

## SPECIAL ARTICLE

## PERSONS FOUND IN THEIR HOMES HELPLESS OR DEAD

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**Abstract** *Background.* Health care providers and providers of emergency services are sometimes called to help with people who are found alone in their homes either helpless or dead. It is not known who is at risk for being found helpless or dead, what the mortality rates are among those found alive, or how frequently this situation occurs.

*Methods.* We conducted a population-based study of patients who were found in their homes either helpless or dead. Over 12 weeks, paramedics employed by the city of San Francisco identified 387 such events involving 367 persons. We obtained information on these patients from the emergency-medical-services department or the hospitals to which they were taken and determined their outcomes.

*Results.* The median age of the persons found helpless or dead was 73 years; 51 percent were women. The frequency of such incidents increased sharply with age, from a rate of 3 per 1000 per year among those 60 to 64

years of age to 27 per 1000 per year among those 85 years of age or older. The highest rate was among men 85 years and older who were living alone (123 per 1000 per year). In 23 percent of the cases, the person was found dead; an additional 5 percent died in the hospital. Thus, total mortality was 28 percent. Of the patients found alive, 62 percent were admitted to the hospital. The average hospital stay was eight days, and 52 percent of those admitted required intensive care. Of the survivors, 62 percent were unable to return to living independently. The total mortality was 67 percent for patients who were estimated to have been helpless for more than 72 hours, as compared with 12 percent for those who had been helpless for less than 1 hour.

*Conclusions.* For elderly people who live alone, becoming incapacitated and unable to get help is a common event, which usually marks the end of their ability to live independently. (N Engl J Med 1996;334:1710-6.)

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HEALTH care providers and emergency-medical-services personnel are sometimes called on to assist when elderly people are found in their homes in need of emergency attention and unable to summon help. In a typical case, a neighbor notices an elderly person's absence or the fact that mail has piled up and calls emergency services. The precipitating incident can be a fall, a stroke, failure to thrive, or some other event. The clinical course for persons found alive but incapacitated can be complicated by factors related to the duration of time since the person became helpless, such as severe dehydration or decubitus ulcers.<sup>1</sup> The prognosis for such elderly patients is thought to be poor. Because of the variety of possible causes of these events, some health care providers refer to patients found in these circumstances as "found down," with the amount of time that the patient is helpless referred to as "down time." In this article, we refer to such patients as found helpless or dead, and we refer to the down time as the time spent incapacitated.

It is unknown who is at risk for being found helpless or dead in the home, how often such events occur, and what the mortality rate is among patients found alive but helpless. We undertook a prospective, population-based study of this phenomenon in San Francisco. Our goals were to determine how often elderly people are found helpless or dead in their homes and to assess the

demographic characteristics of such patients and the outcomes of those found alive but incapacitated.

## METHODS

During a 12-week period, from March through May 1993, paramedics employed by the city of San Francisco responded to 88 percent of all calls for emergency medical assistance (10,402 total calls). Persons encountered by paramedics in responding to these calls were included in this study if they lived alone and had been reported missing or were found helpless or dead in their homes. There were no other criteria for inclusion based on age, residence, or presentation. The case definition was designed to exclude people who were found helpless or dead outside their homes, who did not live alone, or whose illness did not warrant involvement of the emergency medical system. Persons who did not live alone were excluded under the assumption that those living with them would be able to provide them with assistance. Persons found dead were not excluded from our study if the other case criteria were met. Paramedics estimated the length of time the patient had been incapacitated, choosing from several categories ranging from less than 1 hour to more than 72 hours.

Data were abstracted from the records of the emergency medical system and from the hospital charts of patients transported to 13 hospitals. Information on medications taken by the patients before the emergency call was also obtained from the records of the emergency medical system and the hospitals. We also obtained diagnostic and procedural codes (from the *International Classification of Diseases, 9th revision* [ICD-9])<sup>2</sup> from hospital records. Death certificates were obtained for all persons who were found dead, and demographic information was recorded from these certificates, from hospital records, or from the paramedics' records (in descending order of priority).

Data on persons found dead were excluded from the analyses of outcomes and costs of care. Rates of incidence were calculated with the use of 1990 U.S. Census data for the population of San Francisco, both overall and according to age, race, and sex. The annual number of cases was determined, assuming a constant rate over time. Proportions were compared with two-tailed chi-square analyses. Rates were compared with an indirect method of standardization based on the 95 percent confidence intervals for Poisson distributions. An average community income was assigned to each patient on the basis of housing-tract data from the 1990 Census.

The outcomes we studied included survival, duration of hospitalization, and return to independent living. Patients who were evaluated by

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Supported in part by a grant from the Walter and Evelyn Haas, Jr., Foundation. Dr. Gurley is a Robert Wood Johnson Clinical Scholar.

