

Cardiovascular Disease: Tailored Pharmacy-based Interventions to Improve Medication Adherence

Summary Evidence Tables - Economic Systematic Review

This table outlines information from the studies included in the Community Guide economic review of Tailored Pharmacy-based Interventions to Improve Medication Adherence. It details study design and economic analysis, population and intervention characteristics, and economic outcomes considered in this review. Complete references for each study can be found in the Included Studies section of the [review summary](https://www.thecommunityguide.org/findings/cardiovascular-disease-tailored-pharmacy-based-interventions-improve-medication-adherence) [https://www.thecommunityguide.org/findings/cardiovascular-disease-tailored-pharmacy-based-interventions-improve-medication-adherence]

Abbreviations Used in This Document:

- Economic outcomes:
 - DALY: disability-adjusted life year
 - QALY: quality-adjusted life year
 - ROI: return on investment
- Effectiveness outcomes:
 - A1c: glycated hemoglobin
 - BMQ: Specific Beliefs about Medicines Questionnaire
 - BP: blood pressure
 - DBP: diastolic blood pressure
 - HDL-C: High density lipoprotein cholesterol
 - LDL-C: Low density lipoprotein cholesterol
 - MARS: Medication Adherence Report Scale
 - MPR: Medication Possession Ratio
 - SBP: systolic blood pressure
- Study design:
 - RCT: randomized controlled trial
- Measurement terms:
 - DiD: difference in difference
 - Pct pt: percentage point
- Other terms:
 - ADA: American Diabetes Association
 - AF: atrial fibrillation
 - CAD: coronary arterial disease
 - CDSS: clinical decision support system
 - CHD: coronary heart disease
 - CHW: community health worker
 - CKD: chronic kidney disease
 - COPD: chronic obstructive pulmonary disease
 - CV: cardiovascular
 - CVD: cardiovascular disease
 - ED: emergency department
 - HCUP: Healthcare Cost and Utilization Project
 - HTN: hypertension
 - MEPS: Medical Expenditure Panel Survey
 - MI: myocardial infarction
 - mmHg: millimeters of mercury
 - MTM: Medication Therapy Management
 - NR: not reported
 - PBM: pharmacy benefit manager
 - PCP: primary care provider
 - PMAP: patient medication assistance program
 - T2DM: type 2 diabetes
 - UKPDS: United Kingdom Prospective Diabetes Study

Notes:

Quality of economic estimates – Studies are assessed to be of good, fair, or limited quality. This valuation is based on two domains: [Quality of Capture](https://www.thecommunityguide.org/about/glossary#quality-based-on-capture) [https://www.thecommunityguide.org/about/glossary#quality-based-on-capture], and [Quality of Measurement](https://www.thecommunityguide.org/about/glossary#quality-based-on-measure) [https://www.thecommunityguide.org/about/glossary#quality-based-on-measure].

Race/ethnicity of the study population: The Community Guide only summarizes race/ethnicity for studies conducted in the United States.

Cardiovascular Disease Prevention

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
<p>Author (Year): Altavela et al. (2008)</p> <p>Design: Pre post with control</p> <p>Economic Method: Healthcare cost</p> <p>Funding Source: None</p> <p>Monetary Conversions: Index year assumed 2001 in US dollars</p>	<p>Location: Rochester, New York, USA</p> <p>Setting: Primary care clinic</p> <p>Eligibility: Screened for eligibility based on claims and medical records. Must have HF, CAD, T2DM, HTN, COPD, asthma, dyslipidemia, AF, drug reaction, non-compliance, or any ED visit. Those with T2DM with no PCP visit the past 6 months eligible. Must have PCP visit scheduled in following 2 weeks.</p> <p>Sample Size: Intervention 127 Control 216</p> <p>Characteristics:</p>	<p>One clinical pharmacist in two primary care clinics serving capitated patients with incentive contract to reduce cost and improve care.</p> <p>Pharmacist had access to pharmacy claims for 73% of intervention and 39% of control patients from which adherence notes and note to physician were distilled. Primary activity was notes to PCPs on drug related problems before patient meets PCP. Pharmacist also offered physician education and patient counseling, adherence monitoring, and patient education, as needed.</p> <p>Implication may be</p>	<p>Measured at 12 months</p> <p>No clinical indicators reported</p> <p>Adherence: Intervention group twice as likely to have adherence issues addressed than control. Note intervention 11 times more likely to have cost-effective therapy prescribed indicating cost-containment effort but effect on drug utilization was not large.</p> <p>Data Source: Pharmacist records</p> <p>Measure Type:</p>	<p>Intervention cost: NR</p>	<p>Healthcare cost: Without prescriptions reduced 2190 and with prescriptions reduced 2004 per patient per year</p> <p>Components Included in Healthcare Cost: Inpatient, ED, labs, outpatient, specialty visits, medication</p> <p>Source and Valuation: 1-year pre and 1-year post claims data. Medication data not available at patient level and available only in aggregate. All cause claims.</p> <p>Measure Type: DiD</p> <p>Change in Mean Productivity: NR</p> <p>Quality of Capture: Good</p>	<p>No economic summary measures</p> <p>Limitations: Short duration</p> <p>Selection bias in recruitment through invitation</p> <p>Non-randomized</p> <p>Large differences in baseline between intervention and control patient</p>

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	<p>Age 20-50 19.7%, 51-65 46%, 65 or older 34.7%; Females 65%; Medicare 12.3%; Commercial Ins 87.7%; T2DM 24%; With CVD less than 19%</p> <p>Time Horizon: Baseline July 2000 to June 2001. Intervention July 2001 to June 2002. Intervention length 12 months.</p>	<p>that there was probably little direct contact between pharmacist and patient. Pharmacist recorded PCP response to recommendations at 6 and 12 months.</p> <p>Comparison: Usual care</p>	DiD		Quality of Measurement: Fair	
<p>Author (Year): Borenstein et al. (2003)</p> <p>Design: RCT</p> <p>Economic Method: Healthcare Cost only</p> <p>Funding Source: Novartis Pharmaceuticals</p>	<p>Location: Los Angeles, California, USA</p> <p>Setting: Clinical pharmacists in general practice offices</p> <p>Eligibility: Recruited from two general practices affiliated with large community hospital. Age 18 or older with</p>	<p>Study had four clinical pharmacists and 39 physicians from two practices</p> <p>At first visit to clinic run by clinical pharmacist: assess BP; adherence to drugs; side effects; record patient lifestyle and risk habits; counsel regarding diet and lifestyle. Patients discharged from clinic once BP is</p>	<p>Recorded at 3, 6, 9, and 12 months</p> <p>At 12 months Decrease in Systolic BP: Intervention: 22 mm Hg Control: 11 mm Hg Diff 11 mm Hg</p> <p>At 12 months Decrease in Diastolic BP:</p>	<p>Included in healthcare cost.</p> <p>Perspective of capitated medical group also at risk for pharma costs</p> <p>Average Provider Visit Cost Per Patient Per Year: Intervention: 160 Control: 195 (Average visits to Physician: Intervention 3.4</p>	<p>Outpatient visit costs and pharmacy costs are discussed in program costs column</p> <p>Components Included in Healthcare Cost: Outpatient, pharmacist visits, and HTN medication</p> <p>Source and Valuation: Medical records and per unit costs from practice perspective</p> <p>Measure Type:</p>	<p>No summary economic measures</p> <p>Author Conclusions: Authors claim true clinical setting. In capitated environment, reduced physician visits due to pharmacist co-management can save money only if the physician time is used to see more patients.</p> <p>Note: If increase in HTN medication cost is</p>

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<p>Monetary Conversions: Index year assumed 1999 in US dollars</p>	<p>diagnosis for HTN and with uncontrolled BP.</p> <p>Sample Size: Intervention: 98 Control: 99</p> <p>Characteristics: Mean Age 62.5; Females 63.2%; African American 40.8%; T2DM: 13.2% Dyslipidemia: 56.1%; SBP: 162; DBP: 92; CVD: less than 5%</p> <p>Time Horizon: Intervention length 12 months Recruits identified during 1996-1998</p>	<p>controlled based on two consecutive readings.</p> <p>Pharmacist calls physician with findings and recommendations based on treatment algorithm. Changes based on cost alone not allowed.</p> <p>Follow-up visits every 2-4 weeks at pharmacist discretion</p> <p>Comparison: Usual care</p>	<p>Intervention: 7 mm Hg Control: 8 mm Hg Diff 1 mm Hg</p> <p>Proportion Achieving BP Goals at 12 Months Intervention: 60% Control: 43% Diff: 17 pct pt</p> <p>Adherence: NR</p> <p>Measure Type: DiD</p>	<p>Control 6.6; Average visits to Physician or Pharmacist: Intervention 8.0 Control 6.6)</p> <p>Change in HTN Medications Cost: Per Month Per Patient: Inter: 11.31 Control: 4.25 Diff: 7.06 (Not significant)</p> <p>Components included in intervention cost: Physician and pharmacist time and medication HTN cost</p> <p>Source and Valuation: Medical records and per unit costs from practice perspective</p>	<p>DiD</p> <p>Change in Mean Productivity: NR</p> <p>Quality of Capture: Fair</p> <p>Quality of Measurement: Fair</p>	<p>included (~84 per patient per year), the total healthcare cost would be higher for intervention than control.</p>
<p>Author (Year): Bosmans et al. (2019) Linked to van der Laan et al. [2017, 2018]</p> <p>Design: RCT</p> <p>Economic Method: Cost per QALY</p>	<p>Location: Nationwide, Netherlands</p> <p>Setting: Community pharmacies</p> <p>Eligibility: Patients on hypertensive medications and</p>	<p>CATI trial</p> <p>Two consultations with pharmacist. First meeting identified barriers to adherence based on questionnaire and interview. Based on barriers, tailored information and</p>	<p>Effects measured at baseline, 3, and 9 months intervention versus control</p> <p>Very small differences were found for most effect outcomes</p>	<p>Cost per patient 48</p> <p>Components Included in Intervention Cost: Pharmacist time</p> <p>Data Source: Trial records and Dutch average wages</p>	<p>Change in Mean Healthcare Cost Intervention Versus Control: Total 915 Primary -88 Home care 26 Secondary 956 Medication 20</p> <p>Components Included in Healthcare Cost:</p>	<p>Cost per QALY: 59,979 Probability that intervention is cost-effective was: 0.27 if willingness to pay is 0 0.36 if willingness to pay is 20,000</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
<p>Funding Source: Royal Dutch Pharmacists Association (KNMP)</p> <p>Monetary Conversions: Index year 2016 in Euros</p>	<p>age 45 to 75 years, and who self-identify as having hypertension. Patients also had to be non-adherent past 6 months based on either questionnaire or dispensing data.</p> <p>Sample Size: Intervention: 85 Control: 86 from 20 community pharmacies.</p> <p>Characteristics: Mean Age 60; Female 52%; Non-western immigrant 5%; Low education 27%; MARS-5 Sum 21.6; Utility 0.83; SBP/DBP 145/88</p> <p>Time Horizon: Intervention length 9 months</p> <p>Study during 2016</p>	<p>recommendations provided in areas of information, adherence tools, dealing with side effects, practical barriers, and negative beliefs. Written summary provided to each patient with agreed adherence measures. Second meeting 2-3 months later to discuss progress. Pharmacists underwent 1-day training.</p> <p>Comparison: Usual care consisting of usual pharmacy dispensing protocols.</p>	<p>Change in Adherence: MARS-5 Sum 0.23</p> <p>Change in Beliefs: BMQ -0.21</p> <p>QALY gained: 0.02</p> <p>Change in SBP/DBP: -0.3/-2.2</p> <p>Measure Type: DiD</p>	<p>for community pharmacists</p> <p>Quality of Capture: Fair</p> <p>Quality of Measurement: Good</p>	<p>Inpatient, outpatient, home care, medications</p> <p>Source and Valuation: Questionnaires requesting 3-month recall of utilization to patients at 3, 6, and 9 months. Medications from pharmacy fills. Valued using Dutch standard costs.</p> <p>Change in Mean Productivity Intervention Versus Control: Total -67</p> <p>Components Included in Productivity: Absenteeism, presenteeism, for paid and unpaid jobs. Valued at Dutch wages.</p> <p>Measure Type: DiD</p> <p>Quality of Capture: Fair</p> <p>Quality of Measurement: Good</p>	<p>Authors conclude the intervention is not cost-effective.</p> <p>Limitations: Unclear why cost per QALY performed when intervention is not effective. Short trial duration. 20% drop-out addressed with multiple imputations. Cut-Off for adherence on MARS-5 (<25) may be too high.</p> <p>Notes: Note the cost in the cost per QALY is driven by secondary healthcare cost (inpatient) for this short trial.</p> <p>Authors note there already are interventions in place to manage chronic disease and adherence improvement may not add much.</p> <p>Quality of Estimate: Limited</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
<p>Author (Year): Brophy et al. (2014)</p> <p>Design: Pre post with control</p> <p>Economic Method: Healthcare cost</p> <p>Funding Source: PerformRx and Amerihealth Caritas</p> <p>Monetary Conversions: Index year assumed 2011 in US dollars</p>	<p>Location: Pennsylvania, USA</p> <p>Setting: Central offices of pharmacy benefits manager (PBM)</p> <p>Eligibility: Patients diagnosed with T2DM or taking at least 1 T2DM med with polypharma.</p> <p>Sample Size: Two groups in intervention, Group 1 690, Group 2 264. 2 groups in control, Group 1 600 Group 2 210.</p> <p>Characteristics: <u>Group 1</u> Mean Age 53; Female 65.6%; Minority 63.4% T2DM 100% <u>Group 2</u> Mean 53; Females 70.5%; Minority 48.9% T2DM 100%</p> <p>Time Horizon:</p>	<p>Drug therapy management (DTM) that optimizes drug regimen, reduce adverse effects and increase adherence.</p> <p>Pharmacists reviewed adherence, used CDSS to identify gaps in care and self-monitoring, and prepared prescriber and patient interventions. Simplify regimens, reduce side effects and drug interactions. Suggestions made to prescribers and to patients indirectly through care managers. Care managers provided health education and coaching and counseling. Pharmacists available to care managers to assist in counseling. Pharmacists recorded each intervention and followed up to determine whether</p>	<p>No clinical outcomes reported</p> <p>Adherence: Highest acceptance of pharmacist recommendations were for medication adherence and for self-monitoring.</p> <p>Data Source: Pharmacist records</p>	<p>Intervention cost: NR</p>	<p>Healthcare cost: Reduction in healthcare cost Grp 1 573 per patient per year Grp 2 608 per patient per year</p> <p>Components Included in Healthcare Cost: Inpatient, ED, Medication, outpatient</p> <p>Source and Valuation: All cause claims data</p> <p>Measure Type: DiD</p> <p>Change in Mean Productivity: NR</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Good</p>	<p>No economic summary measures</p> <p>Limitations: Short duration</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
	Baseline Nov 2009-Oct 2010 and Intervention Nov 2010-Oct 2011 and analysis 6 month after intervention. Intervention length 12 months.	recommendations were accepted and the outcomes. Comparison: Usual care				
<p>Author (Year): Bunting et al. (2008)</p> <p>Medication Therapy Management</p> <p>Design: Longitudinal pre-post</p> <p>Method: Intervention plus healthcare cost</p> <p>Funding Source: Novartis through Pharmacist Association for data extraction from claims</p> <p>Monetary Conversions: Index year 2005 in US dollars</p>	<p>Location: Asheville, North Carolina, USA</p> <p>Setting: Community and hospital pharmacies</p> <p>Eligibility: Employees of City of Asheville and Mission Hospitals in self-insured plans (12,000 covered lives), with diagnosed HTN or dyslipidemia. Participation was by invitation.</p> <p>Sample Size: 620 met inclusion criteria for economic analysis and 565 for clinical.</p>	<p>Medication therapy management for hypertension and dyslipidemia. Adherence included.</p> <p>Pharmacists received certified CVD training. Self-care education by professionals. Face to face pharmacist consulting with patients. Participants matched to or chose care-manager (pharmacists), who they met every three months. Sessions usually 30 minutes. Goals based on Seventh Report of the Joint National Committee on Prevention,</p>	<p>BP measured every visit with pharmacist and lipids at least annually. Follow-up below is yearly compared to baseline.</p> <p>Change in SBP/DBP at F/U #: 423 with HTN data. From baseline at 137.3/82.6 1. -8.0/-3.5; 3. -9.8/-4.3; 5. -12.3/-6.7; 7. -11.0/-4.8 Percent with controlled BP increased from 40.2% to 67.4%</p>	<p>Intervention Cost: NR*</p> <p>*Intervention cost included in healthcare cost</p> <p>Components Included in Intervention Cost: NR</p> <p>Data Source: NR</p>	<p>Per Person Per Year Cardiovascular (CV)-Medical Costs: Historical: 1362 Intervention: 734 Difference: -628 Per person per month: -52.42</p> <p>Per Person CV-Pharma Costs Per Person Per Year: Historical: 287 Intervention: 846 Difference: 559 Per person per month: 45.83</p> <p>Cost of CV Events: Based on historical and intervention period CV events and mean event costs, events cost was 1,405,614 compared with actual costs of 476,688, a reduction of 928,926 in averted CV costs.</p>	<p>Savings from cost of averted CV events 928,926</p> <p>Savings in total medical costs exceeded the increase in cost of medications and the program.</p> <p>Author Conclusions: From health plan perspective, sum of medical plus pharma costs probably led to modest reduction in cost per member per year.</p> <p>If averted CV-events are also accounted, there may be substantial savings for the plans.</p> <p>Note: The program participants were not</p>

