Cardiovascular Disease Prevention and Control: Reducing Out-of-Pocket Costs for Cardiovascular Disease Preventive Services for Patients with High Blood Pressure and High Cholesterol

Summary Evidence Table (Search period 1980-July 2015)

Study Details	Population Characteristics	Intervention + Comparison Description	Major Results and Summary
Authors: Alderman & Melcher 1981 **Organization(s)/Implementer/Initiator:** Mutual Life Insurance Company - Massachusetts (MA) funded intervention and made time to participate available to their employees.; intervention implemented by Mutual Life Insurance Company – MA and Department of Public Health at Cornell University Medical College; **Funding:** Mutual Life Insurance Company - MA; **Location:** Springfield, MA; **Setting and Scale:** Patients saw their own or other community physicians; **Design:** Single group before-after; **Applicability:** White, mostly female, middle-age employees in a large company in a northeastern state; **Quality of Execution:** Fair (2 limitations);	**Target Population:** Hypertensive employees; **Inclusion:** Employees of Mutual Life Insurance Company selected if average BPf rom 2 screenings was: ≥ 160/95 mm Hg for age ≥30 ≥ 150/90 mm Hg for age <30 Or Automatically enrolled if already taking antihypertensive meds; **Exclusion:** Employees with borderline BP defined as: BP of ≥150/90 for age ≥30 OR BP of ≥140/80 for age <30 Employees were counseled and advised to return in four months; **Reported Baseline Demographics (n=277)** Age (mean): 43% >55 yrs Sex: Male: 42.0%; Female 58.0% Race/Ethnicity: White: 81.0%; NR: 19.0%; Socioeconomic Status: NR Education Level:	**ROPC Intervention Components:** All treatments were covered for free. This included physician charges, medications, labs, hospitalization, etc.; **Type of ROPC Service:** Medication; **Level of ROPC Reduction:** 100%; **Type of Health Plan:** Private insurance; **Additional Intervention Components:** All hypertension treatment is free but specific components are not reported; **Comparison:** Not applicable (NA);	**Change in SBP (mmHg): Mean (SD)** **24 months [ITT]:** Pre (n=254): 149.5 (NR) Post (n=234): 140.1 (NR) **Mean Difference= -9.4** **Change in DBP (mmHg): Mean (SD)** **24 months [ITT]:** Pre (n=254): 92.5 (NR) Post (n=234): 88.5 (NR) **Mean Difference= -4.0** **Proportion Controlled (BP<140/90 mmHg)** **24 months[ITT]:** Pre (n=254): 36.0% Post (n=234): 69.0% **Absolute pct. pts. change= 33.0** **Additional Outcomes:** Absenteeism (mean) increased from 4.7 days to 7.4 for nonparticipants vs. 4.6 days to 5.1 for participants; hypertensives experienced fewer

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Limitations: Data Analysis (1) - No details of data analysis; Interpretation of Results (1) - Confounding - awareness of BP control and treatment was raised companywide;	49.6% grade-HS education; 38.0% 1-4+ years of college; Employment status: 100% employed; # of drugs currently taken: 60.6% on at least one medication; **Reported Co-morbidities:** NR;		hospitalization days post intervention (43 days vs. 41 days). **Summary:** All hypertensive experienced a significant reduction in blood pressure. Those with the highest baseline DBP ≥95 mmHg experienced the greatest reduction in both DBP and SBP. Those who fully participated in the program had the highest initial blood pressure, the greatest decline in blood pressure, and only this group experienced a significant mean reduction on blood pressure.
Authors: Applegate et al. 2000 **Organization(s)/Implementer/Initiator:** Internal Medicine Clinic at Earl Long Medical Center; **Funding:** State of Louisiana; **Location:** Baton Rouge, Louisiana; **Setting and Scale:** Internal medicine clinic at an academic teaching hospital which provides primary medical care to approximately 1,300 patients per month; **Design:** Single group before-after; **Applicability:** Middle-age, low-income, hypertensive African American women living in Louisiana; **Quality of Execution:** Fair (2 limitations);	**Target Population:** Patients seeking care from physicians at the hospital + referrals from the emergency department; **Inclusion:** Patients referred to the clinic with a diagnosis of hypertension; **Exclusion:** Patients diagnosed with secondary hypertension; **Reported Baseline Demographics (n=51):** Age (mean): 46.7 yrs. Sex: Male: 30.0%; Female 70.0% Race/Ethnicity: White: 23.3%; Black/AA: 76.7% Socioeconomic Status: Low-income: 100% Education Level (mean):10.9 **Reported Co-morbidities:** NR;	**ROPC Intervention Components:** Free medication dispensed by registered pharmacist for all patients enrolled in the program; **Type of ROPC Service:** Medication; **Level of ROPC Reduction:** 100%; **Type of Health Plan:** Indigent care/uninsured; **Additional Intervention Components:** Patients received team-based care where the pharmacist provided informal education on med + biweekly visits to the clinic during the first 4 months + changes to pharmacological regimen made by physician as necessary;	**Change in SBP (mmHg): Mean (SD)** **6 months:** Pre (n=51): 156.8 (23.8) Post (n=51): 132 (22.0) **Mean Difference= -24.8** **Change in DBP (mmHg): Mean (SD)** **6 months [ITT]:** Pre (n=51): 96.1 (12.2) Post (n=51): 83.0 (14.0) **Mean Difference= -13.1** **Proportion Controlled (BP<140/90 mmHg) [ITT]:** Pre (n=51): 12.0% Post (n=51): 63.0% **Absolute pct. pts. change= 51.0** **Additional Outcomes:** The number of patients with stage 1 and 2 hypertension declined

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Limitations: Interpretation of Results (2) - Contamination due to sub-sample group being exposed to educational sessions; - Baseline group not comparable for gender and race;		**Comparison:** NA;	significantly; proportion of stage 3 patients decreased from 22% to 0%. Additionally, the group receiving free meds plus education had a lower SBP than the free meds only group. **Summary:** For the six month intervention targeting low-income patients with hypertension, the provision of free medications + education significantly improved blood pressure levels and resulted in a higher proportion of patients achieving control.
Authors: Atella et al. 2006 **Organization(s)/Implementer/Initiator:** Italian Govt.; **Funding:** Pfizer; **Location:** Southern province of Treviso, Italy; **Setting and Scale:** The data come from three registries (drug prescription database, hospitalization registry; death and transfer registry); **Design:** Single group before-after; **Applicability:** Low-compliant hypertensive Italian patients treated with ACE-inhibitors; **Quality of Execution:** Fair (3 limitations); **Limitations:** Sample (1) - Little description of study sample;	**Target Population**: All individuals born between 1910 and 1960 with prescription of ACE-inhibitor class at any time during the period 1993-2002; **Inclusion:** Individuals born between 1910 and 1960 and prescribed at least 1 drug in the ACE-inhibitor class at any time during the period 1997-2000; # in analysis=38,393 patients; **Exclusion:** Patients with compliance score greater than 2 (n=505); Hospitalized patients for renal disease but not for CVDs (n=1207); **Reported Baseline Demographics (n=NR):** 48% male; **Reported Co-morbidities:** NR;	**ROPC Intervention:** On January 1, 2001 a change in policy resulted in elimination of drug prescription co-payment. The provider involved was a physician; **Type of ROPC Service:** Medication; **Level of ROPC:** Copayment rates for medications were reduced from a flat charge of about 1.5 Euros to zero; **Type of Health Plan:** NR; **Additional Intervention Components:** NR; **Comparison:** NA;	Provided results by compliant group (high compliant vs. low compliant). Compliance measured by ratio between the average daily purchase and Italian average daily dosages according to the Italian drug prescription practice (ADD) High compliant indicated ≥ 0.55 score. **Hospitalization rate** Low compliant group. Baseline: 7.9% Post-intervention: 7.0% **Absolute pct. pts. change:** -0.9% High compliant group. Baseline: 6.9% Post-intervention: 6.8% **Absolute pct. pts. change**: -0.1% **Mortality rate** Low compliant group. Baseline: 3.4% Post-intervention: 3.2% **Absolute pct. pts. change**: -0.2%

