



# The Use of Intensive Care: New Research Initiatives and Their Implications for National Health Policy

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**A**S WE STEADILY INCREASE THE PORTION OF OUR national wealth going for medical care, discussion is growing about whether and how to stop or at least slow the growth of expenditures. Previous analyses identified many potential culprits: unrealistically high public expectations of medicine; the rapid introduction of new, large capital-cost technologies and surgical procedures (National Center for Health Care Technology, Technology Assessment Forum 1981; Abrams and McNeil 1978); the increasing use of small technologies such as laboratory tests (Scitovsky 1979); a medical-legal atmosphere prone to litigation; the lack of cost-control incentives in hospital care (Newhouse 1978); and a greater reliance on hospital care as part of the dying process, combined with an aggressive approach to many chronic diseases (Zook and Moore 1980; Schroeder, Showstack, and Roberts 1979).

Together, these studies form a strong argument that medical care costs in the United States are too high because American citizens do not benefit from much of the medical care they currently receive. The Zook and Moore (1980) and Schroeder, Showstack, and Roberts (1979) studies highlight how much of our investment in medical care is going to a few patients who frequently do not benefit from these

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Milbank Memorial Fund Quarterly/*Health and Society*, Vol. 61, No. 4, 1983  
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0160/1997/83/6104/0561-23 \$01.00/0

services. Other papers emphasize how much of our current resources go to a few high-cost areas (renal dialysis, neonatal intensive care, coronary artery bypass surgery) where the benefits are small and where much of the money is spent in the final year, even weeks, of life. Enthoven (1980) and Newhouse (1978) point out one reason why this is true—the total lack of incentives for physicians and hospitals to reduce use of high-cost diagnostic and treatment services.

Therefore, while we acknowledge that for total medical care costs to fall substantially, progress will have to be made in a number of social and medical areas, we contend that the most direct and logical way to begin is to make American medical care more selective. For this to happen, both physicians and patients will have to be involved and be provided with proper incentives. In addition, both will need better information about the efficacy of individual hospital services.

In this paper, we review the development of new research that provides initial suggestions about how to reduce demand for high-cost hospital service, adult intensive care. We illustrate how the information available through this work creates new opportunities and how these efforts are linked to current discussion about national health policy.

## Intensive Care Services

The rapid growth of intensive care reflects elements of all the previously mentioned culprits that have been implicated in the high cost of American medicine. Physicians and the public obviously believe that Intensive Care Units (ICUs) are an essential life-saving part of hospital care. After their introduction in the early 1960s, ICUs spread rapidly. By 1981 there were ICUs in 95 percent of all acute-care American hospitals, a total of 66,000 adult beds (American Hospital Association 1982). (There are an additional 8,000 pediatric and neonatal ICU beds nationwide.)

Because they encourage use of both large and small technologies, ICU care is very expensive, now accounting for an estimated 20 percent of total hospital charges (Russell 1982). (This estimate includes both adult and neonatal units.) In aggregate the cost of adult ICUs approaches 1 percent of this nation's gross national product.

There are a number of different names for intensive care units. The

largest proportion of ICU beds (49,000) treat a broad range of post-surgical, trauma, and medical patients. These units are called surgical ICUs, medical ICUs, respiratory care units, neurosurgical ICUs, or simply ICUs. Another major use of intensive care is the coronary care unit (CCU). CCUs concentrate on the diagnosis and care of patients with heart attacks. We estimate that CCU beds account for 16,000 (25 percent) of the 66,000 total ICU beds. There are also approximately 1,000 beds in units designed specifically for burn victims.

Regardless of the specific names, the two principal roles of intensive care are the same: life support of organ-system failure in critically ill patients or close monitoring of stable, noncritically ill patients in case the need for life support suddenly occurs.

In most ICUs, patients are admitted because their physician believes they need either unique ICU treatment or close nursing and medical supervision. Many stable patients, however, are also admitted following major surgery. This is often done according to protocols and for fear of liability should they develop problems while in less well monitored hospital areas (Knaus et al. 1981).

