

INTRODUCTION

This section begins with a summary of the methods OTA used to review and synthesize the studies. It is followed by an examination of research findings on the direction and variations in the magnitude of relationships among insurance coverage and the utilization, process, and health effects of health care.

NATURE OF OTA'S REVIEW AND SYNTHESIS

The review of existing scientific literature is a science in itself (see 137,145,148). Key components of a literature review include the literature search, the selection of relevant studies, and the synthesis and presentation of study findings.

To conduct the literature review, OTA's contractors searched several scientific literature databases for articles published since 1980 on the relationships among the sources of health insurance; the utilization, process, and quality of medical services; and outcomes of care (178). OTA focused the review on multivariate studies that statistically adjusted, or otherwise attempted to correct for, competing explanations for results. Studies of differences in the use of health services have compared: uninsured to privately insured individuals, uninsured to publicly covered individuals, uninsured individuals to those with both public and private coverage, and/or publicly covered to privately insured individuals.⁸

Study findings were analyzed, and are presented below, in two ways. First, to determine *whether* health insurance makes a difference, all multivariate studies were summarized as to their findings on the *direction* of relationships among insurance coverage and utilization, process, or health outcomes. Second, to address the more policy relevant question of *how much* of a difference health insurance makes, OTA

presents study findings on the magnitude of the relationships. This analysis attempts to answer whether, for example, uninsured individuals are less likely, 2 times more likely, or some other magnitude more or less likely than privately insured or publicly covered individuals to see a physician during the period under investigation. These comparisons as to the magnitude of the relationships found in different studies are also used to suggest the amount of variation across studies. For example, do different studies find widely varying ratios of physician service between uninsured and insured individuals when other factors are held constant?

Information about the variation in magnitude is important to gauging the strength of the findings. Substantial variation may suggest considerable heterogeneity in results and, perhaps, engender less confidence in the underlying relationships. Confidence in the study results could be increased if the reasons for variations could be understood and tied definitively to study findings. At this point, however, considerable variation in study methods makes it difficult to determine what accounts for the inconsistency in magnitude. This is a common problem in attempts to synthesize literature.

The following summaries of variation in magnitude use a more limited set of studies than do the summaries pertaining to the direction of findings. The summary reviews of variations in magnitude focus on only that subset of studies published since 1980 that also examined data from 1980 or later. It is important to note that, in total, only 24 studies used data from 1980 on and included statistical or other adjustments for potential alternative explanations for findings.⁹

To the extent possible, this background paper presents the findings from the studies reviewed in terms of ratios between insurance groups, even if they were not provided in the original studies.

⁸ The RAND Health Insurance Experiment (HIE), a large-scale social experiment conducted in the late 1970s under the aegis of the U.S. Department of Health and Human Services, used a wide range of utilization and health status measures to indicate the effects of varying levels of health insurance coverage. However, the HIE did not examine the impact of publicly covered or compare public coverage to private coverage. Its findings are summarized briefly in appendix F of this background paper, and will be examined in greater depth for OTA's final report in connection with this assessment.

⁹ It is also important to note that a model synthesis would present not only the findings regarding the influence of insurance coverage on the outcome of interest (in technical language, the Beta coefficient for the influence of insurance coverage, all other factors held constant), but would compare multivariate statistics (in technical language, the R²) based on the full assortment of variables in each study (e.g., income, age, gender, health condition, location of service). For OTA's final report, a data analysis will be conducted that attempts to apply identical statistical models to varying sets of national survey data. Because valid data on health outcomes are rarely collected in national surveys and access these analyses will only be able to examine the impact of insurance coverage on utilization of services.

Box A—Utilization of Care Measures Used as Potential/Indicators of Insurance-Related Problems in Access

A number of utilization measures have been examined as indicators of potential insurance-related problems with access to health services. These utilization measures are listed below, along with explanations of how they might present access problems with potential impacts on health.

Having a usual or regular source of care is believed to be important to a person's health because it promotes continuity of care and is associated with greater utilization (13,187). However, the clinical importance of having a usual or regular source of care has not been established. Further understanding of the reasons for not having a regular source of care may be important in determining whether there is a problem in access. Analyzing Robert Wood Johnson Foundation data, Hayward and colleagues found that of the 16.4 percent of individuals without a regular source of care, 61 percent did not want one. The analysts further determined that only 13 percent of those without a regular source reported that they lacked a regular source of care because of access barriers, defined as financial problems or difficulty getting appointments (64).

Physician visits and inpatient hospital stays are two principal components of mainstream medical care. Disparities in their use may point to inequalities in access. Common measurements of physician use include whether or not an individual has seen a health care provider within some specified time period (e.g., a year), and the mean number of visits among individuals who have seen a health care provider at least once. The percentage of persons who do not see a physician at all during a year is a gross measure of initial access to the system—a health care provider cannot diagnose or treat a patient if there is no initial contact. The mean number of visits reflects the intensity of use for those who do enter the system.

Theme of inpatient hospital care is important for at least two reasons. First, hospital care is usually provided for conditions or diseases that are considered to be much more serious than those treated on an outpatient basis. Hence, lower use of hospital care, appropriate, may have adverse implications for health status. Second, because hospital care can be relatively expensive, differential utilization by paying and nonpaying patients can have a large financial impact on a hospital's income. Hospitals may have strong incentives to implicitly ration inpatient care for those who cannot pay. At the same time, providers may have strong incentives to overutilize inpatient care for insured patients. Hospital use has been measured by rates of admission, number of days hospitalized, and percent of respondents hospitalized in the year specified.

Each figure also contains a “callout.” The callout translates the ratios of a selected study or studies represented on the graphs into the actual results provided in the study. For example, the ratio of 1.3 (uninsured) to 1 (privately insured) for any well-child visits is based on Short and Lefkowitz's finding that 48.5 percent of uninsured pre-school children had had any well-child visits, compared with 64.7 percent of privately insured pre-school children (124). Uninsured children, then, were 1.3 times as likely *not* to have had any well-child visits. The intent of the callouts is to compensate for the abstract nature of the presentations for variation in magnitude and to provide a better sense of the real world nature of the study findings.

Additional details about the methods used in OTA's review, selected methodological characteristics of the studies reviewed in this section (data sources, year of data collection, medical conditions included, provider type, number of patients), and

comparisons of the type of potentially explanatory factors controlled for statistically (e.g., income, age, gender, health condition) can be found in appendix E of this background paper.

DOES INSURANCE COVERAGE AFFECT UTILIZATION OF HEALTH SERVICES?

Introduction

Lower use of medical services has often been considered *prima facie* evidence of a problem in access. There are, of course, problems with this assumption. Differences by insurance status may reflect overuse by insured individuals as well as underuse by uninsured or poorly insured individuals, and the impact on health of differential use of certain services may be minimal. Even apparent differences by insurance coverage may need to be interpreted in light of underlying socioeconomic differences among groups as well as variation in medical need (111).

Clinical preventive services use is legitimate as an indicator of utilization as defined by the Office of Technology Assessment if it reflects patient-initiated care. However, the extent to which such care is initiated by patients vs. physicians is unclear, and may vary (146,150). Types of preventive care include immunizations for children, vision and dental check-ups, diagnostic and screening tests (e.g., blood pressure screening, Pap, smears, colorectal examinations), and prenatal care. Routine preventive care is rarely covered by private health insurance (154,168,169,170). However, children who are covered by Medicaid maybe eligible to receive a wide range of preventive and appropriate followup service under the provisions of Medicaid's Early and Periodic Screening, Diagnosis, and Treatment program (EPSDT) (147,155). Studies of the impact of insurance coverage on the receipt of preventive services by children have typically compared Medicaid with other sources of coverage. It is sometimes difficult to draw conclusions about the impact on health of using clinical preventive services because of a lack of systematic evidence (e.g., 151,171).

Patient reports of forgone or delayed care provide an important perspective in an assessment of access. Forgone or delayed care may result in unnecessary morbidity or mortality and greater severity of illness. Delays in seeking care maybe particularly important for some cancer patients because diagnosis and treatment during early stages may prolong survival. For some cancers, on the other hand, early diagnosis and treatment may not make a difference in survival (see, e.g., 58).

The location or site of care may also affect continuity and content of medical care received(6). If an individual receives care that is far from his or her home, there maybe less opportunity for followup care by the same provider or provider group. Care received in institutional or clinic settings (e.g., outpatient clinics at teaching hospitals, hospital emergency departments, urgent care centers) may tend to focus more on specific presenting symptoms than on the whole patient. Except with patients visiting private physicians, patients seen in clinics, emergency departments, or outpatient settings generally have less opportunity to see the same health care providers in repeat visits (e.g., hospital-base medical interns maybe rotating through a clinic or department). Coordination of care may also suffer because hospital outpatient- and emergency room-based providers are less likely to have access to the patient's entire medical record. On the other hand, seeing private or group practice physicians is no guarantee of continuous, coordinated, or otherwise appropriate cam. Alternatively, some clinics may make an effort to schedule appointments with the same providers over time.

SOURCE; Office of Technology Assessment, 1992.

Nevertheless, few would argue with the assertion that differences in utilization are potential evidence of problems in access. Because formation on the use of services is relatively easy to collect, a comparatively large number of studies is available. Typical measures of utilization, explained in box A, include:

- probability of having a usual or regular source of care;
- probability or frequency of visits to a health care provider in the past year;
- probability or duration of hospitalization in the past year;
- likelihood of having received preventive care;
- self-reported forgone or delayed care.

In addition, the site of care (e.g., private physician's office, hospital outpatient department) is considered a potentially important indicator of differences in utilization by level of insurance coverage.

Specific Hypotheses

Coverage by private insurance is expected to engender greater use of personal health services than is lack of insurance coverage (table 1, column A). Similarly, coverage by a public health benefit plan such as Medicaid is expected to promote greater use of personal health services than is having no insurance (table 1, column B).

