COALITION FOR COMPASSIONATE CARE OF CALIFORNIA

with funding from California Health Care Foundation

Using between-patient comparisons to quantify outcomes

Medi-Cal Palliative Care
Managed Care Plan (MCP) Learning Community
December 15, 2021

Save the Date!

Mark your calendar today and plan to join us May 4 – 5, 2022, at the
San Francisco Airport Hyatt Regency for the CCCC Annual Palliative Care Summit

MCP Learning Community

The Big Goal: Ensure timely access to quality palliative care for seriously ill Medi-Cal enrollees

Learning Community Goals:

- Promote peer-peer learning and connections
- Promote discovery and spread of promising practices
- Encourage integration of palliative care with new CalAIM programs

Using between-patient comparisons to quantify outcomes

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Align your methods with your goal

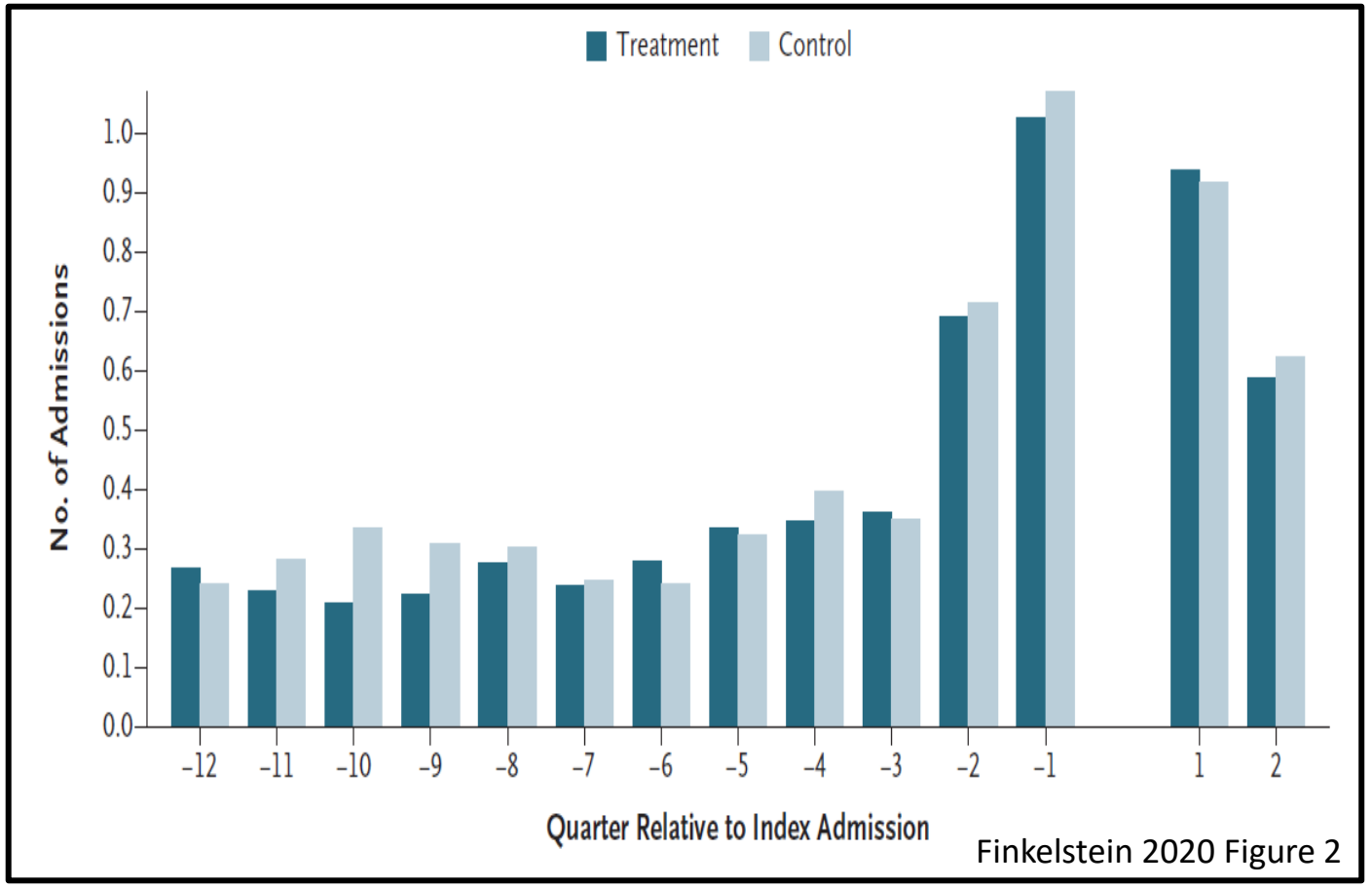
Goal	Suitable Approach	Pros	Cons
Monitor program implementation (process)	Observational: Within-patient analyses of recipients only	Quick, easy, respond to problems. Can evaluate recipient characteristics, length of enrollment, whether pre-post differences are in desired direction.	Will not provide definitive answer on outcomes
Quantify your program's impact (effectiveness)	Observational: Between-patient analyses with careful matching	Can estimate impact in real-world implementation. Can be combined with pre-post (difference-in-differences).	Need good data and good statisticians.
Test whether palliative care produces desired outcomes (efficacy)	Randomized controlled trial	Definitive, avoids bias	Difficult if not impossible for many plans / providers. May be difficult to withhold, delay, or substitute intervention.

What is your goal in evaluating palliative care?

- Are you monitoring implementation and looking for “trends in right direction” outcomes? A within-patient approach will suffice.
- Are trying to quantify the effect of home-based palliative care for Medicaid beneficiaries? An experiment would be great!
- But if not doable, an observational approach with a comparison group is your next best option.
- We’ll delve into the trade-offs that need to be carefully addressed in observational studies, and how to minimize bias.

