Cost-benefit analysis of decision support methods for patients with breast cancer in a rural community

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Background Decision support interventions help patients who are facing difficult treatment decisions and improve shared decision making. There is little evidence of the economic impact of these interventions.

Objective To determine the costs of providing a decision support intervention in the form of consultation planning (CP) and consultation planning with recording and summary (CPRS) to women with breast cancer and to compare the cost benefit of CP and CPRS by telephone versus in person.

Methods Sixty-eight women with breast cancer who were being treated at a rural cancer resource center were randomized to CP in person or by telephone. All participants were then provided with an audio-recording of the physician consultation along with a typed summary for the full intervention (CPRS). Surveys completed by the participants and center staff provided data for measuring costs and willingness-to-pay (WTP) benefits. Societal perspective costs and incremental net benefit (INB) across delivery methods was determined.

Results Total CP costs were $208.72 for telephone and $264.00 for in-person delivery. Significantly lower telephone-group costs ($P < .001$) were a result of lower participant travel expenses. Participants were willing to pay $154.12 for telephone and $144.03 for in-person CP ($P = .85$). WTP did not exceed costs of either delivery method compared with no intervention. INB of providing CP for telephone versus in person was $65.37, favoring telephone delivery. Sensitivity analysis revealed that with more efficient CP training, WTP became greater than the costs of delivering CP by telephone versus no intervention.

Limitations There may be some income distribution effects in the measurement of WTP.

Conclusions Providing CP by telephone was significantly less costly with no significant difference in benefit. Participants' WTP only exceeded the full cost of CP with more efficient training or higher participant volume. A positive INB showed telephone delivery is efficient and may increase accessibility to decision support services, particularly in rural communities.

S hared decision making — which actively involves both patients and providers in treatment decisions — is receiving increasing attention as the preferred model for decision making in health care, especially for oncology.[1] Many cancer patients already have access to a physician for their health care, but their communication with the physician may not be effective for a variety of reasons, such as physician time constraints, patient shyness, or the lack of experience with shared physician-patient conversations. This makes it challenging to reach shared treatment decisions.[2] Indeed, in small rural communities, such as those studied here, communication deficiencies might be even greater.

Decision support interventions better equip patients for shared decision making with their physicians. Visit preparation, a type of decision support intervention, is designed to help patients clarify their preferences for treatment and gather information for an upcoming physician consultation. It can increase patient involvement, reduce anxiety, and impact treatment decisions.[3,4] However, it can be difficult to institute given the constraints on provider time and community resources.

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A type of visit preparation, consultation planning, was implemented at a rural cancer community center. The purpose of this study is to compare the costs and benefits of 2 different methods of delivering the preparation, by telephone and in person. This visit preparation intervention has been tested and implemented elsewhere with good effects on patient satisfaction, self-efficacy, and patient anxiety.[5,6] Our study is one of the few economic studies of a community-based decision support intervention and as far as we know, the first cost-benefit analysis (CBA) of the different delivery methods for visit preparation.[3,7]

Materials and methods

Intervention

The visit preparation in our study consisted of 2 components: consultation planning (CP) and a consultation visit recording and summary (RS). The entire intervention is referred to as CPRS. In CP, trained facilitators (CPRSers) elicited questions and concerns from patients before their appointment with the physician. A written "consultation plan" was then provided to the patient as a visual aid for their upcoming physician appointment. The patients in our study were randomized to receive CP either by telephone or in person.

For the RS portion of the intervention, the CPRSers accompanied the patient to the physician appointment and created an audio-recording of the consultation. After the visit, a written "consultation summary" was given to the patient and the physician. There was no difference in the RS portion of the intervention between the participants who had been randomized to receive CP by telephone or in person.

Characterization of intervention

The CPRS was conducted with patients of various stages of breast cancer. They had to have a confirmed diagnosis of breast cancer and an upcoming appointment with either a surgeon, medical oncologist, or other team member. The goal of the CP portion of the intervention was to articulate key questions and concerns a patient might have before a consultation with a breast cancer specialist. It took about 20-50 minutes with a trained lay person to complete this portion. A printout of the questions and concerns were provided to the patient as a guide for the upcoming conversation with the consulting clinician. In the RS portion, the trained staff member attended the consultation visit with the patient and audio-recorded the conversation between patient and clinician. The recording was summarized and a typed copy was given to the patient and clinician after the visit.

