

BACKGROUND & OBJECTIVE

Background:

- The Joint Commission of Pharmacy Practitioners (JCPP) recognizes the need for pharmacist involvement in improving the quality of care in community pharmacies.
- The SC Community Pharmacy Enhanced Services Network (SC CPESN) is a group of independent pharmacies that have agreed to focus on providing the “extra” pharmacy services shown to improve health and outcomes.
- Do these “extra” services have value for payers? No studies have been published on the cost-effectiveness of the CPESN.

Objective:

- To determine the cost-effectiveness of an expanded service pharmacy vs. traditional service pharmacies from the payer perspective.

METHODS

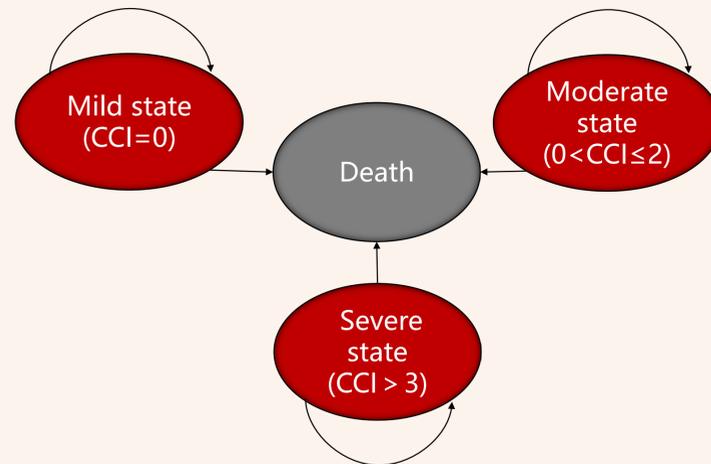
Participants and Study Design:

- Study period: Jan 1, 2017 through December 31, 2017.
- Treatment group: Patients served by an expanded services community pharmacy (ESP) during the study period.
- Control group: Patients served by pharmacies other than the ESP that did not provide expanded services. The control group was selected from independent pharmacies serving similar patients with similar demographic and socio-economic characteristics as the ESP during the study period.
- Patient demographic information, health care utilization and cost were collected from paid claims.
- The treatment and control groups were matched using propensity scoring, controlling for potential confounding factors of age, sex and family status.

Markov Model:

- A Markov model with three health status states and death was constructed to simulate cost-effectiveness. (Figure 1.)
- Health states (mild, moderate and severe) were defined based on the Charlson Comorbidity Index (CCI) and ICD-10 codes.
- Perspective: Payer.
- Time horizon: 10 years with an annual cycle.

Figure 1. Markov Model



Transition probabilities:

- We assumed that patient’s health states would not change.
- The probability that a patient would maintain in a health state is: $(1 - \text{mortality})$
- Ten-year mortality was calculated by CCI which combined comorbidity with age using the formula: $P_1 = 1 - 0.983^{e^{0.9 \times CCI}}$.
- Annual mortality was calculated based on the 10-year mortality using the formula: $P_2 = 1 - e^{\frac{\ln(1-p_1)}{10}}$.

Costs:

- Costs included pharmacy and medical costs.

Effectiveness:

- Number of office visits
- Survival years
- Hospital utilization

Base-case analysis:

- Incremental analysis was used to compare the cost-effectiveness between the treatment and control groups.

Sensitivity analysis:

- Simulated 1000 times using the bootstrap method.
- Cost-effectiveness plane (CE Plane) and Cost-effectiveness acceptability curve (CEAC) were drawn.

RESULTS

- Characteristics of patients after propensity matching are shown in Table 1.
- The average total costs of the treatment group was lower than the control group.