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Interpretation of results (1) - Describe subgroups but do not provide demographics about the overall sample; Other (1) - Reporting of coefficient only made the interpretation of the results difficult;			High compliant group. Baseline: 2.7% Post-intervention: 2.7% **Absolute pct. pts. change**: -0% **Adherence to medications** Low compliant group. Baseline: 35.6% Post-intervention: 57% **Absolute pct. pts. change**: 21.4% High compliant group. Baseline: 92.3% Post-intervention: 90.1% **Absolute pct. pts. change**: -2.2% **Summary:** Changes in the copayment structure appear to have a strong effect on increased compliance paralleled with decreased hospitalization and mortality among low compliant group at baseline, while no such differences were found in high compliant group at baseline.
Authors: Bunting et al. 2008 **Organization(s)/Implementer/Initiator:** City of Ashville + Missions Hospitals; **Funding:** Novartis + APhA Foundation; **Location:** Ashville, NC; **Setting and Scale:** 12 community and hospital pharmacy clinics + 18 pharmacists; **Design:** Single group before-after; **Applicability:** For this study, mainly to middle-aged workers employed by the City of Ashville or Missions Hospital enrolled in an employer-based health insurance plan;	**Target Population:** City of Asheville or Missions Hospitals employees or covered spouses or dependents; **Inclusion:** Diagnosis of hypertension and /or dyslipidemia + participants who agreed to take part in a CV risk reduction program sponsored by their health plan; **Exclusion:** NR; **Reported Baseline Demographics (n=565):** Age (mean): 50.4 yrs. Sex: Female: 53.6%; Male 46.4% Race/Ethnicity: Black/AA: 13.3%; White: 83.7%; Asian: 0.9%; Hispanic: 0.9%; Other: 1.2%	**ROPC Intervention Components:** Employers compensated educators and pharmacists for education and regularly scheduled face-to-face patient consultations; waived or significantly reduced disease-related medication copayments; **Type of ROPC Service:** Medication; **Level of ROPC:** Waived or significant reduction in copayment for medication; **Type of Health Plan:** Private employer-based insurance;	**Change in SBP (mmHg): Mean (SD)** **72 months [ITT]:** Pre (n=301): 137.3 (16.85) Post (n=278): 126 (14.2) **Mean Difference= -11.0** **Change in DBP (mmHg): Mean (SD)** **72 months [ITT]:** Pre (n=307): 82.6 (11.62) Post (n=278): 77.8 (9.67) **Mean Difference=- 4.80** **Proportion Controlled (BP<140/90 mmHg) [ITT]:** Pre (n=565): 40.2% Post (n=423): 67.4%

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Quality of Execution: Fair (3 limitations) **Limitations:** Sampling (1) - Selection bias; Interpretation of results (2) - Loss to follow-up; - Confounding due to the pharmacist intervention;	Education: <H.S.: 7.6%; H.S. grad: 22.5%; >H.S.: 69.9% Smoking: 13.9% Controlled BP (%): 40.2% Controlled Lipids (%): 49.9% **Reported Co-morbidities:** Diabetes: 25.3% MI: 4.8% Heart failure: 3.0% Kidney disease: 2.1% Stroke: 0.7%.	**Additional Intervention Components:** Patients received a six year intervention in which a pharmacist provided CVD risk factor reduction via education on HTN and dyslipidemia +one-on-one counseling sessions + medication compliance assessment + use of national guidelines + follow-up visits every 3 months; **Comparison:** NA;	**Absolute pct. pts. change= 27.2** **Triglycerides (mg/dL) Mean (SD) 72 months [ITT]:** Pre (n=340): 192.8 (171.4) Post (n=323):154.4 (88.4) **Mean Difference=-38.4** **Total Cholesterol (mg/dL) Mean (SD) 72 months [ITT]:** Pre (n=341): 211.4 (45.7) Post (n=326): 184.3 (38.6) **Mean Difference= -27.1** **LDL Cholesterol (mg/dL) Mean (SD) 72 months [ITT]:** Pre (n=369): 127.2 (36.6) Post (n=353):108.3 (32.1) **Mean Difference= -18.9** **HDL Cholesterol (mg/dL) Mean (SD) 72 months [ITT]:** Pre (n=374): 48.0 (13.4) Post (n=362): 46.6 (12.2) **Mean Difference= -1.4** **LDL Cholesterol Controlled (<100mg/dL) [ITT]:** Pre (n=565): 49.9 Post (n=424): 74.6 **Absolute pct. pts. change= 24.7** **Additional Outcomes:** ED and hospitalization utilization significantly decreased by 54%. **Summary:** The six-year pharmacist intervention targeted towards patients enrolled in an employer-based health plan was able to drastically reduce the number of CV events, while also increasing the use of CV medications and

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			reducing medical cost.=196): 89.0 (10.0)
Authors: Chernew et al. 2008 **Organization(s)/Implementer/Initiator:** VBID implemented by Active Health Management (AHM) and Integrated Care Management company; **Funding:** GlaxoSmithKlines and Pfizer Inc.; **Location:** USA; **Setting and Scale:** The intervention site included a large employer with a comparable employer in the comparison group; scale not reported; **Design:** Pre-post with a comparison group; **Applicability:** Population of employed individuals and their dependents, employed by a large company; **Quality of Execution:** Fair (3 limitations); **Limitations:** Description (1) - Little description of study sample; Interpretation of results (2) - Neither study sample size nor follow-up response reported; - No comparison between the control and intervention measures provided;	**Target Population**: All individuals (employee + dependents) who were already taking any of the five classes of medications for hypertension and diabetes; **Inclusion:** Inclusion criteria included employees and dependents (18–64 years) who were continuously enrolled for the relevant quarter and the entire previous quarter. They had to be also taking any of the intervention medications without a contraindication; **Exclusion:** Individuals aged ≥ 65 years; **Reported Baseline Demographics:** NR # of members: -Intervention firm: pre-intervention = 74345 and post-intervention = 70,259 -Control firm: pre-intervention = 35807 and post-intervention = 37867 **Reported Co-morbidities:** NR;	**ROPC Intervention:** VBID Components: Reduced copayment rates for 5 classes of medication: ACE inhibitors/ARBs, beta-blockers, diabetes medications, statins, and inhaled corticosteroids. The service provider included a nurse and pharmacist. Individuals received a letter explaining importance of taking the recommended drugs; The program was added to an already existing accredited DM program used by both the treatment and control firms; **Type of ROPC Service:** Medication; **Level of ROPC:** Copayment rates for generic medications were reduced from $5 to 0. Copays for brand-name drugs were lowered 50 % (from $25 to $12.50 for preferred drugs & from $45 to $22.50 for non-preferred drugs); **Type of Health Plan:** NR **Additional Intervention Components:** NR; **Comparison:** Individuals in the control firm who were part of DM program and/or already taking any of the intervention medications without a contraindication;	**Medication Adherence:** Effects size for adherence as measured by medication possession ratio (MPR): 2.59 for ACE inhibitor/ARBs 3.02 for beta-blockers. 3.39 for Statins 4.02 for diabetic drugs (p for all <0.0001) Increased adherence was 3.79% for ACE inhibitor and 4.43% for beta blockers. The corresponding increase adherence for Statins was 6.28%. **Summary:** Value-based insurance design programs can effectively increase adherence to hypertension and diabetes medications and also complement existing disease management programs. HDL-C and TG.
Authors: Choudhry et al. 2014	**Target Population:** Patients with high blood pressure, high cholesterol, or diabetes enrolled in employer-sponsored insurance plans backed by large pharmacy benefit manager;	**ROPC Intervention Components:** All patients enrolled in VBID plans were offered generous copay reductions for their medications;	**Medication Adherence** **Patients with High Blood Pressure**