**Table 1. Characteristics of Persons Found Helpless or Dead in Their Homes.**

CHARACTERISTIC	FOUND ALIVE (N = 297)	FOUND DEAD (N = 90)
Race or ethnic group — no. (%)		
Non-Hispanic white	191 (64)	54 (60)
Black	38 (13)	19 (21)
Asian	27 (9)	9 (10)
Unknown	26 (9)	0
Hispanic	13 (4)	7 (8)
Other	1 (<1)	1 (1)
Native American	1 (<1)	0
Age — yr		
Median	75	65
Range	26–101	25–93
Female sex — no. (%)	170 (57)	29 (32)
Median community income — \$	31,966	30,247
Estimated time spent incapacitated — no. (%)		
<1 hr	92 (31)	8 (9)
1 to <3 hr	47 (16)	5 (6)
3 to <6 hr	25 (8)	6 (7)
6 to <12 hr	22 (7)	15 (17)
12 to <24 hr	33 (11)	11 (12)
24 to <48 hr	14 (5)	6 (7)
48 to 72 hr	12 (4)	5 (6)
>72 hr	13 (4)	26 (29)
Unknown	39 (13)	8 (9)
Median time spent incapacitated — hr	2	18
Insurance — no. (%)		
Private	152 (51)	
Medicaid	72 (24)	
Medicare only	36 (12)	
None	11 (4)	
Unknown	26 (9)	
Reason for incapacitation — no. (%)		
Inability to get up or weakness	88 (30)	
Fall	67 (23)	
Shortness of breath or chest pain	21 (7)	
Altered mental status	18 (6)	
Found unresponsive	16 (5)	
Cerebrovascular accident	13 (4)	
Miscellaneous*	74 (25)	

\*Includes overdose, suicide or attempted suicide, seizures, no identified problem, syncope, severe pain, diabetes with hypoglycemia, and previous assault. Each category included eight or fewer patients.

paramedics but not transported to a hospital or who were seen in emergency departments and discharged were assumed to have survived and continued living independently. Patients who were discharged to a nursing home, a family member's home, a rehabilitation facility, a board-and-care facility, or a skilled-nursing facility were considered discharged to "other care." Information on who contacted the paramedics was obtained from the records of the emergency medical system or the hospitals. In cases in which no family member was mentioned, the contact person was categorized as "not family." All patients 65 years of age or older were assumed to be covered by Medicare. Patients covered by both Medicare and private supplemental insurance were classified as having private insurance. We estimated costs by calculating 70 percent of 1993 charges for evaluation and transport by paramedics, number of days in the hospital, and number of days in the intensive care unit.

## RESULTS

### Characteristics of the Patients

During a 12-week period, paramedics were called on to assist 367 persons found incapacitated or dead in their homes; these people accounted for 387 episodes of being found helpless or dead and 3.7 percent of all calls to the emergency-medical-services department (Table 1 and Fig. 1). The median age of the women (78 years) was significantly higher than that of the men (65 years). Women made up only 27 percent of the patients under

65, but 63 percent of those 65 years of age or older. A typical patient was an 82-year-old white woman who was found by a neighbor during a routine check. She was lying on the floor, soiled by dirt, feces, and urine, and had garbled speech. She was estimated to have been incapacitated for more than 72 hours. She was admitted with decubitus ulcers and dehydration. After 21 days, she was discharged to a skilled-nursing facility.

### Clinical Presentation

The people found helpless had a variety of precipitating problems (Table 2). The most frequently cited precipitating causes of incapacitation among those who survived were weakness or inability to get up and falls. There was some variation according to age; weakness or inability to get up was the most frequent cause of incapacitation among patients 65 and older (n=72). For example, one 78-year-old woman was found on her bed by the paramedics after a neighbor called for help. She stated that she had been unable to get up for two days. She denied falling. She appeared dehydrated, and her lips had cracked and bled. She spent nine days in the intensive care unit and was then discharged to a skilled-nursing facility.

There were no patients under 65 who had multiple falls or who fell and became lodged in place. Overdose (n=7) and suicide attempts (n=5) occurred only in the cases of patients less than 65 years of age. Contributing factors included gastrointestinal symptoms (n=31; mean age, 62 years) and alcohol or drug use (n=32; mean age, 51 years). Twenty patients (16 percent of those under 65; mean age, 43 years) were identified as having the acquired immunodeficiency syndrome (AIDS) as a contributing condition.