We used the SCOPED model to guide this process. SCOPED stands for situation, choices, objectives, people, evaluation, and decisions. It is a process for encouraging critical reflection, which occurs when people are able to think and talk about issues that are important to them. *Situation* is where the known facts about the patient's condition are clarified, including diagnoses, tests, and what the patient has read or heard about the diagnosis. *Choices* includes a clarification of what options are available, including treatment possibilities, tests, clinical trials, complementary therapies. *Objectives* is where the patient's goals and priorities are clarified, including hopes, fears, thoughts, feelings, and any time lines. *People* includes a clarification of the roles and responsibilities of the clinicians, family, and friends who are involved in the care of the patient. *Evaluation* involves clarifying how the patient's choices will affect their objectives, including effects on survival, recurrence, and quality of life. *Decisions* involves clarifying which choice is best and what the next steps should be with treatments, referrals, possible obstacles, and resources. All 6 of these factors were discussed with the patients with the aim of clarifying their views and concerns and for preparing them for discussion and final decision making with the clinician at their upcoming visit (http://www.jeffbelkora.com/blog/questions-for-your-doctor.html; accessed October 10, 2012).

We have reported elsewhere the decision-self-efficacy (DSE) outcomes from this trial by comparing the telephone and in-person delivery of the CP portion of the intervention.[6] All participants who received CP by telephone or in person had a significant increase in DSE from baseline. But as hypothesized in this noninferiority design, there was no significant difference between the 2 groups. The present report combines the trial results with modeling to determine the costs and cost-benefit of providing CP by telephone or in person, as well as CPRS. For the cost-benefit analysis, we calculated the net benefit (NB) of the CP and CPRS interventions compared with no program; and the incremental net benefit (INB) of CP and CPRS for the 2 delivery methods.

Study population

The Cancer Resource Centers of Mendocino County (CRCMC) have been providing CPRS to rural breast cancer patients at no charge. For our study, women with breast cancer who visited the resource centers during 2007-2010 were screened for study eligibility and, if they were eligible and provided written consent, they were randomized to receive CP by telephone or in person. Women were eligible if they were older than 18 years, had been diagnosed with new or recurrent breast cancer, and had a scheduled appointment with a sur-

geon or oncologist to discuss treatment options. The study was approved by our institution's committee on human subjects research.

Cost-benefit analysis

A CBA weighs the costs and benefits of 1 treatment over alternative treatments by calculating an incremental net benefit (INB) of the 2 alternatives. This is known as the gold standard economic evaluation. We compared the NB of telephone and in-person delivery methods for the CP and CPRS compared with no program; and the INB of the 2 different delivery methods from the resource center and societal perspectives. From the resource center perspective, only the costs incurred by the resource center were included. For the societal perspective, the costs included participant (time and expenses) and resource center costs. Participant time costs included both work-loss and leisure time for the base case and only work-loss time in the sensitivity analysis for the stricter societal perspective. Training costs were included as an expense of the intervention. The benefits were measured as the patient's willingness to pay (WTP).

The CBA formula for calculating the INB is: $INB = (WTP_{tele} - WTP_{in-person}) - (Cost_{tele} - Cost_{in-person})$, where WTP is willingness to pay, *tele* is CP provided by telephone, and *in-person* is CP provided in person. An $INB > 0$ indicates that the incremental value of the new intervention is greater than the added program costs. The CBA formula for calculating the NB of 1 intervention is: $NB = WTP - Cost$.

Data collection and assumptions

Data for the CBA were collected from paper-based surveys that had been completed by the participants and CPRSers using a guided interview approach. The data were used to model the use of the intervention in a community setting. Sensitivity analyses were performed by varying key assumptions. All of the costs were estimated in 2009 US dollars.

Participants

For the base case, the number of women who were solicited to participate in this study was used to model the likely number of CPRSs that would be provided over 3 years if the study criteria did not restrict patient inclusion. For sensitivity analyses, we estimated the maximum number of patients that the resource centers could serve, assuming delivery to 2 patients per working day regardless of delivery mode.