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Organization(s)/Implementer/Initiator: CVS Caremark + Brigham and Women's Hospital; **Funding:** Robert Wood Johnson Foundation Changes in Health Care Financing and Organization Initiative; **Location:** National; **Setting and Scale:** Authors identified VBID plans introduced by large pharmacy benefit manager, CVS Caremark, on behalf of 59 employer-based sponsors between 2007 and 2010. Sample consisted of 274,554 patients in 76 VBID plans provided by thirty-three unique plan sponsors; **Design:** Retrospective cohort with time-series analysis; **Applicability:** Mainly middle-income patients over 50 years old with high blood pressure, high cholesterol, or diabetes enrolled in employer-sponsored plans overseen by a large pharmacy benefit manager, CVS Caremark; **Quality of Execution:** Fair (3 limitations) **Limitations:** Interpretation of results (3 limitations) - Intervention and comparison groups were not compared for significant differences between groups; - Possible confounding – authors mentioned that other simultaneous events may have influenced medication adherence; - Significant difference between plans offering generous copays and those that did not offer this benefit;	**Inclusion:** Analysis restricted to clinical conditions (high blood pressure, high cholesterol, diabetes) for which there was at least one plan with and one plan without each of the VBID characteristics (targeting high-risk patients only, providing generous benefits in the form of copay reductions, eliminating copay tiers, offering a disease management program, and making the benefit available for prescriptions filled by mail order only; Patients with high blood pressure, high cholesterol, or diabetes were included in the cohort on their "index" date – the date when they filled their first eligible prescription between 18 months prior to and 12 months after the implementation of the VBID program. Patients could enter the cohort at any point before or after the VBID plan went into effect, were not required to maintain a minimum period of continuous enrollment, and left the cohort when they lost eligibility for the plan; **Exclusion:** Plans with fewer than 12 months of pre- or post-implementation data OR Plans with average copay change different from plan description; **Reported Baseline Demographics (all patients intervention + comparison)** **Patients with High Blood Pressure (n=203,895)** Age (mean): 57.3 yrs. Sex: Male: 49.2%; Female: 50.8% Race/Ethnicity: Black 1.7% Socioeconomic Status: Median income ($): 46,211 Prescriptions filled (mean): 1.8;	**Type of ROPC Service:** Medication (reduction in copay) **Level of ROPC Reduction:** 100% for generic medications; no more than $10 for brand name medications; no more than 15% coinsurance; **Type of Health Plan:** private (employer-sponsored); **Additional Intervention Components:** VBID plan may have also offered one or more of the following: co-pay reductions for high risk patients only, eliminated co-pay tiers where cost for generic and brand name medications were identical, offered a disease management program, offered a wellness program; **Comparison:** VBID plans included in the study that did not offer generous copay reductions;	**Proportion of days medication available to patients** **Baseline:** Intervention (n=NR): NR Comparison (n=NR): NR **12 months after VBID implemented** Intervention (n=70,751.6): NR Comparison (n=133,143.4): NR **Absolute difference: 2.4 pct pts (p<0.001)*** **Patients with High Cholesterol** **Proportion of days medication available to patients** **Baseline:** Intervention (n=NR): NR Comparison (n=NR): NR **12 months after VBID implemented** Intervention (n=50,949.5): NR Comparison (n=92,975.5): NR **Absolute difference: 1.6 pct pts (p<0.001)*** **Patients with Diabetes** **Proportion of days medication available to patients** **Baseline:** Intervention (n=NR): NR Comparison (n=NR): NR **12 months after VBID implemented** Intervention (n=20,896.5): NR Comparison (n=57,367.5): NR **Absolute difference: 3.6 pct pts (p<0.001)*** *Analysis controlled for all other plan characteristics, differences in patient demographic characteristics, and comorbidities.

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	Reported Co-morbidities: NR; **Patients with High Cholesterol (n=143,925)** Age (mean): 58.8 yrs. Sex: Male: 55%; Female: 45% Race/ethnicity: Black: 1.6% Socioeconomic Status: Median income ($): 47,461 Prescriptions filled (mean): 2.1 **Reported Co-morbidities:** NR; Patients with Diabetes (n=78,264) Age (mean): 54.8 yrs. Sex: Male:51.6% ; Female: 48.4% Race/Ethnicity: Black: 1.7% Socioeconomic Status: Median income ($): 45,075 Prescriptions filled (mean): 2.3 **Reported Co-morbidities:** NR;		**Additional Outcomes:** None **Summary:** Patients with high blood pressure, high cholesterol, or diabetes receiving generous copay reductions for their medications had higher levels of medication adherence after VBID implementation compared to those in insurance plans not receiving generous copay reductions. Results remained similar even after conducting various sensitivity analyses. Other features of VBID associated with larger improvements with medication adherence included: targeting high-risk patients, provided wellness programs, and made benefits available only for medication ordered by mail.
Authors: Elhayany & Vinker 2011 **Organization(s)/Implementer/Initiator:** authors affiliated with Clalit Health Services, Central district, Rishon Le Zion, Israel and Meir Medical Center, Kfar Saba Israel; **Funding:** Grant from Israel Lotus Foundation; **Location:** Israel; **Setting and Scale:** Calit Health Services - largest HMO in Israel; insuring 54% of the population (3.9 million members); **Design:** Single group before-after; **Applicability:** insured, low-SES patients with diabetes, hypertension, or	**Target Population:** low SES adult patients with hypertension, hypercholesterolemia, or diabetes; **Inclusion:** Patients 18 and older w/low SES (as defined by Israel National Insurance Institute) who did not regularly purchase prescribed medicines, identified from Clalit Health Services records; had diabetes, hypertension, or hyperlipidemia; **Exclusion:** Patients who were known abusers of alcohol or drugs; **Reported Baseline Demographics (n=355):** Mean age: 64.6 Sex: Female = 54.9%; Socioeconomic Status: 100% low income (as defined by Israel National Insurance Institute); **Reported Co-morbidities:** Diabetes: 59.2%;	**ROPC Intervention Components**: Eliminated copays through donated credit card; **Type of Health Plan:** HMO funded by the government; **Type of ROPC Service:** medication; **Level of ROPC:** 100% free; **Additional Intervention Components**: NA; **Comparison:** NA;	**Change in SBP (mmHg): Mean (SD) 24 months:** Pre (n=250): 136.2 (16.7) Post (n=248): 128.2 (13.3) **Mean difference: -8.0** **Change in DBP (mmHg): Mean (SD) 24 months:** Pre (250):78.0 (8.7) Post (248): 74.8 (8.1) **Mean difference: -3.2** **Change in LDL-C (mg/dL): Mean (SD)** Pre (304): 116.2 (38.0) Post (270): 105.3 (38.0) **Mean difference: -10.9** **A1C LEVEL: Mean (SD), %** Pre (187): 7.5 (1.5) Post (162): 7.8 (1.7)