Hot Spotting: Within vs. between-patient results

- Question: Did recipients have fewer re-admits?
- Within-patient data certainly indicated that over the years (Gawande, 2011)
- RCT showed that this was also true for controls (Finkelstein, 2020)
- Looking at both treated and controls, it is clear that the intervention did not cause reduction in re-admissions at 180 days.



Finkelstein 2020 Figure 2

Gawande A. “The hot spotters”. The New Yorker. January 16, 2011 (https://www.newyorker.com/magazine/2011/01/24/the -hot-spotters).
Finkelstein, Zhou, Taubman & Doyle “Health care hot spotting RCT”. NEJM 2020 382: 152-162.
Center for Health Care Strategies. https://www.chcs.org/beyond-the-camden-coalitions-randomized-controlled-trial-lessons-for-the-complex-care-field-on-addressing-patient-needs/

Could this also be true of home-based palliative care?

Probably not:

- RCT came first (Brumley 2007)
- 8 observational studies have used comparison groups – not limited to pre-versus-post within-patient analyses
- Magnitude aligns: Cost savings in observational studies are similar to that of the RCT
- Decedent cohort used in 5 studies; avoids potential regression to the mean

Program	Insurance type	Cost reduction
Kaiser Permanente	HMO	33%
Buffalo	88% Medicare Adv.	36%
Prohealth	MSSP ACO	37%
Sharp Transitions	Medicare Adv.	49% - 59%
Sutter AIM	Medicare FFS	29%
Mayo	Medicare	68%
Turnkey	Medicare Adv.	20%
CMS MCCM	Medicare – MCCM	40%
Healthnet	58% Medicaid, 21% each Commercial and Medicare Adv.	21% - 51% lower, and 25% higher

See References slide for sources

Compared to whom?

- Decedents: Compare participants to non-participants, all deceased
  - Requires good ascertainment of death and death dates
  - Focused on end-of-life period (not good for home-based primary care studies)
  - Exposure might include hospice as well as palliative care

Eligibles: Compare participants to eligibles who did not use program

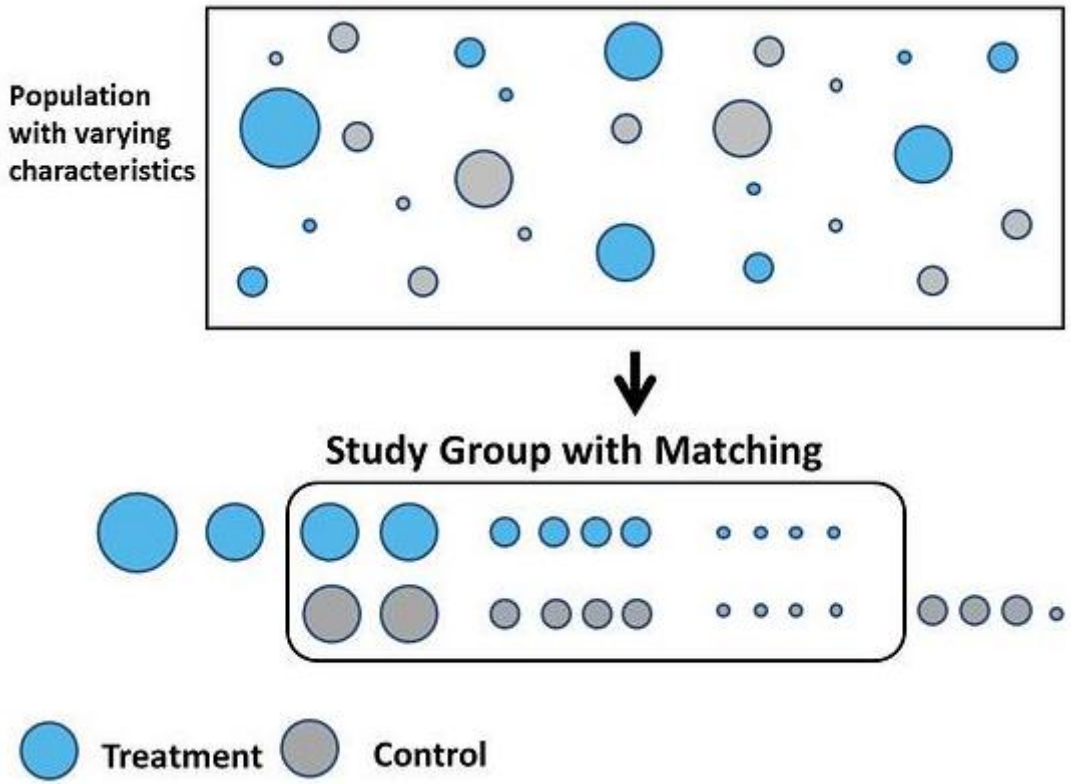
- Can limit this to people who were truly appropriate (based on screening, not just identified via claims)
- Not necessarily focused on end-of-life period

Creating a comparison group: Apples with apples

- The goal is to create homogeneous groups, despite lack of true randomization.
- Simple matching can be done manually if you have just one or two variables that might affect both treatment selection and outcome
- Propensity scores reduce many variables into a single score representing the likelihood that people would have received treatment
- A propensity score is a single variable that represents the combined predictors of treatment (intervention) in a real-world sample.
- While true randomization will usually create groups that are equal in both measured and unmeasured variables, propensity scores only allow you to balance on measured variables.

