

Pharmacist on the Care Team Value and UCSD Experience

Jan Hirsch, RPh, PhD

Associate Professor of Clinical Pharmacy

University of Best Practices, 4/4/11

\$7.98

**Average Benefit/Cost ratio
for Clinical Pharmacy Services**

Perez, A, Doloresco F. Hoffman JM, etal. Economic evaluations of clinical pharmacy services: 2001-2005. Pharmacotherapy. 2008; Vol 28:287-323.

OUTLINE

1. Value of Pharmacy Services

Evidence of Clinical and Economic Impact

2. UCSD Experience

- Current
- Future directions

Right Care Initiative Promising Best Practices

http://www.hmohelp.ca.gov/healthplans/gen/gen_rci_pbprac.aspx#Pharmacist

Value Evidence for Pharmacists on the Care Team

Chisolm-Burns, MA, Lee JK, Spivey CA, et al. US pharmacists' effect as team members on patient care; Systematic review and meta-analyses. *Medical Care*. 2010; Vol. 48, No.10: 923-933.

Chisolm-Burns, MA, Zivin JSG, Lee JK, et al. Economic effects of pharmacists on health outcomes in the United States: A systematic review. *American Journal of Health-Systems Pharmacists*. 2010; Vol 67: 1624-1634.

Perez, A, Doloresco F. Hoffman JM, et al. Economic evaluations of clinical pharmacy services: 2001-2005. *Pharmacotherapy*. 2008; Vol 28:287-323.

US Pharmacists' Effect as Team Members on Patient Care

Systematic Review and Meta-Analyses

Marie A. Chisholm-Burns, PharmD, MPH, FCCP, FASHP,† Jeannie Kim Lee, PharmD, BCPS,*
Christina A. Spivey, PhD, LMSW,* Marion Slack, PhD,* Richard N. Herrier, PharmD,*
Elizabeth Hall-Lipsy, JD, MPH,‡ Joshua Graff Zivin, PhD,§ Ivo Abraham, PhD, RN,*
John Palmer, MD, PhD,¶ Jennifer R. Martin, MA,|| Sandra S. Kramer, MA,||
and Timothy Wunz, PhD***

Medical Care • Volume 48, Number 10, October 2010

FIGURE 1. Systematic review inclusion/exclusion flowchart.