While the routine admission of stable monitor patients may be the greatest single reason for the rapid growth of ICUs, it is ICU care for a few critically ill patients that provides an example of how substantial medical resources are now being used in aggressive but frequently futile attempts to avoid death. Many ICU admissions are older patients with severe, often long-standing disabilities. Many are at high risk of dying during the hospitalization. As early as 1976, Cullen and associates questioned the amount of resources going to patients who lived only a few days or, at best, months following ICU admission (Cullen et al. 1976). More current surveys continue to characterize many ICU admissions as elderly, in chronically poor health, and with poor short-term survivals (Thibault, Mulley, and Barnett 1980; Chassin 1982).

With regard to overall efficacy, while there is substantial documentation of the short-term physiologic correction possible with routine ICU therapies and the resulting life-saving benefit, there is little evidence that widespread use of ICUs has resulted in improved survival or quality of life for many of the patients now routinely admitted (Hook, Horton, and Schaberg 1983; Knaus 1983). Most investigators would agree with Russell (1979, 1982) that investment in ICU services is one of the more inefficient uses of medical care resources.

In fact, one conclusion of the recent National Institutes of Health Consensus Development Conference on Critical Care Medicine (1983) was:

The highly favorable outcomes derived from these [early ICUs] served as the stimulus for establishing large numbers of such units. Over the past two decades, the availability of physical resources, nursing staff, and related specialized procedures, as well as patients' expectations, have resulted in an expansion of the original indications for admission to categories of patients for whom the achievable benefits are less clear.

Thus, intensive care is a logical area in which to encourage more efficient use.

To accomplish this, there has recently been substantial progress in defining admission criteria for intensive care units. One research focus has been to identify monitor patients who may be "too healthy" and whose condition is unlikely to require ICU care. There has also been progress in improving our ability to identify those severely ill or "too ill" to benefit from aggressive care.

### *Monitor Admissions*

Most studies describing low-risk monitor patients involve CCU admissions. As mentioned previously, CCUs treat a relatively uniform patient population, making identification of risk factors easier than in the heterogeneous population of most medical-surgical ICUs. From a number of studies, physicians now know the clinical characteristics of those CCU patients who do not routinely require intensive care (Fuchs and Scheidt 1981; Goldman et al. 1982; Pozen, D'Agostino, and Mitchell 1980). They also know the characteristics of patients already admitted who can be discharged after 24 hours rather than the usual 3 days (Mulley et al. 1980).

The clinical results from these 4 studies performed in 5 medical center teaching hospitals are consistent with each other and suggest that approximately 25 percent of their CCU admissions were at low enough risk to be discretionary. We do not know if admission standards are the same in other regions of the country, or in nonmedical school settings, but these studies alone suggest a significant potential reduction

in CCU use through a more selective admission policy of low-risk patients.

In a direct attempt to accomplish this, the late Michael Pozen and colleagues (1980) provided physicians working in the emergency ward of Boston City Hospital with an objective likelihood projection that a particular patient had a myocardial infarction (MI) as opposed to other noncardiac causes of chest pain. The availability of this precise diagnostic estimate resulted in a decreased admission rate of non-MI patients during the months when the projection was available. Pozen also found that this more selective admission did not increase the number of actual heart attack victims inappropriately sent home.

National and regional data concerning intensive burn care also suggest a substantial number of burn admissions may be optional (Linn 1982). From 1976 to 1979, national data indicated that 42 percent of patients admitted to tertiary-level burn centers had burns covering less than 10 percent of their body, a criterion that does not suggest a need for intensive burn unit care (Feller, Tholen, and Cornell 1980). Feller's data also indicate that, over the last decade, the proportion of burn care unit admissions with less than 10 percent body surface area burned increased from 26 to 42 percent.

Analysis on low-risk or "too healthy" ICU patients in other diagnostic groups has been more limited, primarily because of the large number of diagnoses treated in many ICUs. Initial information from a study we conducted on ICU admissions at the George Washington University Hospital, however, is consistent with the CCU studies above (Wagner et al. 1983c). In this study, all admissions to a mixed medical-surgical ICU were divided into two groups, active treatment or monitor, depending on the type of therapy received during the first 24 hours of their ICU stay. Each patient in the active treatment group received at least one active treatment task, all of which are unique to or best performed in an ICU. Patients in the monitoring group received intense observation or specialized ICU monitoring but no unique ICU therapy.