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	<p>Characteristics (All patients): Mean age:50.4; Male:46.4%; Caucasian: 83.7%; T2DM:25.3%; College:33.5%; CV events: less than 8.1%.</p> <p>Time Horizon: Enrollment Jan 2000 – Dec 2005. Major endpoint is 1-year follow-up. 6 year study.</p>	<p>Detection, Evaluation, and Treatment of High Blood Pressure (JNC-7) and Third Report of the Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (ATP-3) shared with patients and monitored.</p> <p>Comparison: None</p>	<p>Change in LDL-C (HDL-C) at F/U #: 424 with dyslipidemia Baseline was 127.2/48.0 1. -15.8 (0.6); 3. -22.6 (0.4); 5. -16.2 (-0.6); 7. -18.9 (-1.4)</p> <p>CV-Events: The number of CV events reduced significantly from 92 to 48 (OR=0.469).</p> <p>Measure Type: Pre to post</p>		<p>Components Included in Healthcare Cost: CV-related health care costs from claims for inpatient, outpatient, ED, pharma. Also includes intervention cost of reimbursement for 18 pharmacists, educators, and also reduced pharma copays for patients, study related laboratory testing.</p> <p>Source and Valuation: Based on 1189 historical patient-years claims and 1286 intervention period claims.</p> <p>Measure Type: DiD</p> <p>Change in Mean Productivity: NR</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Fair</p>	<p>selected from high risk with uncontrolled clinical indicators.</p> <p>Limitations: Pre-post design OOP incentive may attract those with health events in historical period</p>
<p>Author (Year): Carter et al. (1997)</p> <p>Design: RCT</p>	<p>Location: Illinois, USA</p>	<p>Pharmacist for intervention patients from the medical center were in in co-</p>	<p>Measured at 6 months</p> <p>Change in SBP/DBP</p>	<p>Intervention cost: NR</p>	<p>Change in healthcare cost: 140 per patient per year</p>	<p>No economic summary measures</p> <p>Limitations: Short duration</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
<p>Economic Method: Healthcare cost</p> <p>Funding Source: Illinois General Assembly</p> <p>Monetary Conversions: Index year assumed 1996 in US dollars</p>	<p>Setting: Community pharmacies</p> <p>Eligibility: HTN patients age 18 or older. Intervention patients from medical center with co-located retail pharmacy. Pharmacist determined invited patients to study based on interview. CVD excluded.</p> <p>Sample Size: Intervention 25 Control 26</p> <p>Characteristics: Mean Age 67; Females 76%; Adherence 95%; SBP/DBP 146/83; HTN 100%; CVD 0%.</p> <p>Time Horizon: Dates not reported. Intervention length 6 months</p>	<p>located retail pharmacy. BP and pulse recorded every month for 6 months. Also noted adverse drug reactions, compliance, with progress notes. Patient education about disease and lifestyle. Urgent changes in therapy communicated directly to physician.</p> <p>Comparison: Usual care</p>	<p>-6.0/-8.0 mm Hg</p> <p>Adherence: NR</p> <p>Data Source: Study records</p> <p>Measure Type: DiD</p>		<p>Components Included in Healthcare Cost: Medications and outpatient.</p> <p>Source and Valuation: Based on 6-month clinic charges. HTN-related.</p> <p>Measure Type: DiD</p> <p>Change in Mean Productivity: NR</p> <p>Quality of Capture: Fair</p> <p>Quality of Measurement: Fair</p>	<p>Only medications and outpatient considered in healthcare cost.</p>
<p>Author (Year): Chan et al. (2012)</p>	<p>Location: Hong Kong, China</p>	<p>Pharmacist met patient for 15-30 minutes before</p>	<p>Measured at baseline, and 9 months,</p>	<p>Intervention cost: Cost per patient over 9 months 64</p>	<p>Healthcare Cost:</p>	<p>5-year probability of CHD reduced 1.64%</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
<p>Design: RCT</p> <p>Economic Method: Intervention cost and partial healthcare cost</p> <p>Funding Source: School of Pharmacy, The Chinese University of Hong Kong and the Diabetes Research Fund, Diabetes Hong Kong</p> <p>Monetary Conversions: Index year assumed 2008 in US</p>	<p>Setting: Diabetes clinic in public hospital</p> <p>Eligibility: Diabetes nurses referred to pharmacists. Age 18 and older with DM2, A1c greater than 8%, and at least 5 medications one of which is a hypoglycemic. Those with existing CVD excluded.</p> <p>Sample Size: Interv. 51 Control 54</p> <p>Baseline Characteristics Mean Age 63.2; Female 41%; SBP/DBP 141/75; BMI 25.2; A1c 9.7%; CHD risk 2.16; Compliance 74%; T2DM 100%.</p> <p>Time Horizon: Study during the May 2008 to March 2009. Intervention</p>	<p>every visit with physician. Included medication history review. Each visit addressed areas of med adherence, knowledge & beliefs, skills, perceived health, and cognitive function. Tailored med adherence, CVD education, and lifestyle modifications provided. Notes made in medical record to physician for drug related problems. Provided color coded pill boxes and drug bags. Medications were for T2DM, BP, lipids, platelets.</p> <p>Comparison: Usual physician care in T2DM clinic without pharmacist services</p>	<p>intervention versus control</p> <p>Mean pharmacist interventions 5, with 33% related to adherence and 30% in lifestyle modification.</p> <p>Compliance (=number of tablets taken/correct number) improved by 20.5 pct pt.</p> <p>CHD risk score reduced 0.11. 5-year probability of CHD reduced 1.63 pct pt Stroke risk reduced 1.37. SBP/DBP reduced by 3.3/2.1 mmHg A1c reduced 1.17 pct pt. LDL reduced 0.33 % meeting ADA goals increased 6.9 pct pt</p>	<p>Components Included in Intervention Cost: Pharmacist time</p> <p>Data Source: Tracked in study</p> <p>Quality of Capture: Fair</p> <p>Quality of Measurement: Good</p>	<p>Not estimated except for predicted savings from MI avoided</p> <p>Productivity: NR</p>	<p>Intervention cost per patient 64 Cost per CHD event avoided 3902</p> <p>Average cost of MI treatment 8988.7</p> <p>Savings per patient 5086.3 over 5 years</p> <p>Limitations: Change in healthcare cost not estimated</p> <p>Short term</p> <p>Adherence self-reported</p> <p>Quality of Estimate: Fair</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
	length is 9 months Outcomes assessed at 9 months after start		Measure Type: DiD			
<p>Author (Year): Chen et al. (2016)</p> <p>Design: RCT</p> <p>Economic Method: Intervention cost and healthcare cost</p> <p>Funding Source: Department of Health, Taiwan</p> <p>Monetary Conversions: Index year assumed 2011 in New Taiwanese Dollars</p>	<p>Location: Nantou, Taiwan</p> <p>Setting: Hospital-based physicians and pharmacists for T2DM care</p> <p>Eligibility: Patients of Nantou hospital with T2DM and age 65 or older with A1c greater than or equal to 9.0%. Randomized patients referred by nurse case managers to pharmacist care.</p> <p>Sample Size: Intervention: 50 Control: 50</p> <p>Characteristics: Mean Age 72; Females 50%; SBP/DBP: 135/75;</p>	<p>Hospital participates in the pay for performance program (P4P) for T2DM care of the Ministry of Health. Four other diseases included in P4P. Incentives to providers for increase follow-up visits, self-care education, annual T2DM specific physicals, and lab tests.</p> <p>Team includes physicians, nurses and dieticians. Nurse case managers referred patients to diabetes pharmacist. Pharmacist also trained diabetes educator.</p> <p>Pharmacist care included assessment of</p>	<p>Measured at 6 months</p> <p>In person visits with pharmacist at enrollment and 1.86 times during study. There were 2.48 mean number of phone contacts.</p> <p>A1c: Interv: 9.22 to 8.39% Control: 8.94 to 9.37% DiD: 1.26 pct pt</p> <p>Study reports difference as 0.83% pct pt (assume this is after statistical adjustments).</p> <p>Adherence: Not reported except a note that states, "our patients strictly adhered to their medications...".</p>	<p>Intervention Cost per patient over 6 months: Interv: 1336.9 Control: 132.0 Diff: 1204.90</p> <p>Components included in intervention cost: Pharmacist time and salary, telephone fees, supplies, education handouts, adherence aids.</p> <p>Source and Valuation: Patient medical records and wage rates and cost of supplies</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Good</p>	<p>Change in Payment Points* Interv: -624 Control: -418.75 Diff: 205.25</p> <p>Diff in cost intervention v control: 188.83</p> <p>(Ratio New Taiwanese Dollar/payment points = 0.92)</p> <p>Components Included in Healthcare Cost: Outpatient visits, pharmacist intervention cost, inpatient</p> <p>Source and Valuation: Insurance claims. See components for intervention cost.</p> <p>Measure Type: DiD</p> <p>Change in Mean Productivity: NR</p>	<p>Diff in intervention cost: 1204.90 Diff in healthcare cost: -188.83 Net Benefit of Intervention: -1016.07*</p> <p>Hence, the evidence indicates the intervention is cost increasing. A prior preliminary analysis of the P4P program showed inpatient cost was reduced, see Lee et al (2010). This could offset the net increase in cost found in the short-term study.</p> <p>*Computed by Reviewers</p> <p>Author Conclusion: The authors suggest the P4P intervention for T2DM may be healthcare cost-saving though the estimate is cost-increasing but</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
	<p>No High School: 78%; Years with T2DM: 13 years; A1c 9.2%; Charlson Comorbid: 3.22.</p> <p>Time Horizon: Intervention from Aug 2011 to Feb 2012</p> <p>Intervention length 6 months</p>	<p>adherence, appropriateness of medication, and drug problem resolutions with follow-up. Also evaluated cognition and depression. Provided diabetes education, recommendations to physicians, and referrals to other care providers. Changes to meds confirmed by physicians after pharmacist counseling.</p> <p>Follow-up visits supplemented by monthly phone calls, and home visits if necessary.</p> <p>Comparison: Usual care for T2DM patients at hospital clinics</p>	<p>Measure Type: DiD</p>		<p>Quality of Capture: Fair</p> <p>Quality of Measurement: Good</p>	<p>insignificant in this 6-month study.</p> <p>Limitations: Short duration</p> <p>Quality of Estimate: Fair</p>
<p>Author (Year): Christensen et al. (2007)</p> <p>Design: Pre to post with matched controls</p> <p>Method:</p>	<p>Location: Durham and Orange Counties, North Carolina, USA</p> <p>Setting: 8 community pharmacies and 2</p>	<p>Intervention: SHP employees offered MTM-type service at no cost with pharmacist local to their home address</p>	<p>Percent of patients with PDTPs identified at first or follow-up visit: Drug underuse 70%; More cost-effective drug available</p>	<p>Intervention Cost: Pharmacists compensated at 120 (60 min) for first visit and 60 (30 min) for follow-up</p>	<p>Per Person 6-month Medication Cost to Payer (Out-of-pocket): Intervention -90.10 (34.30) Control 1 -35.40 (54.30) Control 2 -97.3 (-46.10)</p>	<p>No summary measures estimated</p> <p>Limitations: Short duration. Note the 2 clinical pharmacists in the medical offices saw 36% of the patients.</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
<p>Partial intervention cost and healthcare cost</p> <p>Funding Source: North Carolina State Employees Health Plan and Institute for Advancement of Community Pharmacy Practice</p> <p>Monetary Conversions: Index year assumed 2004 in US dollars</p>	<p>clinical pharmacists</p> <p>Eligibility: Medication Therapy Management (MTM)-type program offered to North Carolina State Health Plan (SHP) employees. Targeted patients with large number of prescriptions identified from 1000 highest utilizers from medication claim files.</p> <p>Sample Size: Initial intervention group 130. 85 scheduled visits and 80 had follow-up.</p> <p>Characteristics: Mean Age:68; Male:37%; Younger than 65 (65 or older) percent with disease: Diabetes:37% (45%);</p>	<p>Pharmacists underwent 3-hour education and training focusing on documentation and case studies.</p> <p>Two visits allowed, one initial and one follow-up.</p> <p>Services included drug profile review, identification of potential drug therapy problems (PDTPs) and patient concerns, recommendations for therapy changes to physician, and follow-up to determine if problems resolved.</p> <p>Comparison: Two propensity score matched control groups: SHP employees in Wake County, NC and those who did not get MTM intervention. These received usual care of pharmacists.</p>	<p>60%; Suboptimal drug 50%.</p> <p>Percent of patients by pharmacist recommendations: Add drug 40%; Change a drug 50%; Alter administration/adherence/technique 15%.</p> <p>Type of counseling provided: Medication adherence and self-care 60% Self-monitoring device use 15%</p> <p>Therapy change occurred in 50% of patients</p> <p>Measure Type: Post only</p>	<p>Components Included in Intervention Cost: Pharmacist time</p> <p>Source and Valuation: Pharmacist visit encounter forms</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Good</p>	<p>Components Included in Healthcare Cost: Medication</p> <p>Source and Valuation: Claims data 6 months before first encounter and 6 months after. Matches found for 67 of 80 patients.</p> <p>Measure Type: DiD</p> <p>Authors conclude there was no difference in medication costs.</p> <p>Change in Mean Productivity: NR</p> <p>Quality of Capture: Limited</p> <p>Quality of Measurement: Fair</p>	<p>Patients who went to clinical pharmacist more likely to receive counseling on drug use such as adherence (100% v 84.2%).</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
	<p>HTN 48% (63%); Dyslipidemia 22% (35%); Any CVD 30% (55%)</p> <p>Time Horizon: Pilot program started Aug 2004. Length of intervention analyzed is 6 months.</p>					
<p>Author (Year): Chung et al. (2011)</p> <p>Design: Pre to post with control</p> <p>Economic Method: Intervention cost</p> <p>Funding Source: The School of Pharmacy, The Chinese University of Hong Kong</p> <p>Monetary Conversions: Index year assumed 2006 in US dollars</p>	<p>Location: Hong Kong, China</p> <p>Setting: Outpatient Lipid Clinic in public hospital</p> <p>Eligibility: Patients diagnosed with dyslipidemia and visiting lipid clinic (resistant dyslipidemia). No exclusion based on existing CHD.</p> <p>Sample Size: Intervention: 150 Control: 150</p> <p>Characteristics: Mean Age 56; Female 45%;</p>	<p>Clinic patients routinely visited every 16 to 26 weeks, with lab works done 2 weeks prior</p> <p>For intervention, patients met with pharmacist 3 times during 24-month study, usually to coincide with dates of routine clinic visit. Pharmacist made drug therapy suggestions to physicians, if necessary. Pharmacist performed patient education and follow-up of lipid profile and assessed Framingham risk</p>	<p>All effects except adherence measured at 24 months intervention versus control</p> <p>LDL-C: -0.49 HDL-C: 0.05 Total Cholesterol: -0.66 Triglycerides: -0.42</p> <p>Adherence* (Intervention Only) 2.3 pct pt Adherent (Intervention Only) 13.7 pct pt</p>	<p>Within study intervention cost: 114.84 per patient per year</p> <p>Scaled intervention cost to treat all ~5500 dyslipidemia patients per year 52635, at 9.68 per patient per month</p> <p>Components Included in Intervention Cost: Pharmacist time in documentation, educational visits, and follow-up calls</p> <p>Data Source: Trial records and Hong Kong pharmacist average salary</p>	<p>Change in Healthcare Cost: Potential avoidance of 6 million in healthcare cost due to acute myocardial infarctions avoided per year, 770 MIs at cost of 8010 per event.</p> <p>Components Included in Healthcare Cost: All costs for myocardial infarction.</p> <p>Source and Valuation: Based on incremental numbers with LDL-C at goal. *The assumption that risk of MI is zero for those with LDL-C at goal may be problematic.</p> <p>Measure Type: Post only</p>	<p>Extrapolation to cost of MI avoided: Authors compare this to intervention cost of 116 per patient per year</p> <p>Reviewers Calculations: Cost avoided 6,167,700 Intervention scaled cost 638,880 B/C 9.6</p> <p>Limitations: Not randomized or blinded Specialized lipid clinic</p> <p>Notes: Adherence already high at 77%</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
	<p>LDL-C 3.53 mmol/L; HDL-C 1.60mmol/L; CHD-Risk Moderate 9.3%; High 32.7%; HTN 50.7%; T2DM 26.7%; Existing CVD <=20%; Mean Adherence 77.5%; Adherent 57%.</p> <p>Time Horizon: Intervention length 24 months</p> <p>Recruitment starting Oct 2005</p>	<p>score. Activities included explaining clinical values to patient, importance of medication and adherence, medication side effects, suggested lifestyle changes, and relationship of lipid profile to CHD risk. Patients provided with educational leaflet on dyslipidemia. Pharmacist phone number provided and pharmacist make check-up phone calls once a month following checklist on well-being, adherence, and drug issues.</p> <p>Patients also provided adherence aids – pill boxes, diaries, reminder calls, and calendars.</p> <p>Comparison: Routine lipid clinic care from physician without pharmacist</p>	<p>*Compliant defined as compliance => 75%.</p> <p>All 7 alterations to drug therapy recommended by pharmacist rejected by physician or patient.</p> <p>Measure Type: DiD except for Adherence</p>	<p>Mean visits with pharmacist in 24 months: 3.34 Mean length of visit: 20 minutes Mean phone calls: 16.3 Mean length of call: 10 minutes</p> <p>Time to document: 3.08 minutes per patient per week</p> <p>Total of documenting and clinical time was 7.04 per patient per week</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Good</p>	<p>Productivity NR</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Fair</p>	<p>Percent achieving goals LDL-C reduced as CHD risk score increased similar to other trials</p> <p>Quality of Estimate: Fair</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
<p>Author (Year): Connor et al. (2009)</p> <p>Design: Pre post</p> <p>Economic Method: Healthcare cost</p> <p>Funding Source: None</p> <p>Monetary Conversions: Index year assumed 2007 in US dollars</p>	<p>Location: Pennsylvania, USA</p> <p>Setting: Community pharmacies</p> <p>Eligibility: Patients referred to pharmacists by nurses and physicians from community health center. No disease focus.</p> <p>Sample Size: Intervention 100</p> <p>Characteristics: Mean Age 49; Female 33%; Minority 61%; SBP/DBP 137/85 mm Hg; LDL-C 108 mmol/dL; A1c 10.3%; Less than HS 68%; Medicaid 100%; CVD 0%; T2DM 74%; HTN 54%; Dyslipidemia 29%</p> <p>Time Horizon:</p>	<p>Following MTM model from Univ of Pittsburgh School of Pharmacy implemented by 2-day trained pharmacists. Each encounter records including clinical indicators entered into patient medication record. Individualized recs for self-monitoring. Has action plan and remedies for access to meds such as PMAP. Medications reviewed for appropriateness, effectiveness, and access. Drug related problems recorded including noncompliance. Patient education about disease, lifestyle, medication, and self-monitoring.</p> <p>Comparison: None</p>	<p>Measured at 12 months</p> <p>Reduction in SBP/DBP: -2.7/-2.7</p> <p>Reduction LDL-C: -16 mmol/dL</p> <p>Reduction A1c: -1.2 pct pt</p> <p>Adherence: NR</p> <p>Measure Type: Pre post</p>	<p>Intervention cost NR</p>	<p>Healthcare cost: Reduced 2916 per patient per year</p> <p>Components Included in Healthcare Cost: Reduced out of pocket cost for medications</p> <p>Source and Valuation: Cost of PMAP program. Measured at 12 months.</p> <p>Measure Type: Pre to post</p> <p>Change in Mean Productivity: NR</p> <p>Quality of Capture: Limited</p> <p>Quality of Measurement: Fair</p>	<p>No economic summary measures</p> <p>Limitations: Short duration ROPC for medication cost only based on PMAP program</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
	Jan 2007 to Jan 2008 Intervention length 12 months					
<p>Author (Year): Cote et al. (2003)</p> <p>Design: Pre post with control</p> <p>Economic Method: Intervention and healthcare cost</p> <p>Funding Source: University of Laval and Department of Health, Quebec</p> <p>Monetary Conversions: Index year assumed 1998 in Canadian dollars</p>	<p>Location: Canada</p> <p>Setting: Community pharmacies</p> <p>Eligibility: Pharmacists opted into study and control groups. Patients with uncontrolled BP flagged at refill visit and offered study participation.</p> <p>Sample Size: Intervention 41 Control 59</p> <p>Characteristics: Age % less than 65 37% in intervention and 51% in control; Female 65%; Less than HS education 32%; HTN 100%.</p> <p>Time Horizon:</p>	<p>Pharmacists opted into intervention and control. Pharmacist used CDSS to flag uncontrolled BP patients and also identified adherence. Intervention options followed by pharmacist driven by CDSS recommendations. Intervention activities occurred every refill visit.</p> <p>Comparison: Usual care</p>	<p>No clinical outcomes reported</p> <p>Adherence: Adherence not reported.</p>	<p>Cost per patient per year 120</p> <p>Components included in intervention cost: Pharmacist time for BP readings, instructions, verbal interventions with participants, opinions to physicians, CDSS development cost and service cost. Patient time.</p> <p>Source and Valuation: Study records and local wages</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Good</p>	<p>Change in Healthcare Cost: -290.60 per patient per year</p> <p>Components Included in Healthcare Cost: Medications, inpatient, outpatient</p> <p>Source and Valuation: Pharmacist records, claims, and local wage rates</p> <p>Measure Type: DiD</p> <p>Change in Mean Productivity: NR</p> <p>Quality of Capture: Fair</p> <p>Quality of Measurement: Fair</p>	<p>Authors report benefit-cost ratio of 9.6:1.0</p> <p>However, the estimate is based on an unrealistic scaling up of intervention cost to Quebec province.</p> <p>Limitations: Short duration Unrealistic scaling in author reported cost-benefit</p> <p>Quality of Estimate: Fair</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
	Recruit Oct 1998 to Dec 1999 Intervention length 9 months					
<p>Author (Year): Cranor et al. (2003)</p> <p>Design: Pre to post</p> <p>Economic Method: Intervention plus healthcare cost</p> <p>Funding Source: None reported</p> <p>Monetary Conversions: Index year 2001 in US dollars</p>	<p>Location: Asheville, North Carolina, USA</p> <p>Setting: Community pharmacies</p> <p>Eligibility: Patients with diabetes from 2 employer groups, City of Asheville and a local hospital, offered intervention as a wellness program.</p> <p>Sample Size: Intervention: 187 for clinical cohort and 157 for economic cohort at baseline</p> <p>Characteristics: Mean Age 47.7; Female 51%; Caucasian 83%; Type 1 diabetes 27%; A1c 7.8%; LDL-C 116</p>	<p>Pharmaceutical Care Services (PCS) of Asheville Project</p> <p>Community pharmacists, reimbursed for services, including setting treatment goals, monitoring goals, diabetes and lipid management education, device training, adherence monitoring and counseling. Also performed physical exam of feet, skin, BP, and weight. Diabetes education center (DEC) with certified diabetes educators available to patients. Patient incentives of home glucose monitors and waiver of co-pays for all diabetes medications and supplies. Pharmacist made referrals to</p>	<p>Cohort considered for economic evaluation had to have at least 1 PCS visit and 6 months pre intervention data on A1c.</p> <p>Self-reported adherence to medications, ADA guidelines for tests and exams.</p> <p>Effects measured versus baseline every 6 months for 5 years.</p> <p>Change in A1c at F/U #: 1. -1.1; 3. -0.9; 5. -0.9; 7. -1.1</p> <p>Change in % with optimal A1c 1. 24.3; 2. 27.2; 3. 18.2%</p>	<p>Cohort considered for economic evaluation had to have at least 1 PCS visit and 6 months pre intervention data on healthcare cost.</p> <p>Intervention Cost: NR</p> <p>Was not possible to extract PCS-related costs from claims. So, intervention cost included in healthcare cost.</p> <p>Components Included in Intervention Cost: NR</p> <p>Data Source: NR</p>	<p>Change in Mean Healthcare Cost at F/U Year #: 1. -2704; 3. -3908; 5. -6502</p> <p>Change in Mean Medication Cost at F/U #*: 1. 656; 3. 1932; 5. 2188</p> <p>* 60% of medication cost was related to diabetes</p> <p>Components Included in Healthcare Cost: All cause inpatient, outpatient, ER visits, labs, PCS services, copay waivers, medications. Separate estimates for DEC visits, diabetes supplies, and diabetes medications.</p> <p>Note inclusion of intervention costs.</p> <p>Source and Valuation: All cause medical records and claims</p>	<p>Total healthcare cost (which includes cost of intervention): Cost per patient per year decreased from payer perspective</p> <p>Notes: Unclear where the comparison group was used in any of the analysis. The demonstration program is now a permanent part of the health benefits.</p> <p>Quality of Estimate: Fair</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
	<p>Time Horizon: Enrollment during 1997-2001</p> <p>Annual follow-up over 7 years</p>	<p>physician or DEC as necessary.</p> <p>Pharmacists underwent diabetes education training. PCS without strict protocol incorporated into usual pharmacy care.</p> <p>Comparison: None</p>	<p>Change in LDL-C at F/U #: 1. -4.2; 3. -9.3; 5. -3.2</p> <p>Change in % with optimal LDL-C 1. 2.4; 2. 8.5; 3. 20.9 5. 15.8</p> <p>Change in HDL-C at F/U #: 1. 1.1; 3. 1.9; 5. 3.3</p> <p>Change in % with optimal HDL-C 1. 4.0; 3. 10.9; 5. 15.0</p> <p>Change in Adherence NR</p> <p>Change in self-care: Patients self-reported improvements in diabetes self-care and monitoring</p> <p>Measure Type: Pre to post</p>		<p>Diabetes and all cause prescription claims available</p> <p>Change in Mean Productivity: Increase of 18,000 per year for one employer</p> <p>Components Included in Productivity: Absences due to illness from employer records.</p> <p>Measure Type: Pre to post</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Fair</p>	
<p>Author (Year): Dehmer et al. (2018)</p>	<p>Location:</p>	<p>Home Blood Pressure Telemonitoring and</p>	<p>Effect measured at 12 months</p>	<p>Cost per patient over 12 months 1350</p>	<p>All Cause Medical Cost per patient per year:</p>	<p>Cost per Additional Person with Controlled BP</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
<p>Linked to Margolis et al. (2013)</p> <p>Design: Modeled based on RCT</p> <p>Method: Cost per health outcome</p> <p>Funding Source: National Heart, Lung, and Blood Institute (NHLBI).</p> <p>Monetary Conversions: Index year assumed 2010 in US dollars</p>	<p>Minneapolis-St. Paul, Minnesota, USA</p> <p>Setting: Community pharmacies</p> <p>Eligibility: HealthPartners enrollees age 21 years or older with 2 or more primary care visits. SBP/DBP > 140/90, uncontrolled.</p> <p>Sample Size: Intervention 148 Control 150</p> <p>Characteristics: Mean age:63; Male:54%; Caucasian: 86.6%; Diabetic:13%; CKD: 12%; Household income at least \$50K: 67.5%; SBP/DBP: 148/83; CVD: 9.7%</p> <p>Time Horizon: Recruitment March 2009 to April 2011</p>	<p>Pharmacist Care Management to Control Hypertension (Hyperlink)</p> <p>Pharmacist case management with home blood pressure monitoring. Received home blood pressure monitors that record and transmit to secure website (AMC Health, NY, NY).</p> <p>Initial 1-hour patient visit with pharmacists trained in MTM, to establish care and train in use of BP device. Transmit 3 morning and 3 evening readings per week. Phone meeting with pharmacist every 2 weeks during first 6 months, until BP controlled for 6 weeks, after which meet monthly. Phone meet every 2 months during second 6 months. Phone meetings emphasized</p>	<p>after end of intervention.</p> <p>Change in SBP/DBP in Trial: SBP/DBP: -9.7/-5.1</p> <p>Change in % with BP Control: 18.4 pct pt</p> <p>Measure Type: DiD</p>	<p>Components Included in Intervention Cost: Study explicitly states inclusion of BP monitor, landline and BP readings transmission service. Pharmacist time in patient encounters. The subscriptions service was over 100 per month.</p> <p>Source and Valuation: Study records and pharmacist log of encounters.</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Good</p>	<p>-281.40</p> <p>HTN and CVD- Cause Medical Cost per patient per year Labs HTN increased 15.60 Labs Lipids increased 14.40 HTN Medications 126.00 Lipid Medications - 44.20 CVD Inpatient -497.60</p> <p>Components Included in Healthcare Cost: Medications, Inpatient, Labs</p> <p>Source and Valuation: Claims data. Primary analysis based on 'all cause' and secondary analysis based on 'HTN- and CVD-related causes'.</p> <p>Measure Type: DiD</p> <p>Change in Mean Productivity: NR</p> <p>Quality of Capture: Fair</p> <p>Quality of Measurement: Fair</p>	<p>7337</p> <p>Cost per mm Hg SBP 139</p> <p>Cost per mm Hg SBP 265</p> <p>Base case is intervention cost only because change in healthcare cost was not significant.</p> <p>Intervention cost plus cost of HTN medications per additional Person with Controlled BP: 7782</p> <p>Authors conclude team-care with pharmacist case management had no significant impact on short term medical costs.</p> <p>Limitations: Short duration. Small sample</p> <p>Quality of Estimate: Fair</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
	Intervention length 12 months	lifestyle changes and medication adherence. Drug therapy adjusted as needed. Pharmacist communicated with PCP through electronic medical records. Comparison: Usual care with pharmacist referral possible				
<p>Author (Year): Fabel et al. (2019)</p> <p>Design: Pre to post</p> <p>Economic Method: Intervention cost and healthcare cost</p> <p>Funding Source: University of South Carolina School of Pharmacy</p> <p>Monetary Conversions: Index year assumed 2014 in US dollars</p>	<p>Location: North Charleston, South Carolina, USA</p> <p>Setting: Clinical pharmacist in primary care practice.</p> <p>Eligibility: Patients served by North Charleston location of PPCP</p> <p>Collaboration between University of South Carolina College of Pharmacy and Palmetto Primary Care Physicians (PPCP). PPCP has</p>	<p>Comprehensive Medication Management (CMM) services</p> <p>Clinical pharmacist within an existing primary care team based on the patient-centered medical home model of care. Study objective is to determine business sustainability. Pharmacist reviewed EMR for patients appropriate for his services. Physicians also referred patients to pharmacist.</p>	<p>Measured at 12 months</p> <p>A1c: Reduced 2.5 pct pt from 12.1% to 9.6%</p> <p>LDL-C: Reduced 37 from 162 to 125</p> <p>SBP/DBP: Reduced 9/10 from 150/94 to 141/84</p> <p>Adherence: Not reported</p> <p>Source and Valuation: Retrospective chart review</p>	<p>Pharmacist cost per year 135000</p> <p>Components included in intervention cost: Salary and benefits, computer, drug information resources, professional memberships.</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Good</p>	<p>Annual cost avoidance calculated based on types of interventions performed by pharmacist: 1.9 million</p> <p>Components of Cost Avoided: Hospitalization cost of adverse drug reaction.</p> <p>*This is conjecture though authors state the calculations are based on published methods. Further, the focus on inpatient costs likely overestimates the true cost.</p> <p>Revenues from billing for pharmacist services:</p>	<p>No summary economic measures</p> <p>Authors compare the cost of pharmacist services and the direct billing plus physician revenues.</p> <p>Note the pharmacist was absorbed as an employee after the study. PPCP then expanded the model to an additional location and pharmacist.</p> <p>Author Notes: Took 5 months for number of encounters with pharmacist to increase due to inertia in physician referrals.</p> <p>Limitations:</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
	<p>agreements with insurance providers to be compensated for collaborative care of T2DM, billing for MTM and “incident to physician E/M codes”. Study location of PPCP had 5 physicians, and 2 nurse practitioners serving 20,000 patients.</p> <p>Agreement with Pharmacy school embedded DPharm pharmacist into the clinic team for 1 year and employed by clinic. Clinic provided necessary equipment, supplies, and private counseling space, access to EMR.</p> <p>Sample Size: Intervention: NR</p> <p>Characteristics:</p>	<p>Pharmacist reviewed patient medical history related to medications and outcomes. Manage regimens within treatment guidelines. Provide counseling on medications, nutrition, life-style, and self-management, and adherence. Limited physical exams. Order diagnostic tests and devices to support medication treatment.</p> <p>Comparison: None</p>	<p>Measure Type: Pre to post</p>		<p>Daily pharmacist-patient encounters (direct billed revenue) ranged from 6.4 (1025) in early months to 11.2 (7398) in later months. Note authors consider daily encounters at full capacity to be 16.</p> <p>Reimbursed cost of pharmacist was calculated to be 65% of pharmacist program cost.</p> <p>Average increase in annual revenue per physician after employment of pharmacist: 14,554</p> <p>Measure Type: Pre to post</p> <p>Change in Mean Productivity: NR</p> <p>Quality of Capture: Limited</p> <p>Quality of Measurement: Fair</p>	<p>No control Cost versus revenue analysis</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
	<p>36% of clinic patients were 65 or older</p> <p>Time Horizon: Intervention length is 12 months. Period from October 2013 through September 2014.</p>					
<p>Author (Year): Fishman et al. (2013)</p> <p>Linked to Green et al. (2008)</p> <p>Design: Based on RCT</p> <p>Economic Method: Program cost and cost-effectiveness.</p> <p>Funding Source: National Heart Lung and Blood Institute grant.</p> <p>Monetary Conversions: Index year assumed 2009 in US dollars.</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 years 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>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>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</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 physician contact. 3 pharmacists equally</p>	<p>Healthcare cost from study records: Statement that there was no significant difference in inpatient, outpatient, ED. Except higher specialist visits for pharmacist arm.</p> <p>Productivity gains: NR</p> <p>Measure Type: DiD</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Good</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:</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
	<p>Characteristics: <u>BPM Arm</u> Age 25 to 54 29.3%; Age 55 to 64 41.3%; Age 65 to 75 29.3%; Females 45.9%; Caucasian 86.1%; Less than High School 7.3%; SBP 152.2 mmHg; DBP 89.0 mmHg.</p> <p><u>BPM+ Arm</u> Age 25 to 54 27.6%; Age 55 to 64 43.7%; Age 65 to 75 28.7%; Females 55.9%; Caucasian 79.3%; Less than High School 8.0%; SBP 152.2 mmHg; DBP 88.9 mmHg.</p> <p>Time Horizon: Intervention length is 12 months.</p>	<p>Home BP Monitoring Plus Pharmacist Care (BPM+) All features of BPM and care 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>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># 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 BPM+ relative to others.</p> <p>Increased life years gained modeled based on BP control.</p> <p>Measure Type: DiD for blood pressure.</p>	<p>shared the panel (87 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>Quality of Capture: Good</p> <p>Quality of Measurement: Good</p>		<p><u>BPM vs Usual</u> 23.76 <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 while other organizations may need to bundle providers from different systems. Trial involved mostly white patients with web</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
	Trial period June 2005 to December 2007.	Comparison: Usual Care, patients provided wallet card with BP numbers, pamphlet on BP control, medication adherence and 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.				access. No patient costs considered. Quality of Estimate: Good
<p>Author (Year): Isetts et al. (2012)</p> <p>Design: Pre post with control</p> <p>Economic Method: Healthcare cost</p> <p>Funding Source: Allina Health Systems Innovation and University of Minnesota</p> <p>Monetary Conversions:</p>	<p>Location: Minneapolis-St. Paul, Minnesota, USA</p> <p>Setting: Primary care clinics</p> <p>Eligibility: Patients in pilot CMI clinics with chronic diseases. Focus of effectiveness is diabetes.</p> <p>Sample Size: Interv: CMI implemented in 4</p>	<p>Pilot Care Model Innovation (CMI) Shared savings contract with payer. Medication Therapy Management with team-based patient-centered approach to medication use to help patients achieve desired treatment goals and resolve drug related problems impeding progress to goals. Collaboration between Fairview</p>	<p>For CMI patients receiving MTM services: Mean of 2.13 MTM encounters 4135 drug therapy problems resolved composed of: Adherence 20%; Unnecessary drug 5%; Additional or different drug 28.5%; Dose change 38%;</p>	<p>Intervention Cost: NR *Intervention cost likely included in healthcare cost estimates because the intervention is team-based care with substantial labor component.</p>	<p>Change in Median per Month per Member Cost from Dec 2008 to March 2010 CMI Clinics (341 to 354)3.7% Control (366 to 420) 14.7% Diff -41</p> <p>Components included in intervention cost: NR. Presumably all components.</p> <p>Source and Valuation: NR</p> <p>Measure Type:</p>	<p>No economic summary measures</p> <p>Author Notes: Favorable cost outcomes and favorable outcomes for cost sharing contracts in the ACO from CMI pilot caused Fairview Health Services to expand CMI to other 38 clinics.</p> <p>Limitations: No details of clinical outcomes</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
<p>Index year assumed 2009 in US dollars</p>	<p>clinics. 823 patients had MTM services. Control: 38 clinics</p> <p>Characteristics: Age 15 to 88; Females 60%; Mean number medical conditions 6.4. Most common conditions were HTN, dyslipidemia, and diabetes.</p> <p>Time Horizon: CMI pilot funding began in 2009. Healthcare cost assessed from Dec 2008 through March 2010.</p>	<p>Health Services clinics and University of Minnesota academic health centers. Care teams consist of physicians, nurses, pharmacists, diabetes educators, dieticians, and health coaches. Organized as accountable care organization (ACO) moving away from fee for service to rewards for improved outcomes and quality at reduced cost.</p> <p>Pharmacist contributions: MTM consultations; in-person, telephone, home visits, or co-visits; conferences to discuss patients not at goal; collaborative practice agreements for care of patients with diabetes and other chronic conditions.</p> <p>Comparison:</p>	<p>Drug reaction 8%.</p> <p>Benchmarks for Diabetes Care: Patients meeting 5 performance benchmarks</p> <p>Comparison Group Statewide (5-year period): Increased from 6% to 17.5%</p> <p>CMI Clinic patients 40% in 2009</p> <p>Data Source: Minnesota Community Measurement Program and pilot program data.</p> <p>Measure Type: Pre to post</p>		<p>Pre to post</p> <p>Change in Mean Productivity: NR</p> <p>Quality of Capture: Fair</p> <p>Quality of Measurement: Good</p>	