Medicaid coverage has the *potential* to provide access to a broad range of personal health services (see appendix D), but for a variety of reasons, Medicaid is often regarded as providing poorer coverage than private insurance plans (136,137,154). Hospitals and physicians, for example, may refuse to provide care to individuals covered only by Medicaid because Medicaid payment rates are considerably lower than those of private insurers. Consequently, publicly insured individuals may be expected to use fewer health services than privately insured individuals use (table 1, column D). Some

Table I-Summary of Studies Examining Relationships Between Insurance Status and Indicators of Possible Underutilization

Indicators of possible underutilization/study	Insurance status/ direction of effect			
	A Uninsured vs. privately insured patients	B Uninsured vs. publicly covered patients	C Uninsured vs. publicly and privately insured patients combined	D Publicly covered vs. Privately insured patients
Lacking a regular or usual source of care				
Rosenbach, 1985	+ ^d	+	n.a.	+
Hayward et al., 1988	n.a.	n.a.	+	n.a.
Hubbell et al., 1989	n.a.	n.a.	+	n.a.
Fewer physician visits				
Yelin et al., 1983	n.a. ^b	n.a.	0	n.a.
Rosenbach, 1989	0	o	n.a.	M
Needleman et al., 1990	n.a.	n.a.	+	n.a.
Less inpatient hospital care				
Yelin et al., 1983	n.a. ^c	n.a.	M	n.a.
Chen and Lyttle, 1987	o	0	n.a.	o
Needleman et al., 1990	n.a.	n.a.	+	n.a.
Cornelius, 1991	n.a.	+	+	n.a.
Less preventive care				
Woolhandler and Himmelstein, 1988	n.a. ^d	n.a.	+	n.a.
Short and Lefkowitz, 1991	+	+	n.a.	+
Reported delays in receiving care				
Aday and Andersen, 1984	+	+	n.a.	+
Freeman et al., 1987	n.a.	n.a.	+	n.a.
General Accounting Office, 1987	+	+	n.a.	+
Hayward et al., 1988	n.a.	n.a.	+	n.a.
Needleman et al., 1990	n.a.	n.a.	+	n.a.
Weissman, Stern, et al., 1991	+	+	n.a.	+

^aKey: + = less advantaged (first listed) groups more likely to lack a regular source of care; 0= no statistically significant difference was found; n.a. = comparison was not made in study.

^bKey: + = less advantaged (first listed) groups more likely to have fewer physician visits; M = mixed results; 0 = no statistically significant differences were found; n.a. = comparison was not made in study.

^cKey: + = less advantaged (first listed) groups more likely than more advantaged (second listed) groups to have less inpatient hospital care; M = mixed results; 0 = no statistically significant differences were found; n.a. = comparison was not made in study.

^dKey: + = less advantaged (first listed) groups likely to have had fewer preventive health care visits than more advantaged (second listed) groups; 0 = no statistically significant differences were found; n.a. = comparison was not made in study.

SOURCE: Office of Technology Assessment, 1992, based on studies listed. Full citations can be found in the list of references at the end of this background paper.

studies have compared uninsured individuals to a combination of people with either public or private coverage (table 1, column C).

Research Findings

Overview

Table 1 presents an overview of the findings of multivariate studies conducted since 1980 that have examined the influence of insurance status on utilization of health services.¹⁰

As shown in table 1 (columns A, B, and C), the majority of multivariate studies examined by OTA

found that *uninsured* individuals are more likely than *both privately and publicly insured* individuals to:

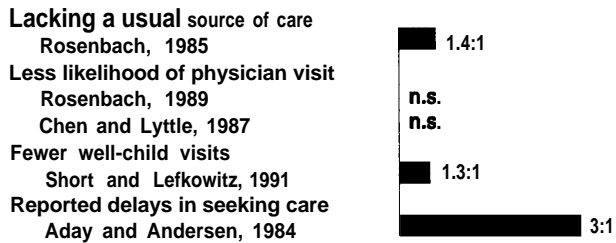
- lack a usual source of care (65,73,118);
- have fewer episodes of inpatient hospital care (27,30,99);
- lack preventive services (124,189); and
- report delays in receiving health care (4,65,99).

The evidence on physician visits is suggestive, but not as strong (99,100,119).

Different locations for care (e.g., private physician's offices vs. hospital outpatient department vs.

¹⁰ In table 1, a "+" indicates that the study findings supported the hypothesis that lack of insurance, or relatively "poor" insurance (e.g., Medicaid), is associated with the use of fewer personal health services. A "-" would indicate that the study found that, contrary to expectations, individuals without insurance, or with relatively poor insurance coverage, used more personal health services than the comparison group. An "M" indicates that results were mixed. A "0" indicates that the study found no differences in the use of personal health services between comparison groups. The notation "n.a." indicates that the study did not examine utilization patterns for a particular comparison (e.g., uninsured vs. privately insured individuals).

Figure 5—Lower Use of Health Services: Ratio of Uninsured to Privately Insured Patients



■ In Short and Lefkowitz's study, 48.5 percent of all pre-school children who were uninsured all year had had any well-child visits, compared with 84.7 percent of all pre-school children who were covered by private insurance all year. Among low-income pre-school children, 45 percent of those who were uninsured all year had had any well-child visits, compared with 54 percent of those who were covered by private insurance all year. These differences in contact between privately insured and uninsured children occurred despite the fact that private insurers almost never cover well-child visits. The differences between low-income and all pre-school children combined also suggest the apparently independent relationship of family income to the receipt of health care.

n.s. = not statistically significant.

SOURCE: Office of Technology Assessment, 1992, based on studies cited. Full citations can be found in the list of references.

emergency room) are also reported by people without insurance, those with public coverage, and those who are privately insured (31,52,99) (see below).

Far fewer studies have examined differences in utilization between publicly and privately insured individuals, but, as expected, these studies tend to find that *publicly insured* individuals use fewer personal health services than do *privately insured* individuals (4,1 18,1 19; table 1, column D). Two studies found that use of physician services was equivalent between individuals who were *uninsured vs. insured* when other factors were taken into account (119,191).

Variations in Magnitude

When studies using data from 1980 and later are used to compare utilization patterns of *uninsured and privately insured individuals* on a variety of measures, the magnitude of the relationships varies (figure 5). For example, analyzing a 1980 national survey, Rosenbach found that uninsured children were 1.4 times as likely as privately insured children to lack a usual source of care, according to their parents' reports (118).¹¹ However, Rosenbach found no significant differences in the use of physician services between uninsured and privately insured

children (119). Aday and Andersen's analysis of 1980 survey data found that uninsured individuals were 3 times more likely than insured individuals to report delays in seeking care (4).

Of the relatively recent studies finding differences in utilization between *uninsured and publicly insured individuals*, uninsured individuals were 1.2 to 1.33 times potentially "worse off" than publicly insured individuals (figure 6). Two studies comparing uninsured and publicly insured individuals found no differences in utilization (30,119). When *uninsured individuals* are compared with groups with either or both public or private coverage,¹² those who are uninsured are from 1.3 to 1.9 times more likely to use fewer personal health services than those with some form of insurance (figure 7).

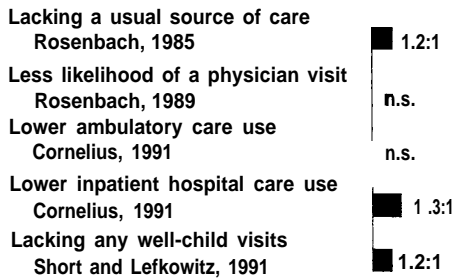
It is important to note that the results as presented here combine widely varying measures of utilization, from individuals reporting that they lack a usual source of care, to individuals not being hospitalized. Not surprisingly, then, the findings, while being generally consistent in direction, suggest a rather wide variation in the magnitude of the effects of being uninsured on utilization, with an average impact of roughly 1.25.¹³

¹¹ Unlike Rosenbach's 1989 study (1 19), this 1985 analysis was descriptive (i.e., it did not control for potential alternative explanations for children's lacking a usual source of care) (118). The 1985 analysis was included in this background paper because it may be appropriate to assume that all children should have a usual source of care (i.e., if a child or adolescent becomes ill, the child or parent knows where to turn for treatment (153,154,155)). Young children, in particular, typically require some treatment in the mainstream medical care system (e.g., for ear infections, strep throat, minor injuries) (147).

¹² The studies cited did not differentiate between publicly covered and privately insured individuals.

¹³ 25.2 divided by the 20 comparisons in figures 5, 6, and 7 combined.

Figure 6—Lower Use of Health Services: Ratio of Uninsured to Publicly Covered Patients

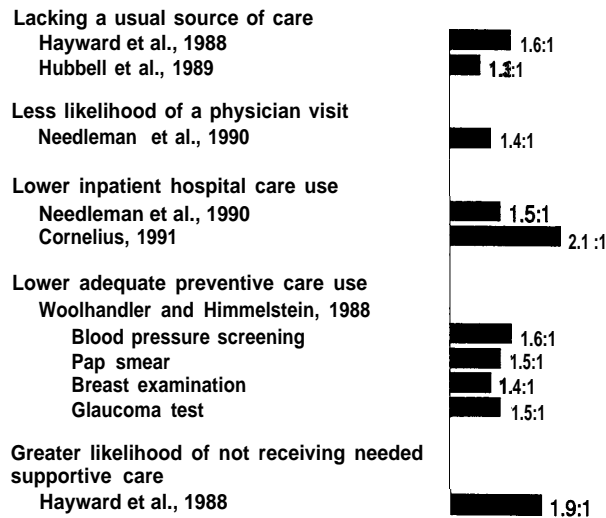


■ In Short and Lefkowitz’s study, 48.5 percent of pre-school children who were uninsured all year had had any well-child visits, compared with 56.4 percent of pre-school children who had Medicaid coverage all year. Short and Lefkowitz estimated that a full year of Medicaid would increase the probability of any well-child visits by 17 percentage points among low-income children.

n.s. = not statistically significant.

SOURCE: Office of Technology Assessment, 1992, based on studies cited. Full citations can be found in the list of references.

Figure 7—Lower Use of Health Services: Ratio of Uninsured to Publicly and Privately Insured Patients Combined



■ In the study by Hayward and colleagues, 81 percent of insured adults, compared with 68 percent of uninsured adults, reported that they had a regular source of health care, that is, that they usually went to “one person or place” when they were “sick or want[ed] medical advice.” A subsequent study by Hayward noted, however, that it is important to ask people why they lack a usual source of care, because some people do not want one (84).

Hayward and colleagues also found that 31 percent of chronically or seriously ill persons without insurance, but only 12 percent of sick people with insurance, reported that they went without needed supportive medical care (e.g., physical therapy, nursing care, a prescription drug).

■ Needleman and colleagues estimated that if uninsured people had been provided insurance, their inpatient hospital admissions would have increased from 91 per 1,000 persons to 133 per 1,000 persons in 1988—an increase of almost 50 percent. No distinctions were made between appropriate and inappropriate hospitalizations.

■ Using published guidelines for accepted screening intervals, Woolhandler and Himmelstein found that 69 percent of uninsured women were inadequately screened by any of four tests, compared with 56 percent of insured women. For example, 39 percent of uninsured women had not received a Pap smear within 4 years or more, compared with 25 percent of women with any insurance. As in the findings by Short and Lefkowitz regarding well child care (see figures 5 and 6), these findings are interesting because preventive services are not usually covered by private insurance.

n.s. = not statistically significant.

^aWoolhandler and Himmelstein defined inadequate preventive care as a screening interval of at least one year longer than that recommended under selected guidelines (e.g., those of the Canadian Task Force on the Periodic Health Examination).

SOURCE: Office of Technology Assessment, 1992, based on studies cited. Full citations can be found in the list of references.

