Cost Savings From Palliative Care

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Background - 2004

- Case for Palliative Care
  - Need
    - SUPPORT and others demonstrated clear need for improved care of serious illness
  - Quality
    - Clear and well defined
    - Wealth of date demonstrating palliative care improved symptoms and clinical care
  - Satisfaction
    - Considerable data showing palliative care enhanced family satisfaction
- Not Enough!

The Gap Between Payments and Costs

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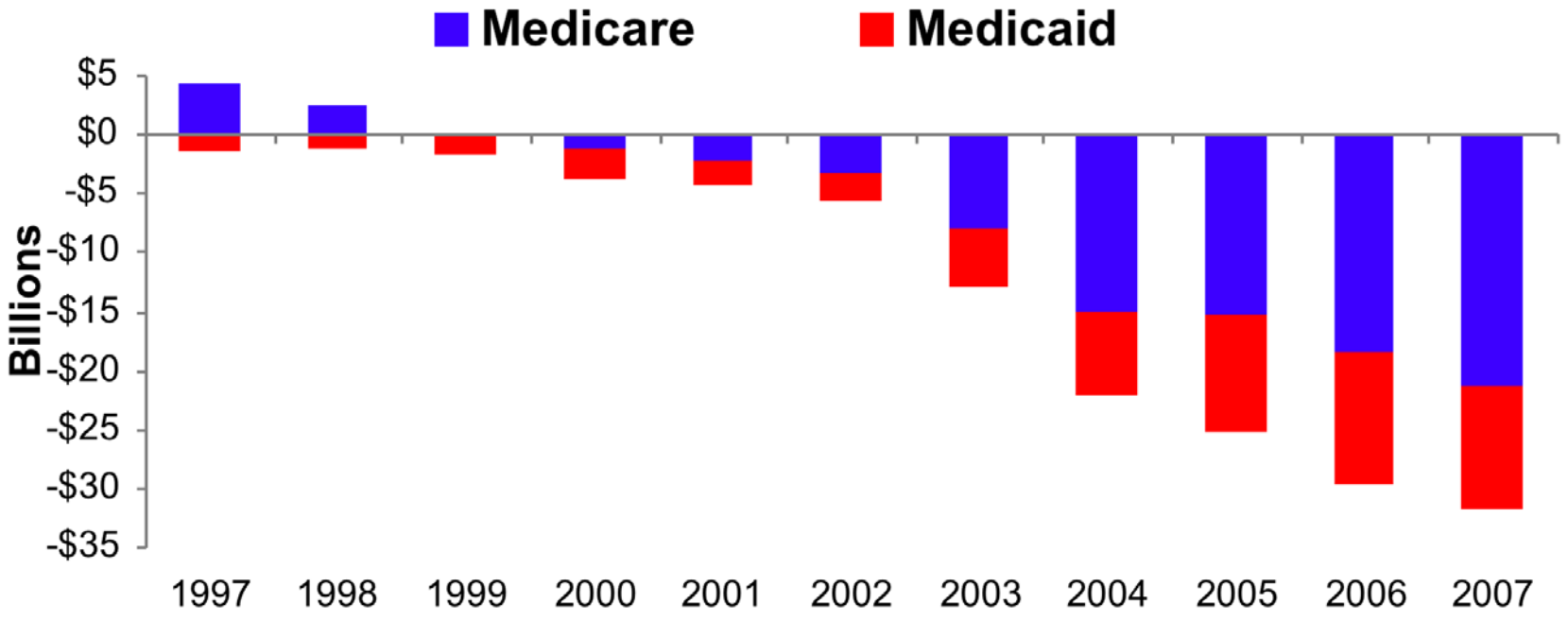
Hospital Payment Shortfall Relative to Costs for Medicare and Medicaid, 1997 – 2007



Source: Avalere Health analysis of American Hospital Association Annual Survey data, 2007, for community hospitals.

Aims

- Can we create a business case for palliative care teams in hospitals that fits within current reimbursement and business models?
  - Revenue generating?
  - Cost Saving?

Hypotheses

- By addressing goals of care with patients and families and matching treatments to goals, palliative care teams:
  - Reduce mis-match between treatments and preferences
    - Decreased costs
      - ICU, pharmacy, ancillary

Design Considerations

- Multi-site
- Diverse and representative hospitals
- Generalizable teams
- Mature programs
- Rapid results
  - RCT versus ?

