Managed Care, Hospice Use, Site of Death, and Medical Expenditures in the Last Year of Life

Ezekiel J. Emanuel, MD, PhD; Arlene Ash, PhD; Wei Yu, PhD; Gail Gazelle, MD; Norman G. Levinsky, MD; Olga Saynina, MBA; Mark McClellan, MD, PhD; Mark Moskowitz, MD

Background: We examined deaths of Medicare beneficiaries in Massachusetts and California to evaluate the effect of managed care on the use of hospice and site of death and to determine how hospice affects the expenditures for the last year of life.

Methods: Medicare data for beneficiaries in Massachusetts (n=37,933) and California (n=27,685) who died in 1996 were merged with each state’s death certificate files to determine site and cause of death. Expenditure data were Health Care Financing Administration payments and were divided into 30-day periods from the date of death back 12 months.

Results: In Massachusetts, only 7% of decedents were enrolled in managed care organizations (MCOs); in California, 28%. More than 60% of hospice users had cancer. Hospice use was much lower in Massachusetts than in California (12% vs 18%). In both states, decedents enrolled in MCOs used hospice care much more than those enrolled in fee-for-service plans (17% vs 11% in Massachusetts and 25% vs 15% in California). This pattern persisted for those with cancer and younger (aged 65-74 years) decedents. Decedents receiving hospice care were significantly (P<.001 for both) less likely to die in the hospital (11% vs 43% in Massachusetts and 5% vs 43% in California). Enrollment in MCOs did not affect the proportion of in-hospital deaths (those enrolled in fee-for-service plans vs MCOs: 40% vs 39% in Massachusetts; and 37% vs 34% in California). Expenditures in the last year of life were $28,588 in Massachusetts and $27,814 in California; about one third of the expenditures occurred in the last month before death. Hospital services accounted for more than 50% of all expenditures in both states, despite 77% of decedents being hospitalized in Massachusetts and just 35% being hospitalized in California. Among patients with cancer, expenditures were 13% to 20% lower for those in hospice.

Conclusions: Medicare-insured decedents in California were more than 4 times more likely to be enrolled in MCOs, were 50% more likely to use a hospice, and had a 30% lower hospitalization rate than decedents in Massachusetts, yet there are few differences in out-of-hospital deaths or expenditures in the last year of life. However, patients with cancer using hospice did have significant savings.

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aged care on end-of-life care have been the subject of significant controversy. 

We examined information on Medicare-insured decedents from Massachusetts and California, matching death certificate data with Medicare expenditure files to explore 3 main issues. First, what is the influence of managed care on the use of hospice care? In particular, within states, are managed care organization (MCO) enrollees more likely to use hospice care? Between states, is MCO penetration associated with greater hospice use? Second, is hospice use associated with more out-of-hospital deaths? Finally, how does hospice use affect expenditures at the end of life? Does greater hospice use save money, especially for patients with cancer?

**PATIENTS AND METHODS**

**SAMPLE SELECTION**

There are wide geographic variations in MCO penetration and in the practice and costs of medicine. To examine a range within this spectrum, we selected 2 urban states. Massachusetts has a low MCO penetration among elderly persons, a high number of hospital beds per population (3.0 beds per 1000 population), and a historically high hospital use rate; it is also a high-cost area. California has a high MCO penetration among elderly persons, a lower number of hospital beds per population (2.4 beds per 1000 population), and a historically low hospital use rate. In both states, we studied fully entitled Medicare beneficiaries who died in 1996, were at least aged 66 years at death, and were not enrolled in Medicare’s End Stage Renal Disease Program. We studied all decedents in Massachusetts and a randomly selected 20% of decedents from the much larger state of California.