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
		Usual care in other system clinics				
<p>Author (Year): Kraemer et al. (2012)</p> <p>Design: RCT</p> <p>Economic Method: Intervention and healthcare cost</p> <p>Funding Source: Community Pharmacy Foundation, Sanofi-Aventis, Lane County Pharmacists Association</p> <p>Monetary Conversions: Index year assumed 2010 in US dollars</p>	<p>Location: Oregon, USA</p> <p>Setting: Community pharmacies.</p> <p>Eligibility: Employees of multiple schools and cities. Pharmacist intervention with ROPC for meds and supplies (for control also) for opted-in beneficiaries of employer plan with T2DM type 1 or 2.</p> <p>Sample Size: Intervention 36 Control 31</p> <p>Characteristics: Mean Age 56; Female 39%; Caucasian 90%; HTN 72%; T2DM 100%; Dyslipidemia 69%; Commercial insured 100%;</p>	<p>Pharmacist intervention with ROPC for meds and supplies (for control also) for opted-in beneficiaries of employer plan with type 1 or 2 diabetes.</p> <p>Pharmacist underwent 14-hour didactic training. Progress note sent to physicians, but not required. Pharmacist and patient agreed to meet every month first three months and every 1 to 3 months thereafter. Pharmacists counseled patients in private area. Details on activities not provided but outcomes measured included adherence barriers, diabetes knowledge, and satisfaction with care.</p> <p>Comparison:</p>	<p>Measured at 12 months</p> <p>SBP/DBP: -5.9/-1.9</p> <p>LDL-C: -4</p> <p>A1c: -0.34</p> <p>Adherence ASK-20 total barrier score reduced 0.4</p> <p>Data Source: Study records</p> <p>Measure Type: DiD</p>	<p>Intervention cost per patient per year 225</p> <p>Components included in intervention cost: Pharmacist time</p> <p>Data Source and Valuation: Pharmacist records</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Good</p>	<p>Change in healthcare cost per patient per year: -43</p> <p>Components Included in Healthcare Cost: All and T2DM related medical (inpatient, outpatient, labs, ED) plus T2DM, HTN, dyslipidemia medications and T2DM supplies.</p> <p>Source and Valuation: Claims from one year baseline pre intervention compared to intervention year, versus control.</p> <p>Measure Type: DiD</p> <p>Change in Mean Productivity: NR</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Good</p>	<p>No economic summary measures</p> <p>Limitations: Short duration</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
	<p>Unemployed 0%; SBP/DBP 136.3/80.6; A1c 7.28%; LDL-C 99.5 mmol/dL; Adherence ASK-20 score 4.0</p> <p>Time Horizon: Period of intervention not reported. Intervention length 12 months.</p>	<p>Usual care with both control and intervention receiving ROPC.</p>				
<p>Author (Year): Kulchaitanaroaj et al. (2017)</p> <p>Linked to Carter et al. 2008 and Carter et al. 2009</p> <p>Design: Markov Cohort Model based on RCTs</p> <p>Economic Method: Cost per QALY gained</p> <p>Funding Source: No external funds</p> <p>Monetary Conversions:</p>	<p>Location: Midwest, USA</p> <p>Setting: Modeled for primary care setting.</p> <p>Eligibility: Patients for cohort model drawn from RCTs.</p> <p>Sample Size: Cohort model based on 399 patients from RCTs</p> <p>Population Characteristics: Mean Age 56.7;</p>	<p>Team-based care co-led by pharmacists and Primary Care Providers (PCPs) located in same clinics.</p> <p>Pharmacist provided recommendations to PCP to address suboptimal therapy in face to face interactions, phone calls, or written communication. Pharmacist counseled patients on medication and lifestyle.</p>	<p>Effects from RCTs: Authors note success of trial including BP reduction, was due to initiation or dosage change for hypertensive medications.</p> <p>Main modeled RCT Outcome: SBP reduction at 6 months: 6.8 for control and 18.8 for intervention</p> <p>Reduction is maintained</p>	<p>Incremental cost per patient 329.15 (from RCT, Kulchaitanaroaj 2012)</p> <p>Separate intervention cost not provided in the model.</p> <p>Components Included in Intervention Cost: Pharmacist time, PCP time, specialist time, in collaboration activities, overheads.</p> <p>Data Source: Records from two RCTs</p>	<p>Incremental Modeled lifetime total healthcare plus intervention cost per patient: 3817.54</p> <p>Components Included in Healthcare Cost: Modeled substantially cost of CVD events. Inpatient, ED, outpatient, medications, nursing home care, home care.</p> <p>Source and Valuation: Modeled CVD events. HCUP data, Medicare/Medicaid fees, and published studies for unit prices.</p>	<p>Cost per QALY gained</p> <p>Base-case: Lifetime 26,808 5-Year 78547 10-Year 39085</p> <p>Intervention was cost-effective based on willingness to pay of 50K to 100K 48.6% of the time under multivariable sensitivity analysis.</p> <p>Intervention was cost-effective based on multivariable sensitivity analysis over a lifetime horizon,</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
<p>Index year is 2015 in US dollars</p>	<p>With CVD 11.3%; SBP/DBP 151.4/86.9; White 86%; Female 57.4%</p> <p>Time Horizon: Original RCTs were 6 and 9 months. Modeled over lifetime.</p>	<p>Comparison: Usual PCP care</p>	<p>through 24 months and then deteriorates to level for control at 3, 4, and 5 years.</p> <p>Modeled outcomes: Acute coronary syndrome (ACS), heart failure, stroke, death. Model used 6 month cycles over lifetime, 5, and 10 years.</p> <p>Transition and recurrence probabilities based on studies from literature search.</p> <p>QALY QALY increased by 0.14 per patient</p> <p>Utility weights associated with CVD events based on EQ-5D for US communities and MEPS data.</p>	<p>Quality of Capture: Good</p> <p>Quality of Measurement: Good</p>	<p>Measure Type: DiD</p> <p>Productivity: NR</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Good</p>	<p>with cost per QALY less than 50K.</p> <p>Sensitivity Analysis: Different profiles of patient cohorts in terms of CVD risks such as BMI and cholesterol. Worst case scenario where SBP reduction maintained only for 24 months.</p> <p>Limitations: Pharmacists and PCPs in RCTs had long history of working together.</p> <p>Notes: Cost per QALY lower for higher risk patients. The present study extends the analysis to long term healthcare cost outcomes from the Kulchaitanaroaj et al. (2012) paper that found pharmacist plus physician team-care costs more than physician alone.</p> <p>Quality of Estimate: Good</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
			<p>Measure Type: DiD</p>			
<p>Author (Year): Moore et al. (2013)</p> <p>Design: Retrospective cohort with matched control.</p> <p>Economic Method: Intervention cost and healthcare cost</p> <p>Funding Source: No external funds. Authors are from CVS Caremark</p> <p>Monetary Conversions: Index year assumed 2009 in US dollars</p>	<p>Location: National, USA</p> <p>Setting: Central office of pharmacy benefit management (PBM) company.</p> <p>Eligibility: Patients from a large employer health plan. High risk patients sent letter invite. Age over 18 with 14 or more claims in past 120 days or with absence of claims for indicated treatment of T2DM, asthma, heart failure or heart disease. Study included patients with T2DM, HTN, dyslipidemia, depression, and asthma.</p> <p>Sample Size: Intervention: 2250</p>	<p>Patients reached by phone from central office of PBM company. Staffed by trained clinical pharmacists. Primary aim was medication reconciliation. First meeting reviewed all medications, lab results sent by patient, patient concerns about medication, and each medication was reviewed for issues of safety, effectiveness, indication, and adherence. Individualized care plan produced and sent to PCP or with patient permission. Care plan shared automatically for patients on referral from case or disease managers.</p> <p>Follow-up appointments made as needed, usually</p>	<p>Change in Adherence:</p> <p>HTN Intervention 2.29 Control -2.31 Diff 4.6</p> <p>Dyslipidemia Intervention 2.10 Control -2.61 Diff 4.71</p> <p>T2DM Intervention 1.64 Control -0.73 Diff 2.37</p> <p>Data Source: Measured as medication possession ratio (MPR).</p> <p>Measure Type: DiD</p>	<p>Cost per patient per year (estimated for year 2009) 478</p> <p>Components Included in Intervention Cost: NR</p> <p>Data Source: NR</p> <p>Quality of Capture: Fair</p> <p>Quality of Measurement: Good</p>	<p>Change in Mean Healthcare Cost per Year: This is study's primary outcome</p> <p>Total Intervention -1304 Control 160 Diff -1464*</p> <p>*Study notes the driver was inpatient</p> <p>Pharmacy Intervention 327 Control -98 Diff 425</p> <p>Non-Pharmacy Healthcare Cost Intervention -977 Control 62 Diff -1039</p> <p>Components Included in Healthcare Cost: Inpatient, outpatient, ED, medications</p> <p>Source and Valuation: Claims from medical and pharmacy. Note estimates are for all causes.</p>	<p>Return on Investment (ROI)</p> <p>Study reports ROI=2.0 (=977/478)</p> <p>Reviewers computed ROI=3.06 (1464/478)</p> <p>Limitations: Self-selected into intervention All cause healthcare cost 33% of patients had depression and 19% had asthma but not possible to separate out their effects/outcomes.</p> <p>Notes: Matched control group on ER use was problematic for loss of substantial number of intervention observations. Analysis comparing outcomes on samples created with and without match on ER visits showed similar results.</p> <p>Quality of Estimate:</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
	<p>Control: propensity score matched on baseline characteristics from patients not accepting invite (=10126)</p> <p>Even after matching, intervention had larger percentage of patients using mail order for pharma. No difference in adherence measured by MPR.</p> <p>Population Characteristics: Mean Age 74; Female 60%; Pharmacy cost 4853; Mean number of conditions 2.5; HTN MPR 81.8; Dyslipidemia MPR 80.9; T2DM MPR 76.</p> <p>Time Horizon: Full-scale MTM program launched in Aug 2006.</p>	<p>2 or more visits over a year.</p> <p>Comparison: Usual care. Matched control who declined the invitation for MTM services.</p>			<p>Measure Type: DiD</p> <p>Productivity: NR</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Good</p>	Fair