Ratings on the Glasgow coma scale were available for 295 of the 297 patients found alive (99 percent). For-

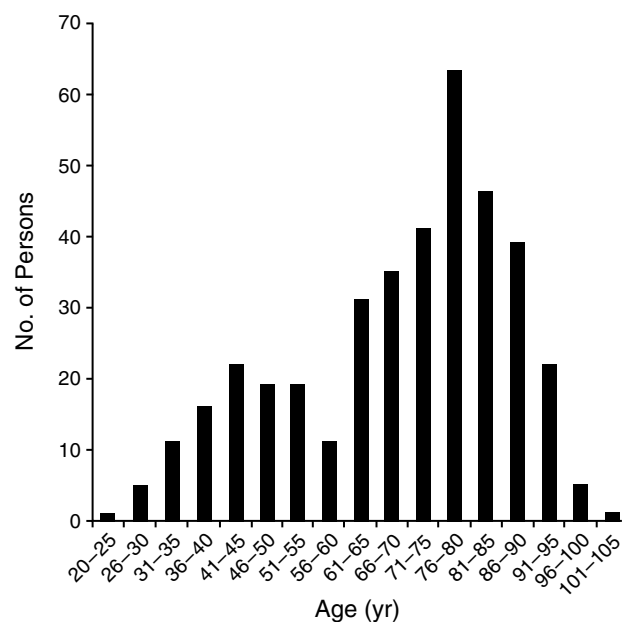


Figure 1. Distribution of Persons Found Helpless or Dead in Their Homes, According to Age.

Table 2. Examples of Patients' Clinical Presentations and Chief Causes of Immobilization.\*

<p><b>Inability to get up or weakness</b> General weakness and confusion for 2 to 3 days; found on well-being check; questionable food and liquid intake for 2 days. Patient could not get up from toilet, moved to the ground, and became wedged between toilet and bathtub for 9½ hours.</p> <p><b>Person found dead</b> Family unable to contact patient for 24 hours; patient found extremely cold in heaps of garbage and feces at home. Patient not seen in 10 days; found decomposed in bathroom by apartment manager. Blood covering bed with trail to bathroom where patient was lying. Patient not seen for 3 to 4 days; younger brother found patient prone on floor by bed with questionable coffee-ground emesis, diarrhea, or blood.</p> <p><b>Falls</b> Caretaker found patient supine on floor, complaining of occipital pain; left shoulder abrasion from fall. Recurrent falls for 24 hours; fire department there earlier today; evidence of diarrhea in clothing, bedroom, bathroom. Patient with a dislocated left hip causing fall; dislocation several times per year.</p> <p><b>Shortness of breath or chest pain</b> Extreme respiratory distress; white frothy sputum from mouth; complaining of severe shortness of breath, nausea, and vomiting; extremely drowsy, unresponsive to verbal stimulation.</p> <p><b>Altered mental status</b> Patient found on bedroom floor by manager; speech incomprehensible. Home nurse found patient shivering and defecating while standing, possibly over- or undermedicated. Psychiatric history; patient has been noncompliant with medications; sequestered in apartment; increased depression for 1 month after losing job; last seen by family several days ago; found supine. Patient found sitting on floor, conscious, but no verbal response, not following simple commands, incontinent of urine, poor skin turgor.</p> <p><b>Person found unresponsive</b> Patient with end-stage acquired immunodeficiency syndrome found unconscious in bed, incontinent of urine and feces. Patient unconscious, unresponsive, clothes soaked in urine, supine on floor, dinner untouched on table.</p>	<p>Patient emaciated, dehydrated, found unconscious on toilet for unknown duration; ecchymoses on buttocks.</p> <p><b>Cerebrovascular accident</b> Patient found by friend on living-room floor with right-sided weakness and aphasia. Patient found supine on floor, nonverbal, left side flaccid; San Francisco Fire Department came to check smoke alarm (teakettle boiled dry).</p> <p><b>Overdose</b> Patient found unconscious, unresponsive, dragged to cold shower before arrival of paramedics; found sitting on stairs, agitated; took heroin, codeine, alcohol.</p> <p><b>Suicide attempt</b> Patient lacerated wrists and ankles; found unconscious in bathtub by friend.</p> <p><b>Seizures</b> Two seizures this p.m., patient postictal, oriented to self only.</p> <p><b>No identified problem</b> Patient with tender hips, ecchymoses on hands; pale, cool, dehydrated; found on floor.</p> <p><b>Syncope</b> Patient found prone on floor with respiratory distress following syncope, scheduled for pacemaker tomorrow.</p> <p><b>Severe pain</b> Patient unable to urinate or defecate for 5 days; burning pain in lower abdomen for 1 week.</p> <p><b>Diabetic patient with hypoglycemia</b> Friend heard patient fall out of bed; patient with insulin-dependent diabetes mellitus, unable to speak but became alert and oriented after the administration of dextrose solution.</p> <p><b>Previous assault</b> Assault yesterday; patient had facial trauma with massive bleeding, eyes open to voice.</p>
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\*These examples have been condensed from the paramedics' records. The categories appear in descending order of frequency.

ty-four patients (15 percent) had moderately to severely depressed scores (1 through 16). Fifty-four patients (18 percent) had scores of 17 through 19, with 74 percent of this group exhibiting "confused verbal response." The remaining 197 patients (67 percent) had a normal score (20).

