Corresponding Author: Saket Girotra, MD, SM, Division of Cardiovascular Diseases, Department of Internal Medicine, University of Iowa Carver College of Medicine, 200 Hawkins Drive, Ste 4427 RCP, Iowa City, IA 52242 (saket-girotra@uiowa.edu).

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Patterns and Trends in Advance Care Planning Among Older Adults Who Received Intensive Care at the End of Life

Approximately 30% of adults older than 65 years are treated in an intensive care unit (ICU) during the last month of life.[1] Advance care planning (ACP)—a process that involves documenting wishes in an advance directive, appointing a surrogate decision maker, and having conversations about values, goals, and preferences[2]—can give such persons more control over their care.[3] By contrast, those without ACP risk receiving unwanted, high-intensity, lower-quality care.[4] This can lead to individual harms, including pain and suffering, and family harms, including psychosocial and financial distress.[5] We therefore examined ACP completion among older adults treated in an ICU during their last month of life to determine the prevalence and factors associated with no ACP.

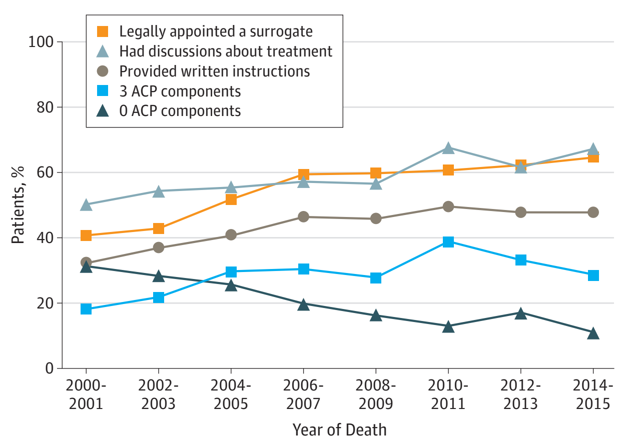
Methods | Study participants were derived from the Health and Retirement Study (HRS), a population-based cohort of older Americans with linked Medicare claims. Participants in the HRS are interviewed every 2 years, and, on dying, researchers contact next of kin to discuss the circumstances of death, decision-making, and other factors.[6]

We included HRS participants who were 65 years or older; were enrolled in fee-for-service Medicare; died between January 1, 2000, and December 31, 2015; and were discharged from an ICU during the last 30 days of life. We identified ICU admissions by using Medicare Provider Analysis and Review Research Data Assistance Center codes 200 to 202, 204, 206, 208 to 209, and 214 per previous methods.[1] The HRS was approved by the institutional review board at the University of Michigan, Ann Arbor, and participants and their proxies verbally consented to participate. Our study was approved by the institutional review board at the University of California, San Francisco.

The primary outcome—no ACP—was defined from HRS surveys as providing no written instructions (ie, advance directive), no legally designated surrogate, and no discussions about treatment preferences (all reported by next of kin). We used multivariable logistic regression to assess whether demographic characteristics, net worth, year of death, chronic conditions, functional status, or prognostic awareness (death expected by next of kin) were associated with no ACP. We present estimated probabilities of no ACP for various subgroups and performed linear regression to assess time trends. Analyses were performed in Stata, version 15.1 (StataCorp) and SAS, version 9 (SAS Institute Inc) using HRS-provided survey weights. We present raw numbers and weighted percentages of respondents.

Results | Of 1730 participants (mean [SD] age at death, 81 [8.4] years; age range, 65.1-111.2 years; 954 [55.1%] women; 803 [46.4%] married; and 197 [10.3%] nursing home residents), 997 (57.6%) died during the index hospitalization and most (1296 [82.1%]) were non-Hispanic white (consistent with the US population older than 65 years). Next of kin completing after-death interviews were the participants' adult children (887 [50.9%]), spouses (538 [31.3%]), siblings (56 [3.3%]), and other

Figure. Advance Care Planning (ACP) Completion Among Adults 65 Years or Older Who Were Treated in the Intensive Care Unit (ICU) During the Last Month of Life, 2000-2015



Percentage of study participants treated in an ICU during the last month of life who had completed each component of ACP (sums to >100% because some participants had completed multiple components), those who had completed all 3 ACP components, and those who had completed no ACP components. Deaths are grouped into 2-year bins. We used survey weights provided by the Health and Retirement Study to account for the complex survey design. The rate of no ACP decreased by 1.4% per year during the study period ($P < .001$), while the percentage of decedents appointing a surrogate (1.5% increase per year; $P = .01$), having discussions about treatment (1.3% increase per year; $P = .005$), providing written instructions (1.1% increase per year; $P = .01$), or completing all 3 ACP components (0.9% increase per year; $P = .049$) all increased at similar rates.