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
	Study during 2009. Data 1 year before and 1 year after study invite is analyzed.					
<p>Author (Year): Pringle et al. (2014)</p> <p>Design: RCT</p> <p>Economic Method: Healthcare cost</p> <p>Funding Source: Community Pharmacy Quality Alliance</p> <p>Monetary Conversions: Index year assumed 2011 in U.S. dollars</p>	<p>Location: Pennsylvania, USA</p> <p>Setting: Community retail pharmacies</p> <p>Eligibility: Age 18 and older in participating health plans and at least 2 medications filled at participating pharmacies for HTN, T2DM, and dyslipidemia.</p> <p>Sample Size: Intervention pharmacies (patients) 107 (29042) Control pharmacies (patients) 111 (30454)</p> <p>Population characteristics: Mean Age 59; Female 57%;</p>	<p>Pennsylvania Project - composed of area partners from commercial, Medicare, and Medicaid health plans, pharmacy chain, information technology, and pharmacy academic department.</p> <p>Composed of a brief screening tool to stratify patients by adherence and a brief 2-5 minute pharmacist-patient meeting in motivational interview format. Meetings can occur with the typical pharmacy encounter such as for refills.</p> <p>Performance assessment measured adherence against payer’s benchmarks similar to CMS</p>	<p>Outcomes measured 1 year pre and 1 year post intervention, compared to controls</p> <p>Adherence Change* Calcium channel blockers 6 pct pt Oral T2DM meds 6 pct pt Beta-blockers 6 pct pt Statins 5 pct pt Renin Angiotensin system antagonists 7 pct pt</p> <p>*Based on percent of patients with proportion of days covered at or exceeding benchmark at 80% (PDC80).</p>	<p>No intervention cost provided</p> <p>Study states no additional staff was necessary and intervention was incorporated into usual pharmacist activities.</p>	<p>Measured 12 months pre and 12 months during trial. Median of cost per patient.</p> <p>Calcium channel blockers 21 Oral T2DM meds -341 Beta-blockers -19 Statins -241 Renin Angiotensin system antagonists -91</p> <p>Components Included in Healthcare Cost*: All health claims</p> <p>*Difference driven by reduction in magnitudes of inpatient and ED visits.</p> <p>Source and Valuation: Claims data.</p> <p>Measure Type: DiD</p> <p>Productivity: NR</p> <p>Quality of Capture: Good</p>	<p>No summary economic measures estimated.</p> <p>Authors conjecture the additional revenues from Medicare star ratings and healthcare cost reduction for health plans afford them opportunity to fund these pharmacy activities. Further, there are increased prescription refills due to improved adherence, which is direct revenue for pharmacy.</p> <p>Limitations: Adherence based on pharma refills but acceptable for health plan level study</p> <p>Duration may be short for healthcare cost components such as inpatient</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
	<p>Commercial Insured 44%; Medicare/Medicaid 56%; HTN 80%; Dyslipidemia 73%; T2DM 31%</p> <p>Time Horizon: Intervention during 2011 with length 12 months. Analysis based 1 year before and 1 year after.</p>	<p>Medicare Star Rating System. Pharmacists received report comparing to peers and benchmark</p> <p>Selected pharmacy managers received day long training as 'teachers'. Intervention pharmacists taught by teachers at half-day session.</p> <p>Throughout study, teachers visited pharmacies for Q&A. Monthly calls and assessment questions to determine quality of implementation.</p> <p>Comparison: Standard pharmacist interaction during patient encounter</p>	<p>Measured using 2 validated instruments at patient encounter. Final effect estimate based on probit.</p> <p>Measure Type: DiD</p>		<p>Quality of Measurement: Good</p>	
<p>Author (Year): Oliviera et al. (2010)</p> <p>Design: Retrospective multiple years</p>	<p>Location: Minneapolis-St. Paul, Minnesota, USA</p> <p>Setting: Fairview retail pharmacies</p>	<p>In 2005, Minnesota state legislature required medication therapy management (MTM) for those receiving public health coverage.</p>	<p>Measured at every pharmacist visit. Reported in study for first and most recent.</p>	<p>Intervention cost: Cost of MTM per encounter 67 10-year cost of MTM 2,258,302</p> <p>Sponsors pay for pharmacist visits.</p>	<p>10-year healthcare cost projected based on pharmacist actions to resolve particular drug related problems, based on short term 3-months cost avoidance.</p>	<p>Return on investment ROI= Cost of MTM/Costs avoided =2913850/2258302 =1.29</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
<p>Economic Method: Intervention and healthcare cost</p> <p>Funding Source: No external funding</p> <p>Employees of pharmacy</p> <p>Monetary Conversions: Index year assumed 2008 in US dollars</p>	<p>and in primary care clinics</p> <p>Eligibility: Opt-in MTM for Medicaid members with 4 or more meds or treating 2 or more conditions; Members of contracted Part D sponsors or self-insured employers; Fairview employees; private pay patients. Analyzed those in MTM and age 21 or greater.</p> <p>Sample Size: 9068 patients in MTM</p> <p>Characteristics: Age: 21-50 33%, 51-64 33%, 65 or more 44.5%; Females 76%; Number of conditions 9-10 12.5%, 7-8 17.7%, 5-6 19.2%, 3-4 14%, 1-2 11.2%, 0 2.4%;</p>	<p>Study assesses Sept 1998-2008 period of the MTM program in Fairview Pharmacy Services of Fairview Healthcare Services, which predates the legislation. Partnership with U Minnesota with 7 hospitals, 48 GPs, 55 specialty clinics, and 28 retail pharmacies.</p> <p>MTM provided in 17 of 48 Fairview clinics by 6.1 FTE pharmacists. Patient must enroll when invited and attend first visit and every follow-up visit. Initial visit 60 minutes and f/u 30 minutes. Requires private exam/consultation room. Pharmacists assisted by software to assess all conditions and medications; identify drug-related needs; set goals; promote indication, safety,</p>	<p>Drug related problem resolutions are documented</p> <p>All Patients 33,706 MTM encounters for 9068 patients, with mean 3.72 visits. 38,631 drug problems identified and addressed: indication 33.8%; effectiveness 34.9%; safety 14.8%; adherence 16.5%. Within adherence the problems were: affordability 36%, does not understand instructions 24.8%, prefers not to take 15.9%, forgets to take 12.6%, drug not available 8.6%, cannot administer 1.8%.</p> <p><u>Overall Conditions</u></p>	<p>Payments based on complexity of visit.</p> <p>Overall MTM practice has pharmacy director, one product manager, one operations manager, and one business operations specialist. Quality assurance by sampling patients from all MTM clinics.</p> <p>Components included in intervention cost: No explicit details provided. Likely substantial part is pharmacist time. Note medication cost is not included.</p> <p>Quality of Capture: Fair</p> <p>Quality of Measurement: Good</p>	<p>Costs avoided: 2,913,850</p> <p>Components Included in Healthcare Cost: Projected Outpatient, ED visits, Inpatient, and long-term care.</p> <p>Source and Valuation: Projected short term 3-month avoided costs through pharmacist resolution of drug problems. Method validated by external panel of pharmacists and in peer-reviewed paper. Each unit avoided multiplied by unit cost in 2008.</p> <p>Measure Type: Projected by model</p> <p>Change in Mean Productivity: Projected within costs avoided model</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Fair</p>	<p>Author Conclusion: Program is indicative of cost savings. Favorable outcomes led to expansion of program.</p> <p>Limitations: Healthcare cost avoided is modeled No control group Opt-in program and possible selection bias.</p> <p>Quality of Estimate: Fair</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
	<p>Number of drug therapy problems 0 15%, 1 15%, 2 16%, 3 16%, 4 8%, 5 or more 29%.</p> <p>Type of enrollee Medicaid 5.5%, Self-pay 13.6%, Medicare Part D 12.5%, Fairview enrollee 68%. Most common conditions were HTN, hyperlipidemia, diabetes, osteoporosis, esophagitis.</p> <p>Time Horizon: 10-year data from 1998 through 2008. Subset diabetes analysis for Aug 2007 through 2008.</p>	<p>and compliance; document and achieve outcomes; collaborate with other providers. Goals set by pharmacist, patient, and physicians.</p> <p>Comparison: None</p>	<p>Of 4849 patients not at goal at enrollment, 55% improved, 23% unchanged, and 22% worsened.</p> <p><u>Diabetes Subset*</u> 42.7% reached all 5 goals of A1c, BP, smoking, LDL-C, aspirin compared to 17.3% at baseline.</p> <p>*Subset analysis for 110 patients with diabetes from self-insured employer plan from Aug 2007 to December 2008.</p> <p>Data Source and valuation: Administrative and clinical records. Average cost of visit in 2008 multiplied by mean number of</p>			