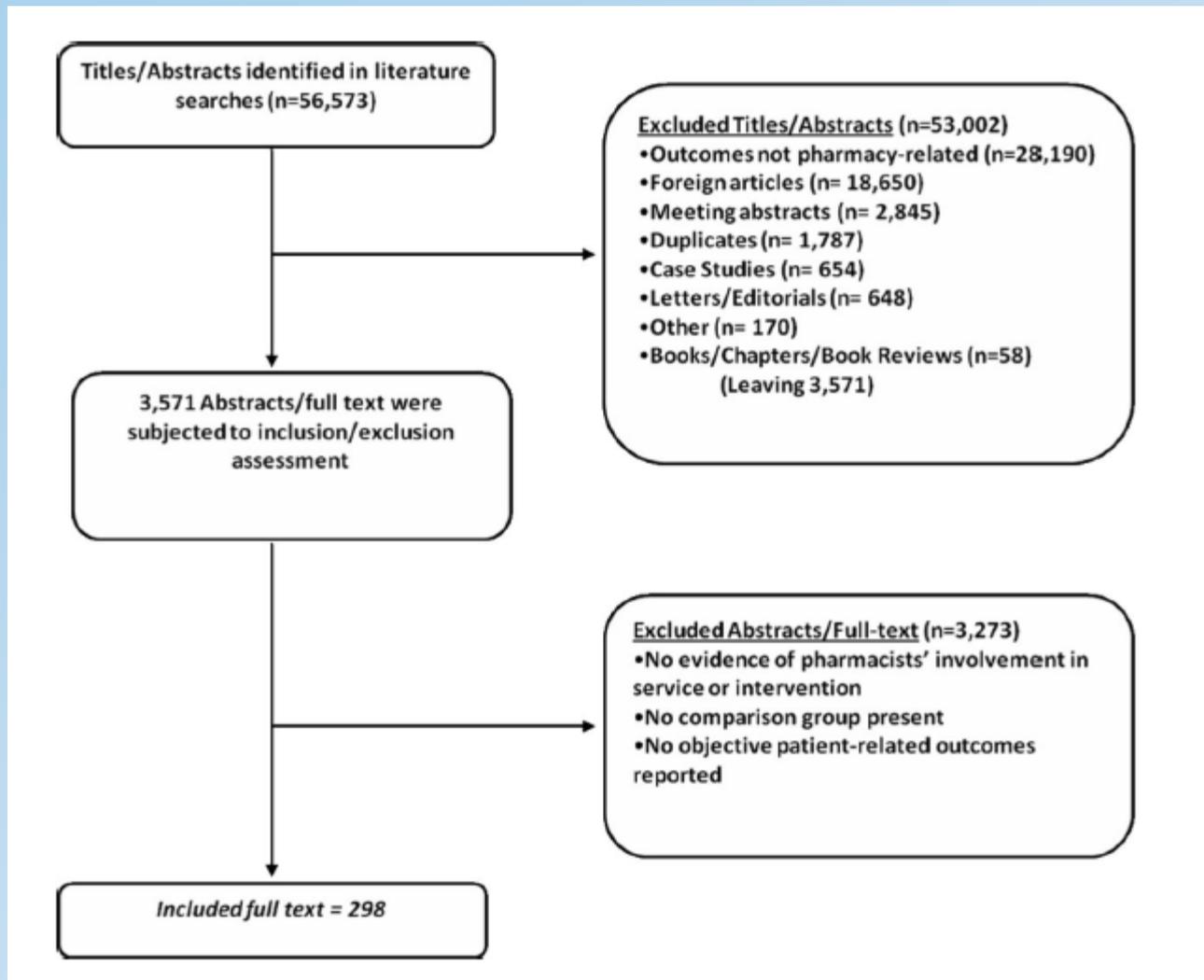


TABLE 1. Summary of Characteristics of Included Studies
(n = 298)

Study Characteristics	n (%)
Study setting [†]	
Inpatient/institutional	88 (29.5%)
Outpatient/ambulatory care/retail/community	194 (65.1%)
Emergency department/urgent care	4 (1.3%)
Home	13 (4.4%)
Other	14 (4.7%)
Pharmacists' interventions [‡]	
Behavioral	1 (0.3%)
Educational	40 (13.4%)
Technical	75 (25.2%)
Combination/multimodal	182 (61.1%)
Patients' health care coverage [§]	
Medicaid	19 (6.4%)
Medicare	16 (5.4%)
VA/DoD	41 (13.8%)
Managed care/HMO	28 (9.4%)
Private	19 (6.4%)
Self-insured	8 (2.7%)
Uninsured	17 (5.7%)
Not reported	164 (55%)

Therapeutic Outcomes

TABLE 2. Summary of Outcomes and Results

Outcomes and Results	n (%)
Therapeutic outcomes	
Blood pressure	n = 59
Favorable results	50/59 (84.7%)
Not favorable results	0/59
Mixed results	2/59 (3.4%)
No effect	7/59 (11.9%)
Cholesterol*	n = 54
Favorable results	44/54 (81.5%)
Not favorable results	0/54
Mixed results*	4/54 (7.4%)
No effect	6/54 (11.1%)
Hemoglobin A1c	n = 36
Favorable results	32/36 (88.9%)
Not favorable results	0/36
Mixed results	2/36 (5.5%)
No effect	2/36 (5.5%)
Hospitalization/readmission	n = 35
Favorable results	18/35 (51.4%)
Not favorable results	1/35 (2.9%)
Mixed results	1/35 (2.9%)
No effect	15/35 (42.9%)

ETC....