Using a severity-of-illness classification system, we then identified those monitor patients who were at such low risk of requiring subsequent active treatment that their routine admission to an ICU was questionable. This logistic regression analysis is described in detail elsewhere (Wagner et al. 1983c). Applying these methods to the 1,987 consecutive ICU

admissions at the George Washington University Medical Center suggested that approximately 20 percent (442) were at such low risk of requiring unique ICU treatment that their routine admission was questionable and could be deferred without significant risk to the patients. Tables 1 and 2 provide an accounting of the resources used for these low-risk monitor patients.<sup>1</sup>

These 442 monitored admissions included surgery patients recovering from craniotomies for brain tumors and from vascular surgery such as aorto-femoral bypass grafts and carotid endarterectomies. Low-risk medical admissions had diabetic ketoacidosis, self-inflicted drug overdoses, concussions, and mild congestive heart failure.

A preliminary survey of 572 admissions to 4 other university ICUs using the same technique revealed similar overall proportions of low-risk monitor admissions (Knaus et al. 1982a). One community hospital had 86 percent of 223 admissions in the monitor category, and 40 percent of them were judged to be low risk (Draper, Wagner, and Knaus 1981).

Another study concerning monitor ICU admissions from Massachusetts General Hospital suggested that the need for ICU monitoring after major surgery, when present, was short-lived, not extending beyond 24 hours (Teplick et al. 1983).

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<sup>1</sup> In this paper, resource use is measured by total days of ICU care and total ICU therapeutic-intervention scoring system (TISS) points (Cullen et al. 1974). TISS is an activity analysis measure that appears to be a reasonable measure of resource costs in intensive care. Use of a measure such as TISS allows one to avoid the cross-subsidization implicit in cost estimates based on hospital bills (Finkler 1981). TISS measures therapeutic effort by assigning a weight from 1 to 4 to 75 various clinical tasks. For example, 1 point is awarded for recording how much fluid a patient receives during a shift, while 4 points are given for treating a patient who is on a ventilator for mechanical assistance with breathing. The higher the number of TISS points, the greater the nursing and physician time and effort involved in the care of the patients. A TISS score (which usually varies from 5 to 50) is determined on every patient by summing the items for every 24 hours of ICU care. Individual total TISS points and ICU days are calculated by adding daily TISS scores and number of days in an ICU. Summing the individual totals resulted in an estimate of total resource use for the entire 1,987 admissions. Since these 1,987 admissions incurred \$10 million of total estimated costs (1979 prices), the average billed cost per TISS point was \$60. This is the figure used in calculation of total estimated costs in tables 1, 2, and 3.

TABLE 1  
Resource Use at the George Washington University Medical Center  
Intensive Care Unit over a 27-Month Period

1,987 Admissions 8,536 Days of Care 166,917 Total TISS Points \$10,000,000 Total Estimated Costs	
Monitoring Admissions N = 800 (40%) 2,538 Days (30%) 34,506 TISS Points (21%) \$2,300,000 Estimated Costs	Active Treatment Admissions N = 1,187 (60%) 5,998 Days (70%) 132,411 TISS Points (79%) \$7,700,000 Estimated Costs
↓ Low-Risk* Monitoring Admissions N = 442 (22%) (see table 2)	↓ Acute Illness in Severely Disabled Admissions N = 74 (4%) (see table 3)

\* Predicted at less than 10 percent risk of requiring active treatment (see text).

TABLE 2  
Resource Use by Low-Risk\* Monitoring Admissions (N)

	% Total Admissions	% Total TISS Points**	% Total ICU Days	Total Estimated Costs** (\$)
Nonoperative (116)	6	1.5	3	150,000
Postoperative (326)	16	5	9	500,000
Total (442)	22	6.5	12	650,000

\* Predicted at less than 10 percent risk of requiring active treatment (see text).

\*\* See footnote 1.

### Severely Ill Patients

The need for identification of patients destined to die regardless of ICU treatment has been driven by our present capacity potentially to provide advanced physiologic support near the end of life for all hospital patients. In 1972-1973, one study indicated that the most intensively treated patients in a surgical ICU had a one-year fatality

rate of 73 percent. Their hospital bills averaged \$14,000 (Cullen et al. 1976). This study observed that if everyone who died in the United States did so after a similar intensive care stay, the aggregate bill for these patients would, by itself, be equal to 70 percent of our current national bill for hospital care.