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
			visits in 10 years. Measure Type: Pre to post			
<p>Author (Year): Rashed et al. (2010)</p> <p>Design: Retrospective pilot study with comparison (cost only)</p> <p>Economic Method: Intervention cost and healthcare cost</p> <p>Funding Source: The Community Pharmacy Foundation</p> <p>Monetary Conversions: Index year assumed 2006 in US dollars</p>	<p>Location: NR, USA</p> <p>Setting: Community specialty pharmacy</p> <p>Eligibility: Pharmacy contracted with self-funded health plan. Employers sent out invitations for pharmacy care of diabetes. Analyzed those with 3 years data.</p> <p>Sample Size: Intervention: 22 Initial enrollment: 36. Controls with diabetes selected by matching: 46</p> <p>Characteristics: Mean Age 57; Females 59%; Caucasian 68%;</p>	<p>Pharmacist met with patients in privacy-secured area in multiple pharmacy locations. Initial meeting was 1-hour to evaluate medical history, pharmaceutical profile, and lab values. Also evaluated exercise, food choices, health literacy which were addressed during follow-ups. Modified therapies in collaboration with physicians. Diabetes education provided based on guidelines from American Association of Diabetes Educators, ADA, and American Association of Endocrinologists.</p> <p>Comparison: Selected patients with T2DM receiving usual care</p>	<p>Note clinical data not available for the controls</p> <p>A1c: Reduced 2.21 pct pt from 8.99% to 6.78%</p> <p>LDL-C: Reduced 34.6 from 140.4 to 105.8</p> <p>HDL-C: Increased 8.0 from 36.8 to 44.8</p> <p>Triglycerides: Reduced from 63.7 235 to 171.3</p> <p>CVD Risk Factor Score: Reduced 1.7 from 5.8 to 4.1</p> <p>Adherence:</p>	<p>No direct estimate of intervention cost provided</p> <p>Cost per patient per year (calculated by reviewers): 348</p> <p>Components included in intervention cost: Likely cost of pharmacist time. No details provided except statement that the services were a fixed fee per patient per year.</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Good</p>	<p>Post only Healthcare cost per patient over 3 years (difference from baseline in year 2004)* 2004 13531 (NA) 2005 8844 (-4687) 2006 10733 (-2798) 2007 11917 (-1614)</p> <p>*Note the cost of medications per patient increased every year from baseline. Reductions were in outpatient and other medical costs, especially inpatient stays and ED visits (data not shown).</p> <p>Cost per patient over 3 years for Control Group: 2004 15505 2005 19109 2006 23455 2007 39831</p> <p>Change in Healthcare Cost per Patient Compared to Control:</p>	<p>4- year total healthcare cost for intervention versus control: Intervention: 990.615 Control: 2,153,855 Diff: -1,163,240</p> <p>Author Conclusion: The authors suggest the intervention is healthcare cost-saving.</p> <p>Limitations: No clinical data for controls Small sample</p> <p>Quality of Estimate: Fair</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
	<p>African American 32%.</p> <p>Time Horizon: Intervention analyzed for 3-year period from 2005 through 2007.</p>	<p>matched for age, race, and baseline healthcare cost. Used for cost comparison only.</p>	<p>Not shown, but study reports improvement in compliance.</p> <p>Measure Type: Pre to post</p>		<p>Lower outpatient and medical costs for intervention. Higher cost of medications for intervention, especially for diabetes meds and supplies.</p> <p>Components Included in Healthcare Cost: Outpatient, Medication, all other medical</p> <p>Source and Valuation: Payments by health plan</p> <p>Measure Type: Pre to post and DiD</p> <p>Change in Mean Productivity: NR</p> <p>Quality of Capture: Fair</p> <p>Quality of Measurement: Good</p>	
<p>Author (Year): Shireman et al. (2016)</p> <p>Design: RCT</p> <p>Method:</p>	<p>Location: Wisconsin, USA</p> <p>Setting: Community pharmacies</p> <p>Eligibility:</p>	<p>Team Education and Adherence Monitoring (TEAM)</p> <p>Staffed by community pharmacists, pharmacy technicians, with</p>	<p>Effect measured at 6 months after end of intervention</p> <p>Change in SBP/DBP: SBP/DBP: -5.6/-2.2</p>	<p>207 patients had sufficient information for the economic analyses</p> <p>Intervention Cost over 6 months per patient: Staff time 90.06</p>	<p>Per Person 6-month Cost of HTN Medications 85.80</p> <p>Components Included in Healthcare Cost: HTN Medication</p>	<p>Labor cost of additional patient achieving BP control: 665</p> <p>Limitations: Short duration</p> <p>Quality of Estimate: Limited</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
<p>Intervention cost and partial healthcare cost</p> <p>Funding Source: National Heart, Lung, and Blood Institute (NHLBI)</p> <p>Monetary Conversions: Index year 2007 in US dollars</p>	<p>African American patients age =>18 years taking at least 1 HTN medication and found to have uncontrolled BP using free screening at pharmacy. Patients at 28 Walgreens or Aurora Pharmacy in 5 Wisconsin cities. Pharmacies were randomized.</p> <p>Sample Size: Intervention 276 Control 300</p> <p>Characteristics: Mean age:54; Male:38%; African American:100%; T2DM:25%; Less than 12 Grade:24%; Household income less than 20K: 45%; SBP/DBP: 151/92; Uncontrolled BP: 100%; Missed => 1 dose last week: 25%</p> <p>Time Horizon:</p>	<p>tools for monitoring and improving medication adherence, with feedback to patients and physicians.</p> <p>Intervention patients got same literature as controls. Invited to baseline and 5 follow-up visits with pharmacist. Tools included Brief Medication Questionnaire (BMQ), screening tools for self-reported barriers to adherence, algorithms to address barriers, checklists to track barriers. Also, structured tool for fax communication with physician.</p> <p>Technicians performed tasks of printing medication records, reminders, recording BP, set up of meeting areas, and recording patient self-reports.</p>	<p>Change in % with BP Control: 17.1 pct pt</p> <p>Change in Adherence: 23.6</p> <p>Based on proportion of days covered (PDC)=>80%</p> <p>Measure Type: DiD for BP and BP control</p>	<p>Tools and supplies: 14.74 Total: 104.8</p> <p>Initial visit mean was 24.8 minutes and follow-ups were 11.7 minutes. 84% completed first visit and 59% completed at least 4 follow-ups. 6-month total minutes per patient: Counseling time 60 Communications with PCP: 2.8 Pharmacy technician time: 95</p> <p>Components Included in Intervention Cost: Staff time, tools, and supplies</p> <p>Source and Valuation: Study and per patient meeting records. Wisconsin wages for personnel time</p> <p>Study provided each pharmacy with counseling station furniture: table, 2 chairs, privacy screen, validated BP monitor and cuffs, appointment book, and supplies.</p>	<p>Source and Valuation: Retrospective analysis of pharmacy claims and fills. Valued using Redbook.</p> <p>Measure Type: Post intervention v control</p> <p>Change in Mean Productivity: NR</p> <p>Other Healthcare Utilization: Note the study found no substantial difference in utilization of inpatient, specialist/PCP visits, ED visits.</p> <p>Quality of Capture: Limited</p> <p>Quality of Measurement: Good</p>	