Safety Outcomes

TABLE 2. (Continued)

Outcomes and Results	n (%)
<i>Safety outcomes</i>	
Adverse drug event	n = 28
Favorable results	22/28 (78.6%)
Not favorable results	0/28
Mixed results	0/28
No effect	5/28 (17.9%)
Unclear	1/28 (3.6%)
Adverse drug reactions	n = 15
Favorable results	9/15 (60%)
Not favorable results	0/15
Mixed results	2/15 (13.3%)
No effect	3/15 (20%)
Unclear	1/15 (6.7%)
Medication errors	n = 11
Favorable results	9/11 (81.8%)
Not favorable results	0/11
Mixed results	1/11 (9.1%)
No effect	1/11 (9.1%)
Other safety outcomes ^{§§}	n = 46
Favorable results	34/46 (73.9%)
Not favorable results	2/46 (4.3%)
Mixed results	4/46 (8.7%)
No effect	6/46 (13%)

Summary Results

Favorable results (vs. comparative services group)

- Therapeutic and Safety outcomes ($p < 0.05$)
 - HbA1c
 - LDL cholesterol
 - Blood pressure
 - Adverse drug events
- Humanistic outcomes – more variability ($p < 0.05$)
 - Medication adherence
 - Patient knowledge
 - Quality of Life

Economic effects of pharmacists on health outcomes in the United States: A systematic review

MARIE A. CHISHOLM-BURNS, JOSHUA S. GRAFF ZIVIN, JEANNIE KIM LEE, CHRISTINA A. SPIVEY,
MARION SLACK, RICHARD N. HERRIER, ELIZABETH HALL-LIPSY, IVO ABRAHAM, AND JOHN PALMER

Am J Health-Syst Pharm—Vol 67 Oct 1, 2010

Figure 1. Flowchart of systematic review.