Resource center costs

Resource center costs included training and overhead. They were estimated from data from paper-based surveys

that were completed by CPRSers and resource center staff. The estimates were modeled and conservative so that base-case results could be generalizable to all communities. Initial training consisted of 3 days of classroom training provided by 1 trainer and 2 assistants; 2 days shadowing someone with expertise; and 1 day practicing. Annual refresher courses included 1 day of classroom training and 1 day of practicing. Training costs included venue, wages, food, equipment, lodging, and parking. For sensitivity analysis, we calculated a more efficient training cost, including 1 day each of classroom training, practice, and shadowing; a less expensive venue and fewer trainers.

Overhead costs were obtained directly from the resource centers using their expenses from July 2007 to June 2008 with inflation to 2009 dollars. Those costs included rent, electricity, equipment, internet, and telephone costs. They were allocated by the number of total patient interactions with the center so that an overhead cost per interaction could be estimated. We assumed 1 interaction per participant (varied 1-3) for both delivery types.

CPRSers completed surveys to document the time it took to provide the CPRS for each participant. Time for CP included time to arrange, prepare for, and provide the CP, and time to prepare, edit, and deliver the consultation plan to the participant.

The time associated with RS included time to arrange and attend the medical visit for the CPRSers. RS also included time to edit and deliver the consultation recording and summary. We calculated a base-case CBA with CP alone and with the full CPRS intervention. The wages for CPRSers' time reflect the average actual wages ($25.00/h) and benefits of those who provided CPRS at the resource centers.

Participant costs to participate in CP

Information for participant time and costs were estimated based on paper surveys completed by the participants. Participant time included time preparing for, traveling to, and receiving CP. Participant expenses included babysitter costs, driving expenses, telephone expenses, and lost household wages. The patient's time and expenses related to participating in the RS portion of the intervention were not included. The participant would have attended the physician visit regardless of the intervention, and it was assumed that the audio-recording would not result in any additional participant cost.

For the base case, the societal approach was used and participant time included both work-loss and leisure time. Participant time cost was $20.90/h, based on average national wages in 2009.

Babysitter costs were $7.37/h, based on 2009 national wage averages.[8] Driving costs were $0.55/mile, the 2009 rates for privately owned vehicles.[9] Telephone costs were $0.05/min, based on pay-as-you-go prepaid wireless plan costs for mobile phones.[10] Lost wages to the household ($20.90/h) were included if family or friends took time off work.[11]

Program benefits

The benefit of the CP was measured based on responses to a WTP questionnaire guided by the standard procedure for WTP and CBA calculation.[12,13] Participants' WTP estimates represent the dollar value of the CP program. It is an ideal method for representing the true program value for CBA from a community perspective and the most accurate reflection of how participants value the service. In a bidding game interview setting, the participants were asked about their WTP for CP immediately after the CP encounter in a series of closed-ended questions. They were instructed that they would not be required to pay for the CP program at that stage or in the future. They were also informed that the purpose of the WTP questions was to determine the value of the program to them.

We began the WTP survey by asking if they would be willing to pay a small fixed amount ($10) given what they knew about the service. Then we asked if they would be willing to pay $0 dollars as well as what amount between $0 and $10 they would be willing to pay if they were not willing to pay the $10 starting amount. The maximum value was $300, but each respondent could state a maximum above that. We pursued this line of questioning until they reached a point of indifference between paying a certain amount or not participating in the intervention and receiving their perceived benefits. That number represented their WTP for the program and its consequences. Our sample size was not large enough to vary the starting point amount. A number of studies have found a starting point bias when using this method.[14] However, others have found no such bias.[15,16]

Statistical analysis

We used the Wilcoxon rank sum tests for continuous variables and Fisher exact test for categorical variables to compare the demographics; and two-sample t-tests to compare the differences in time, cost, and WTP for telephone and in-person CP and for CPRS. Linear regression was performed to identify predictors of WTP.

Theory

Decision support is an important method for preparing patients and for increasing patient-physician communi-

cation. Yet it can be costly to provide. A study such as ours, which compares the costs and benefits of decision support, is useful for communities that are offering decision support programs for patients with breast cancer.

Results

Sample characteristics

Of the 148 women who were solicited for participation in the study, 113 were eligible and 68 gave their consent for participation and were randomized to the telephone or in-person group. There were no significant differences in demographic characteristics between the 2 groups (Table 1).