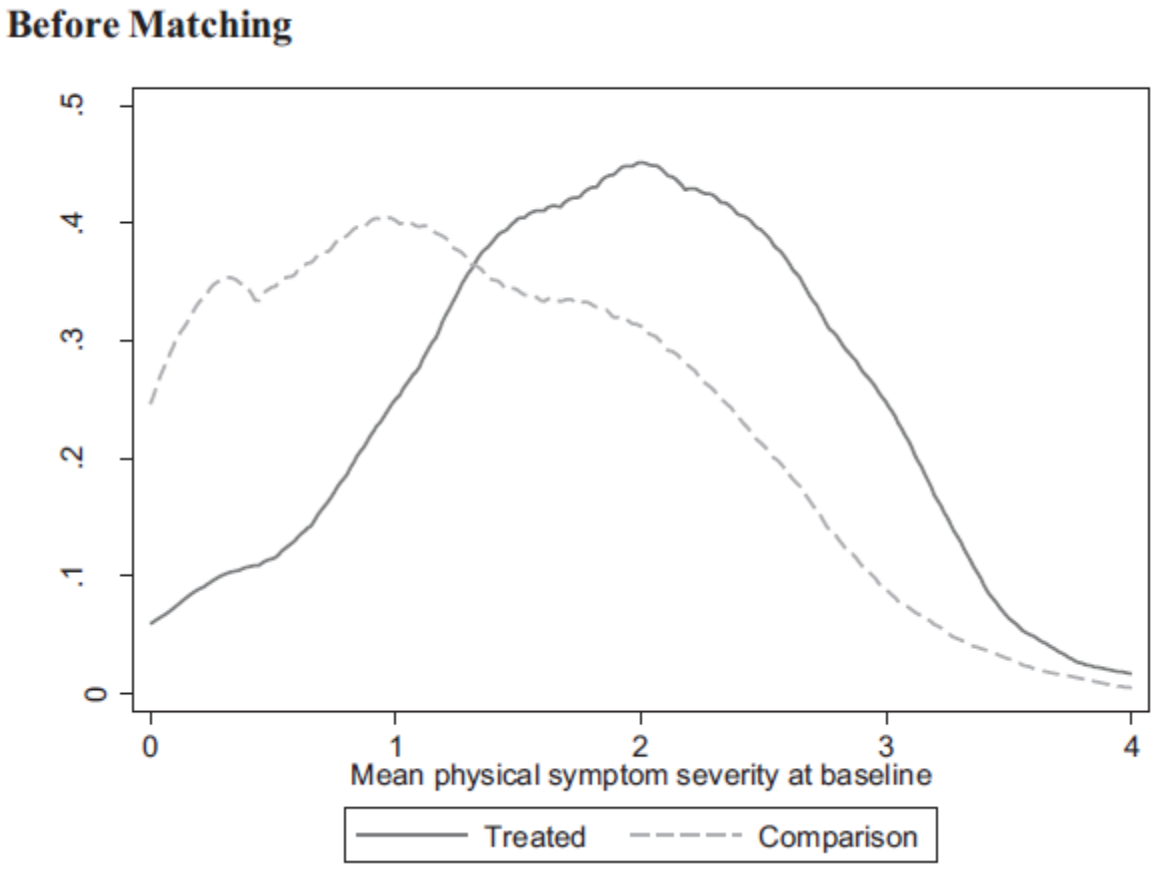
Garrido MM, Kelley AS, Paris J, et al. Methods for Constructing and Assessing Propensity Scores. Health Serv Res. 2014;49(5):1701-20.

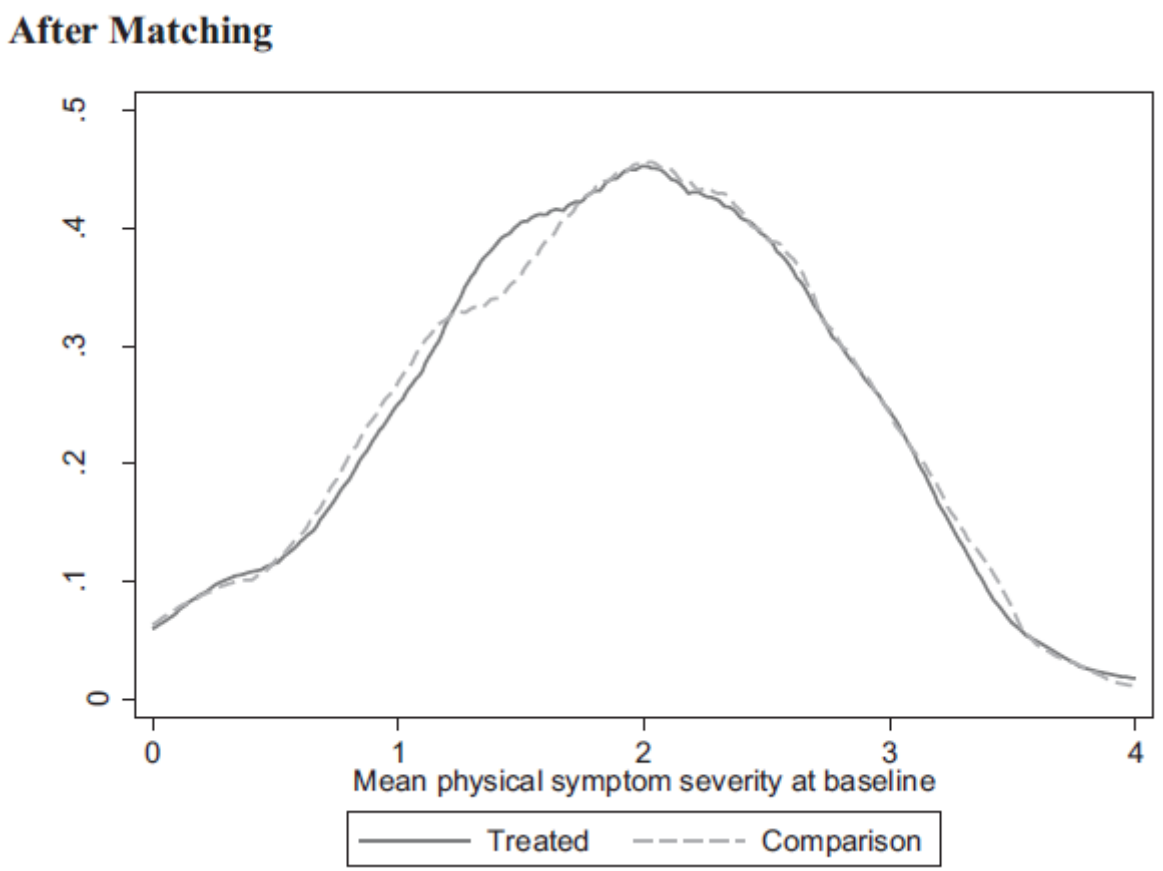
Conceptually



Courtesy of Summit Consulting, https://www.summitllc.us/propensity-score-matching

Empirically





Garrido MM, Kelley AS, Paris J, et al. Methods for Constructing and Assessing Propensity Scores. Health Serv Res. 2014;49(5):1701-20.