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hyperlipidemia eligible for elimination of copays for meds in Israel; **Quality of Execution:** Fair (2 limitations) **Limitations:** Sampling (1) - patients selectively chosen by health staff; Interpretation of results (1) - did not control for secular trends;			**Mean difference: 0.3** **Additional Outcomes:** NR **Summary:** This study demonstrates a significant improvement in health measures associated with decreased medication costs among low-income population in Israel.
Authors: Farley et al. 2012 **Organization(s)/Implementer/Initiator:** Blue Cross Blue Shield of North Carolina (BCBSNC) funded the ROPC; **Location:** North Carolina, US; **Funding:** Robert Wood Johnson Foundation Health Care Financing and Organization Initiative and BCBSNC; **Setting and Scale:** Employers offering health benefits through BCBSNC in 2008(# of employees not reported); **Design:** Pre/Post with comparison group; **Applicability:** older patients at increased risk of CVD who are enrolled in value-based insurance design (VBID) plan similar to BCBSNC and who were already using medications for chronic health conditions; **Quality of Execution:** Good (1 limitation); **Limitations:** Interpretation of results (1) - Confounding - both participants and non-participants received ROPC;	**Target Population:** Patients enrolled in VBID for medications to treat hypertension, hyperlipidemia, diabetes, and congestive heart failure; **Inclusion:** Intervention group: continuously enrolled from January '07 and '09 in a BCBSNC plan, did not have a change in their VBID enrollment status from '08 to '09, 18 yrs and older in '07, taking at least 1 of 8 classes of drugs previously indicated in '07; Control: enrolled in BCBSNC Administrative Services Only benefits plan; **Exclusion:** NR; **Reported Baseline Demographics (n= 12164) median of means for all mediation classes:** Mean age: 52.3 (Median of means); Sex: Male = 61.9% (medians of the means); Socioeconomic Status: NR; # of drugs currently taken: 4.27 (mean # of unique meds); **Reported Co-morbidities:** NR;	**ROPC Intervention Components**: VBID waived copays for generic drugs for diabetes, hypertension, hyperlipidemia, and congestive heart; **Type of Health Plan:** HMO; VBID; **Type of Service Provider:** NR; **Type of ROPC Service:** medication; **Level of ROPC:** 100% free for generics; copays for brand-name drugs were lowered 11% to 86% [from $15.57 to $2.42 for ACEI's, $15.05 to $2.07 for beta-blockers, $24.89 to $19.46 for statins, $16.91 to $9.14 for thiazides, $36.31 to $32.28 for ARB's, $37.09 to $32.90 for CAI's]; **Additional Intervention Components**: Some participants enrolled in disease management; **Comparison:** BCBSNC members in Administrative Services plan; no reduction in copays for generics ;copays for brand-name drugs were lowered 5%-20% [from $16.23 to	**Medication adherence:** In adjusted analyses*, percentage point adherence improved from '07 –'09 2.3% for statins, 4.3% for beta-blockers, 4.8% for ACEIs, 4.5% for thiazide diuretics for intervention vs. comparison group ($p<0.001$). No significant differences in adherence trends for CAIs or ARBs; *Matched for age, sex, 90-day fills, avg. copay, # of meds used, comorbidity burden, percentage of generic prescriptions, disease management participation, case management participation, and baseline '07 healthcare expenditures; Subgroup analysis - 4.1% to 11.5% of intervention participants with poorer baseline adherence had greatest percentage point increase in adherence; participants who were not adherent at baseline became fully adherent by '09, representing a 30 percentage point improvement; **Summary:** This study demonstrates a significant improvement in average adherence

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	Smoking: 30.0%	$12.91 for ACEI's, $15.63 to $12.74 for beta-blockers, $27.15 to $25.66 for statins, $17.63 to $16.00 for thiazides, $38.42 to $32.65 for ARB's, $40.41 to $33.90 for CAI's];	for VBID participants compared to nonparticipants for eight hypertension and cholesterol drug categories. Changes were statistically significant for all categories except CAI's;
Authors: Gibson et al. 2010 **Organization(s)/Implementer/Initiator:** Employer initiated; **Funding:** Novartis Pharmaceutical Corporation; **Location:** US, multiple states; **Setting and Scale:** One large global pharmaceutical company with its US headquarters in New Jersey, with 25, 784 employees and their dependents; **Design:** Pre-post study with a comparison group (post-only data abstracted for this review); **Applicability:** 18-64 years self-insured employed patients with diabetes and CVD taking medications for hypertension; **Quality of Execution:** Fair (2 limitations); **Limitations:** Description (1) - no sample description; Interpretation of results (1) - Not everyone received disease management program (potential confounder);	**Target Population:** Self-insured employed individuals with prescriptions for diabetes or CVD; **Inclusion:** Employees and dependents ages 18-64 with prescription for diabetes or CVD or asthma, enrolled in the plan for ≥1 year prior to the program, had to be enrolled for at least two quarters during the post-implementation period; **Exclusion:** NR; **Reported Baseline Demographics (n=NR):** NR; **Reported Co-morbidities:** NR;	**ROPC Intervention Components:** VBID for employees and dependents offered by the company on January 1, 2005; information about the new programs was communicated to all employees in benefits newsletters and on the company intranet; **Type of ROPC Service:** Medication; **Level of ROPC:** 10% coinsurance for retail prescriptions; 7.5% coinsurance for mail-order prescriptions used to treat CVD, diabetes; **Type of Health Plan:** Private insurance; **Additional Intervention Components:** General disease management programs for asthma, cardiac conditions, and diabetes were also implemented for enrollees in the company's indemnity and point-of-service plans in '05 and across all self-insured plans in '07 (excludes ~30% of enrollees); **Comparison:** Matched each value-based insurance plan enrollee one-to-one with a nonelderly adult enrollee within one of four peer firms**.** Comparison group enrollees n= 154, 444;	**Medication adherence:** **Proportion of patients who were 80% adherent to HTN medications** **36months post intervention:** Intervention (n=NR):61.5 % Comparison (n=NR): 56.4% **Absolute pct. pts. change:** 5.1 **Additional outcomes:** The difference in spending was not significant in the first year after program implementation. However, the average spending was $2,122 lower in the enrolled group in the second year after program implementation and $3,722 lower in the third year. **Summary:** In a three-year evaluation, the authors found that people enrolled in the program significantly improved their adherence to medication regimens and that costs for the company were revenue neutral.

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Authors: Haskell et al. 2006 **Organization(s)/Implementer/Initiator:** Funders provided pharmaceutical support, supplies for point-of-care lipid and glucose testing; authors affiliated with Stanford University; **Location:** Santa Clara County, CA; **Funding:** Health Trust Santa Clara, CA; Cholestech, Inc., Hayward, CA; Merck & Co., Inc., Whitehouse Station, NJ; Pfizer, NY, NY., Bristol Myers Squibb Co., Princeton, NJ, Kos Pharmaceuticals, Inc., Cranbury, NJ, Abbott Laboratories, Abbott Park, IL., SmithKline Beecham, Research Triangle Park, NC.; **Setting and Scale:** 3 primary care clinics +1 women's shelter providing free medical care + Medicare or Medi-Cal (California's Medicaid Program) **Design:** Randomized Controlled Trial; **Applicability:** low-income, predominantly Hispanics, women, and those in their early 60s who either have no health insurance or have public health insurance (Medicare) and receive care from free clinics; **Quality of Execution:** Good (1 limitation) **Limitations:** Interpretation of results (1) - confounding patients in the comparison group may have qualified for free meds as well;	**Target Population:** Patients with limited/no health insurance + low family income + at increased CVD event risk; **Inclusion:** 35 to 80 yrs.+ ≥ 1 major modifiable CVD risk factor+ currently receiving medical care at not-for-profit or free clinics or hospitals; **Exclusion:** Recent history of serious medical condition + alcoholism; **Reported Baseline Demographics (n=99):** Age (mean): 60.5 yrs. Sex: Female: 55.6%; Male: 44.4% Race/Ethnicity: Female: 55.6%; African American: 7.0%; White: 11.0%; Hispanic: 59.0% ; Asian: 11.0%; Other: 12.0% Education:< High school: 55.0%; High school graduate: 20.0%; Post high school: 24.0% Income: Low income: 100% Insurance status: Medicare/Medicaid: 20.0%; Uninsured: 65.0% BMI (mean): 30.4 (obese) Smoking: 10.3% **Reported Co-morbidities:** Personal hx of CHD: 24.5%	**ROPC Intervention Components**: Clinics provided free medical care or accepted payment on basis of ability to pay + free medications for dyslipidemia, hypertension, and diabetes management provided via existing programs at participating clinics and indigent drug programs or donations from pharmaceutical companies; **Type of Health Plan:** Medicare; indigent/uninsured; **Type of Service Provider:** physician + nurse or nurse practitioner + dietitian; **Type of ROPC Service:** medication; **Level of ROPC:** 100% free; **Additional Intervention Components**: Patients randomized to intervention group received an individualized disease management program delivered by a team consisting of a specially trained nurse or nurse practitioner and a dietitian which included: treatment algorithms based on national guidelines + assessed medication compliance + lifestyle counseling + follow-up visits every 6 to 8 weeks + medication management + family involvement; **Comparison:** Patients assigned to usual care received free medical care or made payments based on ability to pay;	**Change in SBP (mm Hg): Mean (SD)** **Baseline:** Intervention (n=96):142 (2.0) Comparison (n=45): 141(3.0) **12m [ITT]:** Intervention (n=96): 128 (1.4) Comparison (n=45): 137 (2.8) **Mean difference = -10.0** **Change in DBP (mm Hg): Mean (SD)** **Baseline:** Intervention (n=96): 82 (1.1) Comparison (n=45): 82 (1.6) **12m [ITT]:** Intervention (n=96): 76 (0.8) Comparison (n=45): 81 (1.5) **Mean difference = -5.0** **Total Cholesterol (mg/dL) Mean (SD)** **Baseline:** Intervention (n=96): 206(4.3) Comparison (n=45): 204 (5.7) **12m [ITT]:** Intervention (n=96):184 (3.4) Comparison (n=45): 197 (4.8) **Mean difference = -15.0** **LDL-C (mg/dL) Mean (SD)** **Baseline:** Intervention (n=96): 121(3.9) Comparison (n=45): 118 (5.73) **12m [ITT]:** Intervention (n=96):104 (2.9) Comparison (n=45): 115 (4.4) **Mean difference = -14.0** **HDL-C (mg/dL) Mean (SD)** **Baseline:**