Resource center costs

Initial training cost $9,967, and the refresher course cost $4,698. Wages were the largest portion of both initial training (77%) and refresher course training (72%). Total training costs over the 3-year period were $14,665 or $99.09/CPRS participant (Table 2). The more efficient training costs (as described on p. 49) reduced training costs to $5,157 or $34.85/CPRS participant. The maximum number of CPRSs over a 3-year period was 3,120. Total overhead costs of $25.31/per eligible participant assumed 1 interaction annually (Table 2, p. 52).

We found no significant difference in average delivery times between the 2 methods for either CP (telephone: 2.36 h [SD, 0.311], in-person: 2.63 h [SD, 0.413]; $P = .29$) or CPRS (Table 3, p. 53).

Participant costs

Participant time was significantly lower in the telephone arm compared with that in the in-person arm (1.01 h [SD, 0.14] vs 1.92 h [SD, 0.28]; $P < .001$; Table 4, p. 53) because of the higher amount of travel time associated with patients who received in-person delivery. When all participant time (work-loss and leisure) was included, the cost per participant was significantly lower in the telephone arm than it was in the in-person arm ($25.43 [SD, 4.12] vs $64.48 [SD, 15.08]; $P < .001$). Costs were also significantly lower in the telephone arm when leisure time was excluded ($4.26 [SD, 2.23] vs $25.64 [SD, 11.68]; $P < .001$).

Total costs

The societal perspective base case included resource center costs and all participant time (work-loss and leisure) and expenses (Table 5, p. 54). The additional total cost per person of providing CP in a rural community compared with not having a CP program ranged from $111.28-$314.61, depending on the mode of delivery and assumptions for training, overhead cost, and volume delivered. In the base-case analysis, the total cost per

TABLE 1 Demographic characteristics of study participants

Characteristic	Method of CP delivery		P
	Telephone (n = 36)	In-person (n = 32)	
Age, mean (SD), y	58.8 (10.9)	59.8 (9.4)	.72[a]
Ethnicity, n (%)			
White	33 (91.7)	30 (93.8)	.56[b]
Other	3 (8.3)	2 (6.3)	
Marital status, n (%)			
Married	21 (58.3)	12 (37.5)	.42[b]
Domestic partnership	1 (2.8)	2 (6.3)	
Divorced/separated	6 (16.7)	8 (25.0)	
Widowed	3 (8.3)	6 (18.8)	
Single/never married	4 (11.1)	4 (12.5)	
Education level, n (%)			
Elementary school	1 (2.8)	0 (0.0)	.14[b]
High school	15 (41.7)	9 (28.1)	
College	7 (19.4)	14 (43.8)	
Graduate/professional	10 (27.8)	8 (25.0)	
Employment status, n (%)			
Employed	13 (36.1)	8 (25.0)	.66[b]
Not employed	20 (55.6)	21 (65.6)	
Retired	3 (8.3)	3 (9.4)	
Household income,[c] n (%)			
Below FPL	6 (16.7)	1 (3.1)	.06[b]
Below 100% FPL	7 (19.4)	4 (12.5)	
Below 150% FPL	0 (0.0)	3 (9.4)	
Above 150% FPL	13 (36.1)	15 (46.9)	
Insurance status, n (%)			
Private insurance	13 (36.1)	17 (53.1)	.25[b]
Medicaid	10 (27.8)	3 (9.4)	
Medicare	6 (16.7)	3 (9.4)	
Medicare + private insurance	6 (16.7)	6 (18.8)	
Medicare + Medicaid	1 (2.8)	1 (3.1)	
Other	0 (0.0)	1 (3.1)	
Breast cancer stage, n (%)			
0	5 (13.9)	2 (6.3)	.83[b]
1	16 (44.4)	14 (43.8)	
2	10 (27.8)	11 (34.4)	
3	4 (11.1)	3 (9.4)	
4	1 (2.8)	2 (6.3)	

Abbreviation: FPL, federal poverty level.
[a] Two-sample t-test. [b] Fisher exact test. [c] 2008 Federal poverty level guidelines.