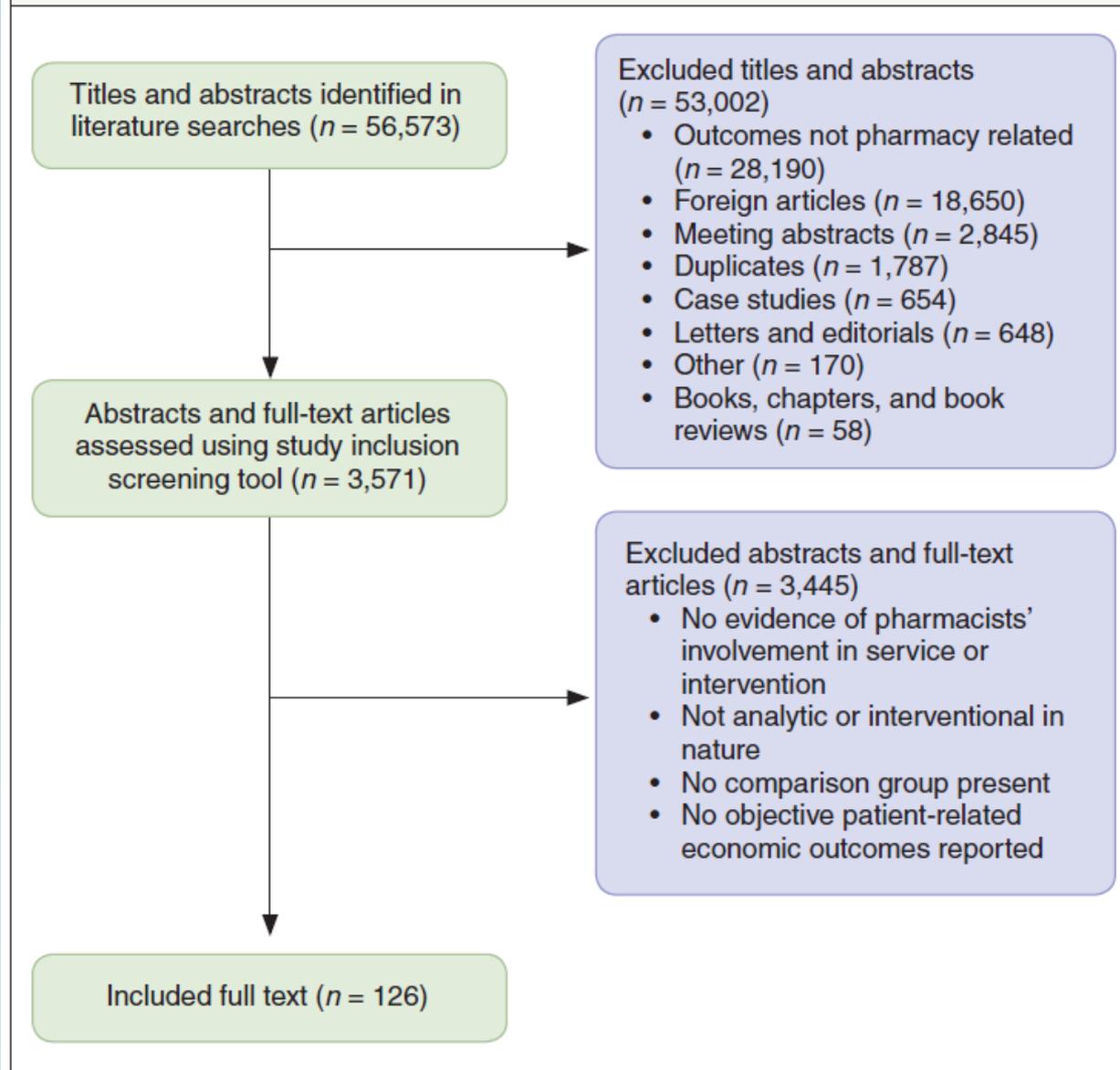


Table 1.

Characteristics of Studies Included in the Analysis (*n* = 126)

Characteristic	No. (%) Studies
Study setting^a	
Inpatient or institutional	59 (46.8)
Outpatient, ambulatory care, retail, or community	62 (49.2)
Emergency department or urgent care	0
Home	2 (1.6)
Nursing home or long-term-care facility	4 (3.2)
Pharmacists' interventions^b	
Behavioral	1 (0.8)
Educational	7 (5.5)
Technical	48 (38.1)
Combination or multimodal	70 (55.6)
Patients' health care coverage^c	
Medicaid	8 (6.3)
Medicare	5 (4.0)
Department of Veterans Affairs or Department of Defense	22 (17.5)
Managed care or health maintenance organization	10 (7.9)
Private	8 (6.3)
Self-insured	4 (3.2)
Uninsured	1 (0.8)
Not reported	68 (54.0)

^aBehavioral = attempts to modify a patient's behaviors through the use of cues, reminders, and/or reinforcement; educational = focuses on teaching and providing knowledge related to the patient's medical condition and medication regimen; technical = addresses the medication regimen, with strategies including therapeutic change or interchange, simplifying the dosing regimen and/or schedule, and the use of tools such as pillboxes; combination or multimodal = uses strategies from more than one of the above categories (technical, educational, behavioral).



Appendix—Examples of selected direct and indirect health care costs that should be considered in economic studies of pharmacists' direct patient care services^{162,166}

Direct Costs^a	Indirect Costs^b
<ul style="list-style-type: none">• Medication costs (e.g., prescription, nonprescription)• Costs of medical devices and equipment and other health care supplies• Hospitalizations and inpatient care• Ambulatory care costs (clinic use)• Health care provider office or clinic visits• Emergency department visits• Preventive care (e.g., screenings, immunizations, vaccinations)• Auxiliary services (e.g., dental services, self-management training, ophthalmology and optometry services, podiatry services, chiropractic services)• Costs of laboratory tests and procedures	<ul style="list-style-type: none">• Rehabilitation• Occupational therapy and physical therapy• Long-term care or nursing home care• Hospice or palliative care• Home health care services• Mental health care services• Transportation• Days of work lost• Time of health care providers• Caregiver time• Time for medical treatment• Time for and costs of treatment of side effects or adverse events

^aExpenses that can be directly attributed to an object such as a product, service, or condition.