In the 387 cases in which persons were found incapacitated or dead in their homes, paramedics found 90 persons (23 percent) dead (Fig. 2). Patients who were found dead were significantly more likely than the patients found alive to be male (68 percent vs. 43 percent,  $P < 0.01$ ), younger (median age, 65 vs. 75 years;  $P < 0.01$ ), and black (21 percent vs. 13 percent,  $P = 0.08$ ). Before being found incapacitated, the patients were taking an average of 3 medications (range, 0 to 17); 21 percent (median age, 70 years) were taking sedative-hypnotic agents.

#### Insurance and Income

Information on insurance coverage was available for 91 percent of the patients found alive. Those under 65 were most commonly covered by Medicaid, which was the sole form of insurance for 27 percent, whereas persons 65 and older most commonly had private insurance (70 percent). Medicare was the sole form of insurance for only 16 percent of those 65 and older.

Community income varied according to race; the

vast majority of whites lived in middle-to-high-income communities, the majority of blacks lived in low-income communities, and the majority of Asians lived in either the very-lowest-income or middle-income communities.

#### Who Called the Paramedics?

Only 11 percent ( $n = 42$ ) of the patients were found by family members. The most common category of contact person was "other" ( $n = 76$ ), which included visiting nurses, caretakers, housekeepers, and home health aides. In one typical case, a 95-year-old white man was found by his caretaker wedged between the toilet and the bathtub. The patient said that he had sat on the toilet at noon the day before and was unable to get up. He tried to move to the floor but mistakenly lowered himself between the toilet and the bathtub. He refused transportation to the hospital. The remaining categories of persons who contacted the emergency medical services were friends ( $n = 41$ ), neighbors ( $n = 36$ ), landlords ( $n = 3$ ), and unidentified persons ( $n = 169$ ).

Calls made to the paramedics by friends resulted in shorter lengths of time spent helpless than any other category (median, 4.5 hours), except for patients who were eventually able to call for help themselves (median, 2 hours). Calls by family members (9 hours), neighbors (9 hours), landlords (more than 72 hours), and

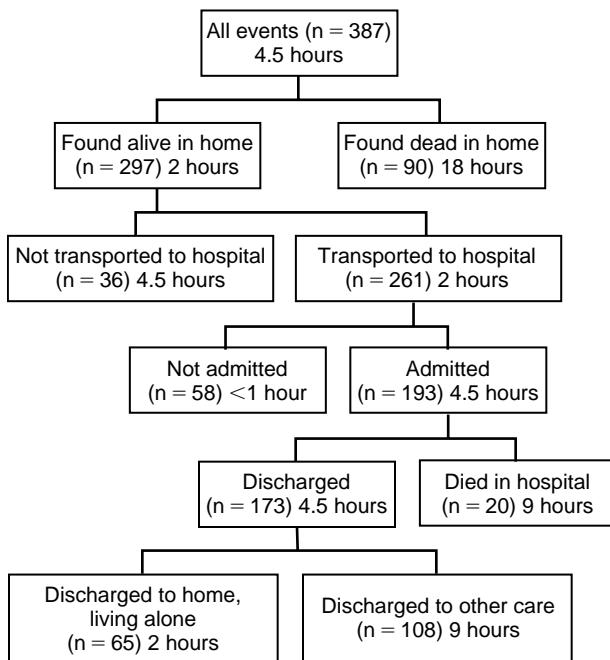


Figure 2. Outcomes of Persons Found Helpless or Dead in Their Homes.

For each group of patients, the median time spent incapacitated, as estimated by the paramedics, is indicated. Data on admission and hospital outcomes are shown for only 251 of the 261 persons transported to the hospital, since the records of 10 persons could not be found.

others (18 hours) were associated with much longer estimated times spent incapacitated.

### Frequency of Incidents

The age-specific frequency of incidents of persons being found incapacitated or dead in the city of San Francisco reached a peak of 27 per 1000 persons per year among those 85 years of age or older (Fig. 3). Overall, the rates for men and women were similar. However, among blacks, the rate for men 85 and older was more than twice that for women (36 per 1000 vs. 16 per 1000,  $P < 0.05$ ). The rates among non-Hispanic whites and blacks were generally about twice those among Asians and Hispanics. The rates varied according to the average annual income in the community, with the highest rates (27 per 1000) among patients living in communities with incomes between \$30,000 and \$40,000.

We recalculated the frequency of incidents with the number of persons living alone as the denominator. The annual rate per 1000 persons living alone was 14.0. The annual rates for men and women living alone were 14.3 per 1000 and 13.6 per 1000, respectively. Annual rates were 10.1 per 1000 for Hispanics, 10.6 per 1000 for Asians, 11.6 per 1000 for non-Hispanic whites, and 22.3 per 1000 for blacks.

The annual rates among people 65 or older who lived alone were 31.6 per 1000 overall, 42.2 per 1000 for men, and 27.6 per 1000 for women. Rates continued to rise with age, even when adjusted for the number of people

living alone (Fig. 4). The peak rate — among persons 85 years of age or older who were living alone — was 123 per 1000 for men and 59 per 1000 for women ( $P$  not significant).