TABLE 2 Resource center training and annual overhead costs[a]

	Cost
Training[b]	
Initial training	$9,967.00
Two annual refresher courses	$4,698.00
Total	$14,665.00
Cost per CPRS provided[c]	$99.09
Overhead[d]	
Electricity	$5,575.51
Rent	$29,516.68
Office supplies	$4,544.85
Equipment maintenance	$1,055.50
New equipment	$7,897.60
Internet	$1,502.53
Telephone	$1,760.20
Total	$51,852.86
Cost per interaction[e]	$25.31

Abbreviation: CPRS, consultation planning, recording and summarizing. [a] 2009 dollars annual. [b] Longer than 3 years. [c] 148 patients were approached for participation in the study. [d] Annual resource center costs to all patients, not just eligible participants. [e] 2,049 total interactions per year.

person to provide CP was significantly lower for telephone delivery compared with in-person delivery ($208.72 [SD, 11.52] vs $264.00 [SD, 20.69]; $P < .001$).

Resource center perspective

Resource center total costs cost per patient person were not significantly different between telephone or in-person delivery methods for either CP alone ($183.29 [SD, 8.60] vs $199.52 [SD, 17.46]); $P = .120$) or CPRS ($264.50 [SD, 11.73] vs $281.89 [SD, 21.45]); $P = .148$; Table 6, p. 55). After varying training, overhead, and participant volume, the range of the cost for telephone CP was $85.85-$233.90, and the range for telephone CPRS was $167.06-$315.11. The cost for in-person CP was $102.08-$250.13, and the range for in-person CPRS was $184.45-$332.50.

Program benefits

No participants expressed a zero or negative WTP, which indicated that the program had likely increased their well-being. They were willing to pay an average $150 for the CP program. Participants in the telephone arm were willing to pay $10 more for CP. But there was no significant difference in the WTP for telephone ($154.12 [68.84]) and in-person CP ($144.03 [75.63]; $P = .85$). Regression analysis indicated that marital status, sex, level of education, change in DSE score, age, income, and

participant cost did not have a significant impact on WTP for CP.

Cost-benefit analysis

Societal perspective. The base-case NB (WTP-cost) for CP telephone delivery compared with no program was negative $54.60 (Table 5, p. 54). Using best low-cost assumptions, the cost benefit for telephone delivery compared with no program was $42.84, with participants now willing to pay more than the telephone CP program costs. Under base-case assumptions, the NB for in-person delivery compared with no program was negative $119.97. Using the lowest cost assumptions, the NB for in-person delivery compared with no program was negative $22.53. The INB of providing telephone compared with in-person CP was $65.37 under our conservative base-case assumptions, which showed that telephone delivery is the most cost-beneficial choice.

Resource center perspective. From the resource center perspective, the NB for telephone delivery compared with no program of CP alone was negative $29.17; WTP not fully covering costs. Using best low-cost assumptions, the NB for telephone delivery compared with no program was $68.27; with WTP now covering program costs. The INB of providing telephone over in-person CP was $26.32 for the base-case, again showing the relative efficiency of telephone delivery (Table 6, p. 55).

Discussion

This study provides important information about the cost benefit of a decision support intervention for breast cancer patients. This intervention increases the patient's self-efficacy in treatment decisions and provides cost benefits in some cases. The information provides input to a community that needs to address the value of helping people make treatment decisions. Currently, these services are provided free of charge with the aid of volunteerism and outside funding. This assessment highlights the value of these services to funders. The number of women who are willing to pay for CP is in line with the value of similar interventions. For example, it is similar to Medicare Fee Schedule payments for a 45-minute physician office visit (CPT code, 99204) or for services involving medical decision making or counseling of high complexity or severity (CPT code, 99220).[17]

It is relatively costly for a rural organization such as Mendocino to initiate CP (at least $200/person) and CPRS (at least $280/person) primarily because the total annual breast cancer prevalence there is low (777 cases). As a result, efficiencies that reduce the high training costs per CP are limited. These costs are similar to those reported for multi-

TABLE 3 Average time and cost per participant to the resource center for providing CPRS

	Method of CP delivery		
	Telephone, h	In-person, h	P
For CP			
Complete intake form, make appointment	0.60	0.54	
Consultation planning session	0.97	1.08	
Edit, deliver CP	0.19	0.08	
Other time	0.60	0.93	
Average time for CP (SD)[a]	2.36 (0.311)	2.63 (0.413)	.29[b]
Average cost to provide CP	$58.89	$65.77	
For CRS			
Arrange physician visit	0.09	0.08	
Attend physician visit, prepare consultation recording	1.60	1.82	
Edit, deliver CRS	1.10	0.84	
Other time	0.46	0.55	
Average time for CRS	3.25	3.29	
Average cost for CRS/participant	$81.21	$82.37	
For CPRS			
Average time for CPRS (SD)[a]	5.60 (0.378)	5.93 (0.832)	.45[b]
Average cost for CPRS	$140.10	$148.14	

Abbreviations: CP, consultation planing; CPCRS, consultation, planning, recording, and summarizing; CRS, consultation, recording, and summarizing. [a] Standard deviation estimated with bootstrapped standard errors. [b] Two-sample t-tests using bootstrapped standard errors.