The widespread availability of respirators, dialysis, and a broad variety of cardiovascular supports also means that a large number of deaths in ICUs must now occur after physicians formally recognize hopelessness. Experience in two large medical center ICUs (University of Pittsburgh and the George Washington University) suggests that 40 to 70 percent of ICU deaths occur only after no-resuscitation decisions (Grenvik et al. 1978; Baker et al. 1983). No-resuscitation decisions, therefore, are one accepted way of limiting treatment for the hopelessly ill.

Among the 1,987 George Washington University Medical Center ICU admissions surveyed in this report, 141, or 7 percent, of the patients had no-resuscitation orders written prior to their death. All but one of these patients died.

As now used, the no-resuscitation decisions do not appear to produce substantial resource savings. Before the order was written, no-resuscitation patients at the George Washington University received 13 percent of total resources; afterwards, 3 percent. It is important to emphasize, however, that there has been very little work done on prognosis, and physicians currently have very few clinical studies on which to base these difficult decisions.

Another approach to improving ICU use is to avoid initiating ICU care for acute problems because of the patient's chronic health condition. Again, as in the low-risk studies, progress is more apparent in units with homogeneous patient populations. In the early 1970s, it was recognized at Memorial Sloan-Kettering Center that many of the patients being admitted to the ICU were surviving their acute illness, only to die shortly thereafter of their underlying cancer. In response, the medical staff developed a policy by which they formally classified all hospital patients according to the underlying prognosis of their cancer. Those patients whose short-term prognosis was poor and for whom no definitive therapy existed were not candidates for transfer to the ICU, regardless of the acute problem they might develop. In a descriptive analysis of the impact of this policy, Turnbull et al. (1976) found a substantial reduction in the number of patients who



died in the ICU and an increase in the percentage leaving the hospital alive. A more recent study from the University of Miami repeated the caution of admitting terminal cancer patients to ICUs (Hauser, Tabak, and Baier 1982).

There have been other attempts to identify poor-outcome patients. Davis and diSant Angnese (1978) found that when patients suffering from cystic fibrosis needed mechanical ventilation, the possibility of recovery was virtually nonexistent. Today, respirator treatment is seldom offered to such patients.

Physicians have long had the ability to prognosticate outcome of acute burn patients using a combination of age and the body surface area involved. In the 1970s, this information was given to newly burned patients whose survival was deemed unprecedented. They were then allowed to decide on the aggressiveness of treatment. Of 24 severely burned patients who were given the opportunity to choose between aggressive or supportive care, 21 chose only pain relief. All 24 died (Imbus and Zawacki 1977).

With the progress made in resuscitation and immediate treatment of cardiac arrest, the need for specific prognostic information is also growing. In response, Levy et al. (1981), used a multicenter international prospective study of outcome following nontraumatic coma to identify characteristics of survivors versus nonsurvivors. In our experience, these results are now used to determine aggressiveness of care for nontraumatic coma ICU patients. Unfortunately, similar detailed prognostic information about other diseases is not yet available.

How many ICU admissions are too sick to benefit from aggressive care and what cost saving would be available from more selective treatment policies? The answer will obviously change as research efforts improve and information about benefit becomes more widespread. We will provide a tentative estimate using the patient information available from the George Washington University ICU Research Project.

We defined "too sick" patients as those suffering from a severe, disabling chronic disease, one which made them incapable of self-care, combined with an acute severe illness.<sup>2</sup> From previous work,

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<sup>2</sup> Within this and related analyses mentioned in this paper, severity of illness was measured using the APACHE (Acute Physiology and Chronic Health Evaluation) classification system. APACHE is designed to be applicable to a broad range of diagnoses. It consists of two parts. The Acute Physiology Score (APS) is designed to capture acute severity of illness. It consists of a

we knew that this combination of severe acute and chronic illnesses resulted in a high in-hospital mortality rate.