RCTs

- Strongest design to test efficacy
  - Is a treatment or intervention better than an alternative or placebo under ideal conditions
- Minimizes potential for confounding
  - Both observed and unobserved factors randomly and equally distributed across both groups (theoretically)
- Excellent internal validity
  - Differences in outcomes can be attribute to intervention or treatment

Nevertheless…

In certain situations RCTs may be:

- Inappropriate
- Impossible
- Inadequate

An RCT Is Inappropriate:

- To accurately assess infrequent adverse outcomes
  - Increased mortality associated with atypical anti-psychotics
- To determine whether an intervention prevents rare events
  - Supine positioning of infants to prevent SIDS
- When the intervention requires the subjects' active participation and thus depends on individual beliefs and preferences
  - Intervention psychotherapy
  - Palliative care consultation

An RCT May Be Impossible:

- Clinicians are reluctant/refuse to participate
- Contamination/cross-over is unavoidable
- Ethical objections exist
- When interventions simply cannot be randomized

An RCT May Be Inadequate (Low External Validity)

- Physicians that allow their patients to participate in a trial may not reflect the average treating practitioner
- Patients who agree to be randomized may be atypical
- The trial does not reflect real world situations
  - Patients in both arms may receive overall better care
  - The intervention may be artificial (mandatory geriatric/palliative care consultation)

Summary

- RCTs offer an indication of efficacy of an intervention rather than its effectiveness in everyday practice
  - Provide evidence of what can be achieved under most favourable circumstances
- Should always be employed when appropriate, practical, ethical

Quasi-Experimental/ Observational Designs

- Applied or field or real-world research
- Appropriate for research questions not amenable to RCTs
- External validity may be better ***BUT***
- Internal validity is weaker
  - Non-random assignment can lead to selection bias
  - Differences may be caused by the intervention, by differences in measured and unmeasured confounders, or both

Methods of Addressing Internal Validity

- Traditional Multivariable Regression
  - Rely on functional form specifications, which can generate unreliable model-based extrapolations
  - Investigators have access to the study's outcomes when the main analyses of the intervention's effects are performed.
  - Strength, and even direction, of the intervention's effect on outcomes can be manipulated by the choice of control variables selected as potential confounders and how these baseline variables are used (e.g., squares, interactions) in the regression model.

Methods of Addressing Internal Validity

- Matching
  - Control subjects matched to treatment subjects on basis of relevant characteristics
  - Difficult to match subjects on all or even many relevant, important covariates as the number of covariates increases

Addressing Internal Validity: Propensity Scores

- Summary variable to control for measured patient characteristics in outcomes analyses
- PS methods mimic RCT process and enable investigators to control for relevant covariates simultaneously by matching on a single scalar variable—the propensity score - **without** knowledge of the study's outcomes

Propensity Score Computation

1. Establish a **reference day**
   - Day of treatment assignment if this were an RCT
2. Construct dataset that contains only patient characteristics available on reference day and no outcome data.
3. Estimate the conditional probability that a patient will be in the intervention group
   - Dependent variable: Group assignment
   - Independent variables: All the measured background characteristics that are relevant and available on the reference day
4. Divide the sample to evenly distribute the PS
5. Test for balance of independent variables within each block (t-test, chi-square)

Propensity Score Methods

6. Match patients who received treatment to patients who did not receive treatment by PS
   - Several different matching procedures available
7. Dataset contains treated patients and non-treated patients who share similar observable relevant baseline covariates – akin to the subject sample of an RCT
8. Dependent variables now made available to the investigators and the effect of the intervention on outcomes is estimated

Summary

- Propensity scores are useful to more accurately estimate the true causal effect
- More accurately mimic RCT than traditional multivariable modeling
- Effectiveness varies by the richness of the variables included in the regression models used to determine the propensity of “treatment

Effect of Palliative Care on Hospital Costs

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ORIGINAL INVESTIGATION

Cost Savings Associated With US Hospital Palliative Care Consultation Programs

R. Sean Morrison, MD; Joan D. Penrod, PhD; J. Brian Cassel, PhD; Melissa Caust-Ellenbogen, MS; Ann Litke, MFA; Lynn Spragens, MBA; Diane E. Meier, MD; for the Palliative Care Leadership Centers' Outcomes Group

Background: Hospital palliative care consultation teams have been shown to improve care for adults with serious illness. This study examined the effect of palliative care teams on hospital costs.