Study Details	Population Characteristics	Intervention + Comparison Description	Major Results and Summary
			Intervention (n=96): 45 (1.3) Comparison (n=45): 47 (2.0) **12m [ITT]:** Intervention (n=96): 46 (1.2) Comparison (n=45): 44 (1.6) **Mean difference = +4.0** **Triglycerides (mg/dL) Mean (SD)** **Baseline:** Intervention (n=96):197 (10.4) Comparison (n=45): 192 (12.8) **12m [ITT]:** Intervention (n=96):176 (7.6) Comparison (n=45): 200 (12.2) **Mean difference = -13.0** **Additional Outcomes:** Fasting Blood Sugar **<u>Summary:</u>** This ROPC + multicomponent intervention achieved significant decreases in blood pressure, blood lipid profile, and fasting blood sugar in mainly Hispanic women who were at increased risk of CVD event and received care from free clinics.
Authors: Hill et al. 2003 **Organization(s)/Implementer/Initiator:** Johns Hopkins Research Center; **Funding:** National Institute of Nursing Research + Merck & Company; **Location:** Baltimore, MD; **Setting and Scale:**	**Target Population** Hypertensive African American males residing in inner city Baltimore, MD; **Inclusion:** 21-54 years old +SBP >140 mm Hg and DBP >90 mm Hg on 2 separate occasions + on or off antihypertensive medication; **Exclusion:**	**ROPC Intervention Components:** Received free mediation and were referred to community-based sources of hypertension care and support; **Type of Health Plan:** Medicare; indigent/uninsured; **Type of Service Provider:** physician + community healthcare worker;	**Proportion Controlled (BP<140/90 mm Hg OR 130/80 mm Hg for persons with diabetes)** **Combined Intervention Arms (1 and 2)** **Baseline:** Usual care (n=159): 72.0% Intervention (n=319): 71.0% **24m [ITT]:** Usual care (n=159): NR

Study Details	Population Characteristics	Intervention + Comparison Description	Major Results and Summary
1 outpatient general clinic research center + home visits; **Design:** Randomized Control Trial (RCT); **Applicability:** For this study, mainly to, inner-city, low-income, hypertensive African American males with a high rate of illicit drug use or obesity; **Quality of Execution:** Fair (2 limitations); **Limitations:** Description (1) - Study dates not reported; Interpretation of Results (1) - Baseline groups not comparable;	Renal dialysis + acute or terminal illness + serious mental illness + participant in another hypertension trial; **Reported Baseline Demographics (n=157):** Age (mean): 41.0 yrs. Sex: Male: 100% Race/Ethnicity: Black/AA: 100% Socioeconomic Status: Low-income: 68.0% (<$10,000) Employment Status: Unemployed 67.0% Smoking: 84.0% **Reported Co-morbidities:** Diabetes: 7% Obesity: 26% Substance abuse: 40%	**Type of ROPC Service:** medication; **Level of ROPC:** 100% free; **Additional Intervention Components:** Tech-enabled database software used to record information and enable tailoring of messages to patients + telephone; **Comparison:** Participants received usual care plus received healthy lifestyle classes. Clinical practice guidelines for managing hypertension were sent with each letter to the provider;	Intervention (n=318) NR **Absolute pct. pts. change=7.65** **Additional Outcomes:** Adherence to intervention + utilization of medical resources + medication adherence + exercise **Summary:** A brief behavioral intervention delivered via telephone by nurses demonstrated a significant improvement in BP control in a mainly older, obese population attending primary care clinics at an academic medical center in both intervention arms. Systolic and diastolic BP improved at 12 months but these results were not sustained at 24 months for the patient behavioral intervention while results remained significant for the combined (patient behavioral + home BP monitors] intervention. Self-reported medication adherence and exercise improved slightly in the intervention arms but was not significant.
Authors: Keeler et al. 1985 **Organization(s)/Implementer/Initiator:** Rand Corporation; **Funding:** U.S. Department of Health and Human Services; **Location:** U.S.A.; **Setting:** NR; **Design:** Randomized Controlled Trial (RCT);	**Target Population:** Patients from the Rand Health Insurance Experiment defined to be hypertensive; **Inclusion:** Patients defined to be hypertensive: (1) reported taking anti-hypertensive drugs, (2) had a repeated systolic blood pressure greater ≥160 mmHg or diastolic blood pressure ≥ 95 mmHg at the examination, (3) had a repeated systolic blood pressure ≥140 mmHg or diastolic blood ≥ 90 mmHg and reported a previous diagnosis of hypertension, or (4) reported that a physician had told them more than once they had hypertension	**ROPC Intervention Components:** Families enrolled in the free plan received all health care services without charge; **Type of ROPC Service:** Medication + comprehensive medical care; **Level of ROPC:** 100%; **Type of Health Plan:** Private insurance;	**Change in SBP (mmHg): Mean (SD)** **Baseline:** Usual care (n=294): NR Intervention (n=294):NR **86mo:** Usual Care (n=294):138.9 Intervention (n=294): 137.1 **mean difference =-1.80** **Change in DBP (mmHg): Mean (SD)** **Baseline:** Usual care (n=562): NR

Study Details	Population Characteristics	Intervention + Comparison Description	Major Results and Summary
Applicability: For this study, mainly to hypertensive adults with cost-sharing free health insurance plans living in the United States; **Quality of Execution:** Fair (2 limitations); **Limitations:** Description (1) - Baseline demographic information not provided for gender; Interpretation of Results (1) - Confounding by quality-of-care;	and either were assigned to miss the examination or had systolic blood pressure ≥130 mmHg or diastolic blood pressure ≥80 mmHg; **Exclusion:** NR; **Reported Baseline Demographics (n=294):** Age (mean): 44.0 yrs. Sex: NR Race/Ethnicity: NR Socioeconomic Status: NR Education: NR Employment Status: NR **Reported Co-morbidities:** NR;	**Additional Intervention Components:** NR; **Comparison:** Three types of cost-sharing plans: catastrophic coverage - family paid 85% of all its health bills; Individual-deductible plan – family paid 95% of the cost of each outpatient service up to a maximum out-of-pocket expenditure of $150 for each person per year; intermediate coinsurance – families paid 25% or 50% of all its health bill each year;	Intervention (n=294): NR **86mo:** Usual Care (n=562): 88.7 Intervention (n=294): 90.6 **mean difference =-1.90** **Proportion Controlled (BP<140/90 mm Hg):** A significantly higher percentage of persons on the free than on the cost-sharing plans had controlled blood pressure at exit (43% vs. 37%, respectively); **Sodium reduction:** A significantly higher percentage of free-plan hypertensives followed their low-salt diet; **Additional Outcomes:** Smoking cessation advice; **Summary:** For this 86 month RCT comparing free health insurance plans to cost-sharing plans in hypertensive patients, significant improvements were observed for DBP and blood pressure control for patients in the free plan compared to the cost-sharing plan. Additionally, reductions in sodium in-take were also observed for the free plan group.
Authors: Knott et al. 2015 **Organization(s)/Implementer/Initiator:** Australian government; **Funding:** Australian government; **Location:** Australia;	**Target Population:** Sample from Australian Hypertension and Absolute Risk Study (AusHEART); patients aged ≥55 years, irrespective of reason for consultation, presented 4/08-7/08; **Inclusion:**	**ROPC Intervention Components (n=1004):** Concession card for discount on prescription medicines; **Type of ROPC Service:** Medication;	**Discontinuation of statin therapy and adherence failure** **12 months(Adjusted): Adherence measured as proportion of days covered (PDC) and adherence failure was considered if a patient fail to adhere to therapy if they**