Propensity scores: more detailed steps

1. **Choose variables to include in the logistic regression**. Generally include variables thought to be related to the outcome, even if they do not seem to be related to receipt of the treatment. Choose variables that occur prior to time of treatment.
2. **Produce propensity scores from the logistic regression.**
3. **Balance propensity scores** across treatment and comparison groups; iteratively check balance as you drop or recategorize variables.
4. **Select (try various) matching or weighting strategies**. Matching will limit the number of comparison persons – you will discard persons that are not "near" the treated persons. Weighting will retain more cases without making bias worse.

Garrido MM, Kelley AS, Paris J, et al. Methods for Constructing and Assessing Propensity Scores. Health Serv Res. 2014;49(5):1701-20.

Checking balance: How well matched are your groups?

Table 1. Weighted Matched Sample (N = 969) by All 33 Covariates Included in Propensity Score

Variable	% of Patients		Absolute Standardized Difference (%)
	UC (n = 713)	PC (n = 256)	
Age, years			
55 to 75	51.6	53.5	3.8
> 75	13.0	10.9	6.4
Sex: female	55.0	53.5	3.0
Race			
White	61.2	61.7	1.1
Black	33.5	33.2	0.6
Living will: yes	40.2	40.2	0.1
Proxy: yes	45.9	44.9	1.9
Insurance			
Medicare only	19.5	19.5	0.0
Medicaid (and Medicare)	25.8	25.4	0.9
Education			
High school[a]	55.0	55.5	1.0
College[a]	37.0	36.3	1.3
Visiting nurse services: yes[b]	13.3	12.9	1.4
Home health aide, total hours[b,c]	0.25	0.25	0.0
Primary diagnosis: lymphoma/myeloma	6.1	5.9	0.6
Complication(s): yes[d]	2.7	2.3	1.8
Comorbidities: Elixhauser index (mean)	3.94	3.96	1.1
Activities of daily living			

A typical benchmark is for your absolute standardized differences to be less than 10%

Portion of Table 1 from May P, Garrido MM, Cassel JB et al., Journal of Clinical Oncology 2015.

Checking balance

Table 2. Sample Characteristics of Matched Analysis Cohort According to Disease Group

	Cancer		COPD	
	Trans (n = 37)	Control (n = 111)	Trans (n = 65)	Control (n = 189)
Age	81.9 (7.4)	82.4 (7.9)	82.8 (7.7)	83.4 (8.1)
White	26 (70.3)	81 (73.0)	53 (81.5)	150 (80.2)
Male	22 (59.5)	63 (56.8)	26 (40)	76 (40.6)
Hospital charges 19–24 months prior to death	17,121 (36,447)	17,431 (36,313)	24,751 (88,782)	18,381 (48,090)
Non-hospital charges 19–24 months prior to death	25,573 (38,612)	24,408 (49,121)	13,184 (16,292)	11,631 (15,278)
Days to death	144.6	144.6	221.6	220.4

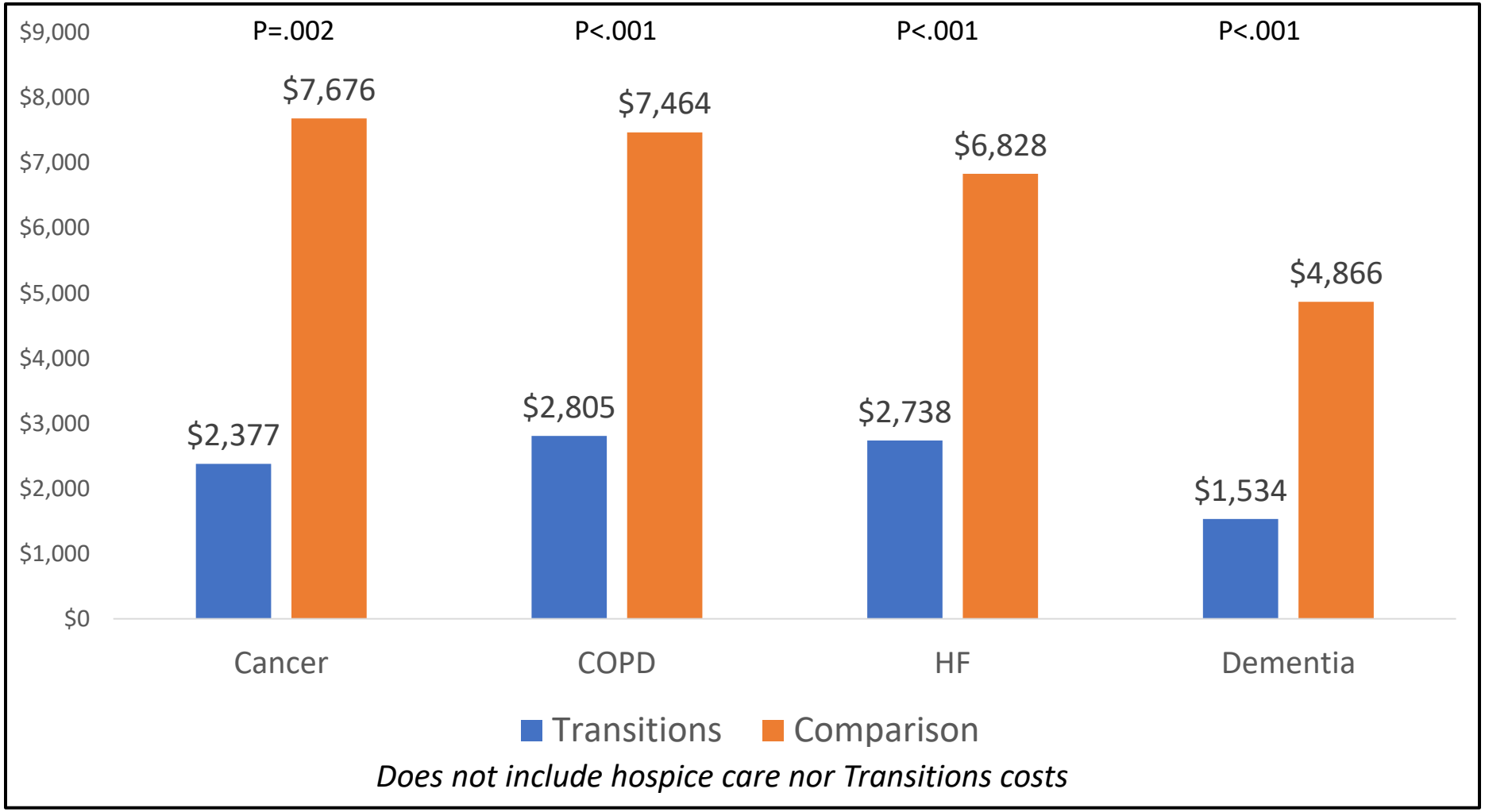
Excerpt of Table 2 from Cassel JB, Kerr KM, McClish DK et al., JAGS 2016. (Does not show absolute standardized differences, described in the text).