Methods: We analyzed administrative data from 8 hospitals with established palliative care programs for the years 2002 through 2004. Patients receiving palliative care were matched by propensity score to patients receiving usual care. Generalized linear models were estimated for costs per admission and per hospital day.

Results: Of the 2966 palliative care patients who were discharged alive, 2630 palliative care patients (89%) were matched to 18 427 usual care patients, and of the 2388 palliative care patients who died, 2278 (95%) were matched to 2124 usual care patients. The palliative care patients who were discharged alive had an adjusted net savings o
and $279

nificant reductions in laboratory and intensive care unit costs compared with usual care patients. The palliative care patients who died had an adjusted net savings of $4908 in direct costs per admission ($P=.003$) and $374 in direct costs per day ($P<.001$) including significant reductions in pharmacy, laboratory, and intensive care unit costs compared with usual care patients. Two confirmatory analyses were performed. Including mean costs per day before palliative care and before a comparable reference day for usual care patients in the propensity score models resulted in similar results. Estimating costs for palliative care patients assuming that they did not receive palliative care resulted in projected costs that were not significantly different from usual care costs.

Conclusion: Hospital palliative care consultation teams are associated with significant hospital cost savings.

Methods

- Retrospective analysis of hospital administrative and cost-accounting data
- Eight geographically and structurally diverse hospitals representing low, middle, and high cost markets served by 6 mature palliative care consultation teams
- Adult patients receiving palliative care were matched by propensity score to usual care patients (LOS of 7-30 days)
- Calendar years 2002-2004
- GLM (gamma distribution with log link) and multivariable logistic regression models used to analyse results

Source: Morrison et al. Arch Intern Med 2008

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Table 2. Demographics and Characteristics of Patients Discharged Alive From the Hospital

Variable	Weighted Value: Usual Care Patients (n=18 427)	Weighted Value: Matched Palliative Care Patients (n=2630)	*P* Value	Nonweighted Value: Unmatched Palliative Care Patients (n=306)
Age, mean (range), y	68.07 (18-106)	68.2 (18-104)	.78	71.2 (18-99)
Men, %	41.8	41.19	.90	47.1
Married, %	42.0	41.7	.52	41.3
Insurance, %				
Medicare	69.4	69.4		73.9
Medicaid	9.7	11.2		7.8
Managed care	16.4	15.7	.21	14.2
Indemnity plan	3.2	2.4		1.0
Other	1.4	1.3		3.2
Principal diagnosis, %				
Cancer	28.4	28.9		36.8
Infection	4.4	4.3		3.3
Cardiovascular	18.9	18.6		17.8
Pulmonary	15.8	15.4	.90	16.8
Gastrointestinal	6.7	7.2		6.2
Genitourinary	4.4	3.8		4.1
Other	21.4	21.9		15.2
Comorbidities, mean (range), No.	2.6 (0-10)	2.6 (0-11)	.86	3.0 (0-9)
Physician specialty, %				
Internal medicine	69.4	67.0		74.2
Oncology	12.7	14.9	.96	13.9
Surgery	12.7	12.9		7.7
Other	5.2	5.2		4.3
Admitted to ICU, %	38.6	37.5	.43	50.3
Discharge destination, %				
Home	67.4	56.3		58.2
Nursing home	25.7	38.1	<.001	37.5
Other	6.9	5.6		4.3
Hospital, %[a]				
Hospital A	12.6	12.6		3.4
Hospital B	6.8	6.8		1.7
Hospital C	13.0	13.0		5.3
Hospital D	14.3	14.3	.99	85.6
Hospital E	18.2	18.3		1.3
Hospital F	9.3	9.3		1.4
Hospital G	2.3	2.3		0.7
Hospital H	23.5	23.5		0.5
Days receiving palliative care, mean (range)	NA	6.5 (1-29)	NA	7.2 (1-28)

Abbreviations: ICU, intensive care unit; NA, not applicable.
[a]For a description of hospitals, see Table 1 footnote.