Table. Estimated Prevalence of No Advance Care Planning for Various Subgroups[a]

Characteristic	Participants, No. (%)[b]	Unadjusted Prevalence of No ACP, %[c]	Estimated Prevalence of No ACP (95% CI), %	P Value[d]	Global P Value[e]
Age at death, y					
65-74	459 (27.2)	25.7	22.1 (17.6-26.6)		.08
75-84	663 (38.6)	20.4	18.1 (14.6-21.6)	.14	
≥85	608 (34.2)	17.1	15.9 (12.5-19.4)	.03	
Sex					
Male	776 (44.9)	22.0	20.9 (17.5-24.3)		
Female	954 (55.1)	19.7	16.4 (13.4-19.3)	.05	
Race/ethnicity					
Non-Hispanic white	1296 (82.1)	15.6	15.7 (13.4-18.0)		<.001
African American	271 (10.5)	45.3	36.3 (29.2-43.4)	<.001	
Hispanic	129 (5.5)	45.0	33.1 (23.0-43.2)	<.001	
Other[f]	34 (1.9)	36.5	29.9 (12.6-47.1)	.05	
Net worth					
Lowest quartile (<$7K)	429 (21.9)	31.8	25.7 (20.5-30.9)		<.001
Second quartile ($7K-$90K)	434 (24.0)	27.9	23.9 (18.4-29.0)	.56	
Third quartile ($90K-$300K)	434 (27.1)	14.6	14.5 (10.8-18.1)	.001	
Highest quartile (>$300K)	433(27.0)	11.6	13.0 (9.2-16.8)	<.001	
Year of death					
2000-2001	211 (11.0)	31.3	25.4 (18.4-32.4)		.003
2002-2003	252 (14.0)	28.3	24.7 (18.7-30.7)	.88	
2004-2005	278 (15.2)	25.7	21.9 (16.3-27.4)	.43	
2006-2007	222 (13.0)	19.9	17.2 (11.2-23.1)	.08	
2008-2009	251 (14.5)	16.2	14.2 (8.9-19.6)	.01	
2010-2011	244 (15.0)	13.0	13.2 (8.7-17.7)	.003	
2012-2013	159 (10.2)	17.1	17.3 (9.7-24.9)	.14	
2014-2015	113 (7.1)	11.1	10.0 (3.9-16.1)	.005	
Marital status					
Unmarried/unpartnered	927 (53.6)	19.3	14.6 (11.7-17.6)		
Married/partnered	803 (46.4)	22.4	22.9 (18.8-26.9)	.003	
Educational attainment					
Completed high school	1053 (64.0)	14.9	15.8 (13.2-18.4)		
<High school	677 (36.0)	31.1	23.6 (19.1-28.0)	.002	
Admitted from SNF					
No	1523 (89.4)	20.9	18.7 (16.3-21.1)		
Yes	197 (10.3)	19.5	14.4 (8.9-19.9)	.19	
Dementia[g]					
No	1273 (76.2)	19.2	17.4 (14.9-20.0)		
Possible or probable	436 (23.0)	25.6	21.0 (15.9-26.2)	.21	
Heart disease[h]					
No	789 (45.5)	21.9	19.4 (16.2-22.7)		
Yes	934 (54.0)	19.8	17.4 (14.4-20.4)	.34	
Chronic lung disease					
No	1332 (77.0)	20.4	17.8 (15.3-20.3)		
Yes	394 (22.8)	21.7	19.7 (14.9-24.6)	.47	

(continued)

Table. Estimated Prevalence of No Advance Care Planning for Various Subgroups[a] (continued)