Study Details	Population Characteristics	Intervention + Comparison Description	Major Results and Summary
Setting and Scale: Was part of larger study in which participants were recruited from 322 GP offices across Australia; **Design:** Prospective cohort (they are looking at possession of medication from the start of the study to the end or last day of possession, whichever comes first); **Applicability:** Pharmaceutical benefits scheme (PBS) statin users in Australia; **Quality of Execution:** Fair (2 limitations); **Limitations:** Interpretation of Results (2) - Groups not comparable at baseline; - Did not account the change in medication during the study period (switching for statins to other lipid lowering medications during study period	AusHEART patients were eligible if they consented to their data being linked to their Medicare records, and had evidence of statin use from PBS records within the first year following survey completion (i.e. time of GP consultation); **Exclusion:** Persons who had evidence of any use of low-cost statins (i.e. Simvastatin 5 mg/10 mg, Pravastatin 10 mg, Fluvastatin 20 mg/40 mg) (already priced below normal non-concessional copay); **Reported Baseline Demographics (n=1260):** Age (mean): 68±8 yrs.* Sex: Male: 50.0%; Socioeconomic Status: Mean yearly household income: $23,459.25±18952.05* Has university degree: 17*% **Reported Co-morbidities:** CVD: 41%; Diabetes: 35%; Chronic kidney disease: 8%; Cancer: 4%; mental health issues: 6% Note: also reports % below average self-reported health, % current smokers, % obese, # of medications types taken ; *groups are significantly different in these categories;	**Level of ROPC Reduction:** Reduced medication copayments; No co-payment after spending $318.00 in a calendar year; **Type of Health Plan:** Pharmaceutical benefits scheme – an Australian government program; **Comparison:** General users of PBS w/out concession card(control);	**possessed statins for <80% of days during study period** Hazard ratio in multivariate unrestricted and restricted model were more likely to discontinue use of statin drugs than concession card users (in restricted model: 1.63 times more likely to discontinue use (95% CI: 1.14–2.33). In the restricted logistic regression model, patients who did not have a concession card were 1.60(95% CI: 1.04–2.44) times more likely to fail to adhere to statin therapy compared to concession users. **Stratified analysis:** Statin users whose therapy was initiated at the time of consultation were 2.28 (95% CI: 1.22–4.28) times more likely to discontinue medication compared to those who had previously commenced therapy **Additional Outcomes:** None reported by concession vs general users; however, they do report no significant evidence that odds of discontinuing therapy varied with CVD risk perception, comorbidities, number of medication types used, socioeconomic characteristics, or the use of combination therapies **Summary:** Concession card users had a significantly higher degree of continuation and adherence to statin therapy compared to general users,

Study Details	Population Characteristics	Intervention + Comparison Description	Major Results and Summary
			even after controlling for income, education and a range of clinical factors. These findings suggest that the higher out-of-pocket costs associated with not having a concession card impacted on the frequency and continuation of dispensing of prescriptions for these cardiovascular drugs and may lead to higher levels of morbidity and mortality among these patients.
Authors: Maciejewski 2014 **Organization(s)/Implementer/Initiator:** Blue Cross Blue Shield of North Carolina + Duke University + University of North Carolina at Chapel Hill; **Funding:** Robert Wood Johnson Foundation Changes in health Care Financing and Organization Initiative + Blue Cross Blue Shield of North Carolina + Department of Veterans Affairs; **Location:** North Carolina (statewide); **Setting and Scale:** Blue Cross Blue Shield of North Carolina instituted a Value-based insurance design (VBID) program affecting 32,032 fully underwritten employers (representing 638,796 enrollees) and 51 self-funded employers (representing 108,504 enrollees; **Design:** Retrospective cohort (pre-post retrospective cohort with nonequivalent control group); **Applicability:** Patients with either hypertension, hypertension and hyperlipidemia, OR hypertension and CAD enrolled in an employer-sponsored VBID	**Target Population:** Patients diagnosed with hypertension, hypertension and hyperlipidemia, or hypertension and CAD; **Inclusion:** At least two face-to-face encounters with a health care provider in an ambulatory setting with a primary diagnosis of the condition (i.e., hypertension, hypertension + hyperlipidemia, or hypertension + CAD) OR At least one encounter in and ED or hospital inpatient setting with a primary diagnosis of the condition. AND Patients had to be continuously enrolled in their insurance plan in all three years of the study (2007-09), to have been diagnosed with the conditions named above before the implementation of VBID in 2007, and to have been prevalent users of these medications in the program in 2007 (i.e., the medications were not newly prescribed in that year); **Exclusion:** Not Reported; **Reported Baseline Demographics (enrolled in VBID)** **Patients with High Blood Pressure (n=28,004)**	**ROPC Intervention Components:** Blue Cross Blue Shield of North Carolina instituted a VBID program in January 2008 that lowered copays for medications to treat hypertension, hyperlipidemia, diabetes, and congestive heart failure. Copays for generic medications were waived and copays for brand-name medications were lowered from tier 3 levels to tier 2 levels; **Type of ROPC Service:** Medication (reduction in copay); **Level of ROPC Reduction:** 100% for generic medications; brand-name medications lowered from tier 3 levels to tier 2; **Type of Health Plan:** private (employer-sponsored); **Additional Intervention Components:** Some participants also received case management or disease management through their insurance coverage but this was controlled for in the analysis;	**Medication Adherence** **Patients with Hypertension Medication Possession Ratio (MPR)*** **Baseline:** Intervention (n=NR):78.2% Comparison (n=NR): 78.3% **12 months after VBID implemented** Intervention (n=NR): NR Comparison (n=NR): NR **Absolute difference: 3.4 pct pts (p<0.001)**** **Patients with Hypertension + Hyperlipidemia Medication Possession Ratio*** **Baseline:** Intervention (n=NR): 78.3% Comparison (n=NR): 78.4% **12 months after VBID implemented** Intervention (n=NR): NR Comparison (n=NR): NR **Absolute difference: 3.0 pct pts (p<0.001)**** **Patients Hypertension + CAD Medication Possession Ratio** **Baseline:**

Study Details	Population Characteristics	Intervention + Comparison Description	Major Results and Summary
insurance plan offered by Blue Cross Blue Shield of North Carolina; **Quality of Execution:** Fair (3 limitations) **Limitations:** Description (1 limitation) - No information provided on race/ethnicity or SES for the included population; Interpretation of Results (2 limitations) - Sample sizes not provided for VBID group and non-VBID group separately; - Authors mentioned possible unobserved confounding that could not be controlled for;	Age (mean): 52.1 yrs. Sex: Male: 44.7% ; Female: 55.3% Race/Ethnicity: NR Socioeconomic Status: NR Number of medications (mean): 3.71 Received case management: 0.76% Received disease management: 17.98% **Reported Co-morbidities:** NR; **Patients with Hypertension + Hyperlipidemia (n=14,582)** Age (mean): 54.2 yrs. Sex: Male: 50.6% ; Female: 49.4% Race/ethnicity: NR Socioeconomic Status: NR Prescriptions filled (mean): 4.71 Received case management: 1.19% Received disease management: 23.21% **Reported Co-morbidities:** hyperlipidemia: 100% **Patients with Hypertension + CAD (n=2,354)** Age (mean): 56.8 yrs. Sex: Male: 63.0% ; Female: 37.0% Race/Ethnicity: NR Socioeconomic Status: NR Prescriptions filled (mean): 5.71 Received case management: 3.82% Received disease management: 23.88% **Reported Co-morbidities:** CAD: 100%	**Comparison:** Control group consisted of 176 employers with more than 1,000 subscribers each (representing 638, 091 enrollees). Eight-four percent of the employers in the control group were self-funded. This group did not participate in the VBID program; Comparison and intervention participants were matched on age; sex; baseline expenditures; baseline comorbidity burden; prior use of case management or disease management; indicators of baseline use of statins and medications for hypertension and diabetes; and interactions between sex and case management and between sex and disease management;	Intervention (n=NR): 77.4% Comparison (n=NR): 76.5% **12 months after VBID implemented** Intervention (n=NR): NR Comparison (n=NR): NR **Absolute difference: 2.7 pct pts (p>0.05)**** **Morbidity & Mortality** **Patients with Hypertension** **Probability of in-patient visit** **Baseline:** Intervention (n=NR):7.48% Comparison (n=NR): 7.88% **12 months after VBID implemented** Intervention (n=NR): NR Comparison (n=NR): NR **Absolute difference: -0.1% (p>0.05)**** **Patients with Hypertension + Hyperlipidemia** **Probability of in-patient visit** **Baseline:** Intervention (n=NR):9.02% Comparison (n=NR): 8.94% **12 months after VBID implemented** Intervention (n=NR): NR Comparison (n=NR): NR **Absolute difference: 7.0% (p=0.21)**** **Patients with Hypertension + CAD** **Probability of in-patient visit** **Baseline:** Intervention (n=NR): 25.06% Comparison (n=NR): 24.89%