Sharp study – example of decedent cohort

- Decedents cohort approach
- Claims data from Medicare Advantage plan
- Stratified by major disease group (cancer, CHF, COPD, dementia)
- Death ascertained from MA plan and social security death index
- Propensity score matching: Each program recipient matched to (up to) 3 controls using age, sex, race, baseline hospital use, baseline non-hospital use to create the propensity score
- Time period of intervention: time from enrollment to death for recipients and their matches

Cassel JB, Kerr KM, McClish DK, Skoro N, Johnson S, Wanke C, Hoefer D. Impact of a home-based palliative care program on healthcare utilization and costs. Journal of the American Geriatrics Society 2016 November; 64(11): 2288–2295.

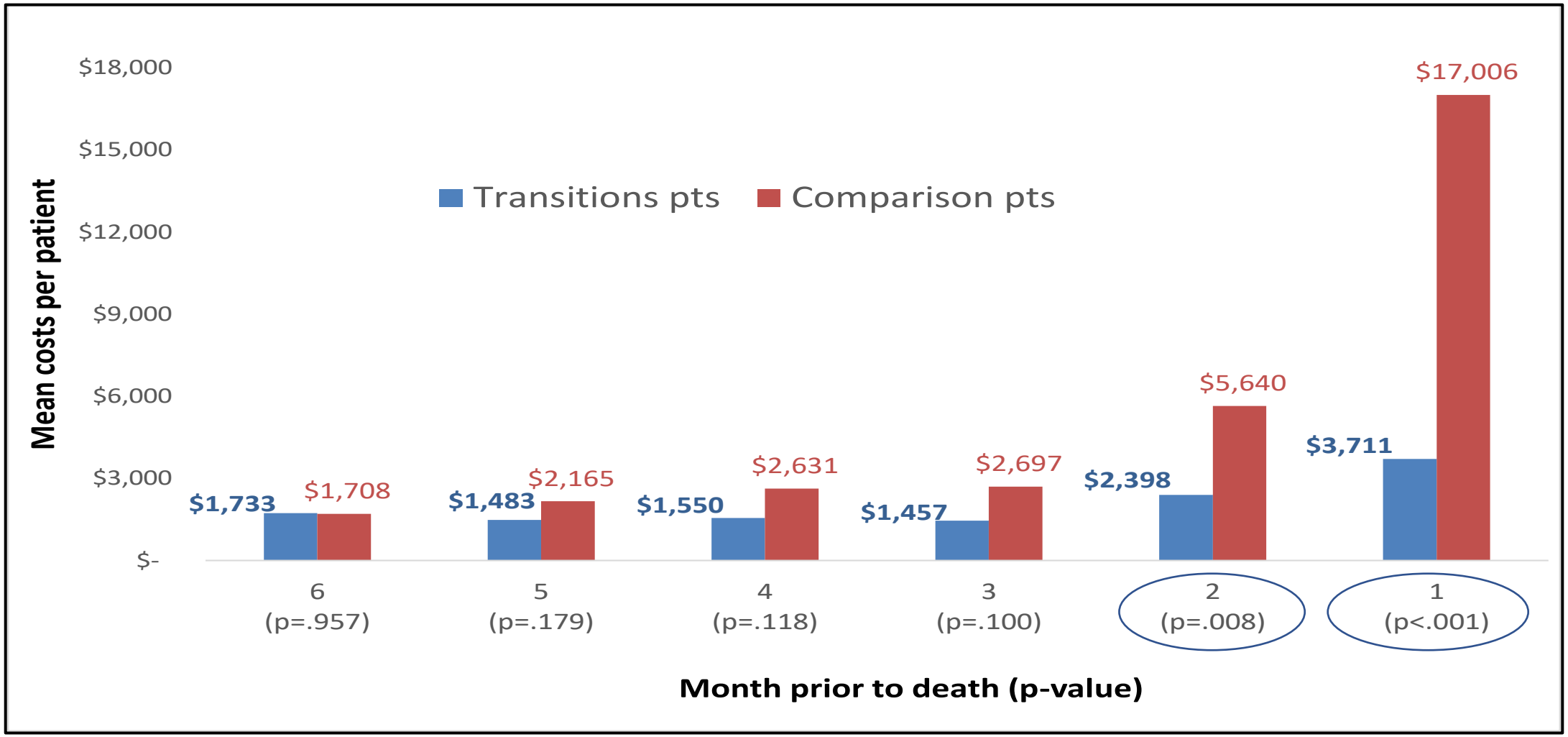
Sharp Transitions program: Total costs per month