Characteristic	Participants, No. (%)[b]	Unadjusted Prevalence of No ACP, %[c]	Estimated Prevalence of No ACP (95% CI), %	P Value[d]	Global P Value[e]
Cancer					
No	1332 (76.7)	21.3	18.2 (15.6-20.8)		
Yes	391 (22.9)	18.5	18.3 (13.8-22.9)	.95	
Stroke					
No	1296 (75.3)	21.3	19.3 (16.6-22.0)		
Yes	430 (24.5)	19.0	15.2 (11.5-19.0)	.09	
Count of chronic conditions[i]					
0	309 (19.1)	19.6	17.9 (13.1-22.6)		
1	616 (35.2)	22.4	19.8 (16.1-23.5)	.53	.79
2	514 (28.9)	20.3	17.3 (13.4-21.1)	.84	
≥3	291 (16.8)	19.3	17.9 (12.8-22.9)	1.0	
Functional status				.02	
Independent for all ADLs	1177 (69.6)	21.2	19.9 (17.1-22.7)		
Dependent for ≥1 ADL	553 (30.5)	19.6	14.6 (11.1-18.1)		
Expected death[j]					
Yes	905 (51.5)	19.4	17.0 (14.1-19.5)		
No	778 (45.0)	22.0	20.0 (16.6-23.4)	.17	
Time to death[j]					
<1 wk	607 (34.9)	18.9	16.2 (12.8-19.5)		
≥1 wk	1092 (63.1)	21.5	19.1 (16.3-22.0)	.18	

Abbreviations: ACP, advance care planning; ADLs, activities of daily living; K, thousand; SNF, skilled nursing facility.

[a] Estimated prevalences were calculated using the postestimation margins command following multivariable logistic regression analysis, wherein "no ACP" is a function of the predictor variable adjusted for age, sex, race/ethnicity, educational attainment, and net worth. In the case of age, sex, race/ethnicity, educational attainment, and net worth, each predictor is adjusted for the other 4 variables.

[b] Percentages may not add to 100% owing to rounding, missingness, and the application of Health and Retirement Study–provided survey weights. Proportion missing was less than 5% for all variables.

[c] Estimated using Health and Retirement Study survey weights to account for the complex survey design.

[d] Compares results for the specific subgroup with the reference group on the basis of the multivariable model, with Health and Retirement Study survey weights applied.

[e] Expresses significance across the subgroup categories.

[f] Other included non-Hispanic American Indian, Asian, or something else.

[g] Dementia determined by Glymour probability, with scores of 0.5 or higher considered indicative of dementia.

[h] Heart disease, chronic lung disease, cancer, and stroke were considered present if reported in any preceding Health and Retirement Study core interview wave.

[i] Count of heart disease, chronic lung disease, cancer, stroke, and dementia.

[j] As reported by next of kin in exit interview.

family members (75 [4.5%]) as well as individuals other than family (174 [10.1%]).

Between 2000 and 2015, 469 respondents (28.8%) had completed all 3 ACP components, 864 (50.4%) had completed 1 or 2 components, and 397 (20.7%) had completed no components. The unadjusted prevalence of no ACP decreased by 1.4% annually, from 31.3% in 2000 to 11.1% in 2015 ($P < .001$; **Figure**) owing to increases in each component of ACP. In multivariable analyses, minority race/ethnicity (eg, estimated prevalence for African American race/ethnicity vs non-Hispanic white, 36.3%; 95% CI, 29.2%-43.4% vs 15.7%; 95% CI, 13.4%-18.0%; $P < .001$) and lower net worth (for lowest [<$7000] vs highest [>$300 000] quartile of net worth, 25.7%; 95% CI, 20.5%-30.9% vs 13.0%; 95% CI, 9.2%-16.8%; $P < .001$) were significantly associated with no ACP. Older age, high school completion, nonmarried status, disability, and female sex were associated with higher rates of ACP (eg, for participants ≥85 vs 65-74 years, estimated prevalence was 15.9%; 95% CI, 12.5%-19.4% vs 22.1%; 95% CI, 17.6%-26.6%; $P = .03$). Chronic conditions and expectedness of death were not associated with ACP (**Table**).

Discussion | In this study of adults 65 years or older who received intensive care during the last 30 days of life, we found gains in ACP across all populations between 2000 and 2015. However, our findings suggest that ACP remains less common in vulnerable populations and that many people with chronic illness lack ACP. The observed increases in ACP are important because critically ill older adults are at imminent risk of receiving goal-discordant care owing to their high acuity of illness, the availability of life support technologies, and the need for urgent or emergent action. Study limitations included the use of next of kin report to determine whether ACP occurred and the focus on individuals admitted to the ICU, which may have selected for those without ACP.