Study Details	Population Characteristics	Intervention + Comparison Description	Major Results and Summary
			12 months after VBID implemented Intervention (n=NR): NR Comparison (n=NR): NR **Absolute difference: 7% (1.72 pct pt reduction; p>0.05)**** *MPR calculated as the number of days' supply dispensed per year divided by 365 (the number of days observed in a year), the ratio was capped at 1 for patients who had a supply for more days than were in the year **Analysis controlled for age, male sex, comorbidity burden, whether each enrollee received case management or disease management. **Additional Outcomes:** There were no significant differences in the adjusted number of ED visits in 2008 or 2009 in any of the three disease cohorts. **Summary:** Patients hypertension, hypertension and hyperlipidemia OR hypertension enrolled in a VBID insurance plan observed statistically significant improvements in medication adherence, while patients with hypertension and CAD observed non-statistically significant improvements in medication adherence. While in-patient admissions decreased across all three groups of patients, these findings were not significantly significant. There were no significant

Study Details	Population Characteristics	Intervention + Comparison Description	Major Results and Summary
			differences in the number of ED visits in any of the three disease cohorts.
Authors: Musich et al. 2015 **Organization(s)/Implementer/Initiator:** A large technology employer; **Funding:** a large technology employer; **Location:** USA; **Setting and Scale:** The intervention site included a large employer; scale not reported; **Design:** Pre-post with a comparison group; **Applicability:** For this study, mainly to high income hypertensive working adults in USA; **Quality of Execution:** Good (1 limitation); **Limitations:** Sampling - Population from which the sample was taken was not well described;	**Target Population:** Employees and spouses enrolled in lifestyle management health coaching or disease management coaching programs who had been diagnosed with hypertension. Referred to program by the respective health/disease coaches; **Inclusion:** Individuals ≥3 months continuous medical plan enrollment prior to study enrollment date + ≥ 3 months continuous plan enrollment after study enrollment; ≥2 prescriptions in the pre and post time periods within the respective therapeutic classes; **Exclusion:** Pregnant women; **Reported Baseline Demographics (n=3254):** Age (mean): 50 yrs. Sex: Male: 34.0%; Female 66.0% Socioeconomic Status: high income: 72.3%; upper medium: 13.4%; lower medium: 6.5%; low: 2.7% **Reported Co-morbidities:** Charlson Comorbidity Index (CCI) (mean): 0.7 Psychiatric Diagnostic Group score (mean): 0.28	**ROPC Intervention Components (n=51):** VBID for hypertensive medications; The program was added to already existing lifestyle management or disease management coaching programs; **Type of ROPC Service:** Medication; diabetic supplies were also covered at no cost for participants with diabetes; **Level of ROPC Reduction:** Generic drug copayments were eliminated (i.e., $0). Preferred brands were available with $5 co-payments for a 34-day supply or $15 for a 90-day supply. Non-preferred brands were available at 50% coinsurance rates with applicable minimum/maximum levels; **Type of Health Plan:** Private insurance: BCBS, UHC and other; **Comparison:** Eligible nonparticipants who were enrolled in either lifestyle or disease management within the same company (control);	**Change in MPR (medical possession ratios): (Unadjusted):** **Baseline:** Intervention (n=2674): 89% Comparison (n=580): 91% **Post-intervention: 13 months:** Intervention (n=2674): 92% Comparison (n=580): 82% **Absolute difference: 12 pct pts;** **13 months (Adjusted):** Regression-adjusted weighted difference in difference for MPRs comparing participant and nonparticipant trends indicated a significant 14.3 percentage point gain for the intervention group relative to the control group (P < 0.0001); **Additional Outcomes:** Regression-adjusted weighted difference in difference for inpatient admissions and emergency visits was 3.5 (P=0.02) and 5.0 (P=0.04), respectively for the intervention group relative to the control group. **Summary:** This VBID program significantly reduced pharmacy co-payments for participants and significantly increased medication adherence for participants hypertension while nonparticipants had a significant medication adherence drop-off.

Study Details	Population Characteristics	Intervention + Comparison Description	Major Results and Summary
Authors: Sauvageot, 2008 **Organization(s)/Implementer/Initiator:** Non-Profit Pharmacy (Shenandoah Valley Compassionate Pharmacy); **Funding:** Pharmaceutical Manufacturer's Assistance Programs (PMAPs); **Location:** Virginia; **Setting and Scale:** Community setting One non-profit community Pharmacy; **Design:** Single group before-after; **Applicability:** Low-income seniors, particularly women, diagnosed with hypertension, dyslipidemia, and/or diabetes without prescription drug benefits living in Northern Virginia; **Quality of Execution:** Good (1 limitation); **Limitations:** Interpretation of results (1) - Confounding: Could not tell if there was any lost to follow-up over the course of this program (42 months);	**Target Population:** Low-income patients with hypertension, hyperlipidemia, or diabetes who needed help paying for their medications; **Inclusion:** Elderly, low-income patients referred to the community pharmacy by their providers. Patient advocate reviewed and matched patients' eligibility with specific PMAPs requirements; **Exclusion:** NR; **Reported Baseline Demographics (n=84):** Age (mean): 72.7 +/- 10.6 Sex: 73.8% females; 26.2% Race/Ethnicity: NR Socioeconomic Status: Education: NR Employment Status: NR Health Insurance: Most had health insurance with inadequate prescription coverage Socioeconomic Status: Low Income Income(mean)$14,412.56+/- $6,451.50 Income Range: $1,314.20 - $31,625.10 **Reported Co-morbidities:** NR;	**ROPC Intervention Components:** Patient advocate matched elderly, low-income patients with a PMAP; received free medication for hypertension, hyperlipidemia, or diabetes and counseling from a pharmacist on proper medication use; **Type of ROPC Service:** Assistance in matching patients with a PMAP; medication through PMAPs; medication management counseling; **Level of ROPC:** 100%; **Type of Health Plan:** NR (most had health insurance but were not covered for prescription); **Additional Intervention Components:** NR; **Comparison:** NA;	**Change in SBP (mmHg): Mean (SD)** **43 months:** Pre (n=36): 138 (15) Post (n=36): 136 (18) **Mean Difference = -2** **Change in DBP (mmHg): Mean (SD)** **43 months:** Pre (n=35): 81 (7) Post (n=35): 75 (8) **Mean Difference = -6** **Total cholesterol (mg/dL) Mean (SD)** **43m:** Pre (n=136): 195 (43.0) Post (n=25): 170 (31) **Mean difference = -25.0** **LDL-C (mg/dL) Mean (SD)** **43m:** Pre (n=21): 112 (39.0) Post (n=21): 98 (34) **Mean difference = -14.0** **HDL-C (mg/dL) Mean (SD)** **43m:** Pre (n=36): 47 (16.0) Post (n=36): 44 (12) **Mean difference = -3.0** **Triglycerides (mg/dL) Mean (SD)** **43m:** Pre (n=23): 198 (100) Post (n=23): 167 (84.0) **Mean difference = -25.0** **A1C level Mean (SD)** **43m:** Pre (n=13): 7.3 (0.9)