### Outcomes

#### *Duration of Hospital Stay, Survival, and Return to Independent Living*

In the 297 episodes in which patients were found alive, 261 patients (88 percent) were transported to the hospital (Fig. 2). When patients were not taken to the hospital, the most frequent reason was the patient's refusal ( $n = 29$ ). Seventy-four percent of the 261 patients transported to a hospital ( $n = 193$ ) were admitted. Those who were admitted were older than those not admitted (median age, 77 years vs. 67 years;  $P < 0.01$ ) and significantly more likely to be women (64 percent,  $P < 0.05$ ).

ICD-9 disease and procedure codes were available for 82 percent of the patients transported to a hospital and 97 percent of those admitted (Table 3). Patients frequently had altered mental status (39 percent of all transported patients); central nervous system imaging was performed in 69 patients. Many patients (25 percent) had acute injuries; 36 had fractures. Alcohol or drug abuse was diagnosed in 38 patients, sepsis or hypotension in 20, decubitus ulcers in 10, and aspiration pneumonia in 10. Dehydration occurred in 42 patients.

For patients admitted to hospitals, the average duration of stay was eight days. Intensive care was required for 52 percent ( $n = 100$ ), with an average stay in the intensive care unit of seven days. In-hospital mortality was 10 percent overall and 16 percent among those requiring intensive care.

Among those who survived until discharge, 62 percent did not return to independent living. Patients discharged to supportive care were significantly older (me-

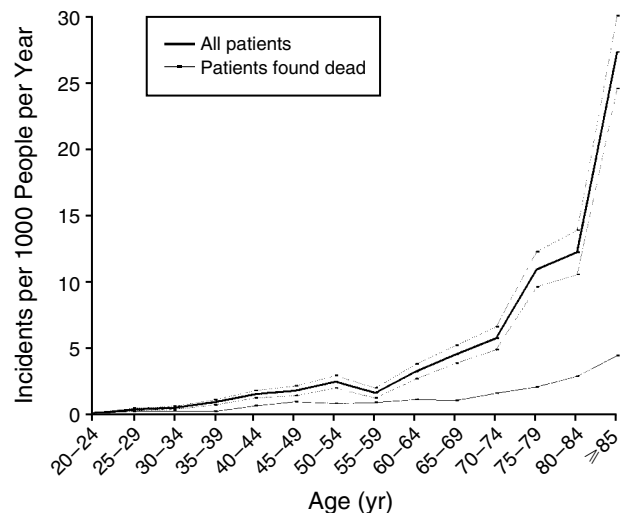


Figure 3. Frequency of Incidents According to Age.

This graph shows the rate at which persons were found helpless or dead in their homes (per 1000 population per year) according to age. The rate for those found dead is also shown. The dotted lines show the 95 percent confidence intervals for all patients.

dian age, 79 years;  $P < 0.01$ ), were more likely to be female (64 percent,  $P = 0.07$ ), and were commonly discharged to institutions (77 percent to nursing homes or skilled-nursing or rehabilitation facilities, with only 4 percent discharged to live with family or friends). Of those who were hospitalized, two thirds either died or did not return to independent living.

#### Estimated Time Spent Incapacitated in Relation to Outcome

Longer times spent helpless, as estimated by the paramedics, were associated with the person's being found dead or being transported to the hospital, being admitted, and being discharged to other care rather than to independent living ( $P < 0.05$  for all these comparisons). Male sex was significantly associated with estimated times of more than 12 hours spent helpless ( $P < 0.05$ ), but age, race or ethnic group, and insurance status were not significantly associated with the length of time spent incapacitated.

The number of deaths, both in the home and in the hospital, varied according to the estimated time since the person had become incapacitated. Of the people for whom this time was estimated to be less than one hour, 10 percent were found dead and 2 percent died in the hospital, for a total mortality rate of 12 percent. Of this group, 11 percent were black, 58 percent were women, and the median age was 75 years. Of those estimated to have been immobilized for more than 72 hours, 62 percent were found dead and 5 percent died in the hospital, for a total mortality rate of 67 percent. Of this group, 28 percent were black, 36 percent were women, and the median age was 64 years.

#### Costs

The estimated average cost of care for each patient was \$9,985.

### DISCUSSION

The number of people 85 years of age or older in the United States is expected to increase from 3.1 million in 1990 to 17.7 million by 2050.<sup>3</sup> Longer life spans, declining birth rates, the expanding role of women in the work force, and the breakdown of the extended family have all been cited as reasons for the increasing number of elderly people at risk for institutionalization.<sup>4-7</sup> Yet elderly people clearly prefer independent living to institutionalization.<sup>8,9</sup>

Elderly people who live alone may fear being unable to obtain help if they are injured or ill. For many families, the specter of such an event can dominate decisions about living arrangements. This fear has generated an industry marketing automatic alarm-and-notification systems. Health care professionals who counsel those who are concerned about being incapacitated or those who have survived such an event have little or no information on which to base recommendations.