^bExpenses not directly related to an object such as a product, service, or condition but that may be incurred as a consequence of a product, service, or condition.

Summary Economic Effects Pharmacists

- Most economic studies were flawed
 - e.g. partial cost analyses, weak study design
- 126 met criteria for review
 - 15.9% (n=20) positive results
 - 42.1% (n=53) mixed results
 - 4.8% (n=6) no effect
 - 37.3% (n=47) unclear effect
- Positive studies mostly involved technical or multi-model interventions

Table 2.
Studies Demonstrating Improved Economic and Clinical Outcomes with Pharmacists' Interventions or Services^a

Ref.	Disease(s)	Findings
<i>Inpatient/Hospital</i>		
27	Multiple	Shorter log LOS and lower log drug cost per admission with a pharmacist-included health care team ($p < 0.05$), resulting in average cost saving of \$377 per inpatient admission and a benefit-to-cost ratio of 6.03:1
28	Anticoagulation	10.1% higher LOS and 6.6% higher Medicare charges without pharmacist-provided heparin management; 5.9% higher LOS and 2.2% higher Medicare charges without pharmacist-provided warfarin management ($p < 0.0001$ for all) ^b
29	Infection	12.3% higher LOS, 6.3% higher total Medicare charges, 8.2% higher drug charges, and 7.8% higher laboratory charges without pharmacist-managed aminoglycoside/vancomycin therapy ($p < 0.0001$ for all) ^b
30	Epilepsy	14.7% higher LOS ($p = 0.0009$), 11.2% higher Medicare charges ($p = 0.0003$), and 32.2% higher laboratory charges ($p = 0.015$) without pharmacist-managed antiepileptic drug therapy
31	Infection	10.2% higher LOS ($p < 0.0001$), 3.1% higher Medicare charges ($p < 0.0001$), 7.2% higher drug charges ($p = 0.005$), and 2.7% higher laboratory charges ($p = 0.0056$) without pharmacist-managed antimicrobial prophylaxis ^b
32	Multiple	Shorter LOS ($p < 0.0001$) and lower pharmacy and total hospital costs ($p < 0.001$) associated with pharmacist-included treatment team
41	Infection	Lower direct costs among patients receiving pharmacokinetic services ($p < 0.05$)
46	HIV/AIDS	Decreased pharmacy costs per day ($p < 0.001$) with pharmacist-implemented guidelines and interventions
61	Anticoagulation	Lower hospital costs ($p = 0.04$) and shorter LOS ($p = 0.05$) associated with pharmacist-managed care group
<i>Inpatient/Institutional at Discharge, Home</i>		
78	Multiple	Significant differences in hospital charges for the first readmission ($p = 0.02$) and in hospital charges for all readmissions during the first month ($p = 0.01$) and the first 3 mo ($p = 0.03$) between pharmacist discharge and postdischarge consultation versus usual care for geriatric patients

Table 2 (continued)

Ref.	Disease(s)	Findings
<i>Outpatient/Ambulatory Care</i>		
85	Diabetes	Higher average costs for inpatient hospitalization and ED admissions ($p = 0.015$) without pharmacist-provided diabetes management
88	Hypertension	Higher average provider visit costs per patient in the usual care group versus physician–pharmacist comanagement group ($p = 0.02$)
90	Multiple	Decreased average monthly medication cost per patient by \$0.60 among patients receiving pharmacist-provided medication review versus increased cost of \$3.31 with usual care ($p < 0.001$)
112	Multiple	Decreased total health expenditures from \$11,965 to \$8,197 per person ($p < 0.0001$) and reduction in total expenditures exceeding cost of providing pharmacist-provided MTM services by >12:1
117	Asthma	Fewer ED visits, fewer hospitalizations, and fewer physician visits ($p < 0.05$) with pharmacist-provided education program in conjunction with pulmonologist care versus pulmonologist care alone
127	Heart failure	Fewer ED visits and hospital admissions and lower annual direct health care costs with pharmacist-provided multimodal intervention
132	Asthma	Reduced ED visits for acute exacerbations of asthma ($p < 0.01$) with pharmacist-managed, physician-directed asthma management program
140	Asthma	40% reduction in hospitalizations, 66.6% reduction in ED visits related to asthma, and a significant cost avoidance to the institution ($p = 0.03$) with pharmacist-provided asthma education
<i>Outpatient/Ambulatory Care/Health Maintenance Organization</i>		
86	Dyslipidemia	Average reduced copayments of \$145.29 (62%) per patient (95% CI, \$143–\$149; $p < 0.001$) after converting from simvastatin to lovastatin
<i>Outpatient/Retail</i>		
98	Diabetes, dyslipidemia	Decreased total mean direct medical costs by \$1,200–\$1,872 per patient per year ($p < 0.001$) and decreased sick days every year (1997–2001) for one employer group with estimated increases in productivity of \$18,000 annually for employers' health plans