We used the denominator files from the Health Care Financing Administration (HCFA) to merge with each state’s 1996 death certificate files. In Massachusetts, 42,452 Medicare-insured decedents met the criteria. In merging the files, we used Social Security number, date of birth, date of death (DOD), and sex. A match was accepted if either of the following conditions was met: (1) there was a perfect match on Social Security number and either sex or date of birth and DOD; or (2) there was a match on at least 7 social security number digits and a perfect match on sex, date of birth, and DOD. Of the 42,452 decedents, there was a match between the HCFA files and death certificates for 39,447 (93%). Only beneficiaries continuously enrolled in Parts A and B of Medicare insurance during the entire last 12 months of life were retained, yielding 37,933 Massachusetts decedents. An identical method was used for California, except that fewer than 1% of the decedents lacked a social security number; therefore, we matched on name, sex, DOD, and ZIP code. Overall, 20% of California decedents comprised 33,684 people, of whom 96% linked to the death certificate file; 27,658 of these were continuously enrolled in Medicare and comprised our analytic file for California.

**PLAN TYPE**

Decedents were divided by their insurance status into 3 groups: (1) those continuously enrolled in a fee-for-service (FFS) plan for the last 12 months of life, (2) those continuously enrolled in an MCO for the last 12 months of life, and (3) those who changed between an FFS plan and an MCO during the last 12 months of life. Comparisons by plan type were included only for those decedents who were continuously enrolled in an FFS plan or an MCO.

**EXPENDITURE DATA**

Because HCFA files do not contain complete information about health care use for MCO enrollees, health care expenditure studies were limited to those decedents continuously enrolled in an FFS plan during the last 12 months of life—34,131 in Massachusetts and 19,064 in California. Total expenditure is calculated as the sum of HCFA payments and payments from other sources of insurance for Medicare-covered services. The average payment per person from other insurance accounts for only 0.13% of costs. Expenditures for each decedent are calculated from 5 HCFA files: (1) Medicare Provider Analysis and Review, including short-term hospitalizations, long-term hospitalizations, and skilled nursing home care; (2) hospital outpatient; (3) Part B physician-supplier; (4) home health care; and (5) hospice care. Durable medical equipment expenses were available to us only in Massachusetts, where they contributed just $400 per person during the last year of life. When comparing the 2 states, we excluded durable medical equipment expenses from the expense calculations.

We examined expenditures for decedents for 30-day periods from the DOD back 12 months. If an expenditure, such as a hospitalization, crossed two 30-day periods, it was allocated by the proportion of the hospital days in each period.

**ANALYSIS**

We compare deaths between the 2 states by age, sex, race, place of death, and cause of death. Causes of death were categorized using methods developed by the National Center for Health Statistics. Site of death was identified from the death certificate file. For people who died in the hospital, we distinguish between those who died as inpatients and all others, such as those who died in the emergency department or on arrival.

We compare patterns in site of death, cause of death, and hospice use, reporting mean and median hospice use (in days) by state and insurance plan type during the last 12 months of life.

Hospital expenditures are for acute-care hospitalizations only. Physician expenditures include insurance payments for all types of claims in the Medicare physician-supplier file, including physician services covered by the Medicare Part B insurance plan and clinical laboratory, ambulance, ambulatory surgical facility, and nonphysician claims. Other expenditures are for services provided by rehabilitation hospitals and hospital outpatient departments.

The statistical significance of differences in proportions between any 2 groups is calculated using a program by Gahlinger and Abramson. P values are based on the z distribution. Because of the large sample size, nearly all reported differences are statistically significant at P < .01. Results that are not significant at P = .05 are indicated.
PATIENT POPULATIONS

Table 1 compares the Medicare beneficiaries in Massachusetts and California based on sociodemographic characteristics. Although the populations are slightly older and have fewer African Americans than national norms, the distribution of the causes of deaths is consistent with national norms.

California decedents were significantly \((P < .001)\) more likely to be enrolled in MCOs than those from Massachusetts. A small proportion of decedents in each state switched between FFS and MCO coverage in the last year of life; in Massachusetts, most (83%) switched from an FFS plan to an MCO, while in California, most (77%) switched from an MCO to an FFS plan.

MANAGED CARE AND THE USE OF HOSPICE CARE

In Massachusetts and California, few patients received hospice care in the last year of life (Table 2). Also, the duration of hospice care was short, with median lengths of stay of less than 3 weeks in each state (Table 2). Hospice care was common only for people with cancer, with more than 33% of decedents with cancer receiving hospice care in Massachusetts and just less than 50% receiving hospice care in California. Consequently, most decedents receiving hospice care had cancer (70% in Massachusetts and 60% in California).