Palliative Care and Costs

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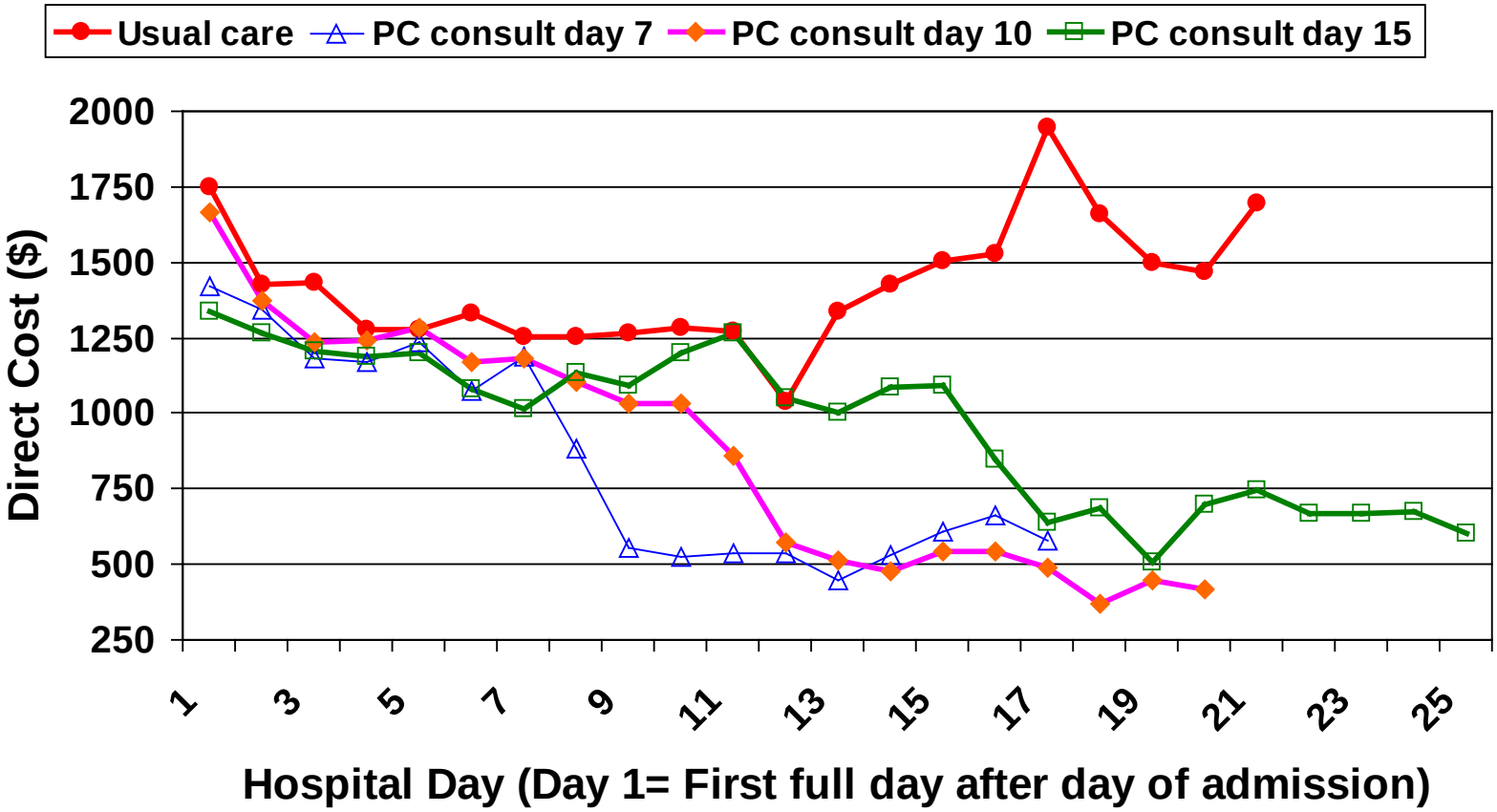
	Live Discharges			Hospital Deaths		
Costs	**Usual Care**	**Palliative Care**	**Δ**	**Usual Care**	**Palliative Care**	**Δ**
Per Day	$ 830	$ 666	$ 174*	$ 1,484	$ 1,110	$ 374*
Per Admission	$11,140	$ 9,445	$ 1,696**	$22,674	$17,765	$4,908**
Laboratory	$ 1,227	$ 803	$ 424*	$ 2,765	$ 1,838	$ 926*
ICU	$ 7,096	$ 1,917	$ 5,178*	$14,542	$ 7,929	$7,776*
Pharmacy	$ 2,190	$ 2,001	$ 190	$ 5,625	$ 4,081	$1,544***
Imaging	$ 890	$ 949	($58)***	$ 1,673	$ 1,540	$ 133
Died in ICU	X	X	X	18%	4%	14%*