Economic Outcomes

Economic Evaluations of Clinical Pharmacy Services: 2001-2005

Perez et.al., Pharmacotherapy 2008;28:286-323

Economic Evaluations of Clinical Pharmacy Services: 2001-2005

- Literature Review
- Focused on Economic Outcomes
 - Excluded any with only clinical and humanistic outcomes

Results

- 3,793 articles & abstracts
 - 93 in final group, 15 had Benefit/Cost ratios

Settings of Economic Evaluations of Clinical Pharmacy Services

Table 4. Setting of Economic Evaluations of Clinical Pharmacy Services

Setting	No. of Studies (%)
Hospital	40 (43.0)
Ambulatory care clinic or physician's office	20 (21.5)
Community pharmacy	16 (17.2)
Long-term care, rehabilitation, or residential facility	6 (6.5)
Clinic or hospital-based outpatient pharmacy	4 (4.3)
Patient's home or telephone-based service	3 (3.2)
Various settings or setting unspecified	3 (3.2)
Veterans Administration Health Care System	1 (1.1)

Type of Service or Intervention

Table 5. Types of Clinical Pharmacy Services or Interventions Studied

Type of Service or Intervention (n=93)	No. of Studies (%)
General pharmacotherapeutic monitoring	32 (34.4)
Target drug program	27 (29.0)
Disease state management	21 (22.6)
Medication therapy management (as stated by authors)	3 (3.2)
Wellness program or immunization service	2 (2.2)
Pharmacokinetic monitoring	1 (1.1)
Health screening or laboratory testing service	1 (1.1)
Other	6 (6.5)
Patient education program or cognitive service	0 (0)

Includes academic detailing/physician profiling service, dose optimization service, drug reconciliation service, and various other services.

Benefit:Cost Ratios

Table 6. Benefit-to-Cost Ratios from Selected Studies

Setting	Type of Service	Currency (Year)	Benefit:Cost Ratio
Ambulatory care clinic ³⁰	General pharmacotherapeutic monitoring	U.S. Dollar (2002)	2.89 ^a
Ambulatory care clinic ³⁰	Target drug program	British Pound (2001)	1.02 ^a
Community pharmacy ³⁹	Disease state management services	U.S. Dollar (2003)	1.17 ^a
Community pharmacy ³³	Disease state management services	Canadian Dollar (1998)	9.47
Community pharmacy ³⁸	Other, dose optimization service	British Pound (2004)	7.67 ^a
Facility (unspecified) ¹¹⁶	General pharmacotherapeutic monitoring	U.S. Dollar (2002)	2.05
Hospital ³⁶	Disease state management services	U.S. Dollar (2002)	4.81 ^a
Hospital ³⁵	General pharmacotherapeutic monitoring	Malaysia RM (2001)	7.28 ^a
Hospital ³⁵	General pharmacotherapeutic monitoring	Australian Dollar (1998)	22.99 ^a
Hospital ³¹	General pharmacotherapeutic monitoring	Euro (2000)	34.61 ^a
Hospital ³⁸	Other, various services	U.S. Dollar (2000)	3.09
Hospital ³⁰	Pharmacokinetic monitoring	U.S. Dollar (1999)	4.89 ^a
Hospital ⁴¹	Target drug program	U.S. Dollar (2001)	4.65 ^a
Long-term care facility ³⁰	General pharmacotherapeutic monitoring	Australian Dollar (1999)	1.33 ^a
Long-term care facility ⁴²	General pharmacotherapeutic monitoring	U.S. Dollar (2002)	11.78
	Median (mean)		4.81 (7.98)