Decedents enrolled in MCOs used hospice care significantly \((P < .001)\) more than those enrolled in FFS plans (Table 2). Within both states, persons enrolled in MCOs were more than 50% more likely to receive hospice care. This pattern persisted within key subgroups. For instance, among patients dying of cancer, those enrolled in MCOs were significantly \((P < .001)\) more likely to enter hospice care. The pattern also held for patients of different ages (hospice use for patients aged 65-74 years: 17% [FFS plan] vs 23% [MCO] in Massachusetts; and 17% [FFS plan] vs 29% [MCO] in California).

Comparing the states, California, with more than 4 times higher MCO penetration among elderly persons, had about 50% higher hospice use (Table 2). Decedents enrolled in FFS plans in California used hospice care 40% more than those in Massachusetts. Similarly, decedents enrolled in MCOs in California used hospice care much more than those in Massachusetts.

HOSPICE CARE, MANAGED CARE, AND SITE OF DEATH

Decedents receiving hospice care were significantly \((P < .001)\) less likely to die in the hospital, for those enrolled in FFS plans and MCOs and regardless of terminal disease (Table 3). In Massachusetts, 11% of hospice users died in the hospital, in contrast to 43% of those who did not use a hospice. The difference was similar in California (hospital in-patient deaths: 5% for hospice users vs 43% for those who did not use a hospice). These proportions were similar whether patients died of cancer or another terminal illness (Table 3).

Despite much greater hospice use among decedents enrolled in MCOs and much greater rates of MCO use in California, in-hospital deaths were similar in either insurance system and state (34%-40%) (Table 3). Similarly, among patients with cancer who used a hospice in Massachusetts, 11% died in the hospital regardless of insurance; in California, 5% of decedents enrolled in FFS plans and 6% of decedents enrolled in MCOs died in the hospital (Table 3). However, among hospice users, the precise site of out-of-hospital death was associated with insurance type, with patients enrolled in MCOs tending to die at home and patients enrolled in FFS plans more likely to die in nursing homes. For instance, in Massachusetts, among decedents enrolled in FFS plans who used a hospice, 60% died at home and 26% died in nursing homes, while among those enrolled in MCOs, 72% died at home and only 15% died in nursing homes (Table 3).

Overall, despite the facts that patients in hospice care were much more likely to die out of the hospital, that patients enrolled in MCOs used hospice much more frequently, and that California had much higher MCO...
penetration and hospice use, the proportion of hospital in-patient deaths between Massachusetts and California was essentially identical (40% and 36%, respectively).

### HOSPICE CARE AND EXPENDITURES IN THE LAST YEAR OF LIFE

Overall, expenditures for decedents enrolled in FFS plans in the last year of life were substantial. In Massachusetts, expenditures totaled $28,588 per decedent, while in California, they were $27,814 (Table 4). Expenditures increased dramatically as death approached (Figure). In Massachusetts, the expenditures in the last month of life were 31.9% of those for the last year of life, while in California, they were even higher, in excess of 38.0%.

In each state, and for each cause of death, more than 50% of the expenditures were for hospital services (Table 4). The amount spent on hospital care was almost identical in Massachusetts and California (Table 4), despite the fact that in Massachusetts 77% of decedents were hospitalized in the last year of life while in California only 55% were hospitalized. Expenditures in California for hospice care were higher than in Massachusetts (3.4% vs 1.8% of the total).

During the last year of life, expenditures for all patients in a hospice were slightly more than expenditures...
for patients not in a hospice in Massachusetts, and only slightly less in California (Table 4). Among patients with cancer, in the last year of life, expenditures were about 13% lower for decedents receiving hospice care in Massachusetts and nearly 20% lower in California (Table 5). In Massachusetts and California, expenditures in the last month of life for patients with cancer were about 40% lower for those in a hospice (Table 5). Indeed, reduced expenditures for hospice users with cancer extended to the third month before death.