Brian L. Block, MD
Sun Young Jeon, MS, PhD
Rebecca L. Sudore, MD
Michael A. Matthay, MD
W. John Boscardin, PhD
Alexander K. Smith, MD, MS, MPH

Author Affiliations: Pulmonary, Critical Care, Allergy, and Sleep Medicine Program, Department of Medicine, University of California, San Francisco (Block, Matthay); Division of Geriatrics, Department of Medicine, University of California, San Francisco (Jeon, Sudore, Boscardin, Smith); San Francisco Veterans Affairs Medical Center, San Francisco, California (Jeon, Sudore, Boscardin, Smith); Department of Anesthesia, University of California, San Francisco (Matthay); Cardiovascular Research Institute, University of California, San Francisco (Matthay).

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Corresponding Author: Brian L. Block, MD, Pulmonary, Critical Care, Allergy, and Sleep Medicine Program, University of California, San Francisco, 513 Parnassus Ave, Room 1314, San Francisco, CA 94143 (brian.block@ucsf.edu).

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Drafting of the manuscript: Block, Jeon.
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Statistical analysis: Block, Jeon, Boscardin
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Sex Differences in Salaries of Department Chairs at Public Medical Schools

Women in academic medicine are paid less than their male peers.[1,2] This salary difference is often attributed to differences in rank and promotion. The goal of this study was to investigate whether sex pay differences exist at the highest ranks of academic medicine: among clinical department chairs. Given that department chairs are exceptional leaders who have reached the top rank of their specialties, we hypothesized that there would be no significant differences in salary between female and male department chairs.

Methods | We extracted 2017 salary data from 29 state medical schools in 12 states that had public employee salary data available online. We included all 20 Accreditation Council for Graduate Medical Education pipeline specialties (leading to board certification) with more than 80 residency training programs nationwide from 2016 to 2017.[3] We used websites to identify chairs of each clinical department as described previously.[2] If no chair could be identified, division chiefs, interim, or acting chairs were identified. Two authors (M.M. and W.B.) independently verified chair identities and term lengths through press releases, newsletters, Doximity, and LinkedIn. Peer-reviewed scientific publications were identified through PubMed, and lifetime National Institutes of Health grants were identified through the National Institutes of Health Reporter. This study was exempt from institutional review board because it represents research on organizations rather than individuals; as such, no written or oral consent was obtained. Data were gathered between November 1, 2018, and January 31, 2019.

Analysis began February 2019. We calculated adjusted salary differences using linear regression of log-transformed inflation-adjusted 2017 earnings, controlling for title (eg, permanent vs interim), term length, specialty, and regional cost of living. We conducted 3 sensitivity analyses. Our first sensitivity analysis removed potentially erroneously low salaries by excluding interim department chairs and chairs at schools where most chairs were compensated below three-fourths of the 25th percentile within their specialty. Our second sensitivity analysis controlled for numbers of publications and National Institutes of Health grants. Our third sensitivity analysis controlled for publications and grants and additionally controlled for differences in state databases reporting by including database-level fixed effects. Two-sided *P* values with a significance threshold less than .05 were used.

Results | Our sample consisted of 550 department chairs across 29 US public schools of medicine (**Table 1**), representing almost half of public medical school department chairs whose salaries were reported to the Association of American Medical Colleges from 2017 to 2018 (N = 1073).[4] A total of 92 chairs (16.7%) were women. The unadjusted mean difference in annual salary by sex was \$79 061 (95% CI, \$23 103-\$135 020; *P* < .01; mean [SD] for men: \$452 359 [\$252 411] and for women: \$373 298 [\$196 304]). After adjusting for term length, specialty, inflation, title, and regional cost of living differences, the salary difference by sex was \$67 517 (95% CI, \$13 474-\$121 561; *P* = .02). Sex salary differences persisted in sensitivity analyses additionally controlling for academic productivity and salary database (**Table 2**). Among chairs who served for more than 10 years, men were paid significantly more than women (\$127 411 [95% CI, \$55 028-\$199 793]; *P* < .01).