Cassel JB, Kerr KM, McClish DK, Skoro N, Johnson S, Wanke C, Hoefer D. Impact of a home-based palliative care program on healthcare utilization and costs. Journal of the American Geriatrics Society 2016 November; 64(11): 2288–2295.

Sharp Transitions study: Mean healthcare costs PMPM

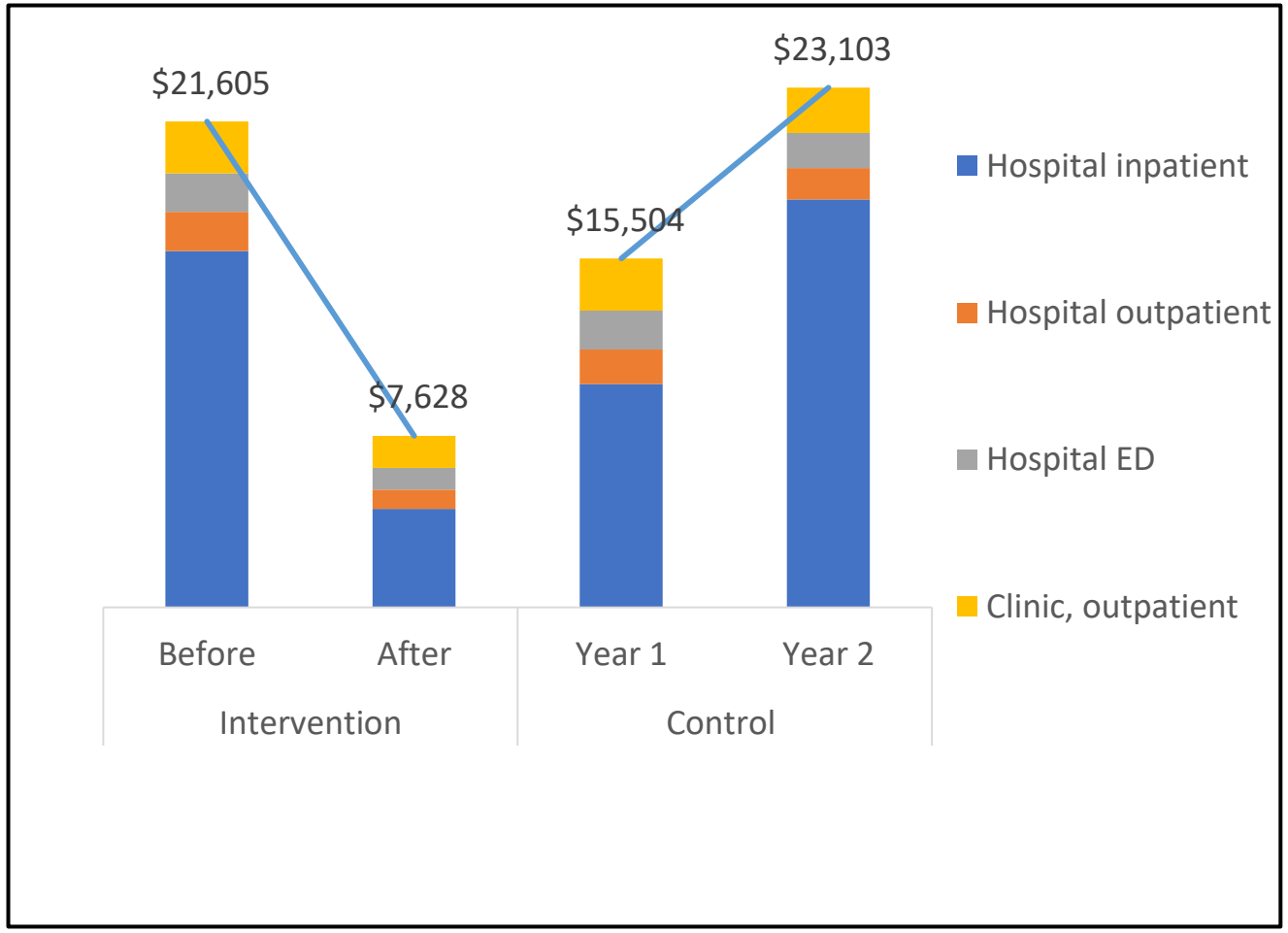
178 Transitions pts enrolled for 6+ months and 515 matched comparison patients. Does not include hospice or Transitions program costs.



Cassel JB, Kerr KM, McClish DK, Skoro N, Johnson S, Wanke C, Hoefer D. Impact of a home-based palliative care program on healthcare utilization and costs. Journal of the American Geriatrics Society 2016 November; 64(11): 2288–2295.