From a total of 1,987 consecutive ICU admissions over a 30-month period, we prospectively identified 74 patients with both severe acute and chronic diseases on admission. Over half (55 percent) of these severely ill admissions died in the ICU, with an additional 25 percent dying before discharge. By 6 months following hospital discharge, 92 percent of these 74 admissions had died, and 4 of the 6 survivors were severely disabled. All of the 22 patients who had severe chronic health problems and were over 65 years of age died within 6 months.

Table 3 records that, although they total only 4 percent of total ICU admissions, these 74 admissions received twice that portion of resources. Included in this group were patients with chronic renal failure, chronic obstructive pulmonary disease, and severe heart disease. Their acute illnesses included septic shock, cardiac arrest, or surgical catastrophes such as acute perforations or gastrointestinal bleeding.

Why did this analysis identify relatively few poor-outcome patients? Because the consequences of denying ICU treatment to patients who could benefit from ICU care were high, we placed strict requirements on prognosis (the patients had to have *both* a severe preexisting health problem and a serious acute illness).

The patients were also identified prospectively. In this type of analysis, retrospective judgment is substantially more accurate since it uses information from the entire hospital stay and it defines the problem only after it has occurred. For example, many of the patients who eventually become high-cost users do so only after unforeseen complications occur during their hospital stay.

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weighted sum of physiologic measurements obtained within 24 hours of admission. It varies from 0 to 60, with the probability of a hospital death rate increasing with an increasing APS. The chronic health status is a four-category scale (A for healthy; D for severe, disabling health condition). In a number of past analyses, APACHE classifications have been uniquely useful in prognosticating outcome from an acute illness (Knaus et al. 1982a, 1982b; Wagner, Knaus, and Draper 1983b).

It is important to emphasize that APACHE classifications are measured at a specific point in time, usually on admission. As such, they are often used to gather baseline information to prognosticate outcome or evaluate the impact of subsequent care. This is in direct contrast to the retrospective severity scoring developed by Horn and the diagnosis-based classification systems aimed solely at reimbursement issues (Horn 1983).

TABLE 3  
Resource Use by Admissions with Severe Acute and Chronic Illness (N)

		% Total Admissions	% Total TISS Points*	% Total ICU Days	Total Estimated Costs* (\$)
Medical	(69)	3.7	7	6	700,000
Postoperative	(5)	0.3	1	1	100,000
Total	(74)	4.0	8	7	800,000

\* See footnote 1.

It must also be remembered that many of the high-cost patients identified nationally are placed into the category because of repeated hospitalizations for incurable but frequently recurring exacerbations of their disease and that a single expensive hospitalization with an intensive care stay may not be the most common pattern (Zook and Moore 1980).

## Discussion

One of the major criticisms of intensive care has been its rapid development, one that has been unaccompanied by any objective criteria for evaluating its use and value. Today this criticism, coupled with the continued demand for expansion of ICU services, has been an important stimulus behind the work surveyed here. The clinical frustration and moral dilemmas posed by aggressively treating patients with chronic and incurable diseases have also prompted physicians to search for prognostic indicators that would be helpful in making difficult but unavoidable clinical decisions.

This effort is the scientific portion of what we see as three closely related questions that require discussion if we are to make progress in improving the use of intensive care. These three questions are:

1. Can we improve our ability to select patients for intensive care?
2. Is it appropriate ethically and possible legally to be more selective?
3. How can we design policies to provide incentives for physicians and hospitals to use intensive care more selectively?

### *1. Improved Selection*

Because of the progress reported in this paper, we think the answer to the first question is yes. Through objective surveys of ICU admissions, physicians will be able to better select which patients are candidates for admission, and patients will have a better idea of the indication for care. For this information to be useful, it will have to be accurate and in a form acceptable to clinicians and their patients.

The identification of low-risk CCU and burn admissions has already progressed to that level. The identification of low-risk postoperative brain tumor patients or those suffering from diabetic ketoacidosis also provides preliminary guidance concerning those who could be cared for outside an ICU (Wagner et al. 1983c). More detailed descriptions of risk factors within other diagnoses will be needed.

The selective admission of patients who may be "too ill" will, by virtue of its nature, have to be even more precise. A 10 percent chance of survival, for example, would not be sufficient to withhold therapy. Most physicians require an indication of very high mortality or a combination of high mortality, severe disability, and very short-term survival before they consider limiting therapy (Jackson and Younger 1979).