Table 1. Characteristics after propensity matching

Characteristic	Treatment group, N=680, No. (Mean)	% (SD)	Control group, N=680, No. (Mean)	% (SD)	P-value
Age, years					
Age<20	138	20.3%	138	20.3%	1.000
20≤Age<40	107	15.7%	107	15.7%	
40≤Age<60	196	28.8%	196	28.8%	
Age≥60	239	35.1%	239	35.1%	
Gender					1.000
Male	232	34.1%	270	39.7%	
Female	448	65.9%	410	60.3%	
Family status					0.344
Subscriber	423	62.2%	427	62.8%	
Spouse	77	11.3%	91	13.4%	
Dependent	180	26.5%	162	23.8%	
CCI					0.474
0	467	68.7%	486	71.5%	
1 - 2	160	23.5%	151	22.2%	
>3	52	7.7%	43	6.3%	
Health utilization					
Number of office visit	12.4	12.6	11.1	11.4	0.050
Number of hospitalization	2.8	7.3	3.5	8.6	0.110
Medical costs, dollars	3,430.3	10,990.4	4,547.8	19,166.5	0.187
Pharmacy costs, dollars	2389.8	6,284.3	1,907.5	3,928.6	0.090
Total costs, dollars	5820.1	12,789.9	6,455.4	19,768.0	0.482

Base-Case analysis:

- Compared to the control group, the ESP could:
 - save \$1,999.39 per patient for 10 years.
 - extend survival time by 0.12 years per patient over a 10-year period (Cost-saving).
 - reduce hospitalizations by 6.9 per patient over a 10-year period (Cost-saving).
- The cost of office visits would increase (ICER: -\$154.6).

Table 2. Result of Base-case Analysis

Group	Cost	Office visit	Hospital utilization	Life Years
Control	\$50,150.16	99.99	27.72	9.82
Treatment	\$48,150.78	112.92	20.84	9.94
Incremental value	-\$1,999.39	12.93	-6.88	0.12
ICER		-\$154.60	Cost-saving	Cost-saving

Sensitivity analyses:

- Results of sensitivity analyses are shown in Figures 2 and 3.
- When the threshold is greater than \$10, the probability that the ESP is more cost-effective is greater than 50%.

Figure 2. CE Plane

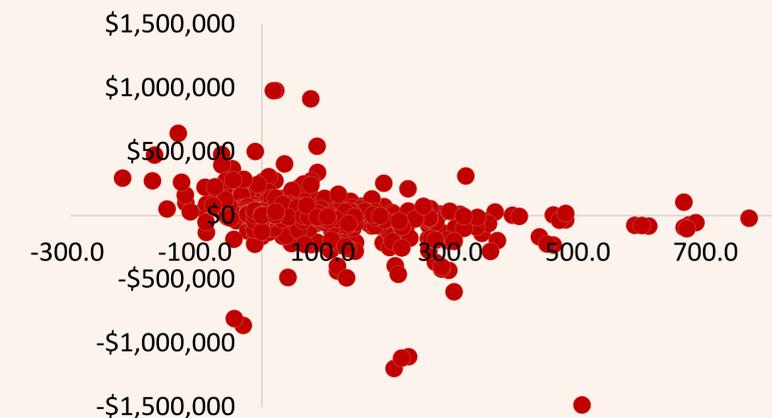
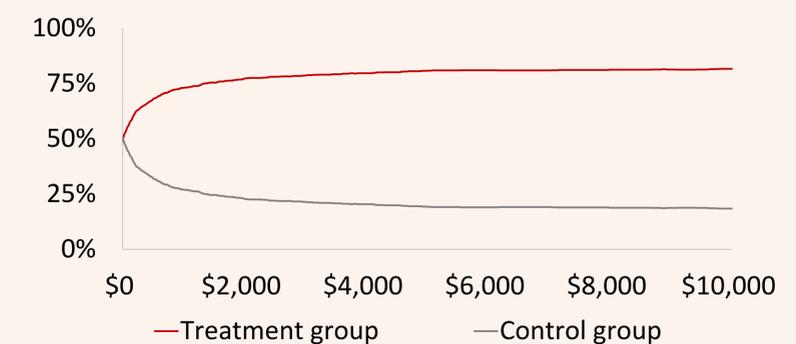


Figure 3. CEAC



DISCUSSION AND CONCLUSION

- An ESP program could reduce total expenditure and the number of hospitalizations with an corresponding increase in total life years.
- The number of physician office visits increased, perhaps due to better pharmacy services and an increased likelihood of the using primary care rather than hospital services.
- The ESP program is a cost-effective or even a cost-saving program from the payer perspective.
- Third-party payers should consider reimbursing pharmacists for the cost associated with this offering expanded services.