**COMMENT**

Despite dramatic changes in the health care system during the past decade, the economics of dying remain relatively unchanged. Managed care programs use hospice care significantly more than FFS programs, and patients who use a hospice die out of the hospital significantly more. Nevertheless, even though California had a much higher MCO penetration among elderly persons, more hospice use, and lower hospitalization rates and hospital bed availability than Massachusetts, these states are extremely similar in expenditures for decedents enrolled in FFS plans in the last year of life and for rates of out-of-hospital deaths.

Within each state, MCO enrollees are 50% more likely to use a hospice than FFS plan enrollees. This difference is not because MCOs have higher proportions of decedents likely to use a hospice, patients who are younger, and patients who are dying of cancer. Even among decedents with cancer, those enrolled in MCOs were nearly 30% to 40% more likely to use a hospice than those enrolled in FFS plans. Furthermore, between states, MCO penetration seems to be associated with greater hospice use. With a 4-fold greater MCO penetration among Medicare beneficiaries, California uses 50% more hospice care than Massachusetts. This difference in use of hospice care persisted in comparing decedents enrolled in FFS plans with those enrolled in MCOs between states. The greater use of hospice care by MCO enrollees may be because the organizational structure and financial incentives are aligned to encourage hospice use. Managed care organizations are in a better position to coordinate care and provide the right care in the right setting. In addition, Medicare reimbursement policies encourage this shift. Once an MCO’s patient begins hospice care, Medicare provides the MCO a small fee for managing the patient while assuming the cost of hospice care. Consequently, referral to hospice care significantly reduces the MCO’s expenditures for high-cost patients. However, even with higher use of hospice care by MCO enrollees, overall use remains relatively low and

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**Table 4. Fee-for-Service Expenditures by Cause of Death and Hospice Use**

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>No. of Deaths</th>
<th>% of All Deaths</th>
<th>Mean Expenditures, $</th>
<th>% of Expenditures for Hospital Services</th>
<th>Mean Expenditures, $</th>
<th>% of Expenditures for Hospital Services</th>
<th>Mean Expenditures, $</th>
<th>% of Expenditures for Hospital Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Those Who Did Not Use a Hospice</td>
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<td></td>
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<tr>
<td>Those Who Used a Hospice</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Massachusetts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All causes</td>
<td>34 131</td>
<td>100.0</td>
<td>28 588</td>
<td>53.1</td>
<td>28 347</td>
<td>54.2</td>
<td>30 533</td>
<td>44.5</td>
</tr>
<tr>
<td>Heart disease</td>
<td>11 351</td>
<td>33.3</td>
<td>24 622</td>
<td>53.3</td>
<td>24 346</td>
<td>56.3</td>
<td>31 739</td>
<td>46.2</td>
</tr>
<tr>
<td>Cancer</td>
<td>7919</td>
<td>23.2</td>
<td>33 200</td>
<td>51.8</td>
<td>34 661</td>
<td>54.7</td>
<td>30 237</td>
<td>45.1</td>
</tr>
<tr>
<td>Stroke</td>
<td>2414</td>
<td>7.1</td>
<td>24 708</td>
<td>50.0</td>
<td>24 525</td>
<td>50.6</td>
<td>28 784</td>
<td>40.0</td>
</tr>
<tr>
<td>Pneumonia or flu</td>
<td>2125</td>
<td>6.2</td>
<td>28 381</td>
<td>53.8</td>
<td>28 396</td>
<td>54.2</td>
<td>27 729</td>
<td>35.5</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>1771</td>
<td>5.2</td>
<td>35 145</td>
<td>52.5</td>
<td>35 281</td>
<td>53.3</td>
<td>33 289</td>
<td>40.6</td>
</tr>
<tr>
<td>California</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All causes</td>
<td>19 064</td>
<td>100.0</td>
<td>27 814</td>
<td>55.0</td>
<td>27 782</td>
<td>57.8</td>
<td>27 995</td>
<td>39.7</td>
</tr>
<tr>
<td>Heart disease</td>
<td>7935</td>
<td>39.6</td>
<td>24 782</td>
<td>55.4</td>
<td>24 457</td>
<td>57.2</td>
<td>29 004</td>
<td>36.1</td>
</tr>
<tr>
<td>Cancer</td>
<td>3954</td>
<td>20.7</td>
<td>32 057</td>
<td>51.8</td>
<td>35 049</td>
<td>57.9</td>
<td>28 090</td>
<td>41.8</td>
</tr>
<tr>
<td>Stroke</td>
<td>1763</td>
<td>9.2</td>
<td>23 631</td>
<td>53.0</td>
<td>23 611</td>
<td>54.9</td>
<td>23 855</td>
<td>31.2</td>
</tr>
<tr>
<td>Pneumonia or flu</td>
<td>1279</td>
<td>6.7</td>
<td>30 927</td>
<td>56.4</td>
<td>30 851</td>
<td>57.4</td>
<td>32 099</td>
<td>40.8</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>1274</td>
<td>6.7</td>
<td>35 259</td>
<td>57.4</td>
<td>35 598</td>
<td>59.5</td>
<td>32 520</td>
<td>37.4</td>
</tr>
</tbody>
</table>