Our results indicate that it is common for elderly people living alone to be found helpless or dead in their homes. Among men who were 85 or older and lived alone, there were an estimated 123 such incidents per

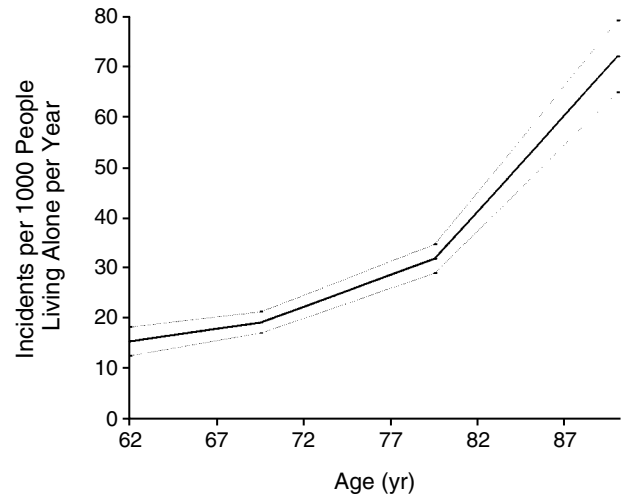


Figure 4. Frequency of Incidents among Elderly People Living Alone.

This graph shows the rate at which persons 62 years of age or older were found helpless or dead in their homes (per 1000 persons living alone per year) according to age. The dotted lines show the 95 percent confidence intervals.

1000 persons per year in San Francisco in 1993. For comparison, the incidence of myocardial infarction among people 65 years of age or older is estimated to be between 1.7 per 1000 and 4.4 per 1000 persons per year,<sup>10</sup> and the incidence of hip fracture among 85-year-old white women is estimated to be 35 per 1000 per year.<sup>11</sup>

The outcomes of such incidents are often poor. In 23 percent of the cases in which the paramedics were called on for aid, the patients were found dead, and an additional 5 percent died in the hospital, for a total mortality rate of 28 percent. Consideration also must be given to the suffering of those who are unable to get help for prolonged periods. Ten percent of the patients were estimated to have been unable to summon help for more than three days; 38 percent of them survived the experience. For those who survive, being found incapacitated and helpless usually leads to a loss of independence; the majority of those who are hospitalized do not return to independent living.

Although the incidence of such episodes is highest among very elderly men, members of all races and ethnic groups and all socioeconomic groups are susceptible to becoming incapacitated in their homes. The rate of such incidents increases dramatically with age. Most of the persons encountered by paramedics were elderly white women from fairly well-to-do communities, as indicated by a high community income and private health insurance coverage. Large differences among non-Hispanic whites, Asians, and Hispanics were eliminated when the rates were adjusted for the proportion of elderly people living alone. Elderly blacks, however, continued to have higher rates than the other racial and ethnic groups; black men were more likely than black women to be found helpless or dead by paramedics.

Our study identified a subgroup of patients found in-

capacitated in their homes, who tended to be relatively young, male, poor, and black and who were frequently found dead. Drug overdoses, suicide, alcohol or drug abuse, and AIDS were contributing factors that predominantly affected people younger than 65.

In only a few cases was there any mention of family members in the records of the emergency medical system, a fact that suggests that patients found helpless or dead may be somewhat isolated socially. Neighbors and others were more likely to call the paramedics with requests for assistance than were friends and family.

Our study has several limitations. By design, we did not include patients who were found incapacitated or dead on the street or who lived with others. Our case definition was chosen to focus on people who were elderly and potentially isolated. Although the study was also designed to include all patients identified as meeting the inclusion criteria by paramedics employed by the city of San Francisco, the magnitude of the problem may have been underestimated because of patients who were seen by paramedics but not enrolled or who were transported to hospitals by private ambulances or by other means. Our assumptions about patients who were not admitted may have caused us to underestimate the mortality rate or the frequency of loss of independence associated with being found helpless in the home. We were unable to assess whether such incidents followed any seasonal pattern.

In this descriptive study, we assessed the magnitude of the phenomenon of patients' being found helpless or dead in their homes, the demographic features of the patients found in this condition, and their outcomes. We did not attempt to determine relative risks or to generalize our results to groups other than those living in San Francisco. Therefore, some important questions that arise from our results cannot be reliably answered on the basis of our data. For example, we were unable to assess whether the patients who were found dead represented a distinctly different group from those found alive or, on the contrary, whether the two groups were similar but

Table 3. Diagnoses of 261 Patients Transported to Hospitals, with Associated Procedures.\*