Location of Care

The most recent data on location of care come from the 1987 National Medical Expenditure Survey (NMES) (31). Of those with a usual source of care, uninsured and publicly insured patients were less likely than privately insured individuals to have a physician as their usual source of care, and over twice as likely to rely on hospital-based or other sources (figure 8). In an earlier analysis, the Robert Wood Johnson Foundation's 1986 access survey found that 24.3 percent of uninsured respondents reported the hospital emergency department or outpatient department to be the site of their most recent ambulatory visit (regardless of whether it was a usual source) compared with 13.2 percent of insured respondents (52).

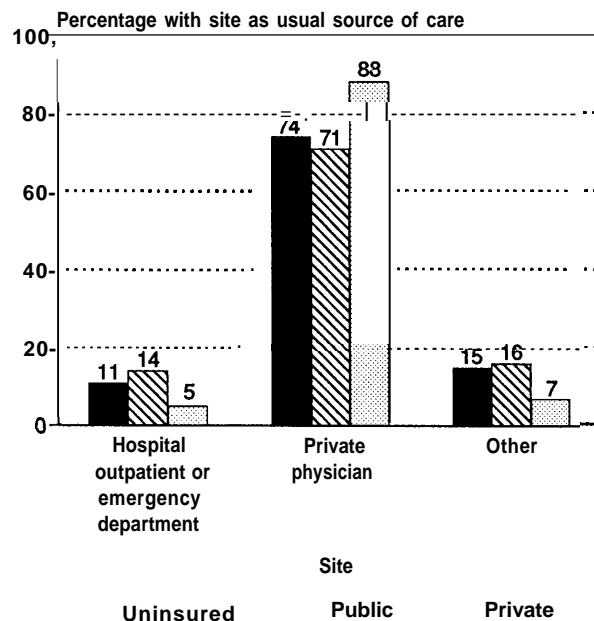
These figures on the site of the usual source of care may underestimate the reliance of uninsured persons on hospital-based ambulatory care because they are based only on individuals who claim to have a consistent source of care. In a study of children, the proportion of care received in the emergency department was twice as high if they reported not having a regular source of care (104). Even though uninsured individuals are relatively more likely to report the hospital outpatient department as a regular source of care (e.g., figure 8), they have reported about 20 percent fewer visits to this site than insured people (99).

Summary: Insurance Coverage and Use of Health Services

In Summary, there appear to be substantial differences in the use of personal health services by insurance coverage. Compared with privately insured individuals, persons covered by Medicaid see doctors as often or more frequently, and persons who are uninsured see doctors less frequently. Patients who are uninsured clearly have lower rates of inpatient hospital use than patients who are privately insured or covered by Medicaid. A number of studies suggest that these differences by coverage are not merely an artifact of sociodemographic characteristics or general health status. This section has also noted the apparent influence of insurance coverage on the location of care.

As compelling as these findings may be, it is important to keep in mind that factors other than insurance coverage influence utilization and that the use of services may not, in and of itself, improve

Figure 8—Usual Source of Health Care by Source of Health Insurance Coverage, 1987



SOURCE: L.J. Cornelius, K. Beauregard, and J. Cohen, "Usual Sources of Medical Care and Their Characteristics," *NMES Research Findings 11*, AHCPH Pub. No. 91-0042 (Rockville, MD: United States Department of Health and Human Services, Public Health Service, Agency for Health Care Policy and Research, 1991).

health. Much depends on other health-related behaviors, both by individual patients and by health care providers. Some services utilized may be unnecessary, inappropriate, or even harmful, and individuals may sometimes be better off without a health care visit. The next section discusses studies that examined influences of insurance coverage on the process of care: what happens during a health care visit.

DOES INSURANCE COVERAGE AFFECT THE PROCESS OF CARE?

In spite of evidence that access to the health care system may be compromised for individuals with inadequate insurance, until recently many felt that all patients received uniform care once initial entry was achieved. In the last few years, however, evidence has grown to suggest the contrary. This section summarizes the literature on variations in the process of care—that is, the nature, sufficiency, or intensity of activities undertaken by health professionals in caring for patients—as related to levels and types of insurance coverage. The research

Box B—Process of Care Measures Used as Potential Indicators of Insurance-Related Problems in Access

A number of process of care measures have been examined as indicators of potential insurance-related problems with access to health services. These process of care measures are listed and defined below, and an explanation is provided of how they have been hypothesized to indicate access problems.

Hospital length of stay is used as an indicator of intensity of resource use. Because there is far less likelihood of a hospital or physician being paid for the care delivered to uninsured or poorly insured patients, one would expect that, all things being equal, the length of a hospital stay would be shorter for uninsured patients than for insured patients with a similar condition. Uninsured patients who face paying the full costs of care out of pocket may also encourage shorter stays to save money. On the other hand, if an uninsured patient is admitted to the hospital with a more severe illness because he or she could not get care as an outpatient one might expect the length of stay to be longer.

Cost of care in the hospital has also been used as an indicator of intensity of resource use, although it may be more problematic than other indicators. Numerous factors affect reported costs of hospital care, including the way it is measured (e.g., whether overhead is included or costs are limited to direct patient care costs), and so reported differences in costs of care by insurance coverage should be viewed cautiously.

Number of procedures used is a third indicator of intensity of resource use which does not have the flaws of aggregate measures such as length of stay and costs of care. However, the number of procedures used is not an indicator of the quality or appropriateness of the care delivered

Types of procedures used can be used as an indicator of how aggressively a condition is treated. One would expect the uninsured or the poorly insured to have less access to high-cost, high-discretionary procedures, that is, those relatively expensive procedures that have not been universally accepted by the health care provider community.

Negligent adverse events. Adverse events are untoward events involving patients (148) (e.g., improper administration of medications, patient falls, or unanticipated poor patient outcomes such as death or readmission to the hospital). The study reviewed here defined negligent adverse events as those poor patient outcomes due to negligence on the part of a health care provider (25).

Patient satisfaction with the process of care is a valid indicator of the quality of interpersonal aspects of care and of patients' satisfaction with physicians' ambulatory care and physicians' and hospitals' inpatient care (148).

SOURCE: Office of Technology Assessment, 1992.

literature uses the following process measures which are explained in box B:

- length of stay in the hospital;
- cost of care in the hospital;
- number of procedures used;
- types of procedures used;
- negligent adverse events in hospitals; and
- patient satisfaction with the process of care.¹⁴

Research Findings

Table 2 presents an overview of the findings of multivariate studies conducted since 1980 that have examined the influence of insurance status on the process of health care. Figures 9 through 12 present variations in magnitude of observed relationships for the most recent analyses.¹⁵

¹⁴ The process measures used in the research literature on the potential impact of insurance coverage do not exhaust the list of potential process indicators. For example, OTA's 1988 report examined the validity and feasibility of using the following potential process indicators of the quality of care: adverse events in the hospital; evaluations of physicians' performance in the ambulatory setting; patients' assessments of the quality of care; and three external evaluations of poor physician performance (formal State disciplinary actions against physicians; sanctions against physicians, and malpractice compensation) (148).

¹⁵ The symbols used in table 2 approximate those in table 1. In table 2, a "+" indicates that the study findings supported the hypothesis that the process of care was potentially less conducive to health if the patient lacked insurance, or was covered by relatively "poor" insurance (e.g., Medicaid) than if the patient was covered by private insurance. A "-" indicates that the study found that, contrary to expectations, individuals without insurance, or with relatively poor insurance coverage, received more or potentially better care than the comparison group. A "O" indicates that the study found no statistically significant differences in the process of care between comparison groups. An "M" indicates that study results were mixed. The notation "n.a." indicates that the study did not examine the potential association of a particular difference in insurance coverage (e.g., uninsured vs. privately insured individuals) and the way care was delivered.

Table 2-Summary of Studies Examining Relationships Between Insurance Status and Indicators of Potentially Inadequate Process of Care

Indicator of potentially inadequate process/study	Insurance status/direction of effect		
	Uninsured vs. privately insured patients	Uninsured vs. Medicaid-covered patients	Medicaid-covered vs. privately insured patients
Shorter length of hospital stay			
Becker and Sloan, 1983	0 ^a	+	n.a.
Goldfarb et al., 1983	0	n.a.	n.a.
Martin et al., 1984	n.a.	n.a.	.
Kelly, 1985	+	+	n a.
Dowd et al., 1986	+	M	
Duncan and Kilprattick, 1987	+	+	n.a.
Melnick and Mann, 1989	+	+	.
Weissman and Epstein, 1989	+	+	.
Epstein et al., 1990	n.a.	n.a.	0
Braveman et al., 1991	+	+	+
Hadley et al., 1991	+	n.a.	n.a.
Lower overall costs of care			
Martin et al., 1984	n.a. ^c	n.a.	0
Melnick and Mann, 1989	+	+	
Braveman et al., 1991	+f	+	+
Fewer procedures overall (during inpatient care)			
Yergan et al., 1988	0 ^d	0	0 ^e
Weissman and Epstein, 1989	+	0	0 ^e
Hadley et al., 1991	+	n.a.	n.a.
Fewer high-rest and/or high-discretion procedures (during inpatient care)			
Wenneker et al., 1990	Mf g	Mh	+
Stafford, 1990	+	+	-
Hadley et al., 1991	+i	n.a.	n.a.
Stafford, 1991	+	n.a.	o
Fewer life-saving procedures			
Greenberg et al., 1988	+j	n.a.	n.a.
Higher rate of negligent adverse events			
Burstin et al., 1991	+k	n.a.	0
Lower satisfaction with health care			
Chen and Lyttle, 1987	+l	0	0
Robert Wood Johnson Foundation, 1987	+	n.a.	n.a.
Oberg et al., 1991	M	M	o

^aKey: + = less advantaged (first listed) groups had shorter length of stay than more advantaged (second listed) groups; - = less advantaged (first listed) groups had longer lengths of stay than more advantaged (second listed) groups; 0 = no statistically significant difference between groups; n.a. = comparison was not made in study.

^bA test of statistical significance was not conducted for differences between Medicaid-covered and privately insured patients.

^cKey: + = less advantaged (first listed) groups had lower overall costs of care than the more advantaged (second listed) groups; - = Less advantaged (first listed) groups had higher overall costs of care than the more advantaged (second listed) groups; 0 = no statistically significant difference was found between groups; n.a. = comparison not made in study.

^dKey: + = less advantaged (first listed) groups got fewer procedures than the more advantaged (second listed) groups; 0 = no statistically significant difference was found between groups; n.a. = comparison not made in study.

^eA exception was that significant differences between patients covered by Medicaid-covered and privately insured patients were found by hospital type.

^fKey: M = study results were mixed; + = less advantaged (first listed) groups got fewer high-cost and/or higher discretion procedures than did the more advantaged (second listed) groups; 0 = no statistically significant difference was found between groups; n.a. = comparison not made in study.