Expenditures (in 1996 dollars) in the last year of life per month. The asterisk indicates that data are per 30-day period for these months.
concentrated in patients with cancer. Less than 20% of all dying patients receive hospice care, even in California, and more than 60% of all hospice users have cancer. This translates into more than 35% of all decedents with cancer using hospice care. Among patients with cancer, historical barriers to the use of a hospice seem to be diminishing. The next hurdle is to use hospice care earlier in the dying process and for more days. Conversely, for patients without cancer (eg, those with chronic obstructive pulmonary disease or heart disease), with low hospice use, the challenge is to increase hospice use, even among decedents enrolled in MCOs.

The sites of death of patients in Massachusetts and California are quite similar. Less than 40% of all decedents, and even less than 50% of decedents who do not use a hospice, die as hospital inpatients, lower than reported in the past. A key determinant of dying out of the hospital and dying at home appears to be receiving hospice care. The proportion of out-of-hospital deaths in Massachusetts and California was similar regardless of whether the decedents had FFS plan or MCO coverage. Similarly, controlling for hospice use, patients with and without cancer died out of the hospital at the same rates. Thus, despite 400% greater MCO penetration, 20% fewer hospital beds, nearly 30% lower hospitalization rates, and 60% greater use of hospice care, California decedents die in the hospital only slightly less frequently than Massachusetts decedents. This suggests that what predicts site of death is more complex than mere hospital bed availability.

Finally, despite declines in hospitalization rates and lengths of stay, more use of hospice care, less than half the deaths in the hospital, and increases in MCO penetration, the health care costs of the last year of life remain high. Indeed, at $28 588 for the last year of life in Massachusetts and $27 814 in California, Medicare beneficiaries account for two thirds of all decedents. The pattern of expenditures seems minimal. The hypothesis that greater MCO penetration and greater hospice use might alter practices and lower costs at the end of life, even among FFS programs, is not supported by our data. Despite a 400% difference in MCO rates and a nearly 60% difference in hospice use between Massachusetts and California, differences regarding expenditures in the last year are minimal. In California, decedents enrolled in FFS plans receive hospice care significantly more and are admitted to the hospital less, and yet the difference in expenditures compared with Massachusetts is small ($774, <3%).

These data support the notion of cost savings from hospice care for patients with cancer. Decedents with cancer who used a hospice had 13% to 20% lower expenditures during the last year of life, and these savings extended to the 3 months before death. Patients with other diseases who used a hospice tended to have higher expenditures. This made the overall effect of a hospice on expenditures seem minimal.

These data suggest that several important follow-up studies are necessary. First, these data represent elderly patients who are Medicare beneficiaries. While Medicare beneficiaries account for two thirds of all decedents in the United States, it is important to extend these data to younger decedents. Similarly, the expenditure data represent only elderly decedents receiving FFS health care. It is important to see if the expenditure data apply to MCO settings also. Finally, while patients enrolled in MCOs use hospice care more frequently, it would be important to understand whether this option is freely selected by the patients and whether they and surviving family members are satisfied or even more satisfied with hospice care and dying at home.