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	<p>Enrollment Dec 2006 – Aug 2007. Intervention length 6 months.</p>	<p>Patient tools included wallet card to record BP, 7-day medication box, leaflets regarding BP and management, and a pedometer.</p> <p>One pharmacist and one technician from each pharmacy received training (1-hour self-study and 7 hour joint workshop).</p> <p>Comparison: Usual care with 14-page guide on HTN, pamphlet on HTN in African Americans, cards to record BP at baseline and F/U.</p>		<p>Total cost. Cost per unit 168? Patient take-home toolkit was 9.62 per unit.</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Good</p>		
<p>Author (Year): Spence et al. (2014)</p> <p>Design: Retrospective with matched control</p> <p>Economic Method: ROI and Cost-Benefit</p>	<p>Location: Southern California, USA</p> <p>Setting: Kaiser outpatient pharmacy.</p> <p>Eligibility: Non-adherent patients with T2DM and/or coronary artery</p>	<p>Outpatient Pharmacy Clinical Services (OPSC) of Kaiser Permanente Southern Californian (KPSC).</p> <p>B-SMART (Barriers, Solutions, Motivation, Adherence tools, Relationships, and</p>	<p>Effects measured at 1 year after first refill visit</p> <p>Change in A1c for T2DM Group -0.5 pct pt</p> <p>Change in LDL-C in</p>	<p>OPSC cost to health plan 579,068</p> <p>Pharmacist training 52,396 Pharmacist time on OPSC 526,672</p>	<p>Change in Healthcare Cost:</p> <p>Count of Hospitalizations: Int 24; Contr 38 (58% reduction) Hospitalization cost avoided 11,367,548</p>	<p>ROI: [(Cost savings from Inpatient and ED Avoided)-(Cost of OPSC and Cost of Medications)]/ (Cost of OPSC and Cost of Medications) =(11640296-579068-1134400)/(579068+1134400) =5.79</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
<p>Funding Source: NR</p> <p>Monetary Conversions: Index year assumed 2010 in US dollars</p>	<p>disease (CAD) with A1c and/or LDL-C outside goal. Must be on T2DM/CAD registry. Non-adherent is medication possession ratio (MPR)<0.8.</p> <p>Selection: Patients who received OPSC consultation identified from records, classed as T2DM and for dyslipidemia. Usual care patients selected from med refill records matched to OPSC patients by med class, age, and gender.</p> <p>Sample Size: Intervention: T2DM 359; Dyslipidemia 1121 Control: T2DM 428; Dyslipidemia 1049</p> <p>Characteristics: For T2DM Mean Age: 56.8</p>	<p>Triage) methodology used by pharmacists in face to face patient encounters at prescription pickup. Process identified barriers, determined workable solutions, motivated patients to adhere, recommended tools, reinforced pharmacist-patient relationship, and triaged patients. Candidate patients identified at point of pharmacy contact using real time medical records, labs, and MPR.</p> <p>Pharmacists underwent 5.5 hours online and in person training.</p> <p>Comparison: Matched patients not receiving OPSC. Presume usual pharmacy care.</p>	<p>Dyslipidemia Group -8.07</p> <p>Change in % Adherent T2DM 16.1 pct pt Dyslipidemia -1 pct pt</p> <p>Change in MPR T2DM 3 pct pt Dyslipidemia -3 pct pt</p> <p>Measure Type: DiD</p>	<p>OPSC cost when scaled to 40K OPSC-eligible members</p> <p>Components Included in Intervention Cost: Pharmacist time, training</p> <p>Data Source: Patient medical records for encounters and program records for operations cost.</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Good</p>	<p>Count of ED visits: Int 78; Cont 85 (8.5% reduction) ED visits cost avoided: 272,749</p> <p>Total healthcare cost avoided 11,640,296. Increase in Medication Cost 1,134,400.</p> <p>Change in healthcare cost -10,505,896</p> <p>Components Included in Healthcare Cost: Inpatient, ED, medications</p> <p>Source and Valuation: Counts from claims and valued based on length of stay and per unit cost. Estimated for intervention versus control for both T2DM and Dyslipidemia groups (extrapolated to ~40K OPSC eligible members)</p> <p>Measure Type: DiD</p> <p>Change in Productivity: NR</p>	<p>Authors conclude the intervention has favorable return on investment.</p> <p>Benefit/Cost Ratio: Total Savings in Healthcare Cost/Cost of OPSC = (11640296-1134400)/579068 = 18.14</p> <p>Limitations: Retrospective with matched control. Extrapolation to all eligible in plan from small study.</p> <p>Note: Adherence for dyslipidemia improved less for intervention than control. However, LDL-C improved compared to control.</p> <p>Quality of Estimate: Fair</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
	<p>Female 47.1% Comorbid Score 1.26; MPR 0.58; A1c 9.79; LDL-C NR</p> <p>For Dyslipidemia Mean Age: 60.1; Female 56.1%; Comorbid Score 1.47; MPR 0.54; A1c NR; LDL-C 135.9</p> <p>Time Horizon: Selection during March 09 to Dec 2010. Patients followed for 1 year.</p>				<p>Quality of Capture: Fair</p> <p>Quality of Measurement: Good</p>	
<p>Author (Year): Twigg et al. (2018)</p> <p>Design: Pre-post with no control</p> <p>Economic Method: Intervention cost and healthcare cost</p> <p>Funding Source: Community Pharmacy Future (CPF) and Pfizer</p>	<p>Location: Northern England, UK</p> <p>Setting: Community retail pharmacies</p> <p>Eligibility: 50 or more years of age with 1 or more medication, of which 1 must be CVD or DM1 or DM2 related. Referred by GPs</p>	<p>Pharmacy Care Plan (PCP) of Community Pharmacy Future (CPF)</p> <p>Patients asked to meet pharmacist at least at base, 6 months, and 12 months. Subsequent meetings as needed. Activities were medication review, clinical measures recorded,</p>	<p>Measured at base, 6 and 12 months. Completers had mean of 2.93 pharmacist consults.</p> <p>Effects for completers at 12 months: SBP/DBP -2.9/-1.81 %SBP/DBP=>1 40/90 -6.4 pct pt</p>	<p>Cost per patient over 12 months for completers</p> <p>Total 160.67 Training 50.01 Initial consult 33.70 6-month review 15.69 12-month review 12.46 Interim reviews 7.52 Equipment 41.28</p> <p>Components Included in Intervention Cost:</p>	<p>Change in Mean Healthcare Cost for completers: Total 39.76 Inpatient 60.84 Outpatient 17.68 Practice nurse -4.27 Hospital doctor -34.49</p> <p>Components Included in Healthcare Cost: Inpatient, outpatient, nurse visits, hospital doctor visits</p> <p>Source and Valuation:</p>	<p>Cost-effectiveness at 12 months:</p> <p><u>Base Case*</u> Total mean intervention plus healthcare incremental cost 202.91 Mean QALY gained 0.024 Cost per QALY 8495.</p> <p>97% probability intervention is cost-effective based on 20K NHS threshold.</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
<p>Monetary Conversions: Index year 2014-2015 in U.K. pounds</p>	<p>or identified from pharma records. Those with existing CVD excluded.</p> <p>Sample Size: 38 pharmacies. 700 patients at baseline with 378 completing the intervention</p> <p>Statistics for Completers: Mean Age 68; Female 56%; SBP/DBP 139.5/78.4; BMI 30.2; QRisk 24.2; % High QRisk62.2%; MMAS-8 Low 19.8; MMAS-8 Medium 2.9%; Mean EuroQoL 74.3</p> <p>Dropouts had higher BMI, lower adherence, lower QoL.</p> <p>Time Horizon: Study during the Feb 2015 to June 2016. Intervention</p>	<p>adherence advice, care plan and goals, referral to GP as needed, referral to smoking, weight loss services etc. Support for intervention by Healthcare Assistant (HCA) taking clinical measurements.</p> <p>Comparison: None</p>	<p>High QRisk 5.4 pct pt* MMAS-8 (Median IQI) 0.26 (0.1, 0.4) Mean EuroQoL 3.15 Mean QALY 0.029</p> <p>*Mostly due to change in health conditions</p> <p>QoL based on EQ-5D-5L. QALY based on area under curve method.</p> <p>Measure Type: Pre-post</p>	<p>Pharmacist and HCA time with patient Pharmacist and HCA training. Cost of equipment and supplies for clinical measurements and lab tests at pharmacy.</p> <p>Data Source: Tracked in study.</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Good</p>	<p>Difference between 12 months pre and 12 months post for <u>patient reported</u> counts. Valued at average cost for NHS.</p> <p>Measure Type: Pre to post</p> <p>Productivity: NR</p> <p>Quality of Capture: Fair</p> <p>Quality of Measurement: Fair</p>	<p><u>Worst Case*</u> 19,392 54% probability being cost-effective</p> <p><u>Best Case*</u> 4673</p> <p>*Base-case analysis based on only patients with all data points. Sensitivity analysis based on best case of excluding cost of equipment and training and worst case of patients with missing values assumed to have zero effectiveness but positive cost</p> <p>Limitations: Pre post. Self-reported adherence, QoL, and healthcare utilization.</p> <p>Quality of Estimate: Fair</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
	length is 12 months. Outcomes assessed at 6 and 12 months after start.					
<p>Author (Year): Vegter et al. (2014)</p> <p>Design: Model based on existing program</p> <p>Method: Cost-benefit and Cost per QALY</p> <p>Funding Source: National Heart, One author had grants from the Royal Dutch Pharmaceutical Society (KNMP) during conduct of this study.</p> <p>Monetary Conversions: Index year 2012 in Euros</p>	<p>Location: Netherlands</p> <p>Setting: Community pharmacies</p> <p>Eligibility: 3 Markov models were estimated: patients with no CVD (primary prevention); patients with history or CV and diabetes (secondary prevention); patients with past stroke (secondary prevention after stroke).</p> <p>Sample Size: Markov model cohorts of 10K</p> <p>Characteristics: Mean age:61; Male:55%; No CVD or t2DM 40%;</p>	<p>Medication Monitoring and Optimisation (MeMO)</p> <p>MeMO is an existing program that addresses multiple conditions. The present study focuses on effects on lipid-lowering therapies. Some generic substitutions are mandated and there is discussion about pharmacy care reimbursements.</p> <p>Comparison: Usual care</p>	<p>Efficacy of medications based on large clinical trials for each of the 3 patient groups. Persistence of effects after discontinuation based on various Dutch studies: 61.5% at year 1 and 47.7% for primary and 57.7% for secondary prevention in year 2.</p> <p>Incidence of CV events and stroke from various Dutch observational studies.</p> <p>Non-CV morbidity and mortality from general Dutch population.</p>	<p>Intervention Cost per patient per year: 36.80 within trial (n=418 patients selected for intervention)</p> <p>Cost per patient per year:2.33. Mean of 2.3 minutes of pharmacist time per patient per year for n=6,710 patients on lipid medications</p> <p>Cost of MeMO activities included: Identifying non-adherent patients: 14 minutes per pharmacy per month Evaluation of non-adherent patients: 1-3 minutes per patient Contacts with non-adherent patients and their physicians: mean of 15 minutes</p> <p>Components Included in Intervention Cost:</p>	<p>Initial 5-years of Model Healthcare Cost per Patient for All Patients (Primary and Secondary Prevention): Medication 61 Disease management 53 MeMO intervention 7.70 CV costs -247.70</p> <p>Components Included in Healthcare Cost: All</p> <p>Source and Valuation: Outpatient visits, labs, medications. Following cardiovascular events were monitored and costs calculated: fatal and non-fatal MI and stroke; revascularizations.</p> <p>Change in Mean Productivity: Not measured within trial. Potential productivity effects estimated from assumptions and</p>	<p>Life time Cost per QALY gained: Primary prevention4585 Secondary Prevention Cost saving All patients Cost saving</p> <p>Probability of cost-effectiveness at20K and50K thresholds for the primary prevention population was 91.7% and 98.1%, respectively.</p> <p>Markov cohorts of 1000. Base case horizon is lifetime and shorter horizons assessed in sensitivity analyses. Costs discounted at 4% and health benefits at 1.5%. Probabilistic sensitivity analysis performed to derive 95% CIs for cost-effectiveness and cost-benefit.</p>

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	<p>CVD or T2DM 60%.</p> <p>Time Horizon: MeMO has been in place since 2006. Modeled cost-effectiveness based on lifetime and shorter horizons.</p>		<p>Adherence: Hazard Ratio of Discontinuation MeMO versus usual care. Primary prevention 0.47 Secondary prevention 0.54</p> <p>HRQoL measured using utility weights for CV events and large U.K study that used EQ-5D questionnaire.</p> <p>Measure Type: DiD</p>	<p>Pharmacist time.</p> <p>Source and Valuation: Pharmacist time measured for activities for sample of patients. Priced at Dutch wages.</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Good</p>	<p>separate analyses performed. Reviewers will not abstract this information.</p> <p>Measure Type: Modeled and DiD</p> <p>Quality of Capture: Fair</p> <p>Quality of Measurement: Good</p>	<p>5-year Intervention Cost Plus Change in Healthcare Cost per Patient for All Patients (Primary and Secondary Prevention): Savings126</p> <p>Lifetime Intervention Cost plus Change in Healthcare Cost Per Patient Primary Prevention Cost increasing255 Secondary Prevention Savings223 All Patients Savings32</p> <p>Probabilistic sensitivity analysis indicated probability of cost-savings was 60.7%</p> <p>Disutility weights for CV states and events drawn from Dutch studies.</p> <p>Limitations: No clinical outcomes for any lipids. Improved adherence extrapolated to CV outcomes.</p> <p>Quality of Estimate:</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
						Fair
<p>Author (Year): Wertz et al. (2012)</p> <p>Design: Pre post with control</p> <p>Economic Method: Intervention and healthcare cost</p> <p>Funding Source: Novartis Pharmaceuticals by funding and employment</p> <p>Monetary Conversions: Index year assumed 2008 in US dollars</p>	<p>Location: Cincinnati, Ohio, USA</p> <p>Setting: Community pharmacies</p> <p>Eligibility: Patients age 18 or older with large self-insured plan with at least one CV or T2DM claim. Tracked those in Heart Health Coaching (HC) and those in Diabetes Coaching (DC)</p> <p>Sample Size: Heart Care (HC) 307 and 274 in control Diabetes Care (DC) 307 with 289 in control</p> <p>Characteristics: <u>Heart Care</u> Mean Age 57; Females 58.3%; Caucasian 50.2%;</p>	<p>Partnership among health plan, large employer, and pharmacy</p> <p>Value based insurance design (VBID) with team-based care through medication management for T2DM, HTN, and dyslipidemia.</p> <p>Patients with HTN enrolled in Heart Healthy Coaching (HC) and those with T2DM enrolled in Diabetes Coaching (DC).</p> <p>Tailored pharmaceutical care by community pharmacists. Also financial incentives or reduced co-pay waivers or reductions or contributions to health savings plans. Follow-up visits covered education and monitoring of clinical outcomes</p>	<p>Measured at 12 months</p> <p>Average pharmacist visits 6 for active and 9.5 for retired enrollees</p> <p><u>HC Group</u> SBP reduced 6.6 mmHg; DBP reduced 4.2 mmHg; % BP Controlled increased 18 pct pt; LDL decreased 6.9; % LDL Controlled increased 13 pct pt</p> <p><u>DC Group</u> SBP reduced 5.7 mmHg; DBP reduced 4.7 mmHg; % BP Controlled increased 12 pct pt; LDL decreased 7.6; % LDL Controlled increased 11 pct pt.</p>	<p>TBC Cost per Person per Year Heart care 493 Diabetes care 552 Pharma cost increased 41, versus control</p> <p>Components included in intervention cost: No explicit details provided. Appears to be cost of pharmacist time, labs, and cost of providing financial incentives.</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Good</p>	<p>Healthcare cost: <u>HC Group</u> HTN Related Per Person per Year Health Care Costs reduced by 269, versus control. All cause reduced 281 <u>DC Group</u> T2DM Related Per Person per Year Health Care Costs increased by 272, versus control. CV related reduced 1107 All cause reduced 633 (All cause due to increase in meds and outpatient in intervention and increase in inpatient in control)</p> <p>Components Included in Healthcare Cost: Outpatient, Medication, ED, Inpatient</p> <p>Source and Valuation: 1-year baseline and 1-year intervention claims data</p> <p>Measure Type: DiD</p> <p>Change in Mean Productivity:</p>	<p><u>HC Group</u> TBC plus All Cause Healthcare Cost Per Person per Year: 212</p> <p><u>DC Group</u> TBC plus All Cause Healthcare Cost Per Person per Year: -81</p> <p>Author Conclusion: Study observed increase in cost due to increased medication and provider visits but offset by reduction in cardiovascular events.</p> <p>Limitations: Short duration</p> <p>Selection bias in recruitment through invitation</p> <p>Quality of Estimate: Good</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
	<p>African American 36.8%; Any CVD 15.3%; HTN: 82.4%; T2DM: 4.2%; SBP/DBP 136.1/79.3; LDL: 104.1</p> <p><u>Diabetes Care</u> Mean Age 59; Females 52.1%; Caucasian 51.1%; African American 33.6%; Any CVD 23.5%; HTN: 54%; T2DM; 93.2%; SBP/DBP 136.1/81.0; LDL: 91.6; A1c: 7.9</p> <p>Time Horizon: Rolling enrollment 2008 through 2009. Average intervention length 14 months.</p>	<p>including feet exams for diabetes patients. Also monitored adherence and treatment goals.</p> <p>Comparison: Usual care for matched patients offered program but declined to participate</p>	<p>A1c reduced 0.8; A1c controlled increased 18 pct pt</p> <p>Adherence: Pct Pt increase in medication adherence versus control: HTN: 7.1 in DC and 11 in HC Statins: 11 in DC and 11 in HC Antidiabetic: 8 for HC but no diff for DC.</p> <p>Higher HTN, statin, antidiabetic use for HC and DC groups versus control</p> <p>Data Source: Medical charts from follow up</p> <p>Measure Type: DiD</p>		<p>NR</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Good</p>	
<p>Author (Year): Yu et al. (2013)</p> <p>Linked to Ip et al (2013)</p>	<p>Location: Northern California, USA</p> <p>Setting:</p>	<p>16 Kaiser Permanente primary care physicians referred</p>	<p>Effect measured at 12 months</p> <p>Change in A1c:</p>	<p>Intervention Cost: NR</p> <p>No separate intervention cost</p>	<p>10-year healthcare cost: Intervention 35,740 Control 44,528 Diff -8788</p>	<p>Incremental intervention plus healthcare cost -8788</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
<p>Design: Pre to post with matched control</p> <p>Method: Modeled cost effectiveness from trial outcomes</p> <p>Funding Source: American Association of Colleges of Pharmacy, New Pharmacy Faculty Research Awards Program</p> <p>Monetary Conversions: Index year 2011 in US dollars</p>	<p>2 Kaiser Clinics. Clinical pharmacist.</p> <p>Eligibility: Referred by Kaiser PCPs to clinical pharmacist for T2DM patients with A1c > 7%.</p> <p>Sample Size: Intervention 204 Control 407</p> <p>Characteristics: Mean Age: 55.5; Mean T2DM Duration: 6.1 years; T2DM:100%; CHD Risk: 16.4%; SBP/DBP: 128.9/73.9; A1c: 9.5% Total Cholesterol: 179.4; Charlson Comorbidity Index: 7.0</p> <p>Time Horizon: Intervention length 12 months</p>	<p>T2DM patients to clinical pharmacist.</p> <p>Single pharmacist with PharmD and certificate in diabetes education. Prescribed and adjusted meds, ordered labs, administered immunizations, provided diabetes self-management education, and sought to optimized overall diabetes and CVD care. Pharmacist integrated into the care team.</p> <p>Average length of initial consultation was 45 minutes and 15 minutes for follow-up (usually by phone).</p> <p>Comparison: Cohort model</p>	<p>Intervention 9.5% to 6.9% Control 9.3% to 8.4% Diff -1.7</p> <p>Odds of Achieving Control: A1c: 3.9; LDL-C: 2.0; BP: 2.0.</p> <p>10-Year CHD Risk: Intervention 16.4% to 9.3% Control 17.4% to 14.8% Diff -4.5 pct pt</p> <p>Measure Type: DiD</p> <p>Change in Adherence (Assumed from trial) Improved 15 pct pt from baseline of 65%</p> <p>Long term outcomes modeled as CHD and stroke outcomes and impacts on QoL and costs. Probabilities drawn from</p>	<p>provided because it is aggregated into healthcare cost from payer perspective.</p> <p>Components Included in Intervention Cost: Pharmacist and physician wages</p> <p>Source and Valuation: Length and number of consultations based on trial records.</p>	<p>Annualized difference - 879</p> <p>Components Included in Healthcare Cost: Pharmacist wages, cost of medications, physician wages. Modeled cost of CHD and stroke events plus cost of intervention</p> <p>Source and Valuation: Events generated by model and cost assigned based on per unit cost derived from literature.</p> <p>Measure Type: Modeled</p> <p>Change in Mean Productivity: NR</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Good</p>	<p>Incremental QALY Intervention 5.51 Control 5.02 Diff 0.49</p> <p>Intervention dominates control. Also dominates when upper bound of CHD risk score is used.</p> <p>Methods: Markov cohort model Modeled CHD or stroke events and risk of death from CHD or stroke over 10 year horizon. Discounting at 3%.</p> <p>Sensitivity Analysis: One-way and probabilistic sensitivity analyses performed</p> <p>Largest impact on monetary net benefits was time horizon and utility weight of CVD-free diabetes patients</p> <p>4-year time horizon appeared to be minimum for positive monetary benefits.</p> <p>Probabilistic sensitivity analysis with threshold at 50K per QALY indicated 5-yrer</p>