^gStatistically significant for two of three procedures.

^hStatistically significant for one of three procedures (angioplasty).

ⁱResults were consistent for five selected high-cost, high-discretion procedures (see figure 9). For findings of "not abnormal" (i.e., potentially unnecessary) biopsies, results were mixed, but, overall, uninsured patients had fewer "not abnormal" biopsies.

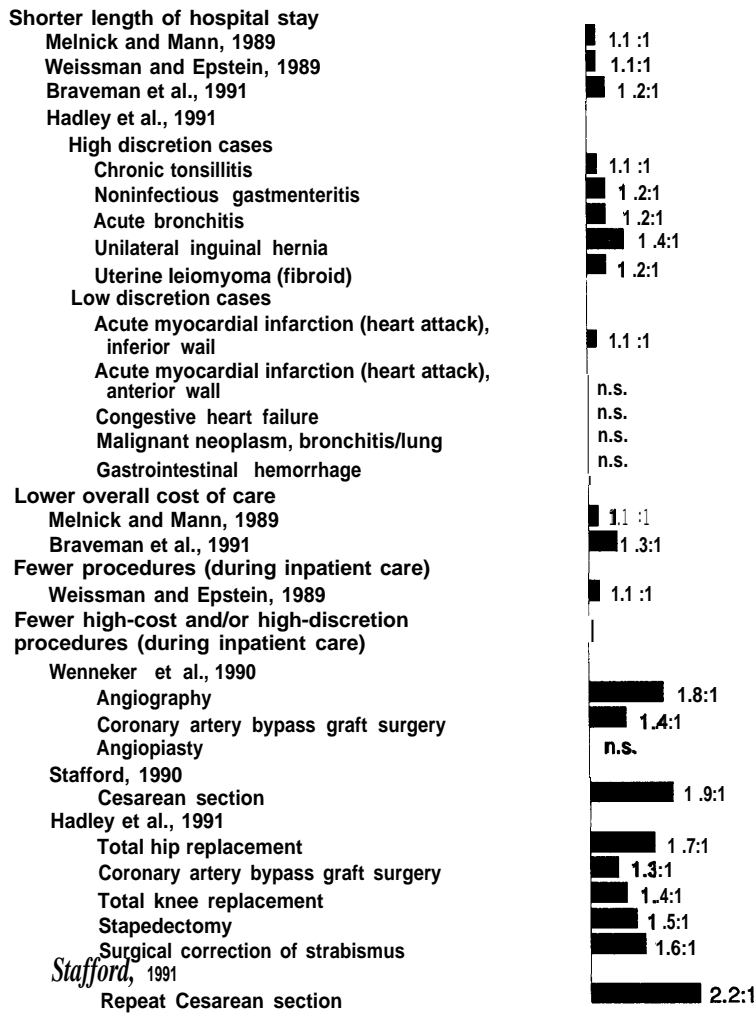
^jKey: + = less advantaged (first listed) groups got fewer potentially life-saving procedures than did more advantaged (second listed) groups; n.a. = comparison was not made in study.

^kKey: + = less advantaged (first listed) groups experienced a higher rate of negligent adverse events than did the more advantaged (second listed) groups; 0 = no statistically significant difference between groups; n.a. = comparison not made in study.

^lKey: + = less advantaged (first listed) groups was less likely than the more advantaged (second listed) groups to report that they were satisfied with health care received; M = results were mixed; 0 = no statistically significant difference between groups; n.a. = comparison not made in study.

SOURCE: Office of Technology Assessment, 1992. Full citations are included in the list of references at the end of this background paper.

Figure 9—Potentially Inadequate Process of Health Care as Measured by Intensity of Resource Use: Ratio of Uninsured to Privately Insured Patients



In the study by Hadley and colleagues, lengths of stay for uninsured patients who were admitted for renditions for which there is typically uncertainty about the necessity for a hospital admission (so-called "high-discretion" diagnoses) were from 12 percent to 38 percent shorter than for privately insured patients admitted for high-discretion diagnoses.

■ Among patients ages 35 to 44 in the study by Wenneker, Weissman, and Epstein, those who were uninsured had 6.7 angiographies^a per 100 admissions and those with private coverage had 15.3 angiographies per 100 admissions.

■ in Stafford's earlier study, 29 percent of women with private insurance, compared with 19 percent of women who were "self-pay" and 16 percent of women who received care under California's indigent Services program, delivered their children by a Cesarean section (C-section). Stafford's findings suggest that even potentially inappropriate procedures such as C-sections may be used at higher rates in response to financial incentives.

n.s. = not statistically significant.

aAn angiography is a test to detect heart muscle and valve abnormalities and atherosclerotic blockages of the coronary arteries, in which a catheter (tube) is used to squirt dye into the heart chambers and coronary arteries while x-ray pictures are taken.

SOURCE: Office of Technology Assessment, 1992, based on studies cited. Full citations can be found in the list of references.

The weight of the evidence indicates that *uninsured patients stay fewer days in the hospital than do privately insured patients, even with controls for patient condition and other factors (41,42,61,82,95, 177) (table 2).*¹⁶ Studies using the most recent data find differences in length of stay ranging from 1.1 to almost 1.4 times (18,61,95,177; figure 9). Hadley and his colleagues extended their work by examining differential lengths of stay among diagnoses in which there would be varying levels of provider

discretion in the decision to admit to the hospital (61). In Hadley's study, *uninsured patients stayed fewer days than did privately insured patients (ratios ranging from 1.1: 1 to 1.4:1) in all five high-discretion diagnoses (chronic tonsillitis, noninfectious gastroenteritis, acute bronchitis, unilateral inguinal hernia, uterine leiomyoma [fibroid]), but in only one out of five low-discretion diagnoses (acute myocardial infarction in the inferior wall) (61; figure 9).*

¹⁶ Yergan and his colleagues also found differences, with self-pay and Medicaid pneumonia patients having shorter lengths of stay than patients covered by Blue Cross, but these differences disappeared when the specific hospital and patients' race were taken into account (192).

Figure 10-Potentially Inadequate Process of Health Care as Measured by Negligent Adverse Events and Patient Satisfaction: Ratio of Uninsured to Privately Insured Patients



■ in an analysis of data from the Harvard Malpractice Study, Burstin and colleagues found that 40 percent of the adverse events suffered by uninsured patients in New York State in 1984 were deemed to be due to negligence. In contrast, 20 percent of the adverse events among privately insured patients were found to be due to negligence. However, few patients in either group (3 percent of both uninsured and privately insured patients) suffered an adverse event.

■ When individuals who had had an emergency visit were surveyed for the Robert Wood Johnson Foundation national access survey, 6 percent of uninsured individuals and 5 percent of insured individuals reported being “not at all satisfied” with their most recent visit. More strikingly, when people who had been hospitalized were asked about their level of satisfaction with their most recent hospitalization, 10 percent of uninsured people and 4 percent of insured people reported that they were “not at all satisfied.”

SOURCE: Office of Technology Assessment, 1992, based on studies cited. Full citations can be found in the list of references.

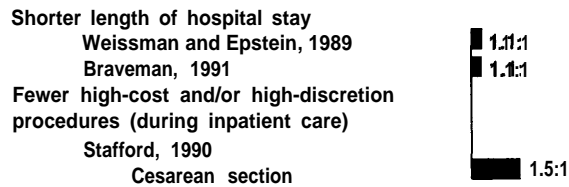
As expected, *uninsured* patients have been found to have shorter stays than patients covered by *Medicaid* (11,18,82,95,177) (table 2). Also as might be expected, the magnitude of the differences is somewhat smaller than the differences between uninsured and privately insured patients (figure 11).

Contrary to some expectations, studies that have compared *Medicaid-covered patients* with those with *private insurance* find that patients covered by private health insurance have shorter hospital stays than patients covered by Medicaid, even when adjustments have been attempted for patient health status and other factors (11,41,46,89,95,177) (table 2). However, the differences in length of stay between Medicaid-covered and privately insured patients are small (ratios of 0.87:1 to 0.99:1 [figure 12]).

Similar to findings for length of stay, *uninsured* patients have been found to have lower costs of hospital care than *privately insured* patients, suggesting that uninsured patients may get less intensive care (18,95) (table 2). Melnick and Mann found that uninsured patients had direct patient costs per admission that were 1.07 times lower than those of insured patients (95), and Braveman and her colleagues found total charges to be almost 1.3 times lower for uninsured than for privately insured newborns (18). Comparisons of Medicaid patients and those otherwise insured showed mixed results (table 2).

One potential explanation of the differences by payer in lengths of stay and costs of hospital care is that poorly insured or uninsured patients might receive equivalent services but in a shorter period of

Figure 1 I—Potentially Inadequate Process of Health Care: Ratio of Uninsured to Publicly Covered Patients



■ Weissman and Epstein found that self-pay or free care (uninsured) individuals in Boston-area hospitals had an average adjusted length of stay of 5.36 days, compared with an adjusted length of stay of 5.87 days for patients whose stay was covered by the Medicaid program.¹⁷

¹⁷The length of stay was adjusted for diagnosis related group, age, sex, number of diagnoses, presence of mental illness as a second diagnosis, and weekend admissions.

SOURCE: Office of Technology Assessment, 1992, based on studies cited. Full citations can be found in the list of references.

time.¹⁷ In one study that investigated this possibility, *uninsured* patients were found to undergo 1.1 times fewer procedures than *privately insured* patients (177) (figure 9).

Studies examining differences in the overall number of procedures used for uninsured v. privately insured patients have been complemented by studies examining differences in the rate of *high-discretion* and *high-cost procedures* by insurance status. As might be expected, these studies have typically found that *uninsured persons* are usually less likely than *privately insured patients* to undergo high-cost and/or high-discretion procedures (e.g., angiography, coronary bypass grafts, total knee replacements) (58,61,129,130,183) (table 2). In the more recent studies, differences ranged from 1.3: 1 to 2.2: 1 (depending on the procedure) (figure 9).

Studies of high-discretion and/or high-cost procedures comparing patients covered by *Medicaid* with those covered by *private insurance* have found no differences (129,130) or that patients with Medicaid coverage get fewer such procedures (129,183) (figure 12).

Among the most potentially troubling effects of insurance status on care in the hospital is the possibility that uninsured patients may be the recipients of *negligent care* more often than those with insurance. In forthcoming analysis of data from the Harvard Malpractice Study (69), Burstin and her colleagues explored the distribution of negligent adverse events among more than 30,000 patients hospitalized in New York State in 1984 (25). While the overall incidence of negligent adverse events was low, the likelihood of a negligent adverse event was found to be more than twice as high among

uninsured patients than among *privately insured* patients (figure 10); there were no differences between patients covered by *Medicaid* and privately insured patients (figure 12). Burstin and her colleagues note that:

...many providers and health policy experts tolerate our patchwork system of financing health care by relying on the assumption that a system of intricate cross-subsidies guarantees that the uninsured receive the same quality of care as those with insurance (25).