TABLE 4 Average participant time and expenses to participate in consultation planning[a]

	Method of CP delivery		
	Telephone	In-person	P
Participant time, h			
Plan CP session	0.08	0.06	—
Participate in CP session	0.91	1.14	—
Travel to participate in CP session	0.02	0.72	—
Total time[b] (SD)[c]	1.01 (0.138)	1.92 (0.286)	<.001[d]
Total time cost per participant	[$21.16]	[$40.14]	—
Participant expenses, $			
Driving expenses	0.94	17.15	—
Babysitter	0.00	0.00	—
Telephone	2.72	0.00	—
Lost wages for family[e]	0.60	7.18	—
Total expenses	4.26	24.33	—
Average time cost and expenses[b] (SD)[c]	25.43 (4.122)	64.48 (15.076)	<.001[d]

Abbreviations: CP, consultation preparation; h, hour. [a] All costs estimated in 2009 US dollars. [b] Includes leisure and work-loss time. [c] SD used bootstrapped standard errors. [d] Two-sample t-tests using bootstrapped standard errors. [e] Includes lost wages for family participation.

media decision aids provided to patients who are considering treatment for benign prostatic hypertrophy.[3,18]

In the conservative societal base case, participants' WTP did not exceed the cost of providing CP with an NB of negative $54.60 for providing CP over the telephone compared with no intervention, and $120 for in-person over no intervention. However, if CP is delivered with just more efficient training, then the WTP is

TABLE 5 Net benefit for in-person versus telephone CPRS including selected sensitivity analysis from societal perspective[a]

	Telephone costs ($)			In-person costs ($)			Net benefit ($)		
	Resource center	Participant	Total	Resource center	Participant	Total	Telephone[b]	In-person[b]	Incremental NB[c]
CP base case	183.29	25.43	208.72	199.52	64.48	264.00	−54.60	−119.97	65.37
Training									
Max no. CPs delivered[d]	88.90	25.43	114.33	105.13	64.48	169.61	39.79	−25.58	65.37
Efficient training[e]	119.05	25.43	144.48	135.28	64.48	199.76	9.64	−55.73	65.37
Max no. CPs delivered + efficient training	85.85	25.43	111.28	102.08	64.48	166.56	42.84	−22.53	65.37
Overhead									
2 interactions/CP	208.59	25.43	234.02	224.82	64.48	289.30	−79.90	−145.27	65.37
3 interactions/CP	233.90	25.43	259.33	250.13	64.48	314.61	−105.21	−170.58	65.37
Participant costs									
Participant cost for work loss Time and expenses[f]	183.29	4.26	187.55	199.52	25.64	225.16	−33.43	−81.13	47.70
Two-way sensitivities									
Participant cost for work loss time and expenses + efficient training	119.05	4.26	123.31	135.28	25.64	160.92	30.81	−16.89	47.70
Participant cost for work loss time and expenses + max no. CPs delivered + efficient training	85.85	4.26	90.11	102.08	25.64	127.72	64.01	16.31	47.70
CPRS base case	264.50	25.43	289.93	281.89	64.48	346.37	−135.81	−202.34	66.53
Training									
Max no. CPs delivered[d]	170.11	25.43	195.54	187.50	64.48	251.98	−41.42	−107.95	66.53
Efficient training[e]	200.26	25.43	225.69	217.65	64.48	282.13	−71.57	−138.10	66.53
Max no. CPs delivered + efficient training	167.06	25.43	192.49	184.45	64.48	248.93	−38.37	−104.90	66.53
Overhead									
2 interactions/CP	289.80	25.43	315.23	307.19	64.48	371.67	161.11	227.64	66.53
3 interactions/CP	315.11	25.43	340.54	332.50	64.48	396.98	186.42	252.95	66.53
Participant costs									
Participant cost for work loss Time and expenses[f]	264.50	4.26	268.76	281.89	25.64	307.53	114.64	163.50	48.86
Two-way sensitivities									
Participant cost for work loss time and expenses + efficient training	200.26	4.26	204.52	217.65	25.64	243.29	50.40	99.26	48.86
Participant cost for work loss time and expenses + max no. CPs delivered + efficient training	167.06	4.26	171.32	184.45	25.64	210.09	17.20	66.06	48.86

