact on drugs, visits. Comparison improved control by 2.2 pct pt. Missing baseline control at national rate. Missing f/u control same as those observed</p> <p>Pessimistic Assumptions: Same as base except missing f/u BP assumed uncontrolled</p> <p>Optimistic Assumptions: Observed drugs and visits due to intervention Missing baseline BP were uncontrolled. Missing follow-up BP had same control as</p>

CVD: Self-measured Blood Pressure Interventions When Used With Additional Support – Economic Evidence Table

Study	Study and Population Characteristics	Intervention & Comparison	Effectiveness	Program Costs	Healthcare Costs and Productivity Losses Averted	Economic Summary Measure
	<p>Age 18 to 85 with 64% in 45-85 bracket. Female 49%.</p> <p>Time Horizon: Recruitment every 6 months since 2004. Based on 2007 round of participants. Intervention length is 6 months based on follow-up in study. Modeled for 1 year and 10 year maintenance of effect.</p>	<p>brochure. BP devices sent to subset with uncontrolled BP and willing. Interavtive Voice Response software used to recruit/communicate . Chart reviews done after kits and cuffs were sent.</p> <p>Data collected for 2007 round of enrollees.</p> <p>Comparison: Modeled group that did not receive the intervention.</p>	<p>for acute myocardial infarction (AMI), stroke, congestive heart failure (HF), renal failure (RF) based on BP control and also life years (LY).</p> <p>1-Year Effects under Pessimistic (Base) [Optimistic] <u>Number with Controlled BP</u> 101 (151) [242]</p> <p><u>LY Gained</u> 1.70 (2.77) [5.10] total for group</p>		<p>modeled adverse events under Pessimistic (Base) [Optimistic] scenarios \$3857 lower (\$6249 lower) [\$21889 lower] for full sample \$7.22 lower (\$10.70 lower) [\$40.99 lower] Per person per year</p> <p>Productivity: No assessment done</p>	<p>those observed. Without intervention BP is uncontrolled</p> <p>1-Year Incremental cost per LY Gained Pessimistic (Base) [Optimistic] \$69,701 (\$41,927) [\$19709]</p> <p>10-Year Incremental cost per LY Gained Pessimistic (Base) [Optimistic] \$5518 ((\$1857) [Negative \$3187])</p> <p>Author Conclusion: The intervention is cost-effective and comparable to other therapy and lifestyle interventions for hypertension</p> <p>Comment: The reviewers will highlight the 1-year \$/QALY estimate because the 10-year modeling assumes effectiveness is sustained and intervention ends in year 1. Some part of</p>

CVD: Self-measured Blood Pressure Interventions When Used With Additional Support – Economic Evidence Table

Study	Study and Population Characteristics	Intervention & Comparison	Effectiveness	Program Costs	Healthcare Costs and Productivity Losses Averted	Economic Summary Measure
						program cost should have been continued into year 1+.

Abbreviations

- ABP, ambulatory blood pressure
- BP, blood pressure
- CEA, cost-effectiveness analysis
- CHD, chronic heart disease
- CKD, chronic kidney disease
- CV, cardiovascular
- CVD, cardiovascular disease
- DBP, diastolic blood pressure
- DM, diabetes mellitus
- GP, general practitioner
- HBP, home-based blood pressure
- JNC, Joint National Committee
- LY, life year
- MI, myocardial infarction
- NHS, National Health Service
- PCP, primary care practice
- PPPY, per person per year
- QALY, quality adjusted life year
- QoL, quality of life
- SBP, systolic blood pressure
- SES, socioeconomic status
- UK, United Kingdom