Morrison RS et al. *Arch Intern Med* 2008; 168:1783

*P<.001 **P<.01 ***P<.05

Mean Direct Costs Per Day For Patients Who Died in Hospital



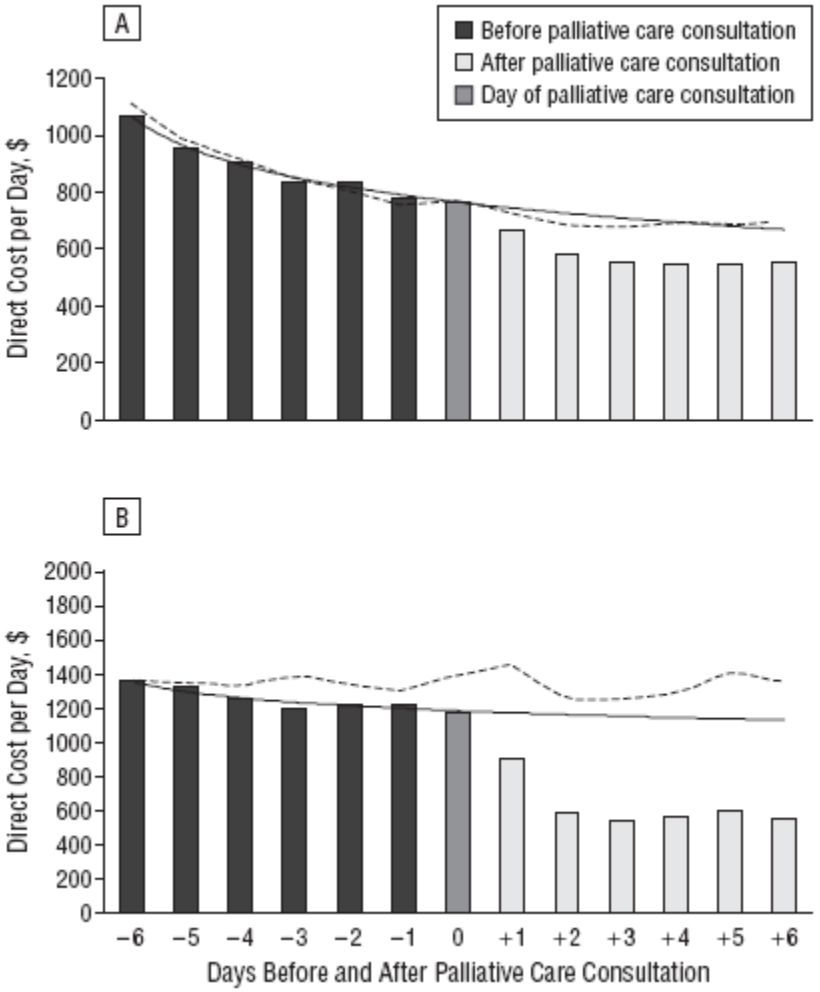
Source: Morrison et al. Arch Intern Med 2008

Why is This Study Useful?

- CAPC-PCLC Study provides national benchmarks
  - 8 diverse hospitals throughout the US
  - Palliative care consultations teams that operationalize CAPC curriculum and follow NQF guidelines
    - Generalizable uniform intervention
  - Sophisticated statistical and economic analyses with adequate power to control for confounding variables
  - Not intended to be replicated at individual programs

How Was This Study Used?

- Provides programs with the ability to do cost projections pre and post consultation using individual institutional data
  - Calculators available at www.capc.org
  - Estimate savings based on volume, average los before and after consultation, percentage of patients discharged alive, costs
- Use national data to reinforce and contextualize findings of local institutions



Source: Morrison et al. Arch Intern Med 2008

The Bottom Line

- Compared to usual care, palliative care consultation results in significant cost savings
  - $174/day or $1696/admission for patients discharged alive
  - $374/day or $4,908/admission for patients who die in hospital
- Comparing costs/day for 48 hours before and after consultation, palliative care consultation resulted in significant cost reductions
  - $238/day for patients discharged alive
  - $574/day for patients who die in hospital

Source: Morrison et al. Arch Intern Med 2008

Background: 2010

- Palliative care excluded from ACA
- Increasing focus on dual eligibles
- State budgetary crisis and increased cost-shift to states with ACA
- Is there a way to refocus need for palliative care in hospitals through state governments?