Abbreviations: CP, consultation planning; CPRS, consultation planning, recording, and summarizing; NB, net benefit; WTP, willingness to pay.
[a] All costs estimated in 2009 US dollars. [b] Net benefit = WTP − Cost. WTP for telephone was $154.12 and $144.03 for in person. [c] Incremental NB = (WTP$_{tele}$ − WTP$_{in\text{-}person}$) − (Cost$_{tele}$ − Cost$_{in\text{-}person}$), where *tele* is CP provided by telephone and *in-person* is CP provided in person. [d] Based on maximum number (3,120) of CPs provided by 2 CPers over 3 years. [e] Based on more efficient training, including 1 day of classroom training, 1 day of practice, 1 day of shadowing, and a less expensive venue. [f] Excludes leisure time.

TABLE 6 Net benefit for in-person versus telephone CPRS including selected sensitivity analysis from resource center perspective[a]

	Telephone costs ($)				In-Person costs ($)				Net benefit ($)		
	Training	Overhead	Time cost	Total	Training	Overhead	Time Cost	Total	Telephone[b]	In-person[b]	Incremental NB[c]
CP base case	99.09	25.31	58.89	183.29	99.09	25.31	75.12	199.52	−29.17	−55.49	26.32
Training											
Max no. CPs delivered[d]	4.70	25.31	58.89	88.90	4.70	25.31	75.12	105.13	65.22	38.90	26.32
Efficient training[e]	34.85	25.31	58.89	119.05	34.85	25.31	75.12	135.28	35.07	8.75	26.32
Max no. CPs delivered + efficient training	1.65	25.31	58.89	85.85	1.65	25.31	75.12	102.08	68.27	41.95	26.32
Overhead costs											
2 interactions/CP	99.09	50.61	58.89	208.59	99.09	50.61	75.12	224.82	−54.47	−80.79	26.32
3 interactions/CP	99.09	75.92	58.89	233.90	99.09	75.92	75.12	250.13	−79.78	−106.10	26.32
Efficiency of telephone											
Higher max no. CPs delivered[f]	3.13	25.31	58.89	87.33	4.70	25.31	75.12	105.13	66.79	38.90	27.89
Lower overhead[g]	99.09	25.31	58.89	183.29	99.09	50.61	75.12	244.82	−29.17	−80.79	51.62
CPRS base case	99.09	25.31	140.10	264.50	99.09	25.31	157.49	281.89	−110.38	−137.86	27.48
Training											
Max no. CPs delivered[d]	4.70	25.31	140.10	170.11	4.70	25.31	157.49	187.50	−15.99	−43.47	27.48
Efficient training[e]	34.85	25.31	140.10	200.26	34.85	25.31	157.49	217.65	−46.14	−73.62	27.48
Max no. CPs delivered + efficient training	1.65	25.31	140.10	167.06	1.65	25.31	157.49	184.45	−12.94	−40.42	27.48
Overhead costs											
2 interactions/CPRSer	99.09	50.61	140.10	289.80	99.09	50.61	157.49	307.19	−135.68	−163.16	27.48
3 interactions/CPRSer	99.09	75.92	140.10	315.11	99.09	75.92	157.49	332.50	−160.99	−188.47	27.48
Efficiency of telephone											
Higher max no. CPs delivered[f]	3.13	25.31	140.10	168.54	4.70	25.31	157.49	187.50	−14.12	−43.47	29.35
Lower overhead[g]	99.09	25.31	140.10	264.50	99.09	50.61	157.49	307.19	−110.38	−163.16	52.78