Values indicate benefit per unit of cost (i.e., "2.89" signifies "2.89:1").

^aBenefit-to-cost ratios calculated by reviewers.

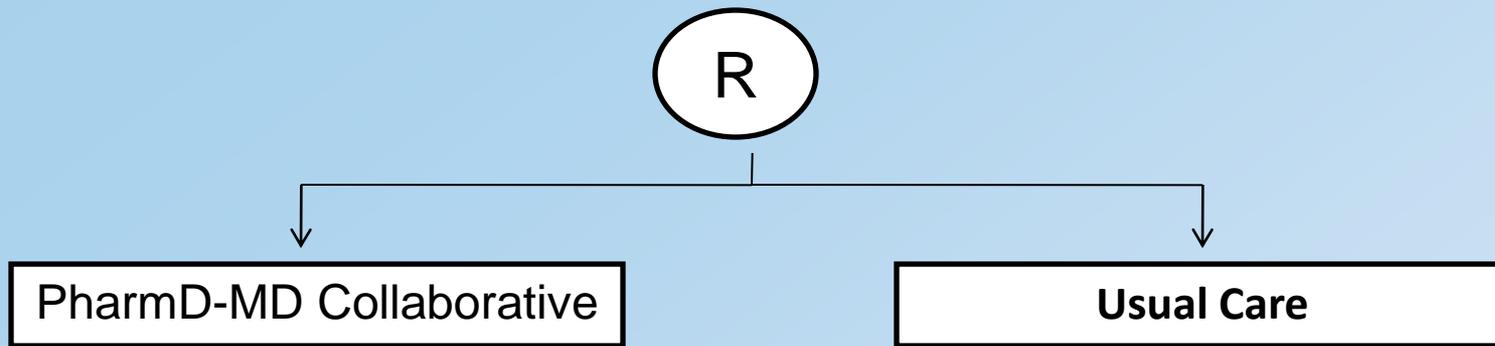
So...

- **There is positive evidence of the value of pharmacist services**
- **Studies vary**
 - **Sites**
 - **Pharmacist Services**
 - **Methods to evaluate**
- **Each program needs to assess benefits and costs**

Pharmacist-Physician Collaborative Medication
Therapy Management Services (MTMS)
RCI Demonstration Project

Three Potential Models

- Academic Clinical Pharmacist
- Medical Group In-House Pharmacist
- Community Pharmacist



- Internal Medicine Group – UCSD
- Registry to identify HTN patients “not at goal” (n=90 per group)
 - >140/90 (or >130/80 with diabetes)
- PharmD (residency trained) two ½ day sessions per week
- Collaborative Practice Protocol – pharmacist a separate visit
- MTMS activities:
 - drug therapy initiation and monitoring
 - medication dosage adjustments
 - physical assessment (BP, height, weight)
 - laboratory test review/order
 - patient education
- Clinic visits and follow-up phone calls
 - Limited time period for intensive medication management

Specific Aims

1. Compare change in systolic and diastolic blood pressure between groups at 6 and 9 months.
2. Evaluate MTMS model
 - a. number and type of medication changes
 - b. number and type of drug therapy problems identified and resolved
 - c. patient satisfaction
 - d. medication and medical resource utilization
 - e. return on investment (ROI)
3. Explore possible markers to target patients most likely to have high benefit vs. cost ratio for future pharmacist MTMS.
4. Interpret clinical, economic and humanistic outcomes from 3 stakeholder perspectives (Medical Group, Health Plan, Patient).
 - a. Stakeholder Interpretation Group