These limits would be most effective if applied before ICU admission. As we have indicated, however, the total amount of resource savings obtained in this way may not be as large as retrospective analyses suggest. The other complementary approach to limiting care is to limit ongoing therapy earlier to patients with serious diseases or complications who fail to respond to aggressive therapy.

Physicians already do this, as evidenced by the fact that approximately half of the patients who die in ICUs do so with written "no-resuscitation" orders. Developing precise physiologic indicators that would allow physicians to identify nonresponders sooner in their clinical course is, therefore, another important area of ongoing research. Based on preliminary estimates from our ongoing work, we estimate that such efforts could save an additional 8 percent of total resources at the George Washington University Medical Center's ICU (Draper et al. 1983).

It is important to be precise about what effects such research will have on total resource use. In most ICUs, low-risk monitor patients account for a large percentage of total admissions but a smaller proportion

of total resources. While reduced admission of these patients will effect resource savings, substantial savings will occur *only* if a more selective ICU admission policy is associated with the closing of existing ICU beds or, at minimum, a halt to the building of new ones.

The economic costs incurred when a selective admission policy is not adopted are highlighted by reviewing a 1974 survey of CCU use in Massachusetts. In 1974 Bloom and Peterson suggested that a reduction from 446 beds in 94 units to 336 beds in 39 CCUs would meet the clinical needs of the Massachusetts population at an estimated savings of \$3 million. Such reductions in CCU beds did not occur in Massachusetts or elsewhere. Instead, both CCU and general ICU beds have increased. In 1981 alone, 4,665 new ICU beds were constructed at an estimated capital cost of \$320 million (American Hospital Association 1982; Arthur D. Little, Inc. 1979).

The exclusion or limitation of therapy for patients with a poor prognosis will have a different effect. These patients are fewer in number than low-risk monitor admissions but they use a larger proportion of resources. Excluding them or limiting their ongoing care may not produce a large decrease in demand for total beds but could lead to substantial reductions in total ICU investment by hospitals through reduced staffing, laboratory, and ancillary support (Wagner, Wineland, and Knaus 1983d).

As emphasized by others (Schroeder, Showstack, and Roberts 1979; Zook and Moore 1980), we need to target our efforts at patients with chronic long-term illnesses, such as renal failure or cirrhosis, who need repeated and high-cost hospitalizations. It is precisely with these patients that prognostic estimates of a very low likelihood of meaningful recovery would be most appropriate since cure is not a realistic goal and a large amount of resources are expended in the last few days of their life (Pellegrino and Thomasma 1981). At the George Washington University Hospital, excluding 74 such "too sick" patients would have reduced total variable costs to the same degree that eliminating 440 monitored admissions would have achieved (tables 2 and 3).

Of course, one cannot develop national projections based on one hospital's experience, and these estimates only suggest the magnitude of the problem. We believe, however, that with a national data base, a larger portion of patients with poor prognoses would be identified. From the preliminary results of such a 15-hospital ICU survey we are conducting, it appears that the overall utilization pattern present at

the George Washington University Hospital is similar at other large units; that is, approximately 25 percent of total ICU therapy goes to patients who are either at low risk of needing unique ICU services or are too acutely and chronically ill to benefit. This figure, while only an estimate, suggests substantial room for improvement in ICU treatment decisions nationwide (Wagner, Draper, and Knaus 1983a).

## 2. *Ethical/Legal*

There is an increased public awareness and acknowledgment of the limits of aggressive medical care. A growing number of states are passing living will or right-to-die statutes. There is also increasing professional acceptance of no-resuscitation orders (Lo and Jonsen 1980; Annas, Glantz, and Katz 1981).

The President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research (1983) acknowledged this by providing guidelines for the writing of no-resuscitation orders for hospital patients and encouraging their use. In our own experience, we see a persistent trend toward a more realistic attitude regarding the benefits of aggressive medical care. More and more families have either had or heard of the experience of hospital care prolonging the dying process. Many are willing, indeed some are anxious, to discuss limiting therapy. This is a change from the situation a few years ago. It is not unrealistic to expect such a trend to eventually reduce the number of chronically ill patients who are admitted to hospitals and subjected to elaborate medical treatment as a "rite of passage" prior to their death (Aries 1980).