Abbreviations: CP, consultation planning; CPRSer, individual trained to provide consultation planning, recording, and summary; NB, net benefit.
[a] All costs estimated in 2009 US dollars. [b] Net benefit = WTP − Cost; WTP for telephone was $154.12 and $144.03 for in person. [c] Incremental NB = (WTP$_{tele}$ − WTP$_{in-person}$) − (Cost$_{tele}$ − Cost$_{in-person}$), where *tele* is CP provided by telephone and *in-person* is CP provided in person. [d] Based on maximum number (3,120) of CPs provided by 2 CPers over 3 years. [e] Based on more efficient training including 1 day of classroom training, 1 day of practice, 1 day of shadowing, and a less expensive venue. [f] Assumes telephone CP would allow for 1 additional CP per day; thus maximum number for telephone delivery would be 4,680, and maximum number for in-person delivery would be 3,120 over 3 years. [g] Assumes lower overhead cost for telephone delivery (1 interaction/CP = $25.31) vs in-person delivery (2 interactions/CP = $50.61).

about $10.00 more than the cost of providing CP by telephone compared with no intervention, and at maximum efficiency participants are willing to pay $64.00 more than the costs of delivering the telephone program compared with no program. WTP was not enough to cover the costs of the intervention when provided in person, except under the most efficient assumptions, demonstrating the added value of providing CP by telephone rather than in person.

The efficiency of training greatly affected overall intervention costs, which are predicated on the cost and frequency of training sessions; the number of people trained per session; and the interventions performed. In this rural community, the number of breast cancer patients who were available to participate in CPRS was lower than the number of patients these resource centers could currently provide services to, even if they were operating at maximum capacity. Expanding these services to patients in the community with other types of cancer could maximize service efficiency. In addition, training larger groups from many communities or providing training online or by video conference could improve efficiency.

This study is the first to assess a CBA of visit preparation types of decision support. It is also the first to use WTP to understand the perceived benefits of decision

support from the participant perspective. It is difficult to measure the value of this intervention in a way that would be meaningful to community members assessing budgets. We chose WTP as a measure of benefit in a CBA instead of using an outcome measure in a cost-effectiveness study, because it allows for economic comparisons of interventions using choice-based decisions. We recommend that more community-based studies of decision support interventions consider WTP and CBA for determining economic impact.

There are also some limitations to using WTP as a measure of the benefits of the program, which are related to the perceived difficulties in valuing health benefit with WTP and the concerns of how the effects of income distribution are incorporated.[19] Furthermore, the value of WTP to measure benefit in CBA is only as good as the quality of the questions that are asked. In theory, one should separate direct payment questions by asking WTP for an increase in insurance premium or tax contribution to decrease the effects of risk aversion.[13,19] In practice, with our low-income group of patients who likely were not paying for insurance, it would have been difficult for them to respond to a question about insurance premiums or tax contributions and also not pertinent to their financial situation. We tried to mitigate participants' possible concerns about their ability to pay by informing them that they would not have to pay for the intervention. In addition, our regression analysis indicated that household income did not have an impact on the WTP responses, which suggests that responses were not influenced by the participants' ability to pay for services. WTP represents the most appropriate measure for understanding the benefit of a program from the patient and community perspective,[12] especially a program that has an outcome that does not include all positive aspects of that intervention.

Finally, although we collected health care utilization data to record any treatment savings as a result of our intervention, we were not able to use the information because of the range of cancer stages in our rural population. Literature suggests that visit preparation can reduce health care utilization, and future studies should assess the impact of this intervention on health care utilization.[3]

Based on combined incidence and prevalence estimates, the maximum number of breast cancer patients in Mendocino County eligible for CP would be 777 annually. The total annual cost of CP delivery, if there were a 50:50 mixture of delivery type, of all breast cancer patients available would be about $230,000 over 3 years, or about $100 per CP delivered. In the societal base case, the WTP is $50 higher than the cost of CP for a mixture of delivery methods, so the total net benefit to Mendocino County is about $38,000 annually. At present Mendocino County

delivers CP and CPRS at no charge to patients. With the results of this study, funders of this program now have information on both the costs and the net benefits of the program to support their motivation to help women making treatment decisions.

Conclusions

More studies are needed at the community level to address the NB of interventions that support shared communication. We demonstrate both a positive NB of the telephone intervention over none if provided with more efficient training and a strong positive INB of telephone compared with the in-person method of delivery. These results, combined with the trial's findings of no difference in DSE for the 2 delivery methods, opens the door for increasing CP decision support in rural communities.

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