While it is the only study of its kind and it may be limited in its application to other locations and sources of data, the study by Burstin and colleagues raises questions about this critical assumption.

Differences in *satisfaction* among patients with different levels of insurance coverage have received little research attention. Those studies that have been conducted have typically found that *privately insured* individuals report being more satisfied with the health care they receive than do *uninsured* respondents (27,103,114) (table 2) sometimes by large margins (figure 10).

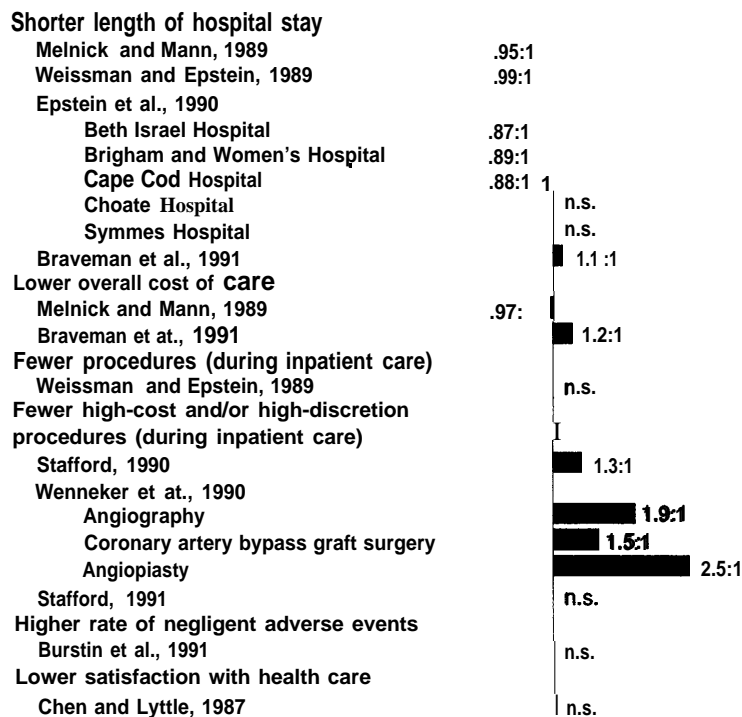
Neither Chen and Lyttle nor Oberg and his colleagues found differences in satisfaction between *publicly* and *privately insured* patients (27,103).

Summary: Insurance Coverage and Potentially Inadequate Process of Care

In summary, there is considerable evidence suggesting that the activities of health professionals in caring for patients may vary in relation to the insurance status of the patient. When other factors potentially related to differences in the process of

¹⁷Depending on the payment arrangements, delivering equivalent services in a shorter period of time may or may not affect the cost of care. In general, much of the costs of care can be explained by variations in length of stay (95).

Figure 12—Potentially inadequate Process of Health Care: Ratio of Medicaid to Privately Insured Patients



■ After adjustments for a number of factors, including hospital characteristics and patient's diagnosis, Melnick and Mann found that patients covered by Medicaid stayed 4.5 percent longer than privately insured patients. Similarly, Medicaid-covered patients cost 3.1 percent more per case than did privately insured patients.^{a,b} The reasons for such differences remained unclear. ^c

■ Burstin and colleagues found that the rate of adverse events (injuries suffered as a result of medical management) that could be attributed to negligence (i.e., failing to meet the standards expected of the typical medical practitioner) did not vary significantly between Medicaid and privately insured patients. Twenty-nine percent of such injuries occurring among Medicaid patients were attributed to negligence, compared with 20 percent of such injuries occurring among privately insured patients. When other factors were taken into account, the apparent differences in rates between Medicaid-covered and privately insured patients was not statistically significant.

■ in the Robert Wood Johnson Foundation national access survey analyzed by Chen and Lyttle, 23 percent of privately insured individuals, compared with 26 percent of publicly insured individuals, expressed lack of complete satisfaction with their most recent visit to a clinician. This difference was not statistically significant.

n.s. = not statistically significant

^aAs Melnick and Mann acknowledge, true differences in hospital costs and charges, and the extent to which these differences are related to differences in source of payment, can be difficult to determine, in part because different payers use different payment methodologies. For example, Medicaid may pay hospitals on the basis of a prospectively determined per diem rate, while Blue Cross may pay discounted charges or costs, and commercial insurers may have paid full charges. Melnick and Mann's analysis of differences by payer was potentially better than most because the researchers selected from a State using an "all-payers system" with a uniform reimbursement methodology. The State also mandated narrow differences in cost-to-charge ratios across hospital departments. Both of these factors lead to more reliable estimates of patient-level costs, but the findings may be difficult to generalize across States.

^bThis finding can be contrasted to the results shown earlier in figure 9, in which uninsured (self-pay) patients had shorter stays (by 9.1 percent) than privately insured patients.

^cIn exploring the data to attempt to understand these differences in costs, Melnick and Mann found that Medicaid patients tended to be treated in "more expensive" (i.e., teaching) hospitals. It was unclear whether this occurred because patients covered by Medicaid sought out such hospitals or because teaching hospitals tend to serve the areas in which Medicaid patients live.

^dThe response used in the analysis was the "percent not completely satisfied overall with most recent visit."

SOURCE: Office of Technology Assessment, 1992, based on studies cited. Full citations can be found in the list of references.

care are considered, and a variety of measures are used, uninsured individuals are from slightly less likely to more than twice as likely to receive less intensive or, in one case, worse care than are individuals who are privately insured. No studies found that uninsured individuals received more intensive or potentially "better" care than privately

insured patients. Clearly, the body of this work suggests strongly that insurance coverage plays a role in decisions to order procedures or otherwise use health care resources. It is important to note, however, that, as with variations in utilization, variations in the process of care do not lead inevitably to variations in the quality of the care that

Box C—Health Outcomes Used as Potential Indicators of Insurance-Related Problems in Access

A number of health outcome measures have been examined as indicators of potential insurance-related problems with access to health services. Health outcome measures that can be useful in this area of research do not just measure whether a patient is in poor health, but whether that health outcome is at least potentially associated with a lack of timely and effective care. The adverse health outcomes that have been used in studies reviewed in this background paper are listed below, along with explanations of how they might be caused by access problems, and notations of measurement issues specifically associated with the indicators. There are few, if any, health outcomes that are indisputable measures of differences in the provision of care based on ability to pay.

Avoidable hospitalizations are hospitalizations that can be avoided if ambulatory care is provided in a timely and effective manner. Avoidable hospitalizations are sometimes measured in terms of the rate of admission for specific avoidable hospital conditions (AHCs) (e.g., ruptured appendix, cellulitis [acute, spreading inflammation of deep sub-skin tissues, caused by various bacteria], diabetic coma, and asthma [179]), and sometimes in terms of professional judgments (using systematic criteria) that specific hospitalizations might have been avoidable if appropriate ambulatory care had been provided (e.g., 14). Because using avoidable hospitalizations as an indicator of an adverse health outcome involves some judgment there may be disagreement among professionals as to whether a specific hospitalization is avoidable.

Severity of illness on hospitalization parallels avoidable hospitalizations as a measure of adverse outcomes because it attempts to measure whether the use of timely and effective ambulatory care may differ by insurance coverage. Presumably, patients who receive timely and effective care outside the hospital will be less severely ill than patients who did not receive such care. Nonetheless, none of the measures of severity available to researchers is ideal.

Various measures of severity of illness on hospitalization have been used in studies of the potential relationship between insurance coverage and health outcomes. These include: the Risk-Adjusted Mortality Index (RAMI), used in the study by Hadley and his colleagues (61); the rate of weekend admissions (61); and a measure of case mix severity based on expected length of stay per diagnosis related group (177). The RAMI, developed by the Commission on Professional and Hospital Activities, is a measure of expected in-hospital mortality rate based on actual in-hospital mortality rates for diagnoses, grouped by their diagnosis related group code, adjusted for patient age, race, sex, the presence of comorbidities (secondary diagnoses at time of admission), and the risk of death associated with comorbidities and the principal operative procedure (if any) (61).

A common problem with measures of severity of illness on hospitalization used in this research is the measures' construction from hospital discharge data, rather than from data collected on admission; thus, some of

is being delivered: "more" is not always better. But at least one study has suggested that the quality of hospital care provided to uninsured patients maybe lower, and uninsured individuals have been found to be less satisfied than those with public or private coverage with their care.

Differences in the process of care would be more compelling if those process differences could be linked directly to differences in patient health outcomes. Unfortunately, studies which attempt to demonstrate direct relationships between the activities of health professionals in caring for patients and the outcomes of that care in terms of patient health are scarce (148). However, as reviewed in the next section, studies that have investigated relationships between insurance coverage and patient health outcomes suggest that patient health can be ad-

versely affected by a lack of insurance, even after patients have gained access to care.

DOES INSURANCE COVERAGE AFFECT HEALTH STATUS?

This section considers evidence of the impact of insurance status on health outcomes. The types of patient health outcomes investigated have included (see box C):

- avoidable hospitalizations;
- severity of illness on hospitalization;
- hospital-related mortality;
- stage at diagnosis of disease;
- cancer survival rates;
- nursing home admissions;
- adverse outcomes for newborns (e.g., low birthweight, infant mortality).

the data may reflect conditions acquired during hospitalization. A more serious problem with all the measures is that they do not include physiologic information about patients; such information is only reflected indirectly in information such as comorbidities, age, and sex.

thing the rate of weekend admissions as an indicator of severity of illness presumes that only patients who are immediately in need of care-and thus more seriously ill-will be admitted on weekends. This presumption is likely to be true in the contemporary health care environment particularly among those who are uninsured.

Hospital-related mortality is an obvious indicator of an adverse health outcome. When properly adjusted for severity of illness on hospitalization, it suggests that the quality of care provided during the hospitalization of patients at interest was worse than that provided to other patients. But merely demonstrating that proportionately higher death rates occur among uninsured or poorly insured patients than among privately insured patients does not definitively indicate what might have happened during the hospitalizations to cause the deaths. As noted above, there are as yet no fully adequate techniques for adjusting for what is probably the most likely predictor of an in-hospital death, severity of illness on admission.

Researchers use late stage at diagnosis of disease in much the same way they have used avoidable hospitalizations and severity of illness on hospitalization to suggest potential outcomes of inadequate ambulatory care. The ability to pay for care that is associated with having adequate insurance coverage is presumed likely to encourage individuals or health care providers to use early detection services (e.g., Pap smears, blood pressure checks), and to encourage individuals to seek care when they detect a symptom Being diagnosed in the early stages of some diseases (but not all) contributes to higher chances for recovery and survival (see, e.g., 146,147,151).