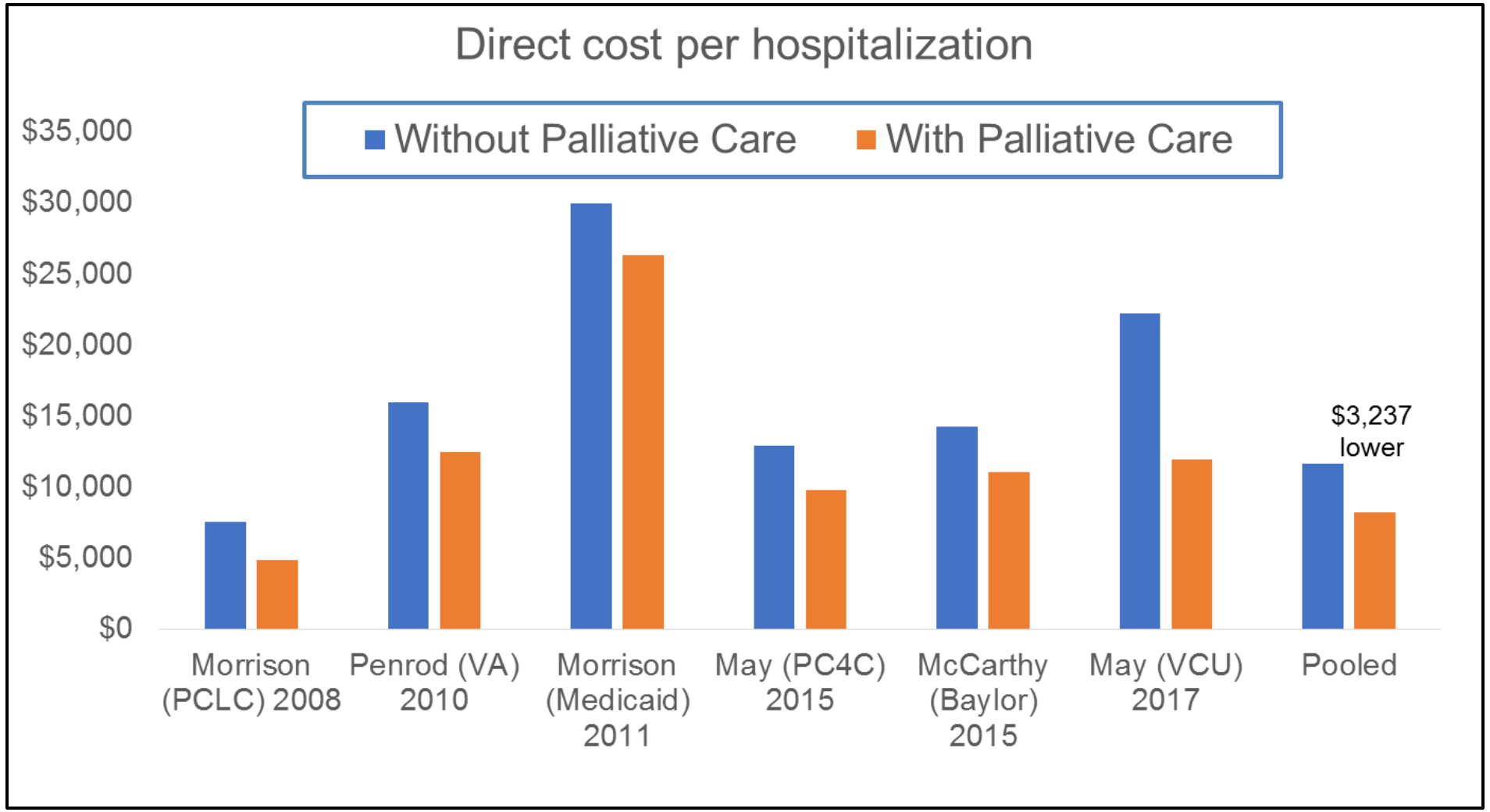
Mayo study: Example of using eligible non-participants

- 50 participants enrolled
- 95 propensity-matched controls who were fully eligible but could not be served due to limited capacity
- Medicare expenditures in year before and after
- $18,251 lower costs attributed to intervention using difference-in-differences approach



Chen, Naessens, Takahashi et al., JPMS 2018 56(6): 928-935.

Propensity-based weighting: Inpatient PC meta-analysis



May P, Normand C, Cassel JB, Del Fabbro E, Fine RL, Menz R, Morrison CA, Penrod JD, Robinson C, Morrison RS. Economics of palliative care for hospitalized adults: a meta-analysis. JAMA Intern Med. 2018 Jun 1;178(6):820-829.

CareMore RCT (Powers et al. 2020)

Primary Outcomes

Complex care management was associated with significant reductions in spending and inpatient utilization