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THE CARE SPAN

By R. Sean Morrison, Jessica Dietrich, Susan Ladwig, Timothy Quill, Joseph Sacco, John Tangeman, and Diane E. Meier

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THE CARE SPAN

Palliative Care Consultation Teams Cut Hospital Costs For Medicaid Beneficiaries

HealthAffairs

At the Intersection of Health, Health Care and Policy

Methods

- Retrospective analysis of hospital administrative and cost-accounting data
- Sites: Four structurally diverse urban New York State hospitals in one large and two mid-size cities served by mature palliative care consultation teams
- Adult Medicaid beneficiaries with advanced illness receiving palliative care were matched by propensity score to usual care patients
- Calendar years 2004-2007
- GLM and multivariable logistic regression models used to analyse results

Palliative Care and Cost Outcomes For Medicaid

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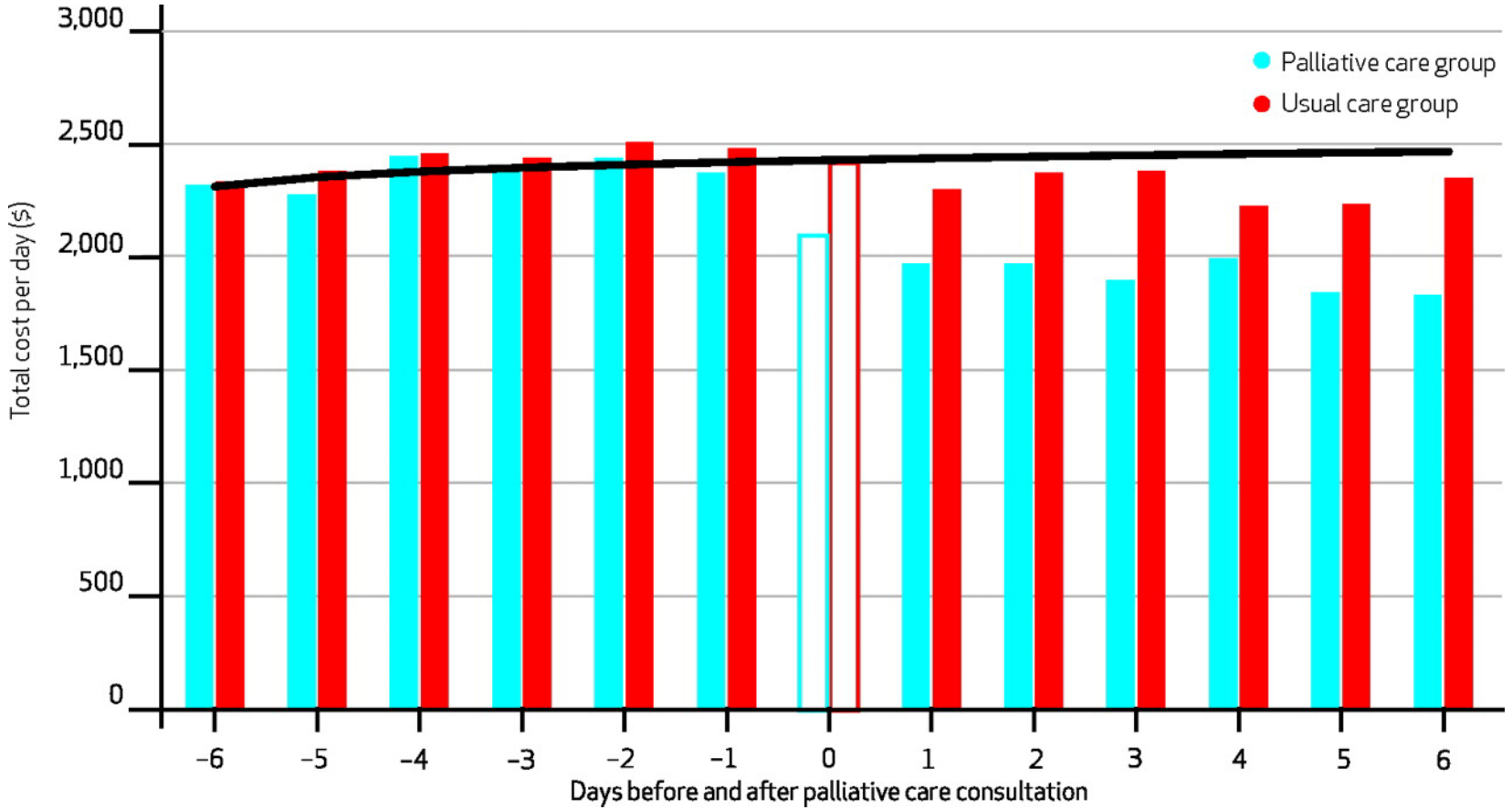
	Live Discharges			Hospital Deaths		
Costs	**Usual Care**	**Palliative Care**	**Δ**	**Usual Care**	**Palliative Care**	**Δ**
Per Admission	$36,741	$32,643	-$4,098*	$68,804	$61,241	-$7,563*
Per Day	$2,744	$2,254	-$490‡	$3,503	$3,187	-$316†
ICU	$6,452	$3,774	-$2,678‡	$29,706	$28,420	-$2,641
Days in ICU	5.8	5.3	-.5	13.8	10.2	-3.6 *
% Died in ICU	N/A	N/A	N/A	58%	34%	-24%*
D/C to hospice	1%	30%	29%‡	N/A	N/A	N/A