We interpret these actions as indications that our society is willing to accept limits to medical care. The research efforts just reviewed indicated how these limits could be ethically accomplished. Specifically, admitting patients to ICUs because of need rather than demand reflects the following ethical values: 1) not prolonging death unnecessarily (death with dignity), and 2) distributing medical resources equitably so that scarce resources can be available to those who need them (Veatch 1981).

The approach of using chronic health status, acute severity of illness, and age together as the criteria for withholding aggressive therapy recognizes the interaction of all in determining outcome from a severe illness and explicitly says that age alone is not a criterion. Such an

approach also permits policies to be adapted sensitive to the needs and desires of the patient (particularly in a period of transition) since the patient-physician relationship should be marked by a discussion of treatment options rather than undermined by real or perceived limits.

Physicians are beginning to understand that, while decisions about the type and intensity of medical treatment necessarily involve medical judgment, there now are other patient considerations that carry equal and sometimes greater weight. In other words, medical judgments, even certain life-saving decisions, are relative, not absolute. Patients need to be consulted about their wishes.

Many medical practitioners are also now acknowledging the need to reevaluate the principles physicians rely on as part of their clinical and ethical decision-making. The often quoted goal that it is a physician's duty to prolong life is one of those principles undergoing reexamination. Some practitioners are acknowledging that there is neither historical precedent nor ethical justification to preserve a few moments or days of biological life, especially when this prolongation comes at great expense and is unassociated with perception on the part of the patient (Petty 1979).

The legal concerns surrounding such situations are not yet entirely resolved but there is an increasing recognition by professionals that medical decisions do not belong in the courts.<sup>3</sup> Right-to-die legislation, while not yet a frequently used option by many patients, is still having an impact by encouraging physicians to consider a less aggressive approach. While none of this reduces the uncertainty involved in making decisions regarding limitation of treatment, it does suggest an environment conducive to progress and change.

The legal issues surrounding low-risk patients are less clear but not insurmountable. If, while a patient is on a regular ward, he develops a complication that is not recognized and treated promptly, the physician and hospital could be held liable for negligence. Indeed, there is substantial anecdotal evidence that fear of this occurring is a strong motivation for building and then using ICUs. In a recent comparison of American and French ICUs, the French units had a lower proportion of monitor admissions, in part related to less concern over liability

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<sup>3</sup> *In the Matter of Karen Quinlan*, 70 N.J. 10, 355 A.2d 647, 668, cert. denied, 429 U.S. 922 (1976).

(Knaus et al. 1982b). But clear, objective criteria indicating which patients are and are not at risk for needing a particular service should be sufficient defense against such negligence suits. Improved communication between patients and physicians would also help reduce the likelihood of legal action in cases where intensive care was forgone.

This is because there is an increasing recognition that admission to an ICU is not without risk. Serious side effects, from psychoses to infections, are more common among ICU patients, and, while severity of illness is important in susceptibility, any ICU patient can develop either or both complications (Donowitz, Wenzel, and Hoyt 1982). Indeed, the recent National Institutes of Health Consensus Development Conference (1983) concluded that "for some patients the risk of iatrogenic illness may now outweigh the benefit of ICU care."

### *3. Policy Considerations*

To complement the progress made in research concerning utilization and evaluation of intensive care, there are important changes occurring in reimbursement policies for hospital services that could help reduce its use. Such changes must be encouraged and expanded since many current reimbursement practices still provide physicians and hospitals with strong incentives to continue and increase their use of intensive care.

For physicians, there is the widespread desire to provide high quality care as well as a professional interest in the latest technology. The other two strong motivating forces for the doctor are his perception that the risk of a malpractice charge is reduced when his patient is in the ICU and the higher fee-for-service reimbursement available for procedures versus consultation (Myers and Schroeder 1981).

The greatest challenge, therefore, will be to provide an atmosphere where lowering the perceived risk of malpractice is not dependent on the increased or continued use of intensive care. As previously mentioned, improved information and communication between physicians and patients are important first steps. It will also be necessary to increase reimbursement to physicians for the time they spend evaluating and monitoring a hospital patient rather than encouraging them to order procedures as the best method of seeking payment. Realistically, this will eventually require movement away from fee-for-service reim-



bursement to one emphasizing a comprehensive fee encompassing all services.