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			UKPDS based on patient characteristics and clinical indicators from trial. QoL weights based on literature or assumptions.			<p>horizon is minimum for cost-effectiveness.</p> <p>Limitations: Based on small number of patients and providers in 2 medical centers. Unclear what aspect, such as adherence, was cause for improvements.</p> <p>Quality of Estimate: Good</p>

Cardiovascular Disease Management

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
<p>Author (Year): Delate et al. (2010)</p> <p>Design: Pre post with matched control</p> <p>Economic Method: Intervention and healthcare cost</p>	<p>Location: Denver and Boulder, Colorado, USA</p> <p>Setting: Primary care or hospital</p> <p>Eligibility: Patients with incident coronary arterial disease enrolled within 90 days after incident. Matched control</p>	<p>Comprehensive Cardiac Care Service (CCCS)</p> <p>Team care by clinical pharmacist, nurse, and physician director.</p> <p>CCCS uses shared web-based tracking database to monitor</p>	<p>Effectiveness of CCCS from other studies: LDL below 100 mg/dl 86% HTN below 140/90 70%</p> <p>Deaths in control (intervention): All cause 188 (16) and CAD related 98 (12)</p> <p>Adherence:</p>	<p>Intervention cost per patient per year: 362.50</p> <p>Components Included in Intervention Cost: Pharmacist and nurse time and overheads</p>	<p>Healthcare cost: Intervention 38 per patient per day and control 108 per patient per day. Adjusted difference was lower in intervention by 59.36 per patient per day.</p> <p>Annualized reduction in healthcare cost was 26,216 per patient.</p>	<p>No economic summary measures</p> <p>Limitations: Selection bias in recruitment through invitation</p> <p>Non-randomized</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
<p>Funding Source: Kaiser Permanente Colorado</p> <p>Monetary Conversions: Index year 2007 in US dollars</p>	<p>patients with incident CAD and similar baseline health expenses and chronic disease score. Exclude younger than 18 and older than 80.</p> <p>Sample Size: Intervention 628 Control 628</p> <p>Characteristics: Mean Age 61.7; Females 33.3%; With CVD 100%; Chronic Disease Score 3.9</p> <p>Time Horizon: Retrospective analysis of existing program. Expenditure data from 2007. Mean days within analysis were 630 in control and 945 in intervention.</p>	<p>progress and update changes. Post discharge, nurse-managed cardiac rehab including smoking cessation, dietary modifications, exercise, and initiation of secondary prevention drugs (cholesterol and hypertension). After nurse program, patient transferred to pharmacist-led long-term CAD drug therapy management. These are evidence-based drug strategies and performed substantially over phone. Duration is indefinite and frequency depends on control of lipids, HTN, and T2DM. Pharmacists activities included making drug recommendations, implementing and titrating physician approved evidence based changes,</p>	<p>Prescriptions of statins, beta blockers after myocardial infarction, and antiplatelet therapy were 87%, 100%, and 97%, respectively.</p> <p>Data Source: Study records and previous studies of the project</p> <p>Measure Type: DiD</p>	<p>Source and Valuation: Study records and health plan salaries. Based on salary plus benefits of pharmacists and mean patient panel size and overheads per pharmacist.</p> <p>Quality of Capture: Fair</p> <p>Quality of Measurement: Good</p>	<p>Components Included in Healthcare Cost: Outpatient, inpatient, ED, rehab, extended care, medications, labs, radiology.</p> <p>Source and Valuation: Health plan claims for all cause because most patients had multiple comorbidities.</p> <p>Measure Type: DiD</p> <p>Change in Mean Productivity: NR</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Fair</p>	

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
		<p>interpreting labs, and monitoring drug adherence on long term basis.</p> <p>Comparison: Matched patients with incident CAD receiving usual care.</p>				
<p>Author (Year): DiTusa et al. (2001)</p> <p>Design: Pre to post with control</p> <p>Economic Method: Healthcare Cost only</p> <p>Funding Source: No funding.</p> <p>Monetary Conversions: Index year assumed 2000 in US dollars</p>	<p>Location: Western New York, USA</p> <p>Setting: Onsite pharmacy in medical center with multiple primary care providers.</p> <p>Eligibility: Patients with documented CVD, including myocardial infarction, cerebral vascular disease, peripheral artery disease, angina, or surgical revascularization. Enrollment occurred at prescription refill for those patients whose PCP agreed to participate. Controls chosen</p>	<p>Pharmacists had group and individual training on National Cholesterol Education Program (NCEP) II, case studies, lifestyle and pharma management strategies, and patient assessment procedures based on EMR. Lipid profile screen and assessment screen developed to monitor and assess. Medication history and demographics collected at first pharmacist meeting. Pharmacist reviewed EMR</p>	<p>Follow-up at 6 months.</p> <p>Less than 1% of recs refused by PCPs. Increase in cholesterol med therapy in intervention was 75% versus 50% for control at follow-up. Percent at goal for LDL in intervention was 45% at baseline and 72% at follow-up, and for controls it was 35% at baseline and 46% at follow-up. No difference for other lipids. There was also no significant difference in CVD events.</p> <p>Adherence NR</p> <p>Measure Type: DiD</p>	<p>Not reported</p>	<p>Cost of cholesterol medications per patient per months for intervention (control) was 46 (44) versus 42 (50) at 1-year follow-up.</p> <p>Components Included in Healthcare Cost: Medication</p> <p>Source and Valuation: Medical records and pharmacy claims.</p> <p>Measure Type: DiD</p> <p>Change in Mean Productivity: NR</p> <p>Quality of Capture: Limited</p> <p>Quality of Measurement: Good</p>	<p>No summary economic measures</p> <p>Limitation: Assessed only cost of cholesterol medications.</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
	<p>similarly from non-participants.</p> <p>Sample Size: Intervention: 300 Control: 150</p> <p>Characteristics: Mean Age 67; Females 30%; HTN: 55%; CVD: 100%; SBP/DBP: 145/82; A1c: 7.3</p> <p>Time Horizon: Intervention length 6 months Recruits identified during Jan 1999 to June 30 1999.</p>	<p>screen for medical chart, pharma records, lab data, cholesterol profile. Recs made to PCP for lab tests and therapy changes. Also made recs on adherence and adverse events from patient self-report and lab reports. All recs implemented upon PCP approval. Appropriate follow-up determined by pharmacist. Medication counseling covered cholesterol risk for CVD, medication adherence, diet and lifestyle changes, and lab monitoring. Pharmacist referred patient to nutrition classes, dietitian, or diabetes educator as needed. Follow-up visits every 2-4 weeks at pharmacist discretion</p> <p>Comparison:</p>				

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
		Usual care				
<p>Author (Year): Ellis et al. (2000)^a</p> <p>Linked to Ellis et al. (2000)^b</p> <p>Design: RCT</p> <p>Economic Method: Healthcare cost plus intervention cost</p> <p>Funding Source: Pharmacia & Upjohn; American College of Clinical Pharmacy-Merck Pharmaco-economics Fellowship Awards</p> <p>Monetary Conversions: Index year assumed 1998 in US dollars.</p>	<p>Location: 9 locations in USA</p> <p>Setting: Pharmacist-managed clinics or primary care clinics in Veterans Affairs Medical Centers (VAMC)</p> <p>Eligibility: Patients with 3 or more of: 5 or more drugs; 12 or more doses daily; 3 or more drug changes past year; non-compliance; drugs requiring monitoring. Not seen in pharmacist managed clinic past year. 72% (n=150) of intervention and 70% (n=161) required secondary prevention. Remaining inter (control) of 58 (68) were primary prevention.</p> <p>Sample Size: Intervention: 208 Control: 229</p>	<p>IMPROVE (Impact of Managed Pharmaceutical Care on Resource Utilization and Outcomes in Veterans Affairs Medical Centers)</p> <p>Staffed by clinical pharmacists. Original trial had multiple disease foci. Study focused on LDL-C goals for substantial patient pool with existing CHD. Initial visit with pharmacist for drug assessment, followed by adjustments in regimen and identification and resolution of drug-related problems. Continue with monitoring and follow patients until patient, PCP, pharmacist agreed goal of therapy achieved. Mix of VAMC sites whether they</p>	<p>Follow-up at 12 months.</p> <p>Pharmacist visits at baseline for intervention (control) was 192 (160) and after 12 months was 629 (177). Intervention also had 140 phone contacts.</p> <p>Medication-related #problems (%resolved): drug education (996 (93.6%); Not taking drug as prescribed 436 (55%) out of 3048 total.</p> <p>LDL reduced 10.6. No difference in percent controlled.</p> <p>Measure Type: DiD</p>	<p>Included in healthcare cost estimate</p> <p>Components Included in Intervention Cost: Pharmacist time</p> <p>Data Source: Local Veterans Affairs Department data</p>	<p>Change in Mean Healthcare Cost Intervention Versus Control: 370 increase</p> <p>Components Included in Healthcare Cost: Pharmacist time, medications, inpatient, outpatient, labs. All cause.</p> <p>Source and Valuation: Single Veterans Administration Medical Center and Medicare.</p> <p>Measure Type: DiD</p> <p>Change in Productivity: NR</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Good</p>	<p>No summary economic outcomes.</p> <p>Limitations: Nine locations but cost per unit drawn from single VAMC in Denver.</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
	<p>Characteristics: Mean Age 65; Female 4%; CVD 67%; T2DM 36%; Dyslipidemia 100%; HTN 76%; LDL 129.4</p> <p>Time Horizon: Intervention length 12 months</p> <p>Analysis period 1997-1999</p>	<p>allowed pharmacist regimen modification or lab tests orders. By protocol 3 visits required: baseline, 6 months, 12 months.</p> <p>Comparison: Usual care consisting of usual at VAMC.</p>				
<p>Author (Year): Lopez-Cabezas et al. (2006)</p> <p>Design: RCT</p> <p>Economic Method: Intervention cost and healthcare cost</p> <p>Funding Source: Health Research Fund (Fondo de Investigacion Sanitaria, FIS) and European Regional Development Fund (ERDF)</p>	<p>Location: Badalona, Spain</p> <p>Setting: Pharmacies in 2 hospitals</p> <p>Eligibility: Patients with heart failure recruited from 2 hospitals at discharge.</p> <p>Sample Size: Intervention 70 Control 64</p> <p>Characteristics: Mean Age 76.1; Female 53.1%; T2DM 37.5%;</p>	<p>Hospital pharmacists from research team, likely clinical pharmacists. Pharmacist interview with patient and caregiver at day of hospital discharge dealing with: disease info supported with audiovisual and written materials; diet education on foods to avoid/reduce; drug therapy and need to follow prescriptions.</p>	<p>Follow-up at 12 months. Percent readmission with heart failure or other cause was Control (Interv) = 72% (39%) and days of stay 611 (410) or mean days 9.6 (5.9). Deaths percentage at 12 months control (interv) was 29.7% (12.9%)</p> <p>EuroQoL and patient satisfaction with care on 0-10 scale. At 12 months control (interv) was 60.6 (64.0)</p>	<p>Intervention cost: 31 euros per patient per year</p> <p>Components included in intervention cost: Patient education materials, pharmacist time at discharge and phone calls.</p> <p>Data Source: Study records</p> <p>Quality of Capture: Fair</p>	<p>Healthcare cost: All cause inpatient care reduced by 608.81 euro per patient.</p> <p>Components Included in Healthcare Cost: Inpatient</p> <p>Source and Valuation: Study and hospital records</p> <p>Measure Type: DiD</p> <p>Change in Mean Productivity: NR</p>	<p>No economic summary measures</p> <p>Limitations: Only inpatient for healthcare cost</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
<p>Monetary Conversions: Index year assumed 2001 in Euros</p>	<p>CVD 100%; HTN 65.6%; Less than High School 78.3%</p> <p>Time Horizon: Patients recruited Sep 2000 through Aug 2002. Intervention length 12 months.</p>	<p>Followed up with telephone contact monthly first 6 months and every 2 months thereafter to strengthen intervention and solve doubts/problems. Regular follow-up and measurements for intervention and control at 2, 6, and 12 months.</p> <p>Comparison: Usual care</p>	<p>Adherence: Compliance measured as % of prescribed doses taken. Reliable is classed 95-100%. At 6 months: Reliable Control (Interv) was 69% (91.1%). At 12 months reliable patients for Control (Interv) were 73.9% (85%).</p> <p>Data Source: Study records</p> <p>Measure Type: DiD</p>	<p>Quality of Measurement: Good</p>	<p>Quality of Capture: Fair</p> <p>Quality of Measurement: Good</p>	
<p>Author (Year): Murray et al. (2007)</p> <p>Design: RCT</p> <p>Method: Intervention cost and healthcare cost</p> <p>Funding Source: NIH</p> <p>Monetary Conversions: Index year assumed 2003 in US dollars</p>	<p>Location: Indianapolis, Indiana, USA</p> <p>Setting: Centralized pharmacy associated with hospital and satellite pharmacies in neighborhood clinics</p> <p>Eligibility: patients with diagnosed heart failure and taking at least one CVD medication for</p>	<p>Associated with Wishard Health (now, Eskenazi Health) in Indianapolis.</p> <p>Central pharmacy with pharmacist and technician. Pharmacist attended to intervention patients and usual care patients handled by technician. Also, pharmacist at decentralized pharmacies in neighborhood</p>	<p>Electronic Medication Event Monitoring System (MEMS). Medication adherence at 9 months was 67.9% in control and 78.8% in intervention. Difference dissipated in 3-month post intervention.</p> <p>ED and inpatient was 19.4% less for intervention versus control.</p> <p>Measure Type: DiD</p>	<p>Intervention Cost: 205 per patient per year</p> <p>Components Included in Intervention Cost: Training, equipment, and software programming. Also, pharmacist time, physician time in consultation with pharmacist, and</p>	<p>Per Person Per Year All Cause Healthcare Costs: Combined ED + Inpatient: 19.4% less for intervention. Outpatient was 886 lower in intervention. Inpatient cost lower in intervention by 2277. Mean total difference was 3165 lower for intervention.</p> <p>Components Included in Healthcare Cost: ED, inpatient, outpatient.</p> <p>Measure Type:</p>	<p>Return on investment reported as 14.0</p> <p>Quality of Capture: Quality of Measurement: Quality of Estimate: Good</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
	<p>heart failure from 4 primary care, 1 cardiology practice, and Wishard Memorial Hospital. Not using any adherence aids currently.</p> <p>Sample Size: Intervention 122 Control 192</p> <p>Characteristics: Mean age:61.4; Female:68%; Caucasian: 54%; T2DM:60.7%; HTN 93.4%; Medicaid 30%; Medicare 54%; Mean years of education:11; CVD 100%. SBP/DBP 132.9/68.9</p> <p>Time Horizon: Study Feb 2001 to June 2004 Analytic period 12 months. Intervention length 9 months.</p>	<p>clinics. Only intervention patients got pharmacist services. All prescriptions were covered by state and local assistance plans. So cost was not an adherence factor. Pharmacist service delivered following protocol. Baseline medical history review with patients bringing meds to baseline meeting. Assess medication knowledge and skill. Dispensed 2 months of meds. Written instructions with timeline for regimen. Monitored medication use, care encounters, weight, etc. Info shared with nurse or PCP as needed by face to face/email/phone/paging. Technicians supported pharmacist</p>		<p>written materials.</p> <p>Data Source: Study observations of pharmacist activities.</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Good</p>	<p>DiD</p> <p>Source and Valuation: ED and hospital admissions records</p> <p>Change in Mean Productivity: NR</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Good</p>	