Cancer survival rates that are higher among insured than uninsured or poorly insured patients likewise suggest that care (whether ambulatory or hospital-based) was provided on a more timely and effective basis to insured patients.

Nursing home admissions are analogous to avoidable hospitalizations. In the study by Soumerai and his colleagues, for example, there was an increase in nursing home admissions among serious chronically ill patients following a capon the number of prescription drugs; this suggested that ambulatory care (prescription drugs) was not delivered effectively (128).

Adverse outcomes for newborns include low birthweight, fetal malnutrition, death, and other indicators such as prolonged hospital stays. For example, low birthweight is a commonly used indicator of inadequate, or lack of, care during pregnancy (147). Of course, low birthweight may have many causes other than inadequate medical care (147).

SOURCE: Office of Technology Assessment, 1992.

Research Findings

Overview

A summary of studies that examine relationships between lack of insurance coverage-primarily the lack of private coverage-and health outcomes shows that a number of studies have found that adverse outcomes appear to be related to the lack of health insurance coverage (table 3). In these studies, uninsured¹⁸ patients have been found to be more likely than insured patients to:

- experience “avoidable” hospitalizations or other institutionalizations (that is, institutionalizations for conditions that might have been ameliorated on an outpatient basis) (14,128,179);

- be diagnosed at later stages of life-threatening diseases (54,62);
- be hospitalized on an emergency or urgent basis (14,61);
- be more seriously ill upon hospitalization (61); and
- die in the hospital, even after statistically adjusting for the patients’ health status upon admission (61,192,193).

The findings of Hadley and his colleagues and other research groups are particularly intriguing because they suggest strongly that effects of lack of insurance persist even after a person obtains access to care (e.g., in a hospital) (e.g., 61,192,193).

Two studies that have included an examination of the effects of providing *Medicaid coverage in*

¹⁸In one case, analyses for uninsured and Medicaid-covered patients are combined (62).

Table 3-Summary of Studies Examining Relationships Between Insurance Status and Adverse Health Outcomes

Indicator of potential adverse health outcome/study	Insurance status/direction of effect		
	Uninsured vs. privately insured patients	Uninsured vs. Medicaid-covered patients	Medicaid-covered vs. privately insured patients
Potentially avoidable hospitalizations or other institutionalizations			
Billings and Teicholz, 1990	+	+	+b
Soumerai et al., 1991	n.a	M ^c	n.a.
Weissman, Gatsonis, and Epstein, 1991	+	n.a	+
Greater severity of illness on hospitalization			
Emergency or urgent vs. elective admissions			
Billings and Teicholz, 1990	+d	+	+b
Hadley et al., 1991 ^e	Mf	n.a	n.a.
Higher clinical risk of mortality			
Hadley et al., 1991	Mg	n.a	n.a.
Higher case-mix severity			
Weissman and Epstein, 1989 ^h	O ⁱ	0	0
Higher hospital-related mortality			
Yergan et al., 1988	+j	n.a	n.a.
Hadley et al., 1991	Mk	n.a	n.a.
Young and Cohen, 1991	+	n.a	n.a.
Late stage at diagnosis on first presentation (cancer)			
Friedman et al., 1973	+l	0	+
Hand et al., 1991	+m	n.a	+
Lower rates of cancer survival			
Greenberg et al., 1988	On	n.a	n.a.
Higher rates of adverse outcomes for newborns			
Braveman, et al., 1989	+	n.a	n.a.
Haas et al., 1991 (low birthweight or prematurity) . . .	O ^o	0p	0p
Higher rates of low birthweight newborns			
Norris and Williams, 1984q	n.a. ^r	0	0
Howell et al., 1991	n.a	n.a	0s
Krieger et al., 1992	n.a	n.a	0t

^aKey: + = less advantaged (first listed) groups experienced more avoidable hospitalizations than did more advantaged (second listed) groups; M = findings were mixed; n.a. = comparison not made in study.

^bFindings apply to Medicaid vs. "all other insured" patients.

^cKey: + = Medicaid-covered patients who experienced a cap on the number of reimbursable medications (i.e., patients who were uninsured for some prescriptions) experienced an increase in nursing home admissions, but no increase in hospitalizations, after the cap. Study population was limited to low-income patients 60 years of age or older who in a baseline year had been taking 3 or more medications per month.

^dKey: + = less advantaged (first listed) groups were more likely than more advantaged (second listed) groups to be hospitalized on an emergency or urgent basis; M = findings were mixed; n.a. = comparison not made in study.

^eMeasure used was weekend admissions.

^fUninsured patients were from 11 to 27 percent more likely than privately insured patients to be admitted on weekends in 14 of 16 age-sex-race strata.

^gUninsured patients scored worse than privately insured patients on a risk-adjusted mortality index (RAMI) in 13 of 16 age-sex-race strata; n.a. = comparison not made in study.

^hThe case-mix severity index in this study was based on expected length of stay.

ⁱKey: 0 = no statistically significant difference between groups.

^jKey: + = less advantaged (first listed) groups were more likely than more advantaged (second listed) groups to die during or soon after a hospitalization; M = mixed results; n.a. = comparison not made in study.

^kHadley found higher mortality for uninsured patients in 10 of 16 age-sex-race cohorts.

^lKey: + = less advantaged groups were more likely than the more advantaged groups to be in later stage of cancer upon diagnosis; 0 = no statistically significant difference between groups.

^mStudy was conducted at the hospital level. Higher levels of late stage at presentation were associated with hospitals with higher proportions of poorly insured (i.e., Medicaid) or uninsured than privately insured patients.

ⁿKey: 0 = no statistically significant difference between groups. The categories "other" and "no" insurance were combined

^oKey: 0 = no statistically significant difference in birthweight or prematurity between groups.

^pThis finding applies to 1987 data, and not overall. The study was unable to judge whether this was truly a result of the program or merely reflected the enrollment of healthier women who were more motivated to seek prenatal care.

^qStudy compared patients covered by Medi-Cal with patients not covered by Medi-Cal. Medi-Cal is the name of California's Medicaid program.

^rKey: 0 = no statistically significant difference between groups in the rate of low birthweight babies; n.a. - comparison not made.

^sHowell and his colleagues found that infants born to mothers who were enrolled in Medicaid for 4 or more months were not significantly different from infants born to mothers living in high-income areas and not covered by Medicaid (and thus assumed to be insured). Howell and his colleagues interpreted this as a positive effect for Medicaid coverage.

^tComparison was between Medicaid patients in managed care settings (e.g., HMOs) and non-Medicaid patients in managed care settings.

SOURCE: Office of Technology Assessment, 1992. Full citations can be found in the list of references at the end of this background paper.

comparison to being *uninsured* have found that outcomes have been better for those covered by Medicaid than for those without any kind of coverage (table 3). However, studies have generally not found *Medicaid* coverage to be associated with better outcomes than *private insurance* coverage (table 3).

Known limitations of the Medicaid program have led to efforts to improve coverage by “managing” Medicaid-covered care more effectively,¹⁹ but several studies suggest that these efforts are as yet unlikely to find health-promoting differences between types of Medicaid coverage or between patients covered by Medicaid and uninsured patients (table 3). A study of the effectiveness of Medicaid managed care efforts is underway at the U.S. General Accounting Office.

Additional support for the hypothesis that a lack of insurance coverage affects health outcomes can be found in uncontrolled followup studies that found adverse health outcomes after patients lost public coverage (49,86a,87,96,112). For example, in a prospective study, Lurie and her colleagues found that, within six months of termination from Medi-Cal (California’s Medicaid program), indigent adult patients of the University of California-Los Angeles Medical Center with hypertension experienced a clinically significant increase in blood pressure, in comparison to groups that were not terminated (86a). Unlike studies using large databases with information collected for other purposes, Lurie’s study was able to trace individuals’ experience with seeking health services to their health outcomes. Seventy-two percent of the hypertensive patients whose diastolic blood pressures at followup were above normal had not found a regular provider, as compared with 45 percent of those with diastolic pressures below normal. Between 6 months and 1 year after termination, patients with hypertension who had been terminated from Medi-Cal improved

somewhat, but were not back to their baseline levels (87). Their general health declined (87).

The studies by Lurie and her colleagues are not definitive. For example, reasons other than lack of insurance coverage for not finding a regular source of care could not be ruled out. The study suffered in terms of research design because the UCLA researchers helped some particularly needy sick patients find care. In contrast to the study findings concerning hypertension, the researchers found no relationship between the ability to identify a regular provider of medical care and blood glucose control among patients with diabetes, and did not find significant differences between diabetics who were terminated and those who were not terminated from Medi-Cal.

Variations in Magnitude

In studies that examined adverse health outcomes potentially related to a lack of adequate *ambulatory care* (e.g., potentially avoidable hospitalizations; greater severity of illness on admission; and low birth weight), *uninsured individuals* have been found to be from no more likely (“n.s.”) to almost three times more likely to suffer adverse health outcomes than are *individuals who are privately insured* (figure 13). The magnitude of the effect may vary depending on the measure, the patient, patient condition, and the settings, although it is not possible to describe an exact pattern of relationships based on available research.

For example, Weissman and his colleagues examined patterns of “avoidable hospitalizations” and found that insurance status (uninsured vs. private) made no difference in the timing of hospitalizations for Massachusetts patients hospitalized with *ruptured appendixes* or *congestive heart failure* (figure 13; 179). On the other hand, in the State of Maryland, uninsured patients were more likely to be hospitalized for congestive heart failure (adjusted relative rate of 1.8 [179; data not shown in figure

¹⁹Precisely what constitutes managed care, and how to identify it, is elusive, and the definition continues to evolve. Managed care is now used as a general term for organized health care delivery systems that control and coordinate patients’ use of services, but it is also applied to a broad range of other arrangements. With tongue in cheek, one observer suggests that perhaps the best definition of managed care is “anything other than an arrangement in which the insurer pays all bills without question” (107). Health insurance and health delivery plans or systems that rely heavily on managed care principles may differ from traditional unmanaged indemnity plans in any of several broad areas, including: utilization management (e.g., preadmission certification, concurrent review, retrospective utilization review, second opinion, high-cost case management); choice of providers (e.g., patients may be limited to using a specific panel of physicians, and/or a gatekeeper physician channels patients to specialists); provider risk sharing; insurance carrier risk sharing (e.g., negotiated at-risk agreements with employers); and patient risk sharing (e.g., a more limited scope of benefits, cost-sharing). The most established form of a managed care payment and delivery system is the staff model health maintenance organization (HMO), but efforts have been made to introduce managed care principles into other kinds of payment and delivery systems. For example, State Medicaid programs have developed primary care case management programs, using a single physician to manage a patient’s care while retaining fee-for-service reimbursement principles.