DIAGNOSIS	No. (%)†	PROCEDURE	No.†
<b>CNS events and alterations in consciousness</b>	101 (39)	<b>CNS procedures</b>	107
Strokes, TIAs, syncope, seizures	71	CT or MRI	69
Paralysis, movement disorders, neuropathy	37	Lumbar puncture	13
Dementia, psychoses, delirium	22	EEG	9
CNS injuries, hemorrhage, infection	17		
Coma	5		
<b>Cardiac disorders</b>	96 (37)	<b>Cardiac procedures</b>	71
Dysrhythmias	42	Echocardiography	23
Heart failure	34	Cardiac catheterization	11
Acute MI and ischemic heart disease	26	PCWP monitoring	6
<b>Infectious diseases</b>	84 (32)		
Septicemia, shock	20		
HIV/AIDS	14		
<b>Acute injury</b>	64 (25)	<b>Orthopedic procedures</b>	65
Fractures	36	OR, femur or tibia–fibula	21
Wounds, abrasions, dislocations, sprains	30	Reduction of hip dislocation	4
		Fasciotomy	3
<b>Electrolyte disorders</b>	64 (25)		
Volume depletion	42		
Hypokalemia	21		
Acidosis	7		
<b>Respiratory disorders</b>	59 (23)	<b>Pulmonary procedures</b>	41
Pneumonia	25	Ventilation ≥96 hr	16
COPD	23	Ventilation <96 hr	9
Respiratory failure	13	Other oxygen supplementation	5
<b>Urinary tract disorders</b>	50 (19)	<b>Urinary procedures</b>	16
UTI	31	Renal dialysis	4
Renal failure	11	Renal ultrasonography	3
<b>Joint, bone, and muscle disorders</b>	47 (18)		
Arthritis, osteoporosis	35		
<b>Hematologic disorders</b>	43 (16)		
<b>Alcohol or drug abuse</b>	38 (15)		
<b>Endocrine disorders</b>	34 (13)		
Diabetes	25		
<b>Gastrointestinal disorders</b>	30 (11)	<b>Gastrointestinal procedures</b>	28
GI bleeding (not occult)	10	Abdominal ultrasonography	8
<b>Psychiatric disorders</b>	26 (10)		
Nonorganic psychoses	10		
Depressive disorders	7		
<b>Skin disorders</b>	25 (10)		
Cellulitis	14		
Decubitus ulcers	10		
<b>Miscellaneous</b>		<b>Radiographic procedures</b>	26
Cancer	18	CT of abdomen	8
Malnutrition	9	CT of area other than abdomen or thorax	5
Poisoning	8	Bone scanning	4
Gangrene	3	CT of thorax	3

\*These data on diagnoses and procedures are based on the ICD-9 codes in the hospital records of 261 patients transported to the hospital after being found helpless in their homes. CNS denotes central nervous system, TIA transient ischemic attack, CT computed tomography, MRI magnetic resonance imaging, EEG electroencephalography, MI myocardial infarction, PCWP pulmonary-capillary wedge pressure, HIV human immunodeficiency virus, AIDS acquired immunodeficiency syndrome, OR open reduction, COPD chronic obstructive pulmonary disease, UTI urinary tract infection, and GI gastrointestinal.

†Major categories, in boldface type, include the numbers of patients and percentages. Selected subcategories are also shown, with the numbers of diagnoses.

those found dead had been left a longer time without help. Our results indicate that the majority of persons who are not accounted for for more than three days are found dead. We were also unable to determine which deaths were preventable. Although some of the people in our study group may have died peacefully at home,

most cases seem to represent deaths or suffering that could have been prevented.

In this study, working with paramedics employed by the city of San Francisco, we examined a common set of circumstances that result in adverse outcomes. We were not able, however, to determine the independent influence of functional status, the length of time spent helpless, the extent of social support, diagnosis, demographic variables, or a number of other factors on the outcomes of persons found dead or helpless in their homes. We were also unable to determine the independent relative risk of being found incapacitated among people who live alone as compared with those who do not. For patients who survive prolonged periods of time spent helpless in their homes, our study suggests that tremendous suffering could be reduced by earlier intervention. The correlation between the estimated length of time since incapacitation and outcome implies that future studies should attempt to reduce mortality and suffering by devising ways for others to intervene earlier.

The results of this study also raise several important policy questions. Who can undertake the monitoring necessary to ensure the safety of relatively isolated, very elderly people living alone in the community? Many of the patients were already known to the health care system and were discovered by other health care professionals after prolonged periods spent helpless. Assisting such patients might require more frequent checks, perhaps every 12 to 24 hours. When is periodic monitoring cost effective or ethically justified? How can it be carried out in a way that is supportive of the individual person's wish for independence and not coercive or intrusive? An important first step would be to raise public awareness of the likelihood that elderly people may become helpless in their homes and to promote activism within a community. Checking on someone requires no specific training. Our finding that notification of the paramedics by patients' friends resulted in a significantly shorter time spent helpless than notification by others implies that the best preventive measure (as simple as it may sound) is the existence of active social relationships. Identifying, facilitating, and assisting in the

maintenance of such friendships for relatively isolated elderly people may require creative social responses. Other possibilities for intervention include electronic telephone checks, calling circles among elderly people at risk, and the use of devices that are commercially available to summon help (only one patient in our study possessed such a device). How can limited resources be targeted to those at greatest risk? Our study indicates that very elderly men living alone, particularly black men, are especially in need of intervention.