This study has several limitations. First, these data are restricted to persons 65 years and older, who account for only two thirds of decedents. The pattern of site of death and expenditures may not extend to decedents younger than 65 years, especially because there are some data to indicate that younger decedents may consume more health care resources. Second, the expenditure data are limited to patients in the FFS sector because reliable MCO cost data are not available. Whether disease-specific expenditures and expenditures for de-

### Table 5. Expenditures in the Last Year of Life for Decedents With Cancer by Hospice Use*

<table>
<thead>
<tr>
<th>Time</th>
<th>Massachusetts Those Who Did Not Use a Hospice (n = 5304)</th>
<th>Massachusetts Those Who Used a Hospice (n = 2615)</th>
<th>California Those Who Did Not Use a Hospice (n = 2254)</th>
<th>California Those Who Used a Hospice (n = 1700)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall (last year of life)</td>
<td>34 661</td>
<td>30 237</td>
<td>35 049</td>
<td>28 090</td>
</tr>
<tr>
<td>Last 1 mo (0-30 d)</td>
<td>10 322</td>
<td>5656</td>
<td>11 998</td>
<td>5549</td>
</tr>
<tr>
<td>Last 2 mo (31-60 d)</td>
<td>5029</td>
<td>4142</td>
<td>4773</td>
<td>4082</td>
</tr>
<tr>
<td>Last 3 mo (61-90 d)</td>
<td>3678</td>
<td>3293</td>
<td>3297</td>
<td>3137</td>
</tr>
<tr>
<td>Last 4 mo (91-120 d)</td>
<td>2775</td>
<td>2893</td>
<td>2496</td>
<td>2626</td>
</tr>
<tr>
<td>Last 5 mo (121-150 d)</td>
<td>2280</td>
<td>2443</td>
<td>2111</td>
<td>2147</td>
</tr>
<tr>
<td>Last 6 mo (151-180 d)</td>
<td>2039</td>
<td>2033</td>
<td>1918</td>
<td>2005</td>
</tr>
<tr>
<td>Last 7-12 mo, per 30-d period (181-365 d)</td>
<td>1385</td>
<td>1586</td>
<td>1372</td>
<td>1385</td>
</tr>
</tbody>
</table>

*Data are given as expenditures (in 1996 dollars).
For the past 2 decades, there has been concern about the high costs of end-of-life care and the hope that hospice use could reduce such costs. According to data from Massachusetts and California, decedents enrolled in MCOs receive hospice care significantly more than those enrolled in FFS plans. However, overall expenditures in the last 12 months of life remain high, 5 times the expenditures for the average Medicare beneficiary. The significant differences between Massachusetts and California in MCO penetration, hospice use, hospitalization rates, and hospital bed availability are not associated with differences in expenditures in the last 12 months of life and site of death.

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From the Department of Clinical Bioethics, Warren G. Magnuson Clinical Center, National Institutes of Health, Bethesda, Md (Dr Emanuel); the Health Care Research Unit, Section of General Internal Medicine (Drs Ash, Yu, and Moskowitz), and the Department of Medicine (Drs Ash, Levinsky, and Moskowitz), Boston University School of Medicine, Boston, Mass; the Palliative and Supportive Medicine Program, Harvard Vanguard Medical Associates, Boston (Dr Gazelle); and the National Bureau of Economic Research, Palo Alto, Calif (Ms Sayinha and Dr McClellan). Dr Yu is now with Health Services Research and Development Field Program and the Cooperative Studies Program, US Department of Veterans Affairs and Center for Health Policy and Center for Primary Care and Outcomes Research, Stanford University, Stanford, Calif.

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Corresponding author and reprints: Ezekiel J. Emanuel, MD, PhD, Department of Clinical Bioethics, Warren G. Magnuson Clinical Center, National Institutes of Health, 9000 Rockville Pike, Bldg 10, Room 1C118, Bethesda, MD 20892-1156 (e-mail: eemmanuel@mail.cc.nih.gov).

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