Figure 13-Adverse Health Outcomes Potentially Associated With Inadequate Ambulatory Care: Ratio of Uninsured to Privately Insured Patients

Avoidable hospitalizations

Weissman, Gatsonis and Epstein, 1991 ^a

Ruptured appendix	n.s.
Asthma	1.4:1
Cellulitis (infection of deep tissues)	2.6:1
Congestive heart failure	n.s.
Diabetes I	2.8:1
Gangrene	2.3:1
Hypokaiemia (low potassium level)	1.6:1
Immunizable renditions b	2:1
Malignant hypertension	2.4:1
Pneumonia	1.6:1
Pyelonephntis (kidney infection)	1.5:1
Bleeding ulcer	1.6:1

Severity of Illness on hospital admission

Emergency (weekend) admission

Hadley et al., 1991 (all conditions) n.s. 1.3:1 ^c

Risk of dying

Hadley et al., 1991 (all conditions) n.s. 2.1:1 ^d

Higher case-mix severity

Weissman and Epstein, 1989 n.s.

Low birthweight or fetal malnutrition

Braveman et al., 1989 1.3:1

Haas et al., 1989 n.s.

■ in Weissman and Epstein's study of severity of illness on hospitalization, a case-mix severity index with a value greater than 1.0 was used to indicate that a group of patients entered the hospital with a distribution of cases that typically have longer-than-average lengths of stay, and are thus potentially more severe. Weissman and Epstein's study found that overall case-mix severity indexes were similar for different payers (1.00 for Blue Cross-covered patients and 0.97 for uninsured patients). However, the distribution of leading causes of hospitalization by condition or procedure varied by payer group.^e

n.s. = not statistically significant.

^aData from the Massachusetts arm of the study are shown. Similar, though slightly less dramatic, findings were found in Maryland hospitals.

^bThe immunizable conditions included whooping cough, diphtheria, tetanus, mumps, acute polio, and measles.

^cFindings were not significant in 3 of 16 age-sex-race strata; 1.3 represents the high end of the Significant results.

^dFindings were not significant in 3 of 16 age-sex-race strata; 2.1 represents the high end of the significant results.

^eFor example, DRGs associated with drug abuse, abortion, concussion and trauma, and pregnancy-were proportionally more common for uninsured Patients than for insured patients. The DRGs for Blue Cross patients represented a range of adult conditions and surgical procedures (miscellaneous ear, nose, and throat procedures, hysterectomy, coronary bypass graft).

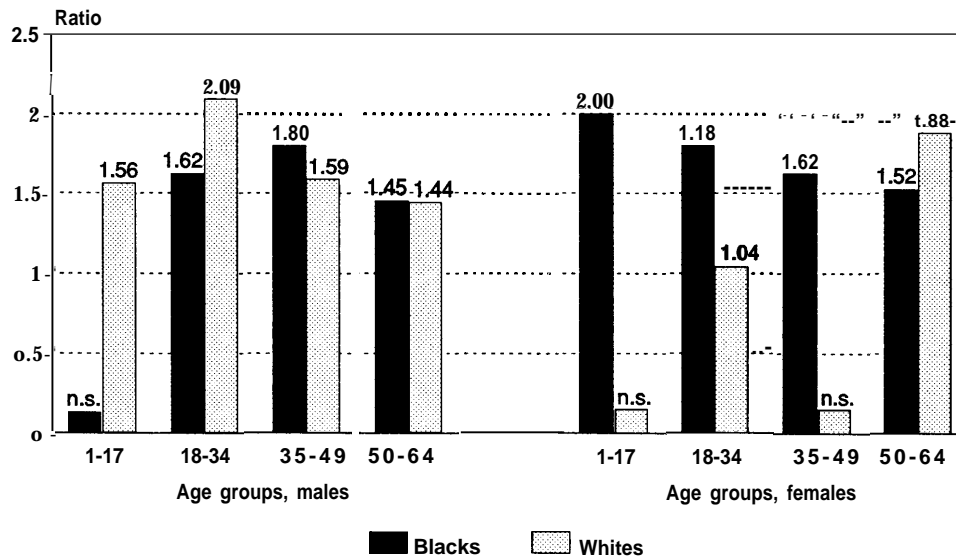
SOURCE: Office of Technology Assessment, 1992, based on studies cited. Full citations can be found in the list of references.

13]). Furthermore, there was variation in avoidable hospitalizations for Massachusetts (and Maryland) patients with a range of other conditions. These conditions included those for which one would expect insurance coverage to have an impact on gaining timely access to appropriate care (figure 13). For example, uninsured patients with bronchial congestion might delay seeking ambulatory care because they couldn't afford a doctor visit, thinking that they had just a chest cold, when in fact they were developing severe pneumonia. Uninsured patients with diabetes may be more likely than insured patients with diabetes to reduce their use of insulin in order to save money.

The study by Hadley and his colleagues suggests that potential lack of appropriate ambulatory care varied depending on combinations of patient demographic characteristics (age, sex, and race) (figure 14). By the time uninsured individuals in Hadley's study arrived at the hospital, they apparently had from no more times to 2.09 times the risk of dying

of privately insured patients. It is important to note, however, that severity of illness in this study was based on post-hoc analyses of the patients' risk of dying using hospital discharge data. Such data are notoriously inadequate as sources of information about health status. The data typically are not collected until the patient has already been in the hospital for at least 24 hours and could reflect differences in hospital quality of care (148). A potentially greater problem is that the severity of illness index used in study by Hadley and his colleagues (the Risk-Adjusted Mortality Index, or RAMI) could merely be indicating that privately insured patients were relatively more likely than uninsured patients to be admitted for less serious diagnoses and procedures; as noted in box C, the RAMI groups patients by diagnosis. Nevertheless, the findings for severity of illness based on the RAMI are consistent with findings that uninsured patients are more likely to be admitted on weekends, which also suggests that they may be more severely

Figure 14-Relative Regression-Adjusted Coefficients for Risk-Adjusted Mortality Index on Hospital Admission, by Gender, Race, and Age, Uninsured vs. Privately Insured Individuals



n.s. = not statistically significant.

SOURCE: Office of Technology Assessment, 1992, based on data in Hadley et al., 1991.

ill when hospitalized (61). As Hadley points out, scheduled admissions are more likely to occur during a weekday because of private physicians' schedules, hospital staffing patterns, and patient preferences; conversely, urgent admissions are more likely to occur on a weekend, among both uninsured and insured patients:

Although many scheduled admissions are for serious conditions, we posited that, *on average*, they are less urgent or immediately life-threatening than the average weekend admission (61) (emphasis added).

Hadley and his colleagues' note that they are dealing with averages is important; exceptions do occur (e.g., some privately insured people may want to be hospitalized on a Sunday night rather than a Monday morning so that tests can be done in the hospital rather than on an outpatient basis). In the current health care environment, however, most privately insured patients are unlikely to be hospitalized until the very day of a procedure or medical treatment. For example, any required preoperative tests (e.g., electrocardiogram; chest x-ray; blood tests) are likely to be done on an outpatient basis if

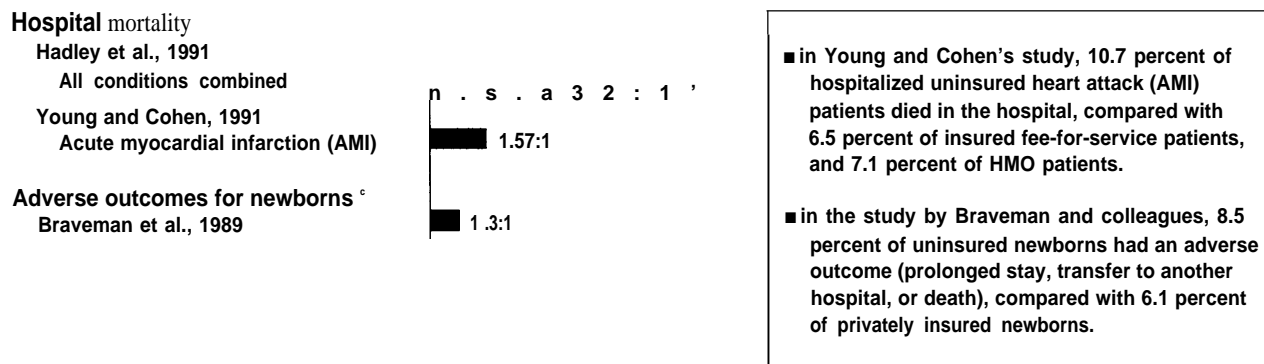
possible. But any differences on average would be likely to appear in Hadley and his colleagues' analysis, given the data base of almost 600,000 patient records that they used (61).²⁰

Few studies have examined whether patient health following a hospitalization varies in relation to insurance coverage. Recent studies of that nature find that *uninsured* individuals are from no more likely to 3.20 times more likely to suffer an adverse health outcome (e.g., death) during a hospitalization than are *privately insured* individuals (figure 15). For example, Hadley and his colleagues found higher in-hospital mortality for uninsured patients in 10 of 16 age-sex-race cohorts (61). While some of the findings related to inpatient mortality may be explained by a greater likelihood of insured patients being discharged to nursing homes or hospices where death may occur shortly after release from the hospital, when Young and Cohen compared in-hospital death rates to mortality rates 30 days after hospital discharge, they found little difference (193).

Findings related to *privately insured* and *publicly covered* patients' health outcomes are mixed (rang-

²⁰ The variety of insurance-related incentives and procedures that may be brought to bear on health care decisionmaking (e.g., utilization review, prehospital certification for admission, concurrent review), and the way they make interpretation of the effects of insurance coverage *per se* difficult, are discussed in appendix C of this background paper, "Conceptual Framework and General Methodological Issues."

Figure 15-Adverse Health Outcomes Potentially Associated With Inadequate Inpatient Care: Ratio of Uninsured to Privately Insured Patients



n.s. = not statistically significant.

HMO = health maintenance organization.

^aNot significant in 6 of 16 age-sex-race groups.

^b3.2 represents the high end of the significant results; 1.2 represents the low end of the significant results.

^cThe adverse hospital outcome in this study consists of either a prolonged hospital stay for the newborn, transfer to another hospital or long-term care facility, or death.

SOURCE: Office of Technology Assessment, 1992, based on studies cited. Full citations can be found in the list of references.

ing from ratios of 0.45:1 to 4.70:1 (figure 16). Generally, however, these comparisons support the hypothesis that publicly covered patients' health may suffer as a result of inaccessible or relatively poorly delivered care. It is important to note, however, that Medicaid-covered patients may receive care in a variety of facilities that may have widely varying access and quality of care (e.g., clinics in nearby major teaching hospitals vs. community clinics), or they may not be able to receive care at all (e.g., 135,143,154). The two studies that examined the effects of apparent variations in outcomes of ambulatory care by source of insurance coverage were not able to measure or control for the receipt of or site of any received ambulatory care (177,179; see table E-3 in appendix E).