This study may help health care providers to counsel patients at risk, but further research is needed to adequately address the fears of elderly people who live alone. Future studies should evaluate interventions to prevent elderly people from becoming helpless in their homes, lessen morbidity, and maintain independent living for patients who desire it.

We are indebted to the men and women of the San Francisco Department of Public Health Paramedic Division, who with diligence and compassion found and cared for each of the patients we studied; to Owen Linderholm, without whom the study could not have been conducted; to Charles Saunders and Tom Newman for their assistance; and to Ramona Doyle for her sharp eye and quick pen.

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## CORRECTION

## Persons Found Helpless in Their Homes

*To the Editor:* Both the article by Gurley et al.<sup>1</sup> and the editorial by Campion<sup>2</sup> (June 27 issue) address the fear expressed by those living alone — that after an emergency, they may be incapacitated for a long time before being found. Of the 367 persons studied by Gurley et al. who lived alone and were “found down” by San Francisco paramedics, only 1 had a commercially available device used to summon help.<sup>1</sup> Had the others had alerting devices, the long periods before they were found might have been substantially reduced.

There is some literature on “personal emergency response systems.”<sup>3</sup> Their users usually live alone, wear a pendant-type transmitter around their necks or a wristwatch-type device, and pay \$25 to \$30 per month for a service that ties their residential phone lines to a response center in a local emergency department or a national response center. Studies we conducted<sup>4</sup> show that not only do subscribers to such services have fewer hospital admissions and shorter stays after they subscribe than they did before ( $P = 0.01$ ), but the elapsed time from the subscriber-initiated alert to the time help arrives is well under one hour.

Campion accurately describes the problem facing those at risk of being “found down.” One third of the almost 33 million Americans over the age of 65 live alone. They carry a risk of 3.2 percent per year of being found helpless or dead.<sup>5</sup> This amounts to about 300,000 older persons each year who have crises at home of the types described by Gurley et al.<sup>1</sup> Health care providers should be informed about preventive measures such as personal emergency response systems, and controlled studies are needed. If clear benefits can be proved, then perhaps such systems, along with other assisted-living arrangements, may be indicated for specific people at high risk, especially older Americans living alone.

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*To the Editor:* In my home community of Morton Grove, Illinois, the “Are You O.K.?” program allows the local police to provide home monitoring to elderly or disabled citizens in the independence-preserving, noncoercive, nonintrusive manner advocated by Gurley et al. The program involves a telephone system that automatically makes a call to a subscriber’s home each day at a time the subscriber chooses. If the subscriber is well, he or she simply hangs up after hearing a prerecorded message. If the subscriber does not answer or the line is busy, three more attempts are made before the system alerts the police. Dispatchers then either contact a neighbor who has previously agreed to assist in the event of an emergency or send the police to check on the subscriber.

The system is an outgrowth of a recently installed “911” system. No new police employees were hired, yet approximately 100 calls can go out hourly whether or not there are police emergencies in progress. Police visit interested citizens at home to enroll them in the program. This model deserves further study.

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The authors reply:

*To the Editor:* Roush and Teasdale and Oserman cite two types of electronic monitoring (personal emergency response systems and automatic-dialing systems) as means communities can use to show concern for people who might otherwise become helpless or die in their homes. Electronic monitoring takes many forms, but the common thread is that a patient is equipped with a device that can inform a central system when a potentially adverse event happens. Several limitations of electronic monitoring have already been mentioned, including the ongoing expense and the need for patients to wear portable devices continuously.<sup>1</sup> Another limitation of these systems is that those at risk must be identified appropriately in order to benefit from the systems.

The types of events we described result from complex sociological conditions that isolate elderly people within their communities. Many elderly people have no source of help when an adverse event occurs in the home. Those at highest risk are, by definition, very isolated. Effective intervention means identifying patients, counseling and educating them, becoming involved with the patients’ communities, and seeing that there is an effective community response. Without these steps, the patients at highest risk may not be identified appropriately; resources may be directed disproportionately to a low-risk group; acceptance and compliance by patients will be poor; and the community response will be inadequate. Further studies of the effectiveness and

cost effectiveness of monitoring systems are needed before they can be recommended widely. Electronic monitoring may be one creative way a community can respond to this complicated need. Friendship would be another.

We must add that there was an error in our calculations of the Glasgow coma scale. The last paragraph on page 1711 should have read as follows: "Ratings on the Glasgow coma scale were available for 295 of the 297 patients found alive (99 percent). *Forty-six* patients (16 percent) had moderately to severely depressed scores (1 through 12). *Forty-three* patients (15 percent) had scores of 13 or 14, with 84 percent of this group exhibiting "confused verbal response." The remaining 205 patients (69 percent) had a normal score (15)." We apologize for the error.

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