Timeline

As of 3-28-11

7/2010 1 st Patient In	1/2011 1 st Patient 6 mos.	8/2011 Last Patient 9 mos.	9/2011 Chart Review Usual Care Patients
--------------------------------------	---	----------------------------------	---

Enrolled: 53

- 48 initial visit + 1 follow-up
- 33 initial visit + 2 follow-up
- 24 initial visit + 3 follow-up
- 10 initial visit + 4 follow-up
- 4 initial visit + 5 follow-up
- 1 initial visit + 6 follow-up

Actions (n=31)

Patients with a drug therapy problem identified % (n)	41.9% (13)
Type of drug therapy problem % (n) of 21 problems	
Unnecessary drug therapy	33.3% (7)
Need for additional therapy	28.6% (6)
Drug dose too low	23.8% (5)
Non-adherence to therapy	9.5% (2)
Adverse drug reaction	4.8% (1)
Patients with a <i>medication change</i> at initial visit % (n)	35.4% (11)
Patients with type of change made % (n)	
Added Medication	12.9% (4)
Increased Dose	12.9% (4)
Decreased Dose	6.5% (2)
Changed Medication	6.5% (2)

So Far...

1. Fairly representative sample of patients with uncontrolled HTN
2. Using many prescription medications
75%: 5 or more (all causes)
3. Two-thirds report low to medium adherence to HTN medications
4. 40% of patients have a drug therapy problem (DTP) identified at initial visit

Overlooked Study Objective

Logistics!

- New provider in the practice
- Scheduling
 - Staff training/access
- Electronic Medical Record
 - Template
- Coding
 - Services
 - Study patients
- Space
- ETC.....

Potential Payment/Reimbursement

- Studies – funded through grants
- Outside of studies
 - Billing via CPT Codes – for example
 - Medication Therapy Management
 - 99605, 99606, 99607
 - Education (e.g. diabetes)
 - G0108, G0109
 - Incident to Physician Visit
 - 99211, 99212, 99213, 99214, 99215

UCSD Clinical Pharmacist Models

Focus	Location
<i>Medical Center</i>	
Palliative Care & Pain Management	UCSD: Moores Cancer Center
Diabetes	San Diego VA Clinic
Chronic Kidney Disease	UCSD Medical Center
Transplant (Kidney & Liver)	UCSD Medical Center
<i>Medical Group</i>	
HIV/AIDS	UCSD: Owens Clinic
Mental Health	UCSD Mental Health
Anti-Coagulation, Hypertension, Diabetes Education	UCSD Internal Medicine (4 th & Lewis, La Jolla)
Asthma, Hypertension, Hyperlipidemia & Diabetes	UCSD Family Medicine (4 th & Lewis, Scripps Ranch)

All operating under Collaborative Practice Agreements between MD & PharmD except Diabetes Education.

Questions?

BACKUP SLIDES

Patients

Inclusion criteria:

Age 18 or over

1. Diagnosis of hypertension with most recent BP \geq 140/90 mmHg (ICD9code 401.xx) or BP \geq 130/80 mmHg if patient also has diabetes
2. Currently treated with at least one anti-hypertensive medication
3. Continuous active patient of the clinic for at least the past 6 months
4. English speaking and able to complete questionnaires in English



Stakeholder Interpretation Group

Daniel C. Cusator, M.D., M.B.A.
Chief Medical Officer
Greater Newport Physicians
P.O. Box 6270
Newport Beach, CA 92658

Barry C. Smith, M.D.
Aetna
Medical Director
6303 Owensmouth Avenue, Ste 900
Woodland Hills, CA 91367

Virginia E. White, Pharm.D., FCSHP
Health Net Pharmaceutical Services
10540 White Rock Road, Suite 280
Rancho Cordova, CA 95670

Kate Tepedino, PharmD
Pharmacy Benefits Supervisor
Sharp Health Plan
4305 University Avenue, Suite 200
San Diego, CA 92105