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
		<p>activities. Pharmacist trained by interdisciplinary team including specialists. Patients visited pharmacy primarily for refills. Patients in intervention encouraged to call or visit pharmacist with questions about medications. Authors note the intervention likely much less intense than pharmacist interventions in other studies.</p> <p>Comparison: Usual care</p>				
<p>Author (Year): Polinski et al. (2016)</p> <p>Design: Pre to post with matched control</p> <p>Economic Method: Intervention cost and healthcare cost</p>	<p>Location: Southeast, USA</p> <p>Setting: In-home for high risk and by phone otherwise.</p> <p>Eligibility: Patients selected from pool for those at risk for re-admission by</p>	<p>Pharmacists with pharmacy benefits manager.</p> <p>Insurer-initiated care transition based on medication reconciliation.</p> <p>Pharmacists from benefits manager, CVS, delivered the</p>	<p>Number of in-home consults for high risk intervention patients was 253.8 and telephone consults for medium risk patients was 196.9</p> <p>Primary effectiveness outcome is 30-day readmission. Secondary results for</p>	<p>Intervention cost: Weighted mean of in-home and telephone-based groups. 677 per patient per month.</p> <p>Components Included in Intervention Cost:</p>	<p>Change in all cause and CVD healthcare cost: Reduced 1347 per patient over 30 days for all cause and reduced 1699 for CVD patients.</p> <p>Components Included in Healthcare Cost: Inpatient</p> <p>Source and Valuation:</p>	<p>Benefit to cost for all cause healthcare averted was 2.0.</p> <p>Notes: Short duration Only inpatient. Acceptable given focus was prevention of 30-day readmission.</p> <p>Quality of Estimate: Fair</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
<p>Funding Source: CVS healthcare</p> <p>Monetary Conversions: Index year assumed 2013 in US dollars</p>	<p>insurer. Pharmacist services offered to these patients. Benefits manager CVS further classed patients as high if at least 7 medications or 5 medications along with CHF, COPD, asthma, pneumonia, ESRD, schizophrenia, bipolar, dizziness, history of falls. Patients at moderate to high risk used 5 to 6 meds and without above conditions or used 3 to 4 meds and with one of above conditions. Initial call from insurer within 3 days of discharge to participate, of which 11% declined the service.</p> <p>Sample Size: Intervention 131 Control 131</p> <p>Characteristics: Mean Age 61.8; Females 58%;</p>	<p>pharmacist intervention.</p> <p>CVS pharmacist contacted patients by phone for initial medication reconciliation consultation. First consult typically in-home for high risk and by phone for moderate to high risk. Pharmacist had access to all pre, during hospitalization, and post discharge medications. Pharmacist also collected other meds and supplements from members. Pharmacist activities included: patient personalized adherence education and coaching; personalized care plan also shared with PCP; educated patients about availability of insurer's support and</p>	<p>CVD and non-CVD (Respiratory) classed by index hospitalization cause. Results: Risk Ratio Overall was 0.5 for any condition and 0.79 for condition at index stay. Risk ratio for CVD index 0.55 and Respiratory index 0.61.</p> <p>Adherence Annual supply of medications for intervention (control) were 220.3 (207.4) days</p> <p>Data Source: Study records</p> <p>Measure Type: DiD</p>	<p>Pharmacist time and travel</p> <p>Data Source: Program and pharmacist records of encounters</p> <p>Quality of Capture: Fair</p> <p>Quality of Measurement: Good</p>	<p>Cost of single event of 30-day re-admission based on 2012 HCUP (Healthcare cost and Utilization Project) data and counts of re-admissions from study</p> <p>Measure Type: DiD</p> <p>Change in Mean Productivity: NR</p> <p>Quality of Capture: Fair</p> <p>Quality of Measurement: Good</p>	

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
	<p>Non-Caucasian 30%; Less than high school 19%; Unemployed 10%; High risk 57.4% and medium risk 39%</p> <p>Time Horizon: Study from June to November 2013. 30-day follow-up over 3 month study.</p>	<p>health services; scheduled follow-up appointments; coordinated care among unaffiliated providers; called providers to clarify or simplify dosing and report any change in health status. Additional follow-up calls initiated by pharmacists or patients for 30 days.</p> <p>Comparison: Insurer's patients in Northeast USA without pharmacist program.</p>				
<p>Author (Year): Scott et al. (2007) Linked to Medman (2007)</p> <p>Design: RCT</p> <p>Economic Method: Intervention cost and healthcare cost plus patient time.</p> <p>Funding Source: British Department</p>	<p>Location: Multiple sites, UK</p> <p>Setting: Retail pharmacies</p> <p>Eligibility: Patients from selected GP's with existing coronary heart disease. Patient lists screened by GPs who sent letters inviting to study</p>	<p>Trial name: Community Pharmacy Medicines Management (Medman)</p> <p>Community pharmacist led medicines management for patients with CHD.</p> <p>Pharmacist activities included</p>	<p>Self-reported compliance score at 12 months compared to baseline. No significant change from baseline value of 59 for compliance total score. Authors state baseline compliance was high.</p> <p>All clinical outcomes reported in terms of % meeting appropriate disease management guidelines. There was</p>	<p>Intervention cost: 118 per patient per year.</p> <p>Components Included in Intervention Cost: Pharmacist time, physician time, pharmacist training, training</p>	<p>Healthcare Cost Reduced by 146 per patient per year</p> <p>Components of Healthcare Cost: Patient and carer time and travel, all medications, and outpatient plus inpatient was for CHD only. Was substantially CHD-related.</p> <p>Source:</p>	<p>Insignificant reduction in societal cost by 50.11.</p> <p>Author Notes: Authors conclude with insignificant effect on clinical outcomes and insignificant effect on cost, the intervention may not be viable.</p> <p>Quality of Estimate: Fair</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
<p>of Health. Scottish Executive Health Department and University of Aberdeen.</p> <p>Monetary Conversions: Index year is 2003 in UK pounds.</p>	<p>participation. Patients in intervention could choose pharmacy where available.</p> <p>Sample Size: Intervention 980 Control 500</p> <p>Baseline Characteristics Mean Age 68.7; Female 32.6%; SBP/DBP 138.8/77.2; Total cholesterol 4.70 mmol/l; CVD 100%</p> <p>Time Horizon: Trial study from Nov 2002 to May 2004. Intervention length is 12 months.</p>	<p>medication review, health and lifestyle counseling in pharmacy setting based on information from medical records. Recommended changes in prescribing fed back to PCP.</p> <p>Comparison: Usual care</p>	<p>no significant improvement intervention versus control for any of the indicators except for patient satisfaction.</p> <p>Measure Type: DiD</p>	<p>development and delivery, patient time.</p> <p>Data Source: Training vendor records and study records from pharmacist logs.</p> <p>Quality of Capture: Fair</p> <p>Quality of Measurement: Good</p>	<p>Patient medical records. Valuation using NHS guides and or market rates. Patient time valued at average wage rates.</p> <p>Measure Type: DiD</p> <p>Productivity: NR</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Good</p>	
<p>Author (Year): Tsuyuki et al. (2004)</p> <p>Design: RCT</p> <p>Economic Method: Healthcare cost.</p>	<p>Location: Multiple sites in 3 provinces, Canada</p> <p>Setting: Hospital pharmacies.</p> <p>Eligibility: Patients with diagnosed HF admitted to 10 hospitals. All</p>	<p>Review of Education on ACE Inhibitors in Congestive Heart Failure Treatment (REACT)</p> <p>Trial implemented in 10 hospitals - led by pharmacists and nurses.</p>	<p>Proportion receiving ACE I at discharge compared to admission date. Any change in dose. ACE I use increased from 58% at admission to 83% on discharge and dose from 11.3 to 15.4 enalaprin equivalents.</p> <p>Adherence</p>	<p>Intervention Cost: NR</p>	<p>CV-related cost per patient at 6 months was 2531 lower for intervention. Total cost per patient was 2463 lower for intervention.</p> <p>Main contributors were number of hospitalizations (not significant), hospital</p>	<p>No economic summary measure reported.</p> <p>Limitations: Short duration</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
<p>Funding Source: Parke Davis Canada (now Pfizer) and University of Alberta Hospital Foundation.</p> <p>Monetary Conversions: Index year assumed 2000 in Canadian Dollars.</p>	<p>received stage 1 of trial. At discharge, stage 2 offered to patients.</p> <p>Sample Size: Stage 1: Intervention: 1766 Control: NA Stage 2: Intervention: 140 Control: 136</p> <p>Characteristics: Mean Age 71; Females 42%; Use of ACE I at stage 2 85%; CVD 100%</p> <p>Time Horizon: Patients recruited Sep 1999 to April 2000. Intervention length 6 months</p>	<p>2-stage trial. At stage 1, research coordinator (nurse or pharmacist) reviewed admissions database for eligible HF patients, reviewed medical records for ACE inhibitor prescribed and dosage. Recommendation made to attending physician. Monitoring on daily basis. Patients invited to participate in stage 2 at point of discharge. Patients randomized in stage 2 to intervention or usual care. Five components of support: salt and fluid restrictions; daily weighing; exercise; proper medication use; recognition of symptoms and knowing when to call physician. Education</p>	<p>Adherence based on medical possession ratio for Stage 2 patients only. Note at stage 2 ACE use was 85% for intervention and control. At 6 months ACE I adherence was 86.2% in control and 83.5% in intervention.</p> <p>Measure Type: DiD</p>		<p>length of stay and ED visits.</p> <p>Components Included in Healthcare Cost: Inpatient, outpatient visits, ED visits, medication.</p> <p>Components not Included in Healthcare Cost: None</p> <p>Source and Valuation: Based on follow-up self-reports confirmed with hospital and pharmacy records. Separated into CV and non-CV ED, inpatient and outpatient. Medications only counted ACE I. Unit costs from each province.</p> <p>Measure Type: DiD</p> <p>Change in Mean Productivity: NR</p> <p>Quality of Capture: Good Quality of Measurement: Good</p>	

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
		<p>materials developed from focus groups and at 8th grade level language covering HF definition, causes, symptoms; nondrug treatments; medication information and benefits; self-monitoring. At discharge, research coordinator educated patients 1-to-1. Received adherence aids such as medication organizer, medication schedule, daily weight log. Asked to contact coordinator for local support. Follow-up by telephone by RC at 2, 4 weeks and monthly thereafter for 6 months. Content was to reinforce education and adherence relating to HF and self-care. Included</p>				

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
		<p>monthly newsletters with success stories. Encouraged to contact physician in case of medical problems or requiring titration of ACE inhibitor.</p> <p>Comparison: Received stage 1 of intervention. Provided HF pamphlet at discharge.</p>				
<p>Author (Year): Vegter et al. (2014)</p> <p>Design: Model based on existing program</p> <p>Method: Cost-benefit and Cost per QALY</p> <p>Funding Source: National Heart, One author had grants from the Royal Dutch Pharmaceutical Society (KNMP) during conduct of this study.</p>	<p>Location: Netherlands</p> <p>Setting: Community pharmacies</p> <p>Eligibility: 3 Markov models were estimated: patients with no CVD (primary prevention); patients with history or CV and diabetes (secondary prevention); patients with past stroke (secondary prevention after stroke).</p>	<p>Medication Monitoring and Optimisation (MeMO)</p> <p>MeMO is an existing program that addresses multiple conditions. The present study focuses on effects on lipid-lowering therapies. Some generic substitutions are mandated and there is discussion about pharmacy care reimbursements.</p>	<p>Efficacy of medications based on large clinical trials for each of the 3 patient groups. Persistence of effects after discontinuation based on various Dutch studies: 61.5% at year 1 and 47.7% for primary and 57.7% for secondary prevention in year 2.</p> <p>Incidence of CV events and stroke from various Dutch observational studies.</p> <p>Non-CV morbidity and mortality from general Dutch population.</p>	<p>Intervention Cost per patient per year: 36.80 within trial (n=418 patients selected for intervention)</p> <p>Cost per patient per year: 2.33. Mean of 2.3 minutes of pharmacist time per patient per year for n=6,710 patients on lipid medications</p>	<p>Initial 5-years of Model Healthcare Cost per Patient for All Patients (Primary and Secondary Prevention): Medication increased 61 Disease management increased 53 MeMO intervention increased 7.70 CV costs reduced 247.70</p> <p>Components Included in Healthcare Cost: All</p> <p>Source and Valuation: Outpatient visits, labs, medications. Following cardiovascular events</p>	<p>Life time Cost per QALY gained: Primary prevention 4585 Secondary Prevention Cost saving All patients Cost saving</p> <p>Probability of cost-effectiveness at 20K and 50K thresholds for the primary prevention population was 91.7% and 98.1%, respectively.</p> <p>Markov cohorts of 1000. Base case horizon is lifetime and shorter horizons assessed in sensitivity</p>

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
<p>Monetary Conversions: Index year 2012 in Euros</p>	<p>Sample Size: Markov model cohorts of 10K</p> <p>Characteristics: Mean age:61; Male:55%; No CVD or T2DM 40%; CVD or T2DM 60%</p> <p>Time Horizon: MeMO has been in place since 2006. Modeled cost-effectiveness based on lifetime and shorter horizons.</p>	<p>Comparison: Usual care</p>	<p>Adherence: Hazard Ratio of Discontinuation MeMO versus usual care. Primary prevention 0.47 Secondary prevention 0.54</p> <p>HRQoL measured using utility weights for CV events and large U.K study that used EQ-5D questionnaire.</p> <p>Measure Type: DiD</p>	<p>Cost of MeMO activities included: Identifying non-adherent patients: 14 minutes per pharmacy per month Evaluation of non-adherent patients: 1-3 minutes per patient Contacts with non-adherent patients and their physicians: mean of 15 minutes</p> <p>Components Included in Intervention Cost: Pharmacist time.</p> <p>Source and Valuation: Pharmacist time measured for activities for sample of patients. Priced at Dutch wages.</p> <p>Quality of Capture: Fair</p>	<p>were monitored and costs calculated: fatal and non-fatal MI and stroke; revascularizations.</p> <p>Change in Mean Productivity: Not measured within trial. Potential productivity effects estimated from assumptions and separate analyses performed. Reviewers will not abstract this information.</p> <p>Measure Type: Modeled and DiD</p> <p>Quality of Capture: Good</p> <p>Quality of Measurement: Good</p>	<p>analyses. Costs discounted at 4% and health benefits at 1.5%. Probabilistic sensitivity analysis performed to derive 95% Cis for cost-effectiveness and cost-benefit.</p> <p>5-year Intervention Cost plus Change in Healthcare Cost per Patient For All Patients (Primary and Secondary Prevention) Savings 126</p> <p>Lifetime Intervention Cost plus Change in Healthcare Cost Per Patient Primary Prevention Cost increasing 255 Secondary Prevention Savings 223 All Patients Savings 32</p> <p>Probabilistic sensitivity analysis indicated probability of cost-savings was 60.7%</p> <p>Disutility weights for CV states and events</p>

CVD: Tailored Pharmacy-based Interventions to Improve Medication Adherence – Economic Evidence Table

Study Information	Study and Population Characteristics	Trial Name Intervention & Comparison	Effectiveness Findings	Intervention Costs	Healthcare Cost Averted Productivity Loss Averted	Economic Summary Measure
				<p>Quality of Measurement: Good</p>		<p>drawn from Dutch studies.</p> <p>Limitations: No clinical outcomes for any lipids. Improved adherence extrapolated to CV outcomes.</p> <p>Quality of Estimate: Fair</p>