***P<.05, † P<.01 ‡P<.001. N/A = not applicable**

	Usual Care	Pal Care	P	Unmatched
Age	52.5 (18-90)	52.5 (19-89)	.94	53 (49-62)
Men	47.4%	49.8%	.61	66.7%
Married	15.4%	14.1%	.37	16.7%
White AA Hispanic Other	14.9% 44.2% 33.7% 7.2%	14.5% 47.6% 31.0% 6.9%	.90	16.6% 50% 16.7% 16.7%
Cancer AIDS CHF COPD Liver Dx ICU	60.3% 1.9% 13.4% 1.9% 16.7% 5.7%	57.6% 2.1% 12.4% 1.7% 19.3% 6.9%	.96	
Comorbidiites	3.2 (0-9)	3.3 (0-8)	.65	2.7 (0-5)
ICU admit	79.8%	81.3%	.78	100%
LOS	16.9 (6-44)	17.2 (6-44)	.45	40.3 (36-43)
Days w Palcare		9.3 (1-39)		34.8 (13-42)

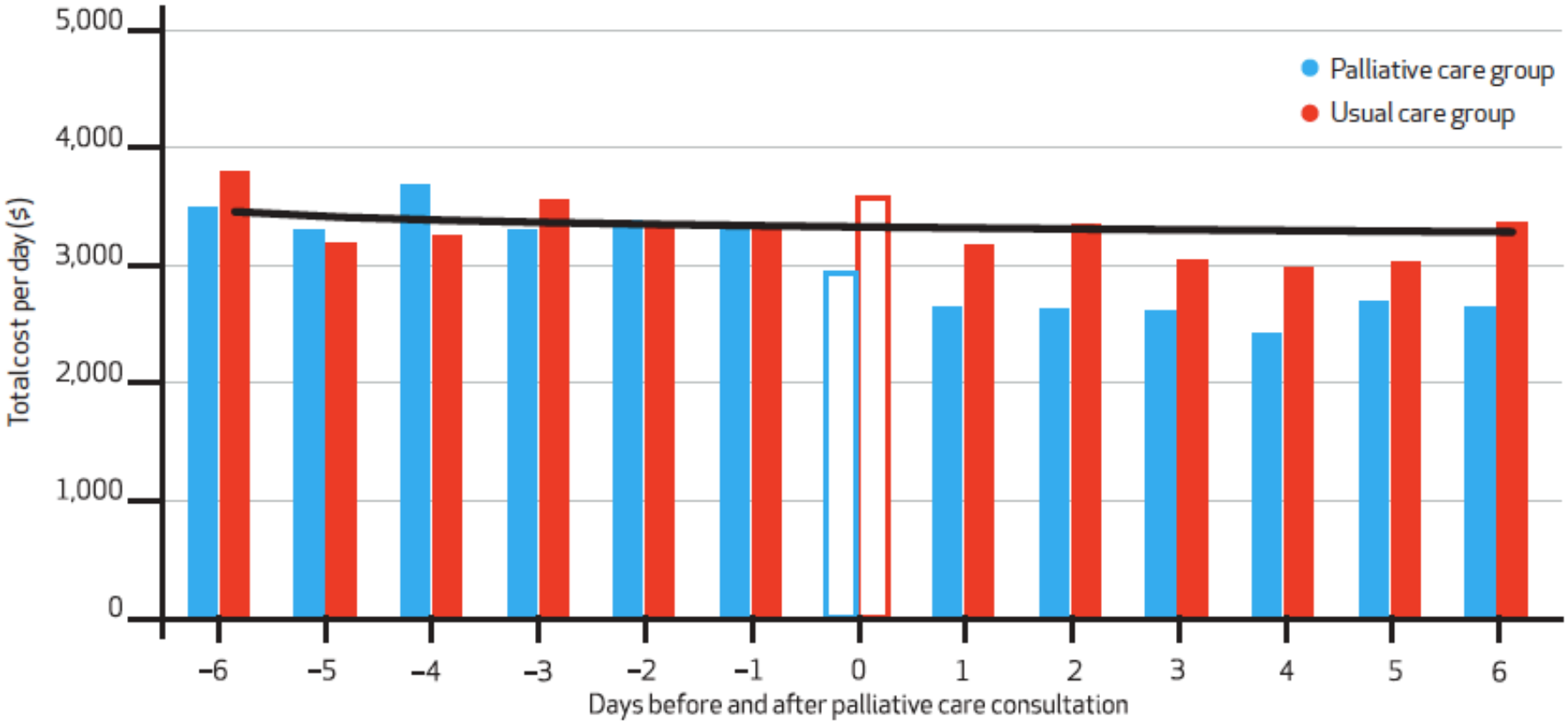
	Usual Care	Pal Care	P	Unmatched
Age	52.1 (18-79)	50.5 (20-79)	.15	42.9 (23-50)
Men	57.4%	54.6%	.60	50.0%
Married	19.4%	19.5%	.98	50.0%
White AA Hispanic Other	20.4% 40.3% 36.1% 3.1%	17.3% 41.1% 32.4% 9.2%	.09	25% 25% 50% 0%
Cancer AIDS CHF COPD Liver Dx ICU	25.8% 5.8% 13.7% 1.1% 30.0% 23.7%	24.9% 4.3% 18.4% 0.5% 29.2% 22.7%	.84	50% 0% 0% 0% 50% 0%
Comorbidiites	3.2 (0-8)	3.4 (0-8)	.98	2.5 (0.7)
ICU admit	98.8%	97.9%	.56	100%
LOS	20.1 (6-44)	19.3 (6-44)	.45	22.5 (11-34)
Days w Palcare		8.4 (1-39)		11.25 (1-23)

Cost Per Day, Before And After Palliative Care Consultation, For Patients Discharged Alive



Morrison R S et al. Health Aff 2011;30:454-463

Cost Per Day, Before And After Palliative Care Consultation, For Patients Who Died



Implications

- Hospital costs among Medicaid beneficiaries were significantly lower when they had consultations with the palliative care team
- Palliative care team consultations may reduce expenditures, while helping to ensure care consistent with patient wishes, for hospitalized Medicaid beneficiaries.
- New payment mechanisms aimed at improving quality and efficiency would benefit from inclusion of palliative care teams.

Results

- Provides data for state advocates of palliative care
- Used to support case for new NYS law mandating access to palliative care for all institutions receiving Medicaid funding

Next Steps…

- Hypothesis:
  - Palliative care can improve value across the care continuum
- Partners
  - New York:
    - Center to Advance Palliative Care, National Palliative Care Research Center
  - Colorado
    - Center for Improving Value in Health Care, UC Denver

Next steps

- Subjects
  - Medicaid beneficiaries receiving palliative care consultation at select Colorado hospitals will be matched by propensity score to usual care beneficiaries hospitalized at same institution over same 6 month time frame
- Outcomes
  - Incident hospital costs, subsequent readmissions, 30 day readmissions, overall inpatient mortality
  - Medicaid,hospital, hospice, homecare, nursing home, and overall costs

Research Challenges

- Matching
  - Instrumental Variables versus Propensity Scores versus RCTs
- Appropriate data sets
- Implications of demonstrating reduced costs
- Business model for ambulatory and nursing home settings.