Until very recently, there have been major financial considerations encouraging hospital investment in and use of ICUs. Under cost or charge-based reimbursement policies, hospitals recover their costs for intensive care on the basis of what they calculated it cost to care for an ICU patient during the previous year. Because most hospitals more than recover the actual costs of treating ICU patients, especially those who are not severely ill, they have incentives to gradually increase the size of their ICUs and the number of ICU beds filled with monitor patients (Wagner, Wineland, and Knaus 1983d).

This incentive is best illustrated with a low severity-of-illness patient whose admission or continued stay in the ICU is medically optional. If this patient is admitted to or remains in the ICU at the George Washington University Hospital, the institution's revenues (from daily bed charges alone) increase by approximately \$700 per day in 1983. Assuming the ICU had an average census at the time, actual costs of caring for this patient increased by only \$100 to \$200 per day. In this way, hospitals not only recover costs, they could generate large "profits" through marginal ICU admission policies.

The new methods for paying hospitals under Medicare that are included in the 1982 tax act and that eventually will involve diagnosis-related groups (DRGs) are steps in the right direction. Paying fixed rates per case, regardless of what is done for the patient (with the exception of certain surgical procedures), will provide an initial incentive for rethinking existing utilization habits that developed during open-ended reimbursement. The increasingly strict limits on Medicaid payments adopted by some states (Melia et al. 1983) will have similar effects.

For these new reimbursement policies to be effective in reducing demand for intensive care, however, they must be extended to other patients, and we must refine the DRG system to include prospective information on the patient's severity of illness.

Restricting prospective reimbursement to Medicare and Medicaid patients runs the risk of their being discriminated against by hospitals unwilling or unable to make use of more objective indicators of need for intensive care.

Reimbursing by diagnosis alone will not distinguish patients who require ICU care because there is substantial inter-hospital variation

in severity of illness within DRG categories (Horn 1983). This is especially important in regard to the ICU admission of low-risk patients. They form a substantial part of community hospitals' ICU populations and are a major factor behind the large demand for more ICU beds (Draper, Wagner, and Knaus 1981). Clearly, as recommended by Muller (1983), if an objective, reliable, yet readily obtainable measure of severity of illness were available to both clinicians and policy makers at the time of the patient's hospital admission, better clinical and reimbursement decisions would be possible.

At the other end of the spectrum, the costs of care to those who do not benefit because of severe incurable illness are a growing dilemma of our society. As outlined in this paper, we think a change in society's attitude is occurring, largely because of the clinical and ethical dilemmas such patients present. In our opinion, changes in attitude will continue unless discouraged by national policy decisions.

One frequently discussed policy change that could have an adverse impact on ICU use is the passage of universal catastrophic insurance coverage. As previously stated, in the two university hospital ICUs where no-resuscitation orders were surveyed, 40 to 70 percent of all ICU deaths occurred only after physicians had explicitly limited therapy. Cost experience in one of these hospitals indicates that 50 percent of these no-resuscitation patients had hospital bills that would have qualified them for catastrophic coverage under most financial definitions of that term. Therefore, implementing a form of universal catastrophic insurance, unless it were accompanied by strict payment limits, could reduce economic considerations from the care of these patients. We believe that the current situation, where the few individuals affected each year must seek financial support from a variety of private and public sources, is preferable to a federally backed universal catastrophic insurance program.

## Conclusion

The issues presented in this survey are crucial concerns not only in intensive care but in American medicine in general. We are now beginning to recognize that our current large and largely indiscriminate national investment in intensive hospital services does not serve the best interests of our society or ourselves. If changes occurred, following

the suggestions outlined here, they would ensure that essential services were still present for persons who needed them, while leaving more resources available for more productive and perhaps more enjoyable spending elsewhere.

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*Acknowledgments:* Jacqueline Glover, Lois Myers, Louise Russell, and Anne Scitovsky gave us important comments on this paper. Netta Fedor provided editorial assistance. This work was made possible, in part, by Grant No. 18-P-97079/3 from the Health Care Financing Administration and Grant No. HS 04857 from the National Center for Health Services Research.

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