Study Details	Population Characteristics	Intervention + Comparison Description	Major Results and Summary
			Post (n=13): 7.6 (0.8) **Mean difference = -0.3** **Additional Outcomes:** NR **Summary:** In a 43 month evaluation, the authors found statistically significant improvements in patients' TC, LDL-C and diastolic blood pressure. Slight but not statistically significant decrease occurred in their DBP, TG, and A1C level.
Authors: Trompeter & Havrda 2009 **Organization(s)/Implementer/Initiator:** Pharmaceutical company implemented the intervention; authors affiliated with Department of Pharmacy Practice, Shenandoah University, Winchester, VA; **Location:** Virginia, US; **Funding:** NR; **Setting and Scale:** intervention included patients from a private family practice site; **Design:** Post-only w/comparison group; **Applicability:** Low-income individuals without prescription coverage provided with medication through PCAP and working with a clinical pharmacist; **Quality of Execution:** Fair (2 limitations); **Limitations:** Interpretation of results (1)	**Target Population:** Patients with no or limited prescription drug coverage; **Inclusion:** 18 years or older + had a diagnosis of hypertension, diabetes, or dyslipidemia; and were prescribed at least one medication for one of the diseases; + For intervention group: patients with noted financial concern; For control group: patients with prescription insurance; **Exclusion:** NR; **Reported Baseline Demographics (n=208):** Age (mean): 67.3 yrs. Sex: Female: 71.2%; Race/Ethnicity: NR; Education: NR; Income: Low income: 100% ; Insurance status: NR; BMI (mean): NR;	**ROPC Intervention Components**: meds at little or no cost through a pharmaceutical company assistance program (PCAP); **Type of Service Provider:** physician + pharmacist; **Type of ROPC Service:** medication; **Level of ROPC:** free or no cost; **Type of Health Plan:** NR; **Additional Intervention Components**: Patients required to keep regular follow-up and laboratory appointments with healthcare providers; pharmacist provided disease state information to PCAP patients, recommended cost-effective therapies, ensured routine follow-up, provided medication reminders;	**Change in SBP (mm Hg): Mean (SD)** **12m:** Intervention (n=191):135.5 (17.1) Comparison (n=188): 128.8 (18.5) **Mean difference = +5.7** **Change in DBP (mm Hg): Mean (SD)** **12m:** Intervention (n=191): 75 (10.0) Comparison (n=188): 77.5 (8.5) **Mean difference = -2.5** **Proportion Controlled (BP<140/90 mm/HG)** **12m:** Intervention (n=191): 46.6% Comparison (n=188): 54.8% **Absolute pct. pts. change= -8.2** **LDL-C (mg/dL) Mean (SD)** **12m:** Intervention (n=150):95.8 (28.0) Comparison (n=136): 111.8 (37.5) **Mean difference = -16.0**

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- groups not comparable at baseline; Other (1) - update in guidelines may have altered physician prescribing behavior;	**Reported Co-morbidities:** NR;	**Comparison:** Individuals with prescription insurance received usual care (did not interact with the pharmacist);	**Proportion at goal LDL** **12m:** Intervention (n=150): 64.2% Comparison (n=136): 54.1% **Absolute pct. pts. change= +10.1** **HDL-C (mg/dL) Mean (SD)** **12m:** Intervention (n=150): 43.8 (12.9) Comparison (n=136): 39.1 (11.5) **Mean difference = +4.1** **Proportion at goal HDL** **12m:** Intervention (n=150): 31.5% Comparison (n=136): 32.8% **Absolute pct. pts. change= -1.3** **Additional Outcomes:** A1C level, % at A1C goal, Fasting Blood Sugar **Summary:** This ROPC intervention consisted of PCAP in which participants received medication for little to no cost. The study found that low-income individuals without prescription coverage provided with medication through PCAP and working with a clinical pharmacist were more likely to have lower LDL-C and higher HDL-C values compared with persons with prescription coverage. In addition, those in the PCAP group were more likely to meet goals for glycemic control than those with prescription insurance.
Authors: Wertz et al. 2012 **Organization(s)/Implementer/Initiator:**	**Target Population**: All individuals diagnosed with hypertension;	**ROPC Intervention:** VBID Components: copayment waivers or copayment reductions for all medications related to diabetes,	**Clinical outcomes reported-** only for the intervention group.

Study Details	Population Characteristics	Intervention + Comparison Description	Major Results and Summary
VBID implemented by Anthem Blue Cross & Blue Shield; **Funding:** Novartis Pharmaceuticals Corp; **Location** Ohio, USA; **Setting and Scale:** The intervention site included two large employers (City of Cincinnati (COC) and Kroger); scale not reported; **Design:** Pre-post with a comparison group; **Applicability:** Population of employed individuals with diabetes or hypertension, employed by large companies; **Quality of Execution:** fair (2 limitations); **Limitations:** Interpretation of results (2) - Difference in baseline measures between the two groups; - Not everyone received the same intervention;	**Inclusion:** Employees+retirees of COC and Kroger, age 18 or above with ≥1 inpatient admissions or ER visits or ≥ 2 professional office visits with ICD-9 codes for hypertension. All patients were required to have a minimum of 12 months of continuous health plan enrollment before and after index date; **Exclusion:** NR; **Reported Baseline** N=289 Age (mean±SD): 57±12 yrs. Sex: Male: 42.2%; Female 57.8% Race/Ethnicity: White: 50.2%; Black/AA: 36.8%; **Reported Co-morbidities:** Diabetes: 4.2% Dyslipidemia: 56.7% Any CVD disease: 15.3%	hypertension, and dyslipidemia. The service provider included community-based pharmacists; **Other Simultaneous Intervention Components: --**Tailored pharmaceutical care services to help members better understand and manage their conditions via regular meetings; Depending on the incentives provided by the employer groups, some members received $100 contributions to their health saving accounts. It happened only in the City of Cincinnati; **Type of ROPC Service:** Medication; **Level of ROPC:** reduced or free. No details provided; **Comparison:** Employees who were offered the program but declined to participate selected using propensity score matching- comparison results are only reported for medication adherence. No comparisons for BP or cholesterol outcomes are provided;	Change in SBP(mmHg): Mean at 14.6 mo Pre (n=283): 136.1 Post (n=283): 129.5 **Mean Difference= -6.6** Change in DBP(mmHg): Mean at 14.6 mo Pre (n=283): 83.5 Post (n=283): 79.3 **Mean Difference=-4.20** Change in T-chol (mg/dL): Mean at 14.2 mo Pre (n=98): 183 Post (n=98): 172 **Mean Difference= -11** Change in TG(mg/dL): Mean at 14 mo Pre (n=99): 133.8 Post (n=99): 124.0 **Mean Difference= -9.8** Change in HDL (mg/dL): Mean at 14.1 mo Pre (n=98): 49.9 Post (n=98): 49.4 **Mean Difference= -0.8** Change in LDL (mg/dL): Mean at 14.2 mo Pre (n=97): 104.1 Post (n=97): 97.2 **Mean Difference= -6.9** **Proportion Controlled (BP<140/90 mmHg):** 14.6 mo Pre (n=283): 52.0% Post (n=283): 70.0% **Absolute pct. pt change= 18.0**

Study Details	Population Characteristics	Intervention + Comparison Description	Major Results and Summary
			Proportion Controlled (LDL-C<160, <130 or <100 mg/dL) based on CHD risk factors: 14.2 mo Pre (n=97): 71.0% Post (n=97): 84.0% **Absolute pct. pts. change= 13.0** **Additional Outcomes:** Change in medication adherence as measured by proportion of days covered (PDC) (%): 12mo **Hypertensive drugs**: mean±SD Intervention: Pre (n=210): 82.0±26.0 % Post (n=210): 91.0±17.0% Absolute difference = 8.4% Control: Pre (n=193): 86.0±24.0% Post (n=193):86.0±21.0% Absolute difference = 0% **Difference of difference: 9%** **Statin**: mean±SD Intervention: Pre (n=210): 76.0±27.0 % Post (n=210): 87.0±22.0% Absolute difference = 11.0% Control: Pre (n=193): 73.0±29.0% Post (n=193):83.0±20.0% Absolute difference = 10.0% **Difference of difference: 1%** **Summary:** Value-based insurance design programs can effectively increase adherence to medications and improve clinical outcomes.