Total Medical Expenditures

$7,732 Lower
(95% CI -$14,914, -$550)
p = 0.03

IP Bed Days

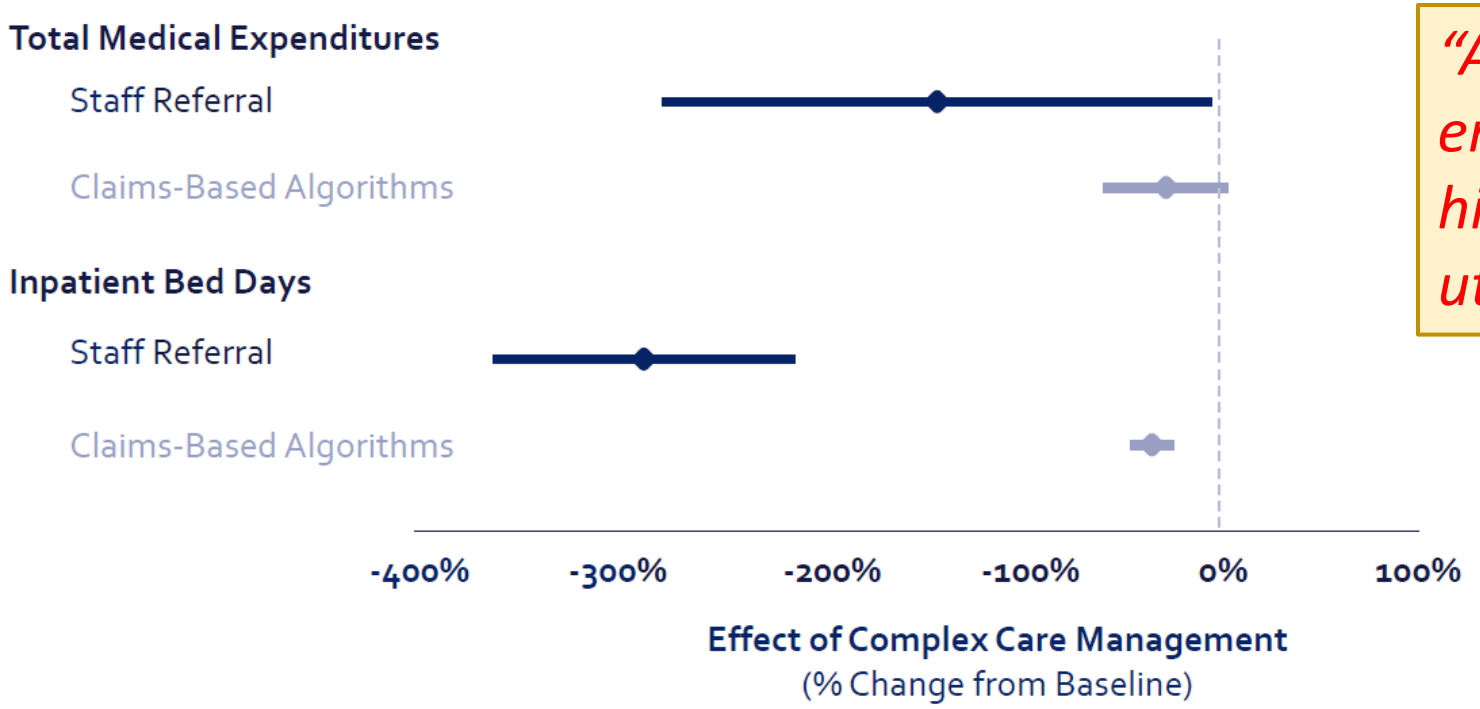
4.25 Fewer
(95% CI -5.13, -3.36)
p = <0.001

Powers, Modarai, Palakodeti et al. AJMC 2020 26(2): e57-e63.
https://www.bettercareplaybook.org/resources/whats-next-value-evidence-camden-coalition-and-caremore-health-inform-complex-care

CareMore 2020: Staff referrals performed better than algorithms

Subgroup Analysis

Complex care management had the greatest impact among patients identified via staff referral vs. claims-based algorithms



"Avoid focusing entirely (if at all) on historical 'super utilizers'"

Powers, Modarai, Palakodeti et al. AJMC 2020 26(2): e57-e63.
https://www.bettercareplaybook.org/resources/whats-next-value-evidence-camden-coalition-and-caremore-health-inform-complex-care

Caveats

- How you implement is more important than how you measure
- Who you offer the program to, and when, is key to what outcomes follow
- Continually evaluate program implementation to identify problems before they become ingrained
  - Frequent analyses of enrolled patients' characteristics, length of service and healthcare use; provider characteristics and inputs; costs and quality of care; non-recipients who were "eligible" and their characteristics and healthcare use…
  - This also sets the stage for more rigorous comparison when implementation is mature
- Poor matching in palliative care may result in comparing highly complex patients at the end of life (who received palliative care) with a more heterogeneous set of somewhat complex patients, most not at the end of life

Conclusions

- Within-patient analyses are good and should be a part of your recurring analyses
- Between-patient analyses are more difficult and should be performed if you can do them well
- There is no single right way of doing between-patient analyses for home-based palliative care
- But it is common to use decedent cohort approach and to focus on the end-of-life period, at least for programs with relatively short enrollment prior to death

References

Austin PC. Balance diagnostics for comparing the distribution of baseline covariates between treatment groups in propensity-score matched samples. Statistics in Medicine. 2009;28(25):3083-107. Epub 2009/09/17.

Garrido MM, Kelley AS, Paris J, et al. Methods for Constructing and Assessing Propensity Scores. Health Serv Res. 2014;49(5):1701-20.

May P, Garrido MM, Cassel JB, et al. Prospective Cohort Study of Hospital Palliative Care Teams for Inpatients With Advanced Cancer: Earlier Consultation Is Associated With Larger Cost-Saving Effect. J Clin Oncol. 2015 Sep 1;33(25):2745-52. PMID: 26056178

May P, Normand C, Cassel JB, et al. Economics of palliative care for hospitalized adults: a meta-analysis. JAMA Intern Med. 2018 Jun 1;178(6):820-829. doi: 10.1001/jamainternmed.2018.0750. PMID: 29710177

From Slide 8:

"Kaiser Permanente": Brumley, Enguidanos, Jamison et al., JAGS 2007; 55(7): 993-1000.

"Buffalo": Kerr, Donohue, Tangeman et al., JPM 2014;17(12):1328-1335.

"Prohealth": Lustbader, Mudra, Romano et al., JPM 2017; 20(1): 23-28.

"Sharp Transitions": Cassel, Kerr, McClish et al., JAGS 2016; 64(11): 2288-2295.

"Sutter AIM": Ruiz, Snyder, Giuriceo et al., Innov. Aging 2017; 1(2).

"Mayo": Chen, Naessens, Takahashi et al., JPMS 2018; 56(6): 928-935.

"Turnkey": Yosick, Crook, Gatto et al., JPM 2019; 22(9): 1075-1081.

"CMS MCCM": https://innovation.cms.gov/data-and-reports/2020/mccm-thirdannrpt

"HealthNet": Gordon, Le, Lee, Gao. JPM 2021; https://doi.org/10.1089/jpm.2021.0142

Questions / discussion

- We will distribute a brief guide to between-patient analyses as a companion to these slides & recording
- We will hold an “office hour” to field questions in the near future

COALITION FOR COMPASSIONATE CARE OF CALIFORNIA

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Upcoming Activities

Open Forum:
Monday, January 24, 2022
12 – 12:30 PM