Overall, it is important to note that the body of work on the relationship between insurance coverage and patient health outcomes is not definitive. Much more work is needed to sort out reasons for variations in care that may have nothing to do with ability to pay for care, or that may interact with ability to pay for care.²¹ As Weissmm and his colleagues point out in discussing their findings on avoidable hospitalizations:

As with any adverse outcome, avoidable hospitalizations [AHCs] may have multiple causes, and it follows that alternative hypotheses may exist to explain higher rates of AHCs among vulnerable populations. For example, increased incidence or prevalence of disease among the uninsured and Medicaid populations, perhaps because of poor environmental or social factors, may result in higher rates of hospitalization. . .

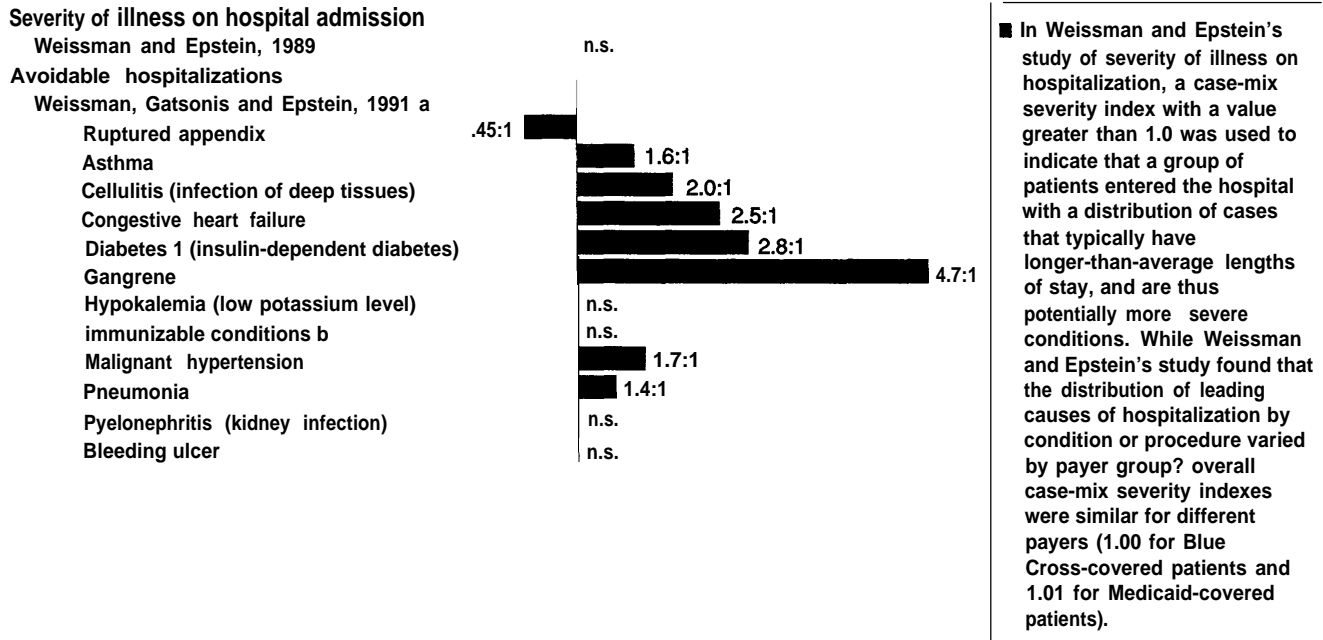
The frequency of avoidable hospitalizations may also be affected by patients' compliance, by their patterns of seeking care, or by providers' perceptions of barriers to ambulatory care. . . [P]hysicians may have lower thresholds for admitting disadvantaged patients for AHCs if they think that outpatient followup might be unreliable. . .

We relied on expert medical opinion to select our list of [avoidable hospital] conditions. Although we undertook a substantial effort to ensure the face validity of AHCs with our consensus panel and clinical reviewers, they could be further validated empirically by confirming whether a preponderance of admissions for AHCs (relative to other conditions) were preceded by untimely or poor-quality ambulatory care. . .

As with any research based on large-scale medical utilization, our data sources and methods have certain limitations. The diagnostic codes from the

²¹ Some, but not all, of the Patient Outcome Research Team (PORT) studies being supported under the USDHHS's Agency for Health Care Policy and Researches (AHCPR's) Medical Effectiveness activities will be examining the role of payer in variations in utilization and, perhaps, outcomes (50s). These studies are still underway and the strengths and limitations of available databases are still being tested. Many of the PORTS are using only Medicare data, and there will not be an opportunity to examine differences associated with which variation in source of coverage.

Figure 16-Adverse Health Outcomes: Ratio of Publicly Covered to Privately Insured Patients



n.s. = not statistically significant.

^aData from the Maryland arm of the study are shown.

^bThe immunizable conditions included whooping cough, diphtheria, tetanus, mumps, acute polio, and measles.

^cDRGs differentiating Medicaid from other payers included those that primarily apply to children under 18 years (e.g., bronchitis and asthma, tonsillectomy). The DRGs for Blue Cross patients represented a range of adult conditions and surgical procedures (e.g., miscellaneous ear, nose, and throat procedures, hysterectomy, coronary bypass graft).

SOURCE: Office of Technology Assessment, 1992, based on studies cited. Full citations can be found in the list of references.

hospital discharge abstracts may not be completely reliable because of clinical disagreement or human error, and miscoding would affect the frequency of AHCs. . .

Certain of our estimates maybe imprecise because of limitations in the data bases. For the statistical analysis we used the median household income of the patients' zip codes. Although the technique has been used in other published work, this ecological approach may lead to biased estimates. . . We also used the codes of "self-pay" or "free care" to designate uninsured patients. . the principal payer may change eventually (e.g., to Medicaid). . In spite of the large databases, the frequencies for four of our individual conditions. . were very low. . the estimated confidence intervals²² for these conditions may be unreliable. . .

Our population estimates by insurance status are derived from the CPS (Current Population Survey). . and the small samples could lead to imprecise or unstable estimates.

In addition, the CPS provides only broad categorizations of insurance. . .

Finally, we note that our data showed similar rates of hospitalization for uninsured persons and those with private insurance in Massachusetts, where other national data suggest that rates are lower for the uninsured. . Also, the regulatory environment in Massachusetts may cause patterns of hospital use to be atypical (179).

Similarly, in discussing their findings on the apparently higher rate of mortality among uninsured than among privately insured hospital patients, Hadley and his colleagues comment:

Although it is possible that this observed difference in in-hospital mortality is due to underprovision of needed medical services to hospitalized uninsured patients, the difference also could be due to differences in severity of illness between the uninsured and privately insured that are not reflected fully in

²² A confidence interval communicates the range of values consistent with the study data, that is, the range of values that would still be statistically significant within the chosen level of statistical significance. As a hypothetical example, in addition to reporting that a difference in length of stay of 2 hospital days was statistically significant, the researcher would report that a difference of anywhere from 1.3 to 3.3 days would be statistically significant.

the Medicare case-mix index and the RAMI. It is also possible that privately insured patients are more likely than uninsured patients to be discharged to another facility, such as a nursing home or a hospice, where death might occur shortly after discharge from the hospital (61).

Researchers in this field are understandably reluctant, therefore, to conclude definitively that, in the United States, lack of health insurance can make a substantial difference in ultimate health outcomes.

Summary: Insurance Coverage and Health Outcomes

In conclusion, the literature provides evidence that there are important differences in health outcomes associated with variations in insurance coverage (e.g., mortality, late stage at diagnosis of cancer). In the view of many, this conclusion should be sufficient to encourage the expansion of health care coverage to those who are uninsured. It is important to note, however, that the evidence on differences in health outcomes between *uninsured* and *privately insured* individuals is less consistent and compelling than the evidence on utilization and process. Few studies have been conducted relating health outcomes to private insurance coverage. One reason may be that studies using health outcomes as an endpoint are somewhat more difficult to conduct than studies using utilization measures (e.g., number of physician visits). For the same reasons that “outcome” studies are more difficult to conduct, they are difficult to interpret with confidence. Even more variable and difficult to interpret than comparisons of uninsured and privately insured individuals are the findings of studies relating public coverage (e.g., Medicaid) to health outcomes.

Thus, there is considerable variation among studies, with some studies finding no effect for lack of health insurance, and others finding that the magnitude of observed relationships between payer and health outcomes varies in currently unknown ways by patients’ condition, age, race, sex, income and site of care (17,54,62,72,83,136). These issues are discussed more fully in appendix C in this background paper, “Conceptual Framework and General Methodological Issues.

One would have to assume, however, that the differences in utilization and processes of care discussed above either were not valid or were largely irrelevant to patient health in order to conclude that

there are no health effects consequent to being uninsured or having poor coverage. Such a conclusion seems unwarranted. Precise process-of-care mechanisms potentially leading to the adverse outcomes (i.e., “smoking guns”) have, however, not yet been identified.

RESEARCH IMPLICATIONS AND NEXT STEPS

OTA found that the research base addressing whether insurance makes a difference is both small and methodologically underdeveloped. Available data from insurance claims, State agencies, and individual hospitals and health care providers are flawed. The data are typically not designed to address whether health insurance makes a difference. Further, elements of insurance coverage—such as specific services covered—may vary widely across individuals, and specific coverage information is typically not available to researchers using large databases. Finally, the health care and health insurance environments are constantly changing and it is difficult to be sure that the findings of past studies are relevant to today.

Some basic questions are yet to be answered: How much difference does insurance make? How much difference does insurance make relative to other factors? If patient health suffers from lack of insurance, what are the mechanisms by which that happens? How can those mechanisms be changed? Certainly, there can be greater exploration of the interactive effects of noncoverage and coverage factors in access and health. Further, not all insurance coverage may be equally valuable. There is no indication that all of what is available or received under current insurance plans is necessary to improve health.

OTA’s final report in connection with this assessment will address in greater depth issues related to the design of benefit packages on the basis of effectiveness and cost-effectiveness. In addition to examining the issues generically, OTA will examine evidence for the utilization and health effects of various levels of patient cost-sharing for physician visits and inpatient care, and of providing benefits for mental health services, substance abuse treatment services, and preventive services. In the meantime, the literature review for this background paper makes clear research efforts could be designed to track, at least selectively, the health effects of the

increasingly numerous cost containment strategies that often have the effect of reducing access to care, of concurrent efforts aimed at expanding access (e.g., Medicaid expansions; expansions of community health centers), and of the impact of becoming uninsured or underinsured on individuals and fami-

lies. Prospective studies of changes in ability to pay for care would be useful. Advances in measurements of physiological health status, measurements of the process of care, and computerization of patient records (e.g., 97) should